2020 - 2025 Forest Action Plan

Part II: Strategy

The Mission of the Maryland Department of Natural Resources

The mission of the Maryland Department of Natural Resources (DNR) is to lead Maryland in securing a sustainable future for our environment, society, and economy by preserving, protecting, restoring, and enhancing the State's natural resources. DNR is the state agency responsible for providing natural and living resources-related services to citizens and visitors. DNR manages more than 467,000 acres of public lands and 17,000 miles of waterways, along with Maryland's forests, fisheries, and wildlife for maximum environmental, economic and quality of life benefits. A national leader in land conservation, DNR-managed parks and natural, historic, and cultural resources attract 14.5 million visitors annually. DNR is the lead agency in Maryland's effort to restore the Chesapeake Bay, the state's number one environmental priority. Learn more at www.dnr.maryland.gov.

The Mission of the Maryland Department of Natural Resources Forest Service

The Forest Service mission is to restore, manage, and protect Maryland's trees, forests and forested ecosystems to sustain our natural resources and connect people to the land.

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Forest Strategy Executive Summary

The first goal of the 2020 Maryland Forest Action Plan is to "**Grow forests, habitats, markets, and jobs."** This fundamental goal is reinforced and refined by an additional four goals to maximize public benefits over the long term: **Manage forest health and fire, provide clean water, create healthy, livable communities,** and **respond to climate change.** The 2020 revisions increase emphasis on forest markets and their fundamental role in supporting sustainable forestry practices and wildlife habitats. They also expand climate adaptation and mitigation actions, refine approaches to fire as both threat and tool, and better integrate human health issues into community forestry goals.

The Forest Assessment characterized a maturing forest base that supports considerable biological diversity, the potential expansion of saw timber and other durable wood products, greater tree growth than tree removal, net gains in carbon sequestration, and protection of water quality. Recent inventory data in Maryland showed increasing natural mortality on forestland overall, although not on timberland, which is more likely to be harvested for forest products and maintained at healthy densities of trees. Forest growth outpaces losses from mortality and harvest by twice the volume. Forest land conversion to other non-forest uses is considered the greatest threat to many of these forest benefits. Forest health issues are of concern with the increasing trend of aging forests, natural mortality, and frequent finds of new pests, diseases, and exotic invasive plants.

Maryland is a very urbanized state with over 6 million people on 6.2 million acres, which also supports a multi-billion-dollar forest products industry and outdoor recreation. Maryland benefits from strong environmental policies that help retain trees, forests, and forestry, including the Seed Tree Law, State Highway Reforestation law, Roadside Tree Law, Licensed Tree Expert Licensing Law, Forest Conservation Act, and Sustainable Forestry Act. These laws will become increasingly important as the population is expected to reach 6.8 million before 2040. Outreach to encourage voluntary forest restoration on private lands, which make up the majority of Maryland's lands and restoration opportunities, will also be increasingly important. Additionally, programs to help landowners successfully establish and manage new forests in today's altered ecosystems will need to be implemented.

Since Maryland's first Forest Action Plan in 2010, progress has been made and new challenges and opportunities have emerged.

Grow Forests, Habitats, Markets, and Jobs: Maryland's forest land is at 2.4 million acres according to U.S. Forest Service (USFS) inventory data, with a slowing rate of loss, but continued conversion to development and other threats remains a concern. Recent severe losses in forest products markets have triggered intense interest in restoring renewable, resource-based jobs, and a statewide economic adjustment strategy is underway. This is supported by additional efforts with forest industry partners for outreach, woody biomass policy roundtables, and a technical study on forest data, program implementation, and policies. Habitat for declining golden-winged and cerulean warblers has expanded on public and private land in Western Maryland, creating younger forest habitat, but future projects are threatened by the loss of the pulpwood market after the state's only paper mill closed. The Delmarva fox squirrel, listed as endangered since 1967, has been delisted as the population has expanded and State Forest lands on the Eastern Shore are being sustainably managed to expand future fox squirrel habitat.

Manage Forest Health and Fire: Aging forests and global trade are bringing expanded challenges. Emerald ash borer is still spreading across Maryland, leaving most ash dead within a few years. Community planning and outreach helped jurisdictions understand options to treat priority trees and limit public hazards. Continued development near wooded areas increased the wildland urban interface and associated fire risk. Community Wildfire Protection Plan coverage expanded in several counties, partnering closely with local fire departments and communities in the wildland-urban interface with support from grant funding from the US Forest Service. Firewise Chipper Days were an effective strategy that helped communities reduce fuels near their homes and remove invasive plants such as vines that could act as ladder fuels to move a surface fire into a more damaging canopy fire.

Provide Clean Water: Over 1500 miles of forest buffers have been created in Maryland since 1996. The Backyard Buffer program expanded to 20 counties in 2019, helping landowners plant seedlings by backyard streams, increasing urban forest buffers. A landscape approach to reservoir forest management was piloted in Western Maryland in partnership with Pennsylvania and The Nature Conservancy. Forest management plans for reservoir forests are being updated with current forest inventory data to guide management for future healthy forests. This landscape-scale planning is designed to highlight priorities for forest health, conservation, and restoration in the larger watershed.

Create Healthy, Livable Communities: Urban forestry has expanded through the innovative Lawn to Woodland Program to reforest parts of large lawns. More forests were planted in residential areas through the Healthy Forests, Healthy Waters partnership (Alliance for the Chesapeake Bay, MD Forestry Foundation, and MD Forest Service), supported by the Chesapeake and Coastal Bay Trust Fund in priority watersheds. Continuing education requirements for licensed tree experts have been established to assure quality tree care for Marylanders. Recent legislation in support of forest conservation has increased attention on mitigation banking and allowed jurisdictions to set higher thresholds for conservation during development.

