



Chapter 6:

The Economics of Chesapeake Forests



KEY FINDINGS

- Each year, forests in the Chesapeake Bay watershed provide at least \$24 billion just from the ecological services carbon sequestration, flood control, wildlife habitat, and recreation. The value of these are rarely accounted for in private and public decision-making or in developing incentives for retaining and managing forestland.
- Residential development requires four times more community expenditures than forestland, making forest conservation a long-term economic advantage for local communities.
- Each Bay watershed resident uses an amount of forest products equivalent to harvesting more than two acres of forest each year, but 65% of this supply comes from forests outside the Bay watershed.
- Sustainably-managed forests provide both invaluable ecological services and important economic returns to communities in the Bay watershed.
- The forest products industry provides 140,000 jobs, \$6 billion in income, and a total industry output of \$22 billion to the Bay watershed economy each year.
- While large-scale commercial forestry in the Bay watershed will become increasingly concentrated in rural western Pennsylvania, southern Virginia, and western and southeastern Maryland, there are growing opportunities for small-scale forest management throughout the region.
- Waning owner interest, decreasing parcel size, and expanding development is shrinking the land base of the forest products industry.

ECOSYSTEM SERVICES: “GETTING MORE THAN YOU PAY FOR”



Forests are the largest portion of the Chesapeake Bay watershed’s green infrastructure—the natural life support system that sustains the environment and contributes to public health and quality of life. Whether in a city or rural area, ecosystem services or “ecoservices” are highly valued benefits constantly supplied by green infrastructure. Ecosystems services are so fundamental to life that they are easy to take for granted and so large in scale that it is hard to imagine that human activities could destroy them. Even though these services are inherently renewable, they require that we protect natural system productivity and diversity. Some of the most significant ecological services provided by forests include:

- Cleaning the air
- Filtering and cooling water
- Storing and cycling nutrients
- Conserving and renewing soils and soil fertility
- Habitat for pollinators
- Regulating climate
- Maintaining habitat and biodiversity
- Lowering residential and commercial energy use
- Protecting areas against storm and flood damage
- Maintaining hydrologic function¹

QUANTIFYING THE VALUE OF FOREST ECOSYSTEM SERVICES

Just as we expect economic capital to provide steady financial returns, natural capital provides steady environmental and economic returns in the form of ecosystem services for free. For example, forests provide services that the public spends millions of dollars on to reproduce. Air pollution control, flood mitigation, storm water management, and drinking water filtration are among these ecological services.

However, the public does not pay for most ecological services, so places little economic value on them. Instead, decision-makers tend to emphasize the value of forests only for human goods such as wood or paper products, which have been traded on the public market for centuries—resulting in dollar values that are both established and well understood. Many ecosystem services are beyond price, providing a source of cultural identity, of kinship with life, of learning, of evolutionary processes, and of soil, air, water, and biodiversity that have no engineered substitutes.

While very few ecosystem service valuations have been conducted in the Mid-Atlantic, studies from outside the region have shown

that ecoservices provide enormous cost savings to the public and highlight the potential benefits of forest conservation. Healthy natural lands like forests show a net gain in cost-benefit analyses. Natural areas that are relatively free from disturbance can produce 100 times the benefits that could be derived from converting the same landscape to another use. A seminal study estimated

the value of 17 basic ecoservices such as water supply, climate regulation, and erosion control. An estimate of the total annual global value was between \$18 and \$61 trillion, with a rough average of \$38 trillion, similar to the size of the global gross national product.² In addition, The Wilderness Society has estimated that the annual value of ecoservices from temperate and boreal forests in the

Ecosystem Services Provided by Forest Cover		
Ecological Service	Location	Annual Value Per Acre of Tree Cover
Air Pollutant Removal	Washington D.C. Area ¹	\$261
	Charlottesville, VA Area ¹	\$261
	Harrisburg, PA ¹	\$405
	Binghamton, NY ²	\$269
	Roanoke, VA Area ¹	\$265
	Washington D.C. ³	\$174
Biodiversity	Maryland ⁴	\$305
Carbon Sequestration	Chesapeake Bay Watershed ⁵	\$5-\$57
Recreation	Chesapeake Bay Watershed ⁶	\$131
Energy Savings	Washington D.C. ³	\$231
Stormwater Control (one-time savings)	Washington D.C. Area ¹	\$25,031
	Charlottesville, VA Area ¹	\$4,602
	Harrisburg, PA ¹	\$3,527
	Binghamton, NY ²	\$10,088
	Roanoke, VA Area ¹	\$11,406

Sources: 1. American Forests 2002, 2. American Forests 2004, 3. USDA FS / UFORE 2004, 4. Pimentel 1998
5. Birdsey 2005 / Chicago Climate Exchange 2006 / European Climate Exchange, 6. USFWS 2001

United States is approximately \$75 billion (in 2001 dollars). Climate regulation, food production, and waste treatment accounted for approximately 75% of this total.³

VALUE OF ECOSERVICES PROVIDED BY CHESAPEAKE FORESTS

Based on a study published by the Audubon Society, which considered only carbon sequestration, flood control, wildlife habitat, and recreation, the annual ecoservice value of Chesapeake forests ranges from \$10 to \$48 billion, with a conservative estimate of \$24 billion per year.⁴ Since this analysis does not include water quality, air quality, water storage, and other valuable services, this range is a considerable understatement of the total value of Chesapeake forests.

Furthermore, while residential, commercial, and industrial areas require public services, natural areas require little other than protection. Natural areas even reduce costs of public services like stormwater treatment facilities. Studies in 33 Bay watershed communities show that for every dollar of tax revenue raised by residential development, the median cost to support it is \$1.23. In contrast, the median cost of forest and farmland is \$0.32 per dollar of community revenue.⁵

Drinking water supply, carbon sequestration, and recreation are some of the most prominent and quantifiable ecoservices of Chesapeake forests and are highlighted as examples.