Respond to Climate Change: Forestry is a key element in Maryland's Greenhouse Gas Reduction Act and the Climate Action Plan. Partners led by the University of Maryland Center for Environmental Science and Extension collaborated to produce a landowner's guide, *Helping Your Woodland Adapt to a Changing Climate*. Forestry activities tracked for the Greenhouse Gas Reduction Act are contributing 2 million metric tons of carbon dioxide towards the 2020 goal.

Priorities for 2021 to 2025:

Grow Forests, Habitats, Markets, and Jobs: Forests are an abundant and renewable resource in Maryland, but recent trends in losses of forest markets mean that fewer landowners have a practical path to sustainable forest management. Lack of affordable management translates to the loss of associated benefits to forest health, habitat diversity, and active carbon sequestration, especially in the context of an aging forest. The 2020 strategy emphasizes the role of healthy forest markets, while maintaining commitments to core programs for forestry technical assistance, cost-share and tax abatement programs that help private landowners meet their goals for their forest. Maryland's commitment to sustainably certified forests continues, with dual certification on state forests and inclusion of certification for private forests through the Maryland Tree Farm Program. Issues to address in the next five years include keeping a viable forest industry while protecting a diversity of forest ages, from older forests to expanding young

forest habitat for declining bird populations, and identifying other landowner and community priorities. The Forest Legacy Program and newly approved Maryland Assessment of Need will be an important tool to augment state land conservation programs and permanent easements for working forest lands. New measures to conserve and expand forests to offset ongoing development will be pursued, from outreach initiatives and funding for restoration and conservation, to better interaction with local land use planning.

Manage Forest Health and Fire: Priorities will include keeping access to effective treatments of major forest pests such as emerald ash borer and hemlock woolly adelgid, increasing understanding of new threats like spotted lanternfly, and thousand cankers disease of walnut and invasive plants. Partnership approaches will be used for long-term strategies, including development of carefully vetted biocontrol organisms. State lands will be used to strategically address forest health issues, including biocontrol release and recovery, and training on invasive plant control. Maintaining readiness to address wildfires with training and equipment, proactively reducing risk through Firewise prevention, and carrying out prescribed fires are intertwined priorities, balancing the threats and benefits of fire for fire-adapted native forests. Coordination among conservation partners will be a priority, such as The Nature Conservancy's Fire Learning Network.

Provide Clean Water: Chesapeake Bay commitments are focused on riparian forest buffers and urban tree canopies, underscored by the 2013 Forest Preservation Act goal for maintaining 40% tree cover. Trees and acres planted have lagged behind desired progress, so new opportunities will be sought to expand tree plantings through Backyard Buffers, and Healthy Forests/Healthy Waters programs. Additionally, flexible options for sharing costs for planting and care of buffers will be explored. The Maryland Forest Service is expanding technical assistance on forest harvesting sites, and more work is needed to streamline the forest harvest permitting process so seasonally-dependent best management practices can be used reliably to protect clean water during harvests. A landscape planning approach to forest management will be expanded, increasing planning around drinking water reservoirs and continuing the work started with the drinking water source for the town of Cumberland, where the forest management plan for the public lands around the reservoir was augmented by analysis for forest restoration and conservation opportunities throughout the basin.

Create Healthy, Livable Communities: Maryland has a range of programs to help Marylanders plant trees, from the Marylanders Plant Trees coupon for a single tree, to Tree-Mendous for public land plantings to Lawn to Woodland for an acre or more; we will continue to expand options to help people plant and care for trees. Tree canopy cover is being updated as part of Chesapeake Bay investments, which will help identify critical areas for trees and other vegetation in addressing heat islands, recreational needs, and greenways. More work on tailoring tree plantings to improve human health outcomes is planned, building on the recent planting project with the Veteran's Administration. Continued training opportunities will be offered for tree experts and Forest Conservation Act compliance.

Respond to Climate Change: Expanding tree planting is a core strategy that addresses adaptation and mitigation. Maryland also is acquiring better information on carbon sequestration for forest management practices, to include considering life-cycle outcomes of forest products and forest growth rates. Forest management plans for drinking water reservoir forests will be revised to directly address adaptation needs for climate change. Commitments to meet the Greenhouse Gas Reduction Act mitigation will be tracked for rural tree planting, urban tree planting, forest management, and renewable biomass projects. With projected variability in rainfall and storms, maintaining readiness will be a priority for wildfire response, storm

response, and prescribed fire for native forest types. Education for landowners will continue, including increasing access to information on how to access economic benefits of voluntary carbon credits. Forestry practices to mitigate and adapt to climate change will be pursued in ways that enhance other forest benefits simultaneously, supporting water and air quality improvements, local efforts for climate resilience and hazard mitigation, biodiversity, habitat connectivity, and renewable natural resource-based industries.

Introduction

Maryland's forests are the foundation for native wildlife, healthy watersheds, scenic beauty, and a renewable natural resource-based economy in the state. Maryland faces many challenges in sustaining ecologically functional and economically viable forests in the face of rapid urban development and other threats. When European colonists arrived, more than 90% of Maryland was forested. Today, 39% of Maryland's 6.2 million acres are covered by forest over an acre. Maryland remains the nation's fifth most densely populated state, with more than 6 million people (U.S Census Bureau, 2019). The state's population has more than doubled since 1950. This translates to less than one-half acre of forest per person.

Maryland has been called "America in Miniature" because it spans from the sandy ocean beaches and marshy estuaries across the rolling hills of the Piedmont to the steep slopes of the Blue Ridge Mountains and Allegheny Plateau. This fosters a tremendous variety of conditions and habitats within a small state. Maryland also has extensive urban and suburban areas, housing 95% of the state's population on a little over 10% of the land area. Marylanders rely on their trees and forests for recreation, scenic beauty, and pleasant neighborhoods. Many take for granted that forests support healthy streams, fish and wildlife habitat, and clean air. Forest products contribute renewable natural resources for rural economies and urban wood manufacturing centers, as well as supplying wood for heat. The intersection of the diverse forests, rising population, and varied demands yields an abundance of issues for Maryland's forests.

Maryland supports a $3.5 billion forest products industry and has capacity to grow. Maryland benefits from an active policy environment that helps retain trees, forests, and forestry, including the Seed Tree Law and the Forest Conservation Act. The importance of Maryland's forests was recognized in 2009 when the State Legislature passed the Sustainable Forestry Act, and in 2013, with the Forest Preservation Act.

National and Regional Charges for the State Forest Action Plans

The Maryland Forest Action Plan was produced as part of the national strategy to "redesign" how federal and state cooperative assistance programs address America's forest lands. Conceived in 2007, this approach within the USDA Forest Service State and Private Forestry (S&PF) improves the ability to identify the greatest threats to forest sustainability, target program delivery and accomplish meaningful on-the-ground changes in high priority areas. The 2008, 2014, and 2018 Farm Bills required states to develop the plans, pushing strategic action in spending public resources. The Farm Bill identified three national priorities from the Redesign Process and amended Cooperative Forestry Assistance Act.:

- Conserve and manage working forest landscapes for multiple values and uses
- Protect forests from threats
- Enhance public benefits from trees and forests

State Forest Assessments- To ensure that federal and State resources are being focused on high priority areas with the greatest opportunity to achieve meaningful outcomes, each state, territory or island has worked collaboratively with the USFS and other key partners to develop a

comprehensive state forest resource assessment. These assessments provide a comprehensive analysis of the forest-related conditions, trends and opportunities in each state.

Assessments are slated for review and updates on at least a five year cycle. The assessments encompass existing planning requirements for USFS State and Private Forestry funding, moving assessment and planning tasks to be more integrated. At a minimum, Maryland's forest resource assessment:

- Describes forest conditions on all ownerships in the state
- Identifies forest-related benefits and services
- Highlights issues and trends of concern as well as opportunities for positive action
- Delineates high priority forest landscapes to be addressed
- Outlines broad strategies for addressing the national priorities along with critical issues and landscapes identified through the assessment

Maryland's Forest Assessment also identifies critical information gaps so that this information can be acquired as opportunities arise and to better coordinate with other natural resource plans. The assessment addresses all public and private ownerships in Maryland, spans the urban to rural continuum, and is guided by the following Seven Criteria of Forest Sustainability established through the Montreal Process - the internationally agreed-upon criteria and indicators for the conservation and sustainable management of temperate and boreal forests.

Criterion 1: Conservation of **biological diversity**
Criterion 2: Maintenance of **productive capacity** of forest ecosystems
Criterion 3: Maintenance of forest ecosystem **health and vitality**
Criterion 4: Conservation and maintenance of **soil and water** resources
Criterion 5: Maintenance of forest contribution to **global carbon cycles**
Criterion 6: Maintenance and enhancement of long-term multiple **socioeconomic benefits** to meet the needs of societies
Criterion 7: **Legal, institutional, and economic framework** for forest conservation and sustainable management

Forest Strategy - With the background provided by the State Forest Assessment, the Maryland DNR Forest Service worked collaboratively with partners and stakeholders to develop a Forest Action Plan Strategy. This described Maryland's desired actions for forestry issues, specific to current forest conditions, laws, programs, political subdivisions, and stakeholders. The Action Plan will be used as a basis for Maryland to propose needed investments of state and federal dollars, in combination with other available income streams.

The Maryland's Forest Strategy:

- Describes how the Maryland Forest Service proposes to invest both competitive and non-competitive federal funding, along with other available resources, to address national and regional priorities as well as those identified in the state's forest resource assessment
- Describes how the state's proposed activities will accomplish national program objectives and respond to specific performance measures
- Outlines a specific timeline for project/program implementation
- Provides a detailed budget including opportunities to leverage non-federal resources

- Identifies partner/stakeholder involvement
- Identifies strategies for monitoring outcomes and revising action as needed

Strategy

Maryland's Forest Action Plan is intended to chart a course that builds towards a desired future outcome - a vision of Maryland's future forests. The following strategies are meant to guide actions and investment of resources over the next five years. It is built on an understanding that forests are long-term investments needing near-term actions to contribute to progress over decades. The strategy for managing Maryland's forests and trees is based on the conditions, trends, threats, and opportunities in the 2020 Assessment document. The assessment uses the seven criteria for sustainable forestry developed through the Montreal Process. The seven criteria for sustainable forests support the five statewide issues for the Forest Action Plan. The assessment also identifies priority areas to focus targeted actions addressing threats that vary across Maryland's forested landscape.

Findings: Maryland Assessment 2020

1. Maryland has 39% forest cover and a continued trend of slow loss of forest land. Tree canopy includes patches less than an acre and covers almost 50% of the state. Trends correlate with the pace of development, constrained but not stopped by existing laws, policies, and programs.

2. In a year, Maryland's forests absorb 10.45 million metric tons of carbon dioxide equivalent (MMtCO2e) emissions. Urban trees and forests also contribute and store an additional 1.33 MMtCO2e per year.

3. Maryland's trees are aging; mature forests now make up 78% of Maryland's forest cover, with 40% of forest over 80 years old. This has led to slower annual net growth rates as older trees grow more slowly than younger trees.