Clean Drinking Water

For most of the last 50 years, advancements in science and technology effectively treated most known contaminants in drinking water sources—providing United States citizens with some of the safest drinking water in the world. As a result, many communities have neglected policies that protect source water and instead rely on water treatment systems to deliver clean drinking water. Many of these systems now require upgrades to handle new standards and threats. There is evidence that some water supplies that require extensive treatment may pose public health risks. Recent findings are suggesting that chlorination and other chemical processes

used in water treatment are not benign and could lead to potential health problems. The Environmental Protection Agency, in 1998, estimated that necessary upgrades to the nation's water treatment systems would cost more than \$158 billion. Some cities, notably New York and Boston, with assertive forest protection programs are providing quality water with minimal filtration and treatment.

It is also clear that the more water sources are affected by impervious surfaces, production agriculture, and other intensive land uses, the harder and costlier it is to filter or treat drinking water.

A recent survey of water suppliers conducted by the Trust for Public Land and the American Water Works Association showed that treatment costs for drinking water go up when the amount of forestland and wetlands goes down. Approximately 50% of the variation in operating treatment costs could be explained by the percentage of forest cover in the drinking water source area alone.⁶

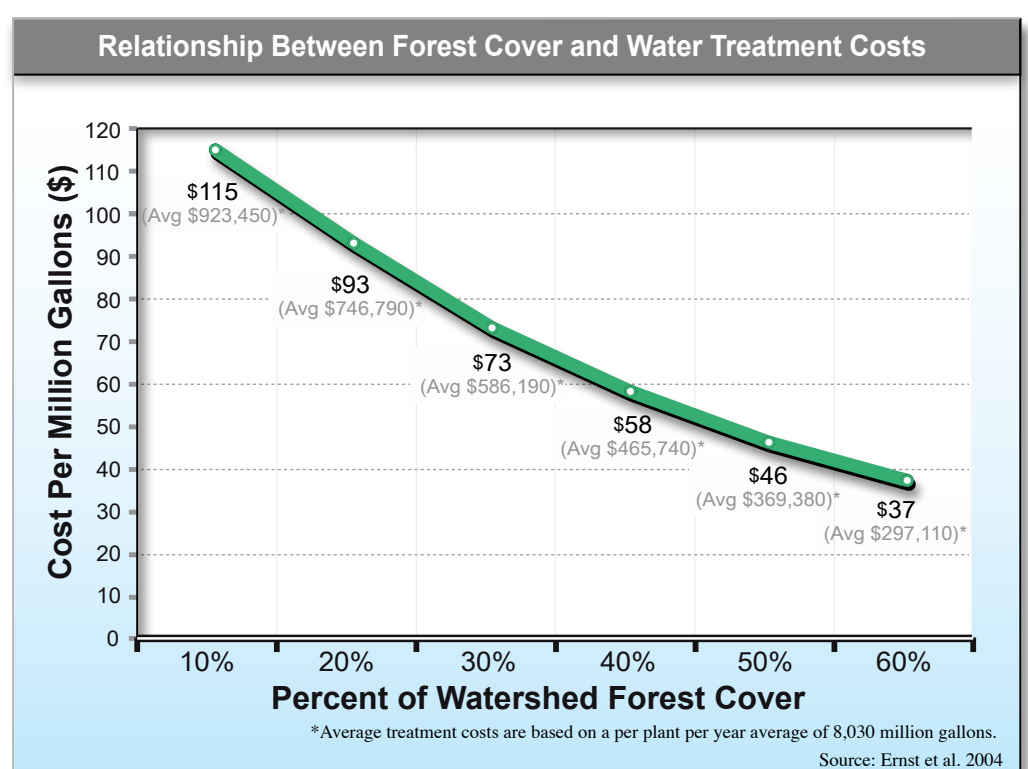
Carbon Sequestration

Internationally, industries and governments are growing more concerned about increasing levels of carbon dioxide and other greenhouse gases contributing to climate change. Globally, the average surface air temperature is expected to rise between 1°C and 3.5°C by the year 2100.⁷ Forests are a critical

component to mitigating climate change because they store carbon.

The economic value of Chesapeake forests for sequestering carbon could be immense. Based on the current value of United States carbon credits, the net value of publicly owned forests for carbon sequestration would be approximately \$25 million dollars per year. Using European prices, their value would be approximately \$310 million per year. European market prices are currently higher than in the United States because of Europe's involvement in the Kyoto Protocol and use of carbon dioxide emission caps for industries. Using management to increase carbon storage potential and expand forest conservation on private forestland could increase the value to the Bay watershed by \$81 million. The value could approach \$1 billion if we could attain the European market value.⁸

This impressive value is possible because Chesapeake forests are currently storing a net 17 million metric tons of carbon annually. Between 1990 and 2000, carbon stored in the Bay watershed accounted for 11% of the contemporary increase for the whole United States on just 3% of the land base. This means that Chesapeake forests may be more productive than any other area in the country.⁹ There are approximately 2 billion metric tons of carbon stored in the soil, plants, trees, forest floor, and dead woody material of Chesapeake forests.