4. Over 16.9 million trees have been planted through 10 planting programs in the last 14 years. The Backyard Buffer program has expanded to 20 counties, the Marylanders Plant Trees coupons continue to be available, and state funding for residential plantings in priority areas has increased.

5. Planting and maintaining riparian forest buffers is an integral strategy for protecting water quality. Since 1996, over 1,400 acres of riparian buffers have been planted in Maryland. Statewide, 57% of Maryland's streams are fully buffered and another 27% are partially buffered.

6. Forest health concerns are expanding as many forests age and growth slows, combined with continued new introductions of invasive, exotic pests, such as emerald ash borer and spotted lantern fly. Gypsy moth (exotic) and southern pine beetle (native) continue to pose significant risks of interacting with seasonal weather, biocontrol organisms, and drought stress.

7. The area of sustainably certified forests has expanded since 2010, adding private lands certified though the American Tree Farm System to the dual certified State Forests, and other Sustainable Forestry Initiative certified private forests.

8. Wildfire acres burned has declined, correlated with trends in rainfall and increased use of prescribed fire to restore fire-adapted ecosystems and manage wildfire risk.

9. Markets for locally sourced forest products are decreasing due to several factors including the loss of the state's only paper mill in Luke, Maryland, removal of the fumigation capability at the Port of Baltimore, decline of log truck driving capacity, and the closure of sawmills on the Eastern Shore. The Luke paper mill alone was capable of producing 450,000 tons of freesheet paper product annually.

10. Declining markets have impacted forestry's contribution to the economy. From 2005 to 2015, the economic impact of forestry in Maryland declined from $4.7 billion to $3.5 billion. Investing in existing markets, like poultry bedding, and new markets, like woody biomass for thermal and electrical energy, could help revitalize the forest products industry, provide income to landowners, and help landowners afford to carry out practices for forest health and environmental restoration.

11. Forest harvest best management practices are widely used, properly implemented at a rate of 88% during forest harvest, with 99% on public lands.

12. Most Maryland forest types, dominated by oaks and yellow-poplar are well-constituted to be resilient in the face of climate change, but red spruce habitats are at risk. Faster growth has been documented for many tree species and is expected to continue with the higher carbon dioxide levels (needed for photosynthesis), and observed trends of warmer, wetter conditions, especially in winter and spring.

13. Coastal Maritime forests are at risk, where saltwater intrusion is a particular concern. Maritime forests face increasing levels of saltwater, and a 2016 survey by MDA found that 50,406 acres had been affected by saltwater intrusion. This was an increase from 18,117 acres of forest in 2013.

Maryland's Forest Strategy addressed the priorities identified in the national strategic planning effort by the U.S. Forest Service. The goals and objectives identify and respond to the current situation in Maryland's forests, and reference priority areas from the 2020 Forest Assessment. Please refer to the Assessment document for details of the GIS models, data sources, and analysis used to develop the priority areas. The priority areas do not mean that no actions will be taken outside of those areas for a particular goal or set of actions, but that planning and resources will emphasize progress in those areas. Colors in maps are used to distinguish among areas and do not denote different levels of priority.

Socioeconomic setting:

Maryland has a robust set of laws and strong institutions designed to protect natural resources and ensure legal forest harvests. For markets where people want assurance that the forest products that they buy have been produced legally and sustainably, these laws serve as sideboards for sustainable forest and natural resource management. Investments in staffing and systems that carry out the laws and regulations mean that Maryland can serve as a source of renewable forest products with substantial certainty that products are legally harvested from sustainable sources with appropriate protection of water, air, and biodiversity resources.

The earliest laws, starting in 1906 in Maryland, established the authority to own public forests, manage forest resources and fight wildfire, engaging staff and volunteers. Forest cover was at an historic low, and the state established a nursery to expand tree planting. Other laws have provided technical and financial assistance to support good management and a renewable forest resource, and to assist communities with urban trees and forests. These laws help people manage their trees and forests, and address concerns that cross landowner boundaries, such as forest health.

- Forest Management   NAT. RES. ARTICLE 5-1
- Tree Nursery   NAT. RES. ARTICLE 5-4
- Required County Payments   NAT. RES. ARTICLE 5-212g
- Forest Resources Plan   NAT. RES. ARTICLE 5-214
- Reforestation and Timber Stand Improvement Program NAT. RES. ARTICLE 5-219
- Woodland Incentives   NAT. RES. ARTICLE 5-3
- Urban/Community Forestry   NAT. RES. ARTICLE 5-4
- Forestry Boards   NAT. RES. ARTICLE 5-6
- Fire Hazards   NAT. RES. ARTICLE 5-7
- Mid-Atlantic Fire Compact   NAT. RES. ARTICLE 5-8
- Sustainable Forestry Act of 2009   NAT. RES. ARTICLE 5 et al
- Reduced Property Tax Assessments for FCMAs TAX PROPERTY ARTICLE 8-211

Laws to protect trees in Maryland date back to 1914, with the establishment of the Roadside Tree Law. The Seed Tree law in the 1970s required replanting or leaving seed trees to assure a future forest on pine harvests. As development replaced harvesting as the major means of forest loss, laws affecting development have expanded, including 1:1 replacement for forest acreage cleared for highways, retention and mitigation of forests near tidal waters (Critical Area), and partial replacement to limit loss of trees during development through the Forest Conservation Act (applicable outside of the Critical Area to all counties except the two most heavily forested counties in Western Maryland). Because counties and municipalities have land use authority in Maryland, some of these laws establish statewide standards that the local jurisdictions have to incorporate in their unique ordinances for zoning, subdivision, grading, and others.