Urban forests and soils also store large amounts of carbon, offering potentially large economic benefits. It is estimated that the urban forests in Baltimore, Maryland, and Washington, D.C., together store 22,500 tons of carbon annually.¹⁰

However, deforestation is threatening the carbon storage potential of Chesapeake forests. Forest loss led to a decline in storage of about 1.6 million metric tons of carbon per year between 1990 and 2000. This rate of loss is lowering the carbon sequestration value of forests by \$10 million annually and by much more using the European market value.⁸ The loss of forest to development also limits the overall amount of forestland that can be managed to increase carbon storage in the future.⁹

Also, carbon stored in living trees, shrubs, grasses, and other live vegetation (known as “biomass”) in Chesapeake forests has potential to provide an alternate and renewable fuel source for industries, universities, governments, and other groups. Today, wood and wood waste (such as bark, sawdust, and



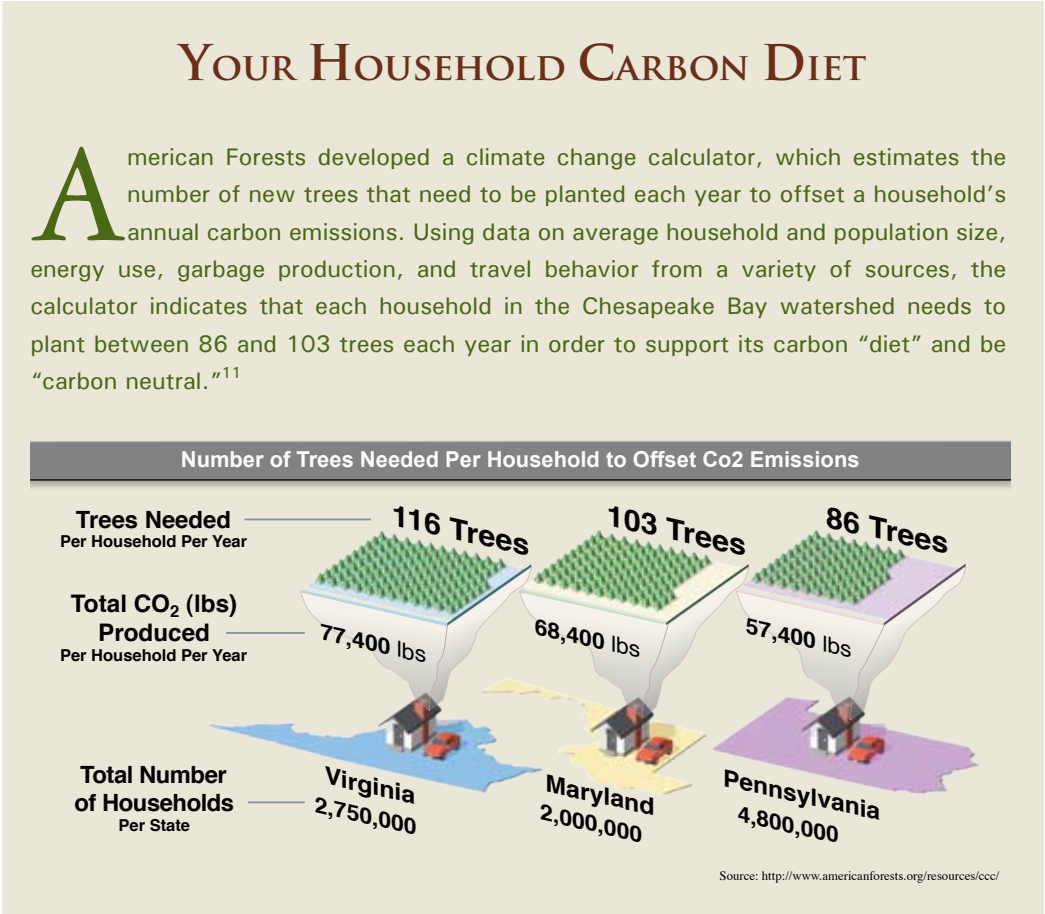
Photo: Lisa Gutierrez

wood chips) provides only about 2% of the energy used in the United States.

Recreation

Forest-related recreation generates income through entrance fees and by creating demand for equipment like camping, hunting, and fishing gear, and trip services like gas, food, and lodging. More than 15 million people fished, hunted, or viewed wildlife in the Chesapeake region’s forests in 2001 and contributed approximately \$3 billion to the regional economy.¹²

Surveys indicate that urban residents are willing to pay an additional \$1.60 per visit to a site that is “mostly wooded, some open grassy areas under trees” rather than “mowed grass, very few trees anywhere.”¹³ Trees in urban parks and recreation areas add a value exceeding \$2 billion per year for outdoor leisure and recreation experiences in the United States.¹⁴



THE FOREST PRODUCTS INDUSTRY

PUBLIC PERCEPTION VS. CONSUMPTION

Crop and livestock production are often the most noticeable industries taking place on the land. However, since the Chesapeake Bay watershed was first settled, people have depended on its forests to produce food, fuel, shelter, and other commercial products.¹⁵

The highly publicized political battles over logging and the spotted owl in the western United States have led many people to view tree harvesting as an environmentally damaging use of the land. When done poorly, this is certainly the case.

One problematic practice used for centuries and still used today on private land is to “cut the best, and leave the rest”—known as high grading. Professionals discourage removing all of the biggest, best, and most valuable trees. This method leaves only less fit or poorer quality trees to regenerate the forest. High grading not only reduces future economic return, but also reduces the overall health of the forest stand and eliminates wildlife food sources and important habitat features.



Photos: Don Outen and Eric Sprague

Which forest was recently logged? Answer: The one on the left.

However, economic motivations can be compatible with maintaining healthy forest ecosystems. Sustainable forest management considers the future health of the entire forest ecosystem, including wildlife, soil, and water resources as well as the valuable timber trees.

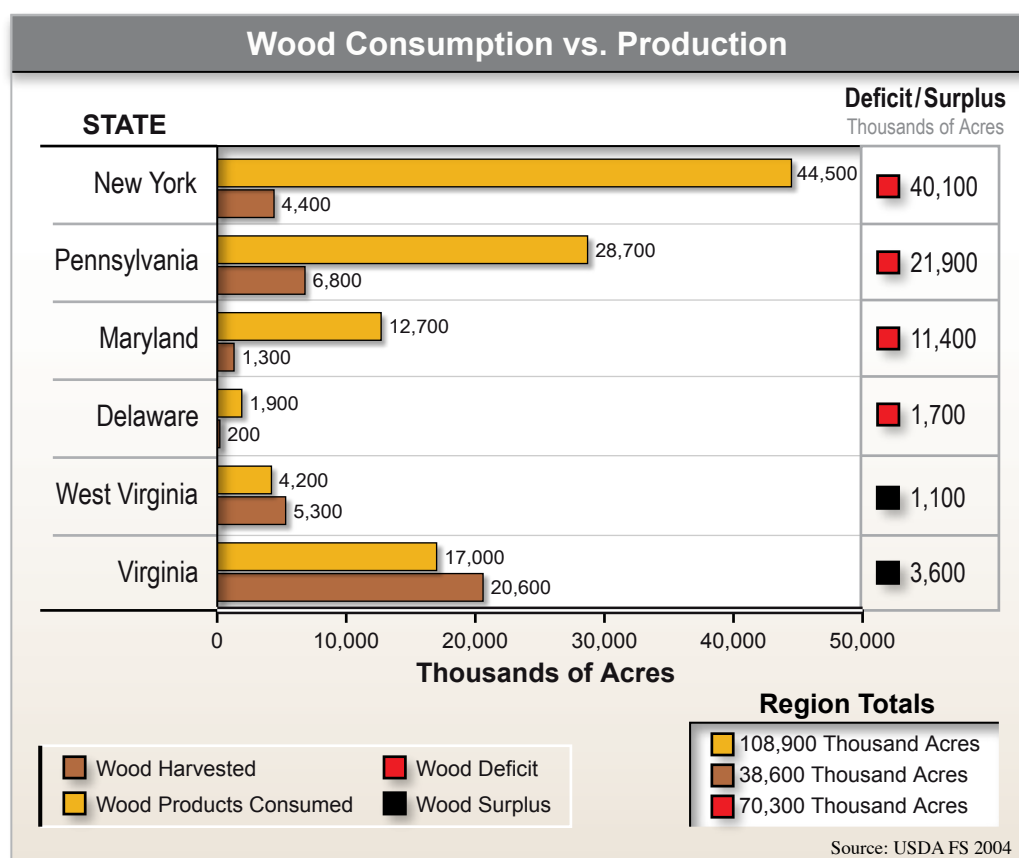
While the public perception of tree harvesting may have cooled in parts of the Bay watershed, the consumption of wood products has not. The average person in the Bay watershed uses an amount of forest products equivalent to the clearing of more than two acres of forest per year—2.5 times the European and 3.4 times

the world averages.¹⁶ The demand for forest products by residents in the Chesapeake region is three times the annual yield from forests in Maryland, Virginia, and Pennsylvania. Therefore, Bay watershed states rely on over 9 million acres of non-Chesapeake timberland to meet their annual needs.¹⁷

Importing so much wood passes the burden of sustainable management to other regions such as Canada’s Boreal Forest and the subtropical forests of Central and South America. These regions are often not subject to the same level of environmental and labor regulations that commercial and family forest landowners in the Bay watershed must follow.¹⁸ Increasing the regional production of wood products, while reducing overall consumption would allow Chesapeake forest owners to maintain their land through new sources of income and would enhance the sustainability of forests and the environment in the Bay watershed and around the globe.

VALUE OF THE FOREST PRODUCTS INDUSTRY

According to output from the economic model IMPLAN, the forest products industry in the Bay watershed directly employs approximately 140,000 people and supplies \$6 billion in labor and proprietor income with a total industry output (sales) of more than \$22 billion to the Bay watershed economy each year.ⁱ Half of the total economic output is derived from secondary wood manufacturing—the production of goods like furniture, containers, and toys. Nearly 40% is



ⁱ Economic data was compiled using the IMPLAN categories “output” and “employment.” Income was calculated using the sum of “employee compensation” and “proprietors income.”

ⁱⁱ New York, Delaware, West Virginia, and Washington, D.C. were not included

THE MANY USES OF WOOD

Most people are conscious of their every day use of many wood products like furniture, paper, chopsticks, and packaging. However, wood is also used in countless other commonly used products like concrete, rubber, paint, food preservatives, adhesives, photographic film, make-up, rayon fabrics, gum, and soap.



generated from primary manufacturing—the processing of logs and related products into lumber, veneer and plywood, pulp, and other products. The remainder comes from direct timber management and harvesting activities. Although the forest products industry represents just 2% of total sales and 1% of all employment across the Bay watershed, the industry is particularly valuable to many local economies and private forest owners.¹⁹

Regional Profiles

The Chesapeake Bay Program has identified the locations of economically important forestland across the Bay watershed.ⁱⁱ The analysis considered not only the potential economic gain from forest harvest operations, but also the long-term economic sustainability of forest management and the local importance of the timber and wood products industry. Local data helped to characterize site conditions such as slope, tree species, forest density, and soil productivity. Regional factors focused on forest fragmentation, population density, and historic timber harvests. In general, highly ranked forests contain commercially valuable species, productive soils, few management constraints (such as steep slopes and wetlands), large areas, a low surrounding population density, and a significant forest products industry in the area.²⁰

Economic Impact of Chesapeake Forestry			
Chesapeake Bay Watershed	Workers Employed	Income (million dollars)	Sales (million dollars)
	139,438	5,610	22,614

Source: IMPLAN 2001

Pennsylvania

The highest valued forest in Pennsylvania occurs in the western portions of the Appalachian Plateau, and the Ridge and Valley regions. These areas have relatively high proportions of forestland to other land cover types and are dominated by economically valuable species like black cherry and oak species. These regions also contain the largest average size of forest tracts and the lowest human population density in the commonwealth.