- Roadside Tree Law   NAT. RES. ARTICLE 5-4
- Seed Tree Law   NAT. RES. ARTICLE 5-5
- State Highway Reforestation Law (Nat. Res. Article 5-103)
- Forest Preservation Act   NAT. RES. ARTICLE 5-104
- Forest Conservation Act   NAT. RES. ARTICLE 5-16
- Chesapeake and Coastal Bays Critical Area Law,   NAT. RES. ARTICLE 8-18

Other laws establish licensing and standards so Maryland citizens have access to basic consumer protection while trying to take care of and benefit from their trees:

- Tree Expert Law   NAT. RES. ARTICLE 5-4
- Forest Product Operators Licensing   NAT. RES. ARTICLE 5-6

Other laws address environmental goals for biodiversity, clean air, and clean water, including wetlands:

- Threatened and Endangered Species. NAT. RES. ARTICLE 10-2
- Greenhouse Gas Reduction Act,   Environment Article 2-12

- Erosion & Sediment Control,   Environment Article 4
- Nontidal Wetlands Law   Environment Article 5-9

Other State commitments are in policies and signed agreements, such as grant funding and the Chesapeake Bay Agreement Action Plan. For the Chesapeake Bay, forest buffers, urban tree canopy, and conserving other forests of high value for water quality will be near-term priorities based on existing commitments for 2025. Two-year milestones, like the Natural Filters strategy, focusing on revegetating buffers, wetlands and highly erodible lands, have been established for several forest restoration practices to meet Chesapeake Bay nutrient reduction commitments in the Chesapeake Bay Watershed Implementation Plan.

Maryland Goal I. Grow Forests, Habitats, Markets, and Jobs

(Supports National Priority I, Conserve and Manage Working Forest Landscapes for Multiple Values and Uses)

When the health and integrity of natural resources deteriorate, so do the environmental, economic, and social benefits they provide. These benefits include, but are not limited to: cleaner drinking water, reduced carbon emissions, climate benefits, thriving wildlife, increased recreational opportunities, community health, and economic prosperity. Forest markets are an essential part of paying for practices needed for forest health and costs of land ownership. The Maryland Forest Service will work with partners to restore and sustain the forest landscapes and provide incentives to prevent the loss of private forests and other working lands. Public forests are uniquely situated to provide some wider ranges of benefits and serve as models for ecological forestry. None of the other benefits of forests can be provided if the forests themselves do not remain.
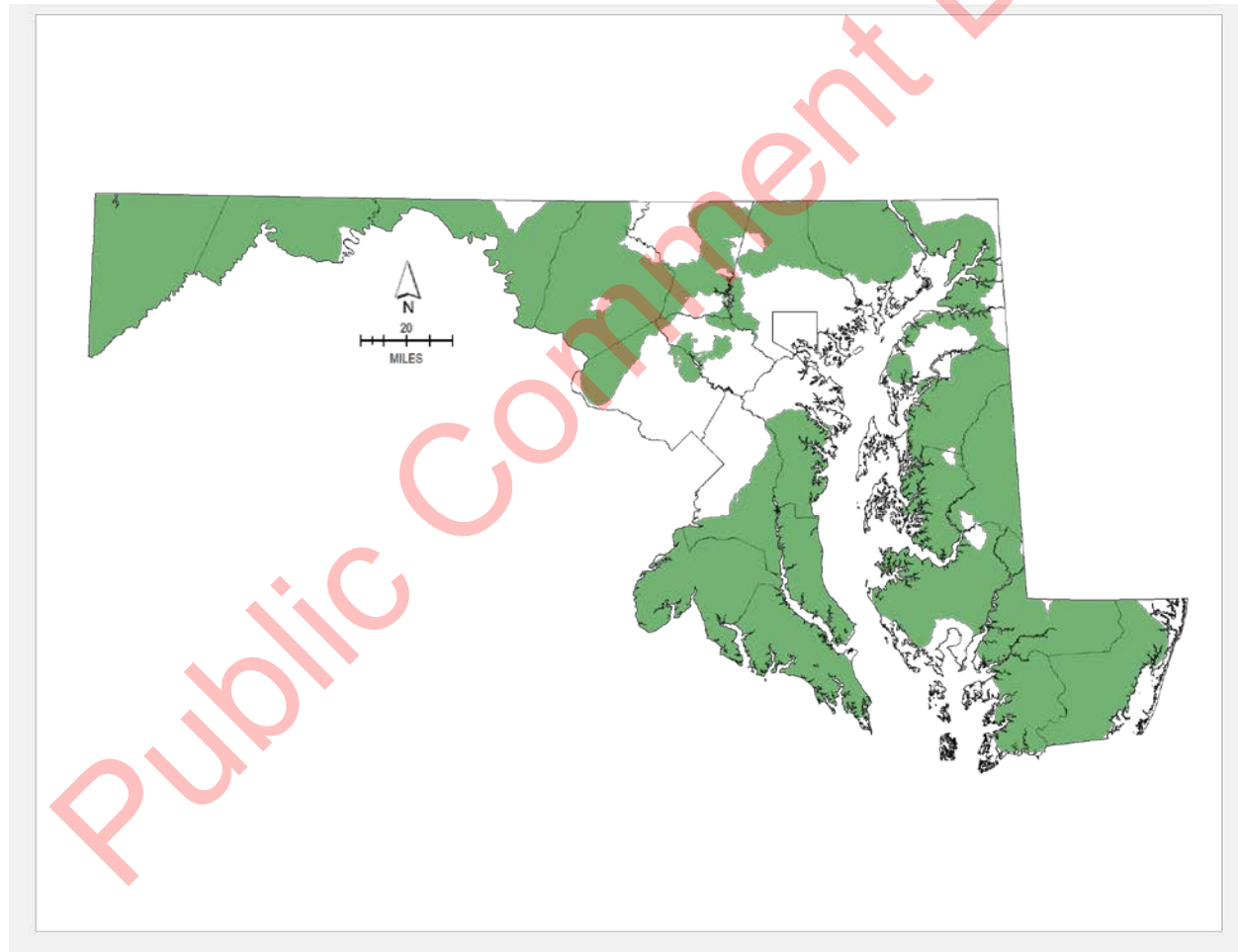
Figure 1: Priority areas to encourage working forests