Over half of Pennsylvania’s timberland is located inside the Bay watershed and accounts for more than 40% of the commonwealth’s net timber growth and removal.²¹ The forest products industry is the fourth largest manufacturing sector in the state. The portion of the industry in the Bay watershed employs more than 60,000 people contributing more than \$2 billion in income and around \$10 billion in total sales annually to the economy.¹⁹ Nationally, Pennsylvania is the number one producer of hardwood lumber and has the largest amount of hardwood timberland.²²

The Pennsylvania Chesapeake forest products industry represents 6% of all sales of manufacturing goods and 4% of all employment in rural counties.ⁱⁱⁱ Rural, low-income Sullivan County derives 6% of all jobs and 17% of all sales from the Chesapeake forest products industry in the commonwealth.

The industry is also important to the central Appalachian counties of Wyoming, Clinton, and Snyder, where it makes up more than 20% of all sales and 4% of jobs.¹⁹

Virginia

Virginia’s highest economically valued forest is located in the south-central and southeastern portions of the commonwealth. These regions have large amounts of commercially valuable oak, pine, and in particular loblolly pine. These regions have been long-valued for their timber production and have low population densities, allowing the industry to remain viable.

Similar to Pennsylvania, Virginia’s portion of the Bay watershed is valuable to its overall forest products industry. Around half of Virginia’s timberland, live tree volume, lumber volume, and net tree growth and removal occur in the Bay watershed.²¹ Across the commonwealth, the forest products industry ranks first in manufacturing jobs. The Virginia Chesapeake forest products industry accounts for approximately 36,000 of the 405,000 statewide manufacturing jobs in Virginia.²³ The industry also provides more than \$1 billion in income and \$7 billion in sales annually to the Virginian economy.¹⁹

Many counties are dependent on their local timber industry for employment and economic well being. For example, the Chesapeake

Economic Impact of Chesapeake Forestry by State			
STATE	Workers Employed	Income (million dollars)	Sales (million dollars)
Delaware	4,300	100	600
Maryland	16,300	600	2,400
New York	10,300	300	1,500
Pennsylvania	66,200	2,300	9,700
Virginia	36,300	1,400	6,600
Washington D.C.	200	10	20
West Virginia	6,000	100	700

Source: IMPLAN 2001

ⁱⁱⁱ Counties not present in a United States census-defined 2000 Metropolitan Area.

forest products industry in Virginia provides 5% of the total income and jobs in the low-income rural Nottoway County. Fifteen percent of jobs in Charlotte County depend on the Chesapeake industry.¹⁹

Maryland

The most economically valuable forestland in Maryland occurs in the far western panhandle and the lower Eastern Shore. The western forests are dominated by oak and hickory, while pine is more prevalent on the Eastern Shore. These two high-value zones also occur far enough away from the heavily developed central portions of the state for a thriving timber industry to remain viable. Only a small portion of western Garrett County and the coastal Eastern Shore are outside of the Bay watershed. Therefore, Chesapeake forests in Maryland are especially important to the future of the state's forest products industry. Timberland area, live tree volume, lumber volume, and net tree growth in Maryland's Bay watershed area all represent more than 80% of the state's total resource.²¹

Jobs in the forest product industry account for 9% of Maryland's total manufacturing employment.²⁴ Every job directly involved in wood harvesting or production supports two additional jobs in value-added services such as furniture production.²⁵ In addition, Maryland's forest products industry generates eight times the economic output and five times the direct employment of the well-known seafood industry.¹⁹

While all manufacturing industries make up a small percentage of the state's economy, forest product industries are important to many rural economies.²⁴ The forest products industry is the fifth largest manufacturing

industry statewide, but it ranks first in western Maryland and second on the Eastern Shore. The forest products industry is particularly valuable to rural, low income Garrett County, where the industry makes up 20% of all jobs and economic output.¹⁹