Objective I.A. Keep Forests as Forests

Strategy I.A.1. Expand and diversify forest product markets to improve demand for keeping land forested and managed for renewable, recyclable, and biodegradable forest products.
Three-quarters of Maryland's forests are privately owned, and most landowners need some cash flow to pay for conservation practices and other costs of land ownership. Diverse markets provide the financial engine to carry out good silviculture - thinning small trees create larger, healthier trees for future function and value and a diversity of species and stand ages make forests more resilient across the landscape.

Example Tactics:
- Develop a forest economic adjustment strategy for countering the economic impact of numerous mill closures across the State of Maryland and to provide a roadmap for capitalizing on new opportunities in the forest industry which will lead to the creation of jobs and businesses in designated Opportunity Zones throughout the region. This would include markets for small-diameter wood from thinning or timber stand improvement needed to support longer rotations for sawtimber or veneer, as well as other high-value products to increase forest land value.
- Work with economic development partners to provide technical and business management support to expand existing forest industry, aid in business ownership transition, and/or develop new industries that add value for forest landowners, especially primary job creation sectors such as timber.
- Prepare and publish a risk analysis to identify Maryland as a reliable source of legally harvested and sustainably sourced forest products for domestic and export markets.
- Identify and provide technical support to building code officials, architects, and specifiers for using cross-laminated and other mass timber products, and build demand for renewable, sustainably produced materials that aid long-term carbon sequestration.
- Reach out to community and local government leadership to identify ways that forest products could be used to meet community needs, reduce costs for solid waste, and support local businesses.
- Use or develop public policies and regulations that reduce barriers to efficient forest industry, such as trucking rules, environmentally friendly forest product treatment options for phytosanitation, low-interest capital, favorable tax treatment, and marketing.
- Work with local governments and the Maryland General Assembly on zoning and permitting issues to avoid or address restrictions for acceptable forestry practices and processing, building on recommendations from the Rural Economies Workgroup of the Maryland Sustainable Growth Commission.
- Provide a fair, consistent and effective regulatory structure for forest harvesting in Maryland, including timely permitting, prioritizing areas with forest stewardship plans and coordinating closely with the Maryland Department of Environment, Soil Conservation Districts, and delegated local governments.
- Publicize forest market and income options for landowners and Maryland forest product operators, communicating their contributions to forest health, wildlife habitat diversity, and carbon sequestration.
- Develop options for forest income on smaller forest parcels (< 10 acres), including agroforestry, networking with farmer's markets and grow-local or farm-to-table businesses.

Strategy I.A.2. Conserve Maryland forests using a spectrum of land conservation programs, policies, and laws in a way that honors private property rights and sustains forest product markets.

Losses to development remain the greatest threat to maintaining Maryland's forests, and development values usually far exceed values from sustainable resource management. Conservation is much less expensive than restoration and better maintains the full suite of benefits from trees and forests. A variety of programs is needed for diverse land conditions and landowner situations.

Example Tactics:
- Use the Forest Legacy program and Maryland's 2020 Assessment of Need, incorporated by reference in this plan, to protect critical forests threatened by development, and other non-forest land uses augmenting state land conservation efforts and maintaining a focus on working forests.
- Coordinate with partners to track and expand land conservation of forests, partnering with the Forever Maryland Foundation, Maryland Environmental Trust, Maryland Agricultural Land Preservation Foundation, Maryland Department of Planning, and DNR's Land Acquisition and Planning unit.
- Use existing laws to reasonably limit forest loss during development and transportation projects, including the Forest Conservation Act, Chesapeake and Coastal Bays Critical Area laws, the State Highway Reforestation Law, and Roadside Tree law. With land conservation partners, identify important tracts of forests over 40 acres not currently protected from development and develop conservation options for willing landowners, such as Rural Legacy easements, Program Open Space easements or acquisition, Maryland Agricultural Land Preservation Foundation easements, federal easement programs, donated conservation easements, purchase of development rights, and other land preservation techniques to protect priority forest lands (see areas in Figure 1).
- For landowners not drawn to permanent conservation options, expand familiarity with benefits of forest management, forest markets, and property-tax reduction programs through 15-year Forest Conservation Management Agreements or 3-year options in the Woodland Assessment Program.
- Increase coordination between Maryland Agricultural Land Preservation Foundation and Forest Conservancy District Boards, continuing to coordinate at least one annual meeting as required by the 2009 Sustainable Forestry Act.
- Work with federal defense agencies to conserve land in zones that maintain ability to support missions on military bases, working across multiple states.

Strategy I.A.3. Expand tree planting, forest restoration, and post-planting care to help meet or exceed the no-net-loss-of-forest goal.
Even with Maryland's strong regulatory policies protecting trees, increased economic development and expanding populations have contributed to forest losses that need to be offset by vigorous tree planting and forest restoration in many parts of the landscape.

Example Tactics:
- Provide incentives for small acreage owners to convert lawn to natural areas, building on programs such as Lawn to Woodland or the Healthy Forests, Healthy Waters partnership funded by the Chesapeake and Coastal Bays Trust Fund.
- Expand conservation financing options for cost-effective forest restoration, tapping new sources such as crowd-funding or voluntary nitrogen footprint offset purchases.
- Implement the Sustainable Forestry Act of 2009 and the Forest Preservation Act of 2013, reviewing requirements, monitoring progress, and scheduling needed steps.