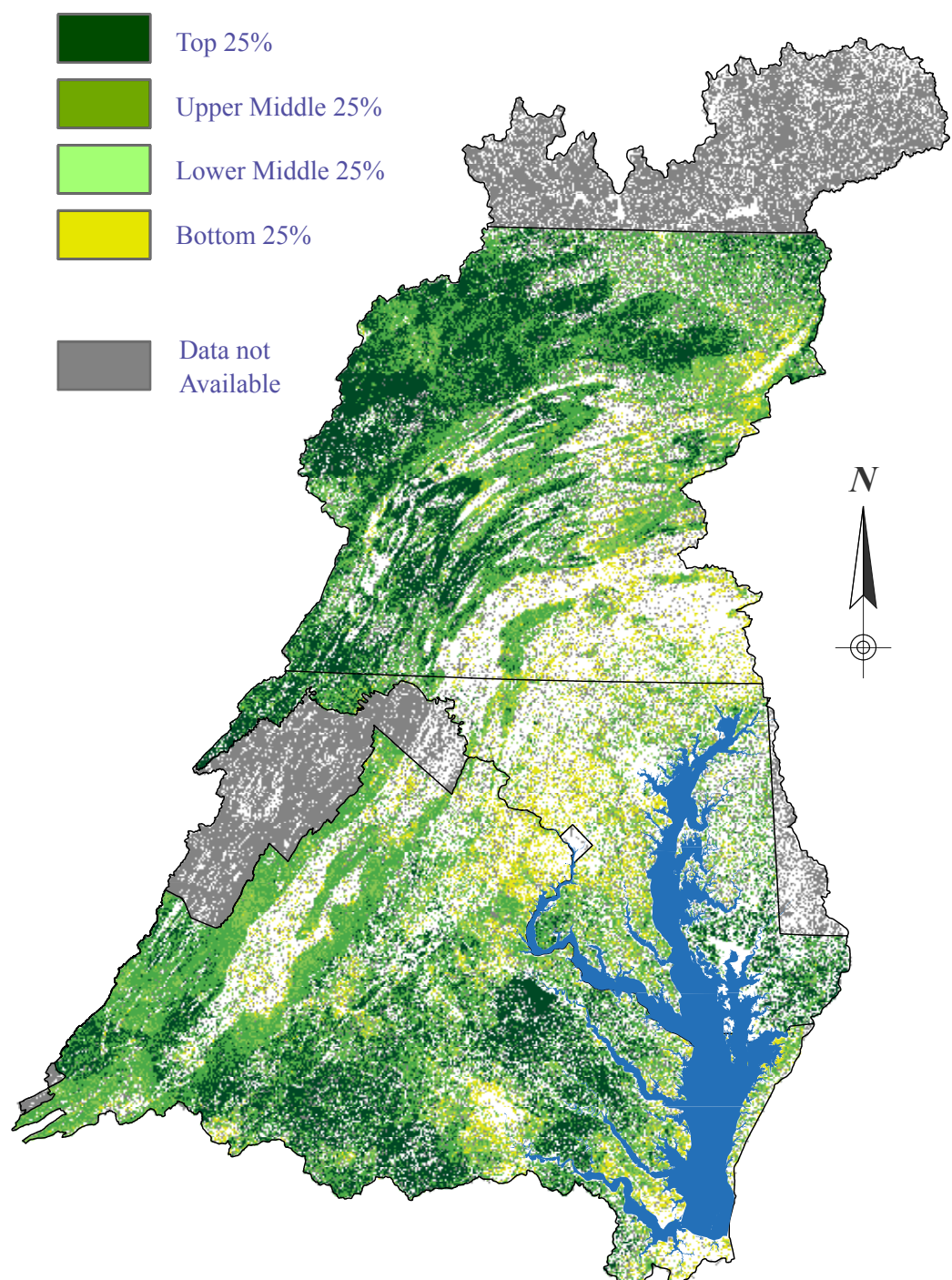
CHANGES AFFECTING THE FOREST PRODUCTS INDUSTRY

A growing number of forces are reducing the viability of the forest products industry. As forest parcel size, owner interest in management, and the amount of industry-

owned lands decrease, management costs rise and revenue possibilities dwindle. Sawmills soon become too expensive to run and close down forcing loggers to travel farther to deliver wood, increasing costs still further. Additionally, the costs of paperwork, permit processing, and management plans are fixed and do not decrease greatly as the size of forest blocks decrease.

The ability of states in the Chesapeake Bay watershed to sustain a wood-based manufacturing economy is declining. Innovations that are tailored to small land owners, the use of forest enhancement practices such as thinning, and the support of small diameter and traditionally low value

ECONOMICALLY VALUABLE FORESTS RESOURCE LANDS ASSESSMENT



INTERPRETATION: Economically valuable forestland has long-term economic potential and is an important source of income and jobs for local communities. In general, highly ranked forests are those that contain commercially valuable species, productive soils, few management constraints (such as steep slopes and wetlands), large areas, low surrounding population density, and a significant forest products industry and infrastructure in the area.

SOURCE: Chesapeake Bay Program 2005

species like red maple may be required to maintain this industry.²⁴

Less Forest to Manage

Land can only be managed for sustainable forestry as long as it remains forest. After a century of expansion and growth, the amount of forestland in the Bay watershed is declining.²⁶ Between 1982 and 1997, development accounted for approximately 70% of the loss, but agriculture and other land uses also played a considerable role.²⁷

At the same time, nearly 900,000 acres of fallow cropland and pastureland reverted to forestland. Those lands left to revert to forestland are often of lower soil quality or degraded by decades of tillage and chemical use, meaning that the ability of the forest to reach its full potential has probably also declined. In addition, the vegetation that initially reclaims abandoned farmland, including invasive species, often has lower economic value.²⁸

More Owners and Smaller Parcels

The consulting firm U.S. Forest Capital estimates that half of all American timberland has changed hands in the past decade. In the Chesapeake Bay watershed, the number of family forest owners has risen by nearly 25% over the past ten years—an average of 23,000 new forestland owners each year. In addition, the average size of forested landholdings decreased from 21 to 16 acres per family forest owner. This trend, known as “parcelization,” is likely to continue in the future, especially because more than 70% of family forestland owners are more than 55 years old.²⁹

Forest management objectives may change significantly once land has been parcelized. This is certainly true in the Bay watershed, where family forestland owners are increasingly interested in aesthetics and privacy and less interested in timber production. Land investment now ranks as a more important objective than timber harvesting.²⁹ These parcelized forests are in effect becoming personal green spaces maintained as amenities, rather than working forests.²⁸

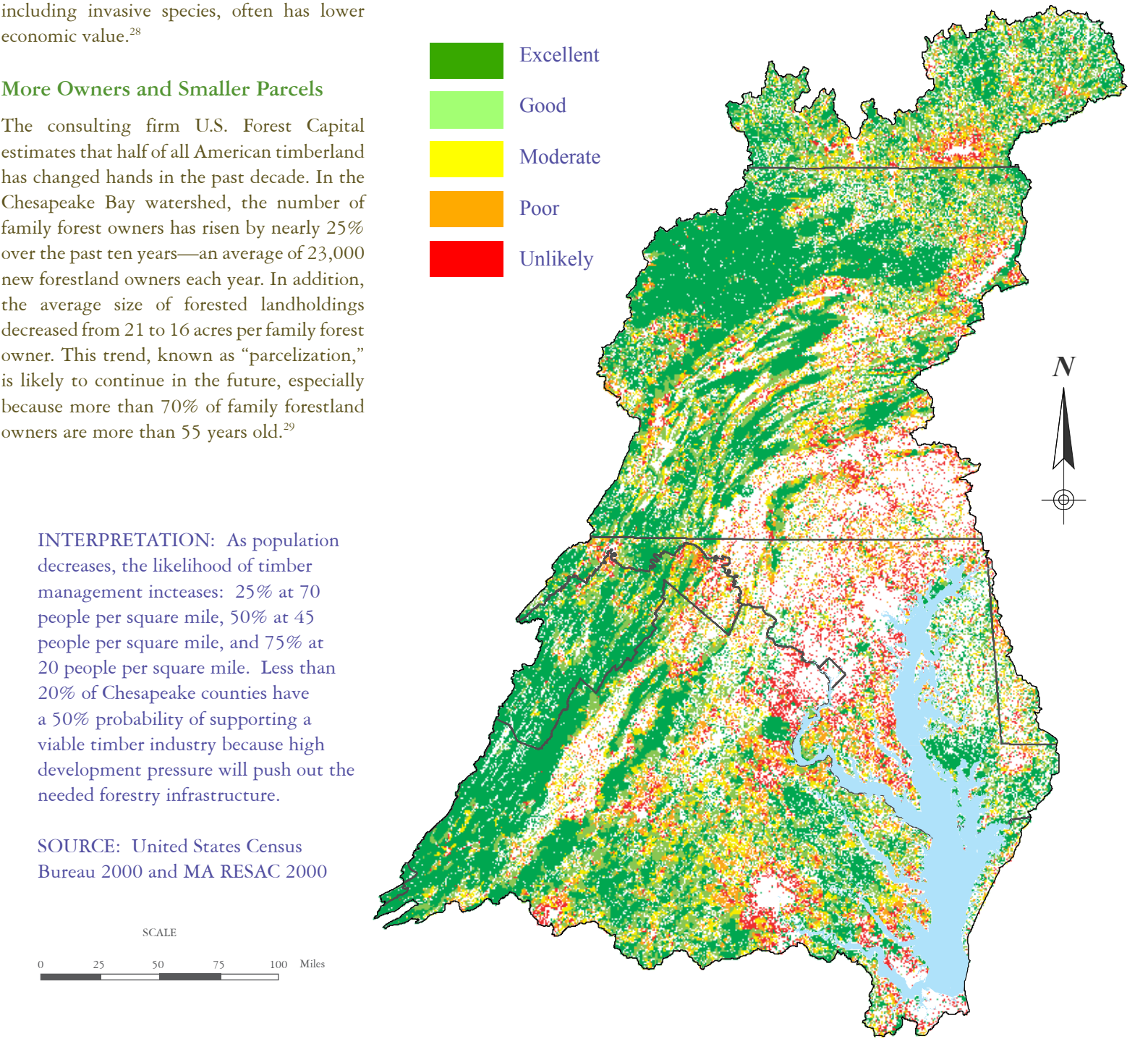
For new forest owners who are still interested in growing wood products, parcelization may mean that the size of their holdings is too small to make logging economically viable. When

the size of a forest property drops below 50 acres, the average per-acre cost of preparing for a timber sale, harvesting the trees, and growing a new forest often goes up, making owners less likely to manage their land for timber.³⁰ This has important implications for Chesapeake forests, where 41% of forestland and 94% of all owners involve parcels of less than 50 acres.²⁹

Expanding Development

As development expands (particularly low-density, automobile-dependent sprawl), the economic viability of forestry decreases. This is due to the direct loss of forests to make room for homes, roads, and stores, and the

POTENTIAL FOR FOREST HARVESTING



SUSTAINABLE FORESTRY: MARYLAND'S CHESAPEAKE FOREST LANDS

In 1998, the Chesapeake Forest Products Corporation (CF) determined that its 278,000 acres of forestland, stretching across the Delmarva Peninsula in Delaware, Maryland, and Virginia, were no longer essential to its business. In April of 1999, the corporation disclosed a plan to sell the land to the Hancock Timber Resource Group (HTRG), an investment management firm that holds millions of acres of timberland across North America and abroad. Along with a change in ownership, the long-term fate of the forest was uncertain, given its location for second home development.

In Maryland, more than 58,000 acres of CF lands were located on the Eastern Shore, widely distributed over five counties, and 460 separate tracts. Collectively, the tracts represented the largest singly owned property in Maryland. In addition to supporting a forest-based economy of importance to the entire state, these lands contained more than 11,000 acres of unmodified wetlands, habitat for game species and migratory birds, endangered and threatened species, and watersheds identified as critical to maintaining water quality in the Chesapeake Bay.

The HTRG consulted with The Conservation Fund (Fund) to investigate the acquisition of these sensitive lands. The Fund wanted to secure the forest's long-term ecological and economic benefits and called for a sustainably managed forest to support the local economy and provide revenue for on-site restoration projects. At the same time, the Fund worked closely with the Maryland Department of Natural Resources (MD DNR) and the Richard King Mellon Foundation (RKMF) to structure an offer and transfer the land to state ownership.

The deal closed in September 1999, providing for:

- 28,237 acres to the state of Maryland, including the most environmentally sensitive land and land adjoining existing state property, for \$16.5 million
- 29,935 acres to the RKMF for \$16.5 million, to be transferred to the state of Maryland after the Fund and its partners developed a sustainable forestry management plan

A short time after the sale was executed, a consensus emerged to create a management plan for sustainable forestry practices. The plan aimed to meet environmental and socio-economic goals, while providing a land management model for the public and private sectors. The Fund worked closely with The Sampson



Photo: Ted Weber

Group of Alexandria, Virginia, to develop the initial plan.