- Clarify goals and tracking methods for forest cover and tree canopy used for evaluating no-net-loss of forests in Maryland required by the Forest Preservation Act of 2013 (40% tree canopy).
- Update the forest and tree cover information every five years and provide data to local jurisdiction planning contacts and the public.
- Develop market-based options identified in the 2013 Act: forest mitigation banking, carbon credit or sequestration system, clean water credit trading system, environmental services credit trading system, and renewable energy credit trading system.
- Expand tree planting and post-planting care on public and private land to offset forest loss, engaging new funding sources and partners.
- Provide training materials for caring for trees and new forests and build peer learning networks, partnering with local volunteers, including District Forestry Boards, Watershed Stewards, Master Gardeners, and Master Naturalists.
- Utilize Marylanders Plant Trees coupon as a way to incentivize homeowners to plant more trees - especially native species.
- Encourage the public to use the Tree-Mendous website, which provides tree care resources.

Strategy I.A.4. Provide technical and financial assistance to help private forest landowners practice sustainable forest management.

Example Tactics:
- Provide general forestry assistance and an array of services for landowners, from basic forestry questions to site visits and full USDA Forest Stewardship Plans, tailoring technical assistance based on staffing and landowner interest.
- For landowners with more than 5 acres interested in managing forests, prepare, implement, and monitor sustainable forest management plans that recommend actions to meet landowner goals and address forest health concerns.
- Strengthen partnerships and shared stewardship approaches with the Natural Resource Conservation Service (NRCS), Soil Conservation Districts, University of Maryland Extension, conservation organizations, and others to increase forestry assistance to landowners.
- Use the Mel Noland Woodland Incentive Fund to share some costs with forest landowners applying forest management or tree planting practices
- Expand sustainable certification of private forest lands through programs such as the American Tree Farm System, accredited by the international Forest Certification organization "Programme for Endorsement of Forest Certification" (PEFC), headquartered in Geneva, Switzerland.
- Use tax abatement programs to reduce property taxes for landowners who develop and implement forest management plans (15-year Forest Conservation Management Agreements and the 3-year Woodland Assessment Program).
- Use the Income Tax Modification program to offer preferential tax treatment of expenses for landowners implementing desired forest management practices such as reforestation.
- Maintain core technical competence and consistent funding in the Forest Stewardship and Utilization Programs within the Maryland Forest Service to assist landowners with forest management, partnering to expand capacity and avoiding duplication.
- Uphold rights for landowners to lawfully practice forest management, established in the Sustainable Forestry Act of 2009.

● Provide outreach to landowners with easements in conjunction with partner entities to encourage maximum resource returns, best management practices, and ecological conservation and restoration.

Strategy I.A.5. Develop and share informational resources for landowners to help them maintain and manage forests, with emphasis on new and future owners.

Example Tactics:
● Improve landowner access to forest management information, partnering with programs such as Call Before You Cut, Extension's Maryland Woodland Stewards, The Nature Conservancy's Western Maryland Resilient Forests, Alliance for the Chesapeake Bay's Forests for the Bay, and Maryland Forestry Foundation outreach to encourage cooperative land management and use of professional assistance. The National Woodland Owner Survey and other data can be used to tailor information and outlets for effective messages.
● Provide training on transitioning forest ownership and management within families and between generations, reducing conversion to non-forest use at the time of inheritance.
● With partners like the volunteer Forest Conservancy District Boards, Forests for the Bay, and University of Maryland Extension, expand awareness of forestry issues, good practices, and available forest management resources for private landowners, including the Extension General Forestry course and Alliance for the Chesapeake Bay's Real Forestry for Real Estate training.
● Reach landowners with small acreage to encourage forest management and transition of lawn to natural areas through programs like Extension's Woods in Your Backyard.
● Share forest management resource information using social media through "From the Treetops" posts with DNR Office of Communications.
● Reach youth with forestry training, coordinating with organizations such as vocational agriculture programs, Envirothon, and environmental clubs to increase awareness of renewable resource management and education options.

Strategy I.A.6. Assure supply of expertise and materials for forest management and tree planting, continuing efficient production of affordable seedlings with a diversity of species.

Example Tactics:
● Efficiently produce high quality yet affordable forest tree seedlings to support afforestation, reforestation and restoration needs on public and private lands.
● Increase local source seed collection in partnership with conservation and community organizations.
● Provide genetically superior loblolly pine and white pine for reforestation in Maryland and Delaware.
● Establish mid-Atlantic provenance hardwood seed production areas, selecting sources from forest lands protected from development such as state forests or forest easements.
● Promote species diversity by offering a large variety of affordable tree and shrub seedlings suitable to the diverse habitat types of Maryland and Delaware.
● Improve landowner access to and information on licensed foresters and sources of professional forestry advice.
● Expand workforce training in forest products harvesting and processing, partnering with agriculture and natural resources agencies and organizations, Commerce, community

colleges, and high school technical programs, integrating with existing curriculum and promoting pathways to recruit a diversity of trainees.
● Consider developing and implementing a resource assistance program with the Maryland Ornithological Society.

Objective I.B. Manage for Resilient Forest Landscapes, Habitats, and Partnerships

Today's forests contend with a changed ecology, including lack of historic landscape-scale fire, loss of large predators to keep tree-nibbling herbivores like deer in check, and the addition of new plants, pests, and diseases. Partnerships are essential for addressing the complexity and scale of resource management needed.

Strategy I.B.1. Improve natural resource management and diminish the use of practices that degrade forest quality and wildlife habitat over time.