When the plan was complete, the Fund signed a three-year contract with Vision Forestry, LLC, to manage the 29,000 acres held by the RKMF, which then donated the land to the state. The donation was made with the following agreements:

- The land will remain in perpetual public ownership.
- The land will be subject to a sustainable forest management plan, long-term supply agreement, and management agreement.
- Timber revenue will be used for management, restoration, and enhancement of forest resources, and will be shared with local counties.

In January of 2005, the MD DNR Forest Service completed a sustainable forest management plan for all 58,000 acres, now known collectively as the Chesapeake Forest Lands. The plan called for significant changes from the prior corporate operations, including:

- Moving from industrial forest management to multi-purpose public ownership and management
- Deploying "adaptive management" principles to sustain the health and productivity of the forest using state-of-the-art science and monitoring
- Using less intensive methods of forest regeneration and longer pine plantation rotations
- Executing a comprehensive assortment of restoration actions to improve water quality and to restore wetlands and wildlife habitat, particularly for the Delmarva fox squirrel
- Achieving greater access for public recreation, especially hunting

- Placing special emphasis on riparian buffer zones, including variable width buffers and management prescriptions
- Obtaining dual certification as a sustainable forest by the Sustainable Forestry Initiative and the Forest Stewardship Council
- Using an annual work plan to guide all aspects of forest management operations, including cost efficiency and conservation concerns.

The Chesapeake Forest Lands received dual certification in 2005. The MD DNR hopes to impress both industry skeptics and environmental groups by demonstrating that the forest can simultaneously become a self-sufficient business enterprise, a publicly accessible recreational asset, and a model habitat management area. This bold initiative will allow future generations to enjoy both the economic and environmental heritage that the forest has to offer.

Trends in the forest products industry have contributed to the parcelization of forestland as the transfers of corporate-owned forestland to other ownerships have increased dramatically.³¹ Nationally, at least 25 million acres have dropped out of commercial forest ownership since the 1980s. In 2003 alone, 4.5 million acres of major United States timber holdings changed hands.²⁴ By 2010, an additional 12 to 15 million acres could be transferred out of industry ownership.

While some of these transfers are made to public interests or other forest products companies, most are sold to investment organizations such as pension funds, insurance companies, and banks. The main goal of these companies is to secure the highest rate of return for their investors—making them less likely to use capital for sustainable forest management.³² If the selling spree of commercial forestland continues, many fear that these areas could be cut up into much smaller parcels in which condominiums and summer homes would replace trees.

As ownership among investment organizations continues to rise, new partnerships will be needed to decrease the chance of forest conversion and fragmentation.³³ Chesapeake Forest Products Corporation, once a stalwart of the Maryland and Virginia timber industry, liquidated its land holdings in 1999. In this case, a consortium of private, state, and federal interests were able to work quickly to raise the funds needed to retain these lands as forest, ensuring future protection for the Nanticoke River and Eastern Shore streams.

loss of investment in timber production as landowners anticipate continued growth and changes in land use. In addition, forest managers encounter increased local opposition to practices such as thinning and prescribed fire.

A groundbreaking study of these interactions in Virginia revealed that nearly 20% of all forestland in the commonwealth is in effect removed from commercial forestry because surrounding areas are too densely populated. The probability of timber management is nearly zero when population density exceeds 150 people per square mile because development pressure and social preference pushes out the needed forestry resources and infrastructure. As population decreases, the likelihood of timber management increases: 25% at 70 people per square mile, 50% at 45 people per square mile, and 75% at 20

people per square mile.³⁴ Based on these thresholds, less than 20% of counties in the Bay watershed have a high probability of supporting a viable timber industry.³⁵

Increasing Land Values

Parcelization and expanding development generates land values that are significantly higher than timber values. Commercial timberland normally sells for much less than the land’s value as residential sites, second homes, or recreational areas.³⁶ This is particularly true for forest properties around the recreational and scenic assets of the Bay. In these places, the financial pressure to sell major portions of forestland will likely be too great for landowners to resist. Whether they are families seeking retirement security or companies seeking profitable returns, the result is the same for forest management.

Public investment can compete with these rising land values but as time goes on, even the government and major non-profits will be unable to compete with rising development pressures and land values.

Estate Tax

The federal estate tax often forces the sale of forest properties, which increases the risk of conversion to development. Estates valued at more than \$1.5 million face taxes upon the death of the property owner. The estate tax is particularly worrisome in the Bay watershed because family owners make up 64% of all forest owners and individuals over 65 years old own over 40% forestland.²⁹ Corporations, which do not pay estate taxes, own only a small percentage of all forests. Current legislation is reducing the tax over time, but it is unknown if the changes will become permanent.

INDICATORS FOR SUSTAINABLE CHESAPEAKE FORESTS

The following indicators could be used to track the economic sustainability of Chesapeake forests:

- Area and percent of forestland in watersheds with drinking water sources
- Ratio of timberland needed to meet local consumption of wood products to area of land harvested regionally
- Relative contribution of the forest products industry to the overall economy



CHAPTER IN PERSPECTIVE

Forests provide billions of dollars each year to the Chesapeake Bay watershed economy, but an inability to account for ecological services in the market place, changing landowner demographics, and economic restructuring in the forest products industry are restricting Bay communities from taking full advantage of their value. If the many forces of change discussed in this report continue to increase, the hope for economically and ecologically sustainable forests will fade for generations to come. Just as today's forests are substantially different from those present in the Bay watershed 100 years ago, Chesapeake forests 30 years from now could offer significantly different environmental, economic, and community values. However, Bay leaders can learn from past mistakes and make choices that will ensure a healthy "next forest" and Bay watershed.