Example Tactics:
● Use diversity in species, age classes, and forest structure to spread risk from forest health stressors.
● Assess diversity of stand types and ages across the landscape, quantifying old-growth, designated future old-growth forest areas, fire-dependent forest types, and early successional forest habitats.
● Support continuing education of natural resources professionals, including the ongoing partnership with the Society of American Foresters and other professional organizations to provide training in current forestry skills, science, and advances in technology.
● Support Forest Certification programs, landowner cooperatives, coordinated contracting for land management needs such as weed control, and other innovative programs for private forest landowners.
● Encourage forest management that supports principles of Sustainable Forestry (Montreal Process Criteria and Indicators).

Strategy I.B.2. Prioritize restoration and conservation focus areas across ownerships to increase connectivity and reduce fragmentation at a landscape scale.

Example Tactics:
● Partner with community groups and local governments to identify landscape-scale forest health challenges and local priorities for forest conservation and restoration.
● Prioritize activities based on mapped priority areas for urban forestry, fire risk, water quality, forest stewardship need, and Forest Legacy.
● Work with the Natural Resource Conservation Service, Soil Conservation Districts, the Farm Service Agency, and watershed partnerships to implement appropriate forest practices in Priority Watersheds in cooperation with family farm owners and other qualifying forestland owners.
● Encourage expanded use of Forest Conservation Management Agreements and other forest conservation mechanisms in watersheds with high priority for working forests.
● Work with local planning and economic development staff to help develop land use rules that support sustainable resource management, a viable resource-based economy, and conservation of priority working forests. Provide technical forestry information to support planning goals such as protecting priority woodlands, supporting rural economies,

setting goals for open space, and improving water quality, including during the comprehensive plan development process.

- Provide free assistance to local governments to help them achieve sustainable forest management certification on resource lands they manage.
- Learn from and expand use of local programs that are conserving rural land and working forest.
- Partner with the Maryland Department of Planning and local planning agencies to assess contributions of existing laws and planning requirements for conserving forests over 40 acres in Maryland, and gaps in programs to encourage retention and management of forests.
- Improve forest conservation and connectivity over time by funding afforestation on lands protected from development.
- Coordinate with land conservation stakeholders to design complementary actions and funding options that support overall landscape conservation and restoration strategies statewide, learning from Pennsylvania's Conservation Landscape Initiative.
- Identify opportunities for easements and continued private land management as alternatives for State-funded land conservation, evaluating current state land ownership patterns and desired limits to continued fee-simple acquisition.
- Continue working with the "White Oak Initiative," which is a partnership across state agencies, conservation groups, landowners, trade associations, academics and oak-dependent industries from 17 different states to ensure the long-term sustainability of white oak in the United States.
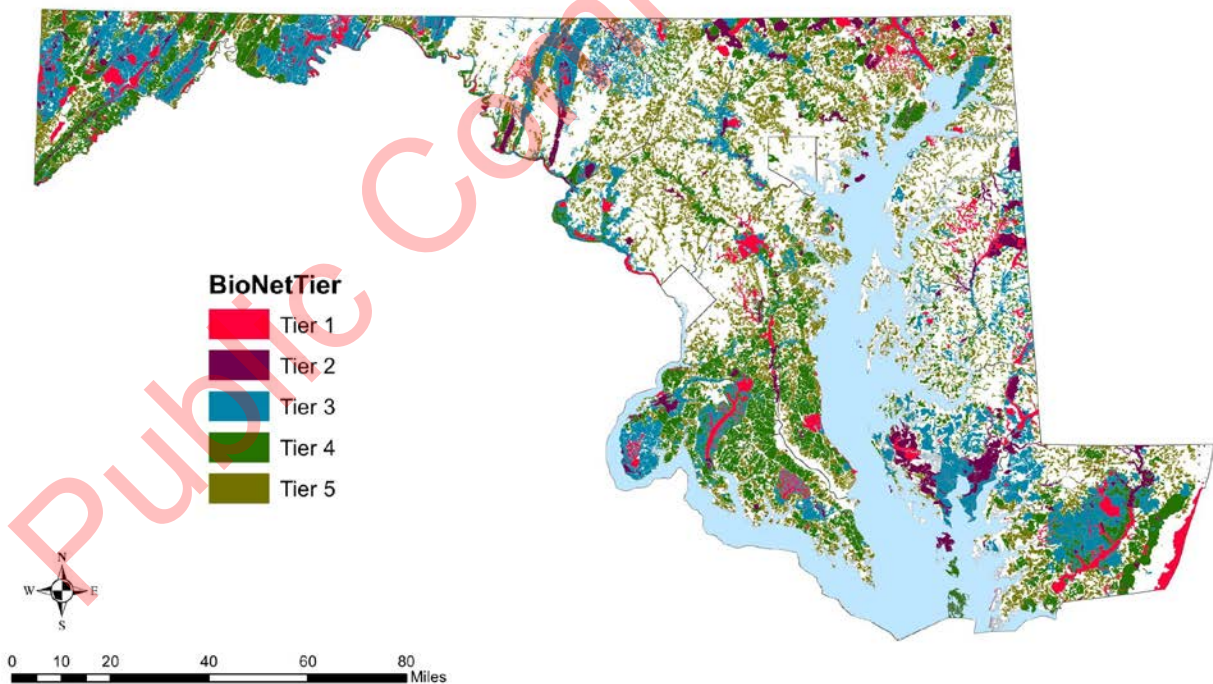

Figure 2: Priority map for fish and wildlife habitat- BioNet map from the 2015 Maryland State Wildlife Action Plan.

The 2015 Maryland State Wildlife Action plan describes the priority mapping: "BioNet integrates information on rare, threatened, and endangered plants and animals, species of greatest conservation need, watch list plants, and rare ecological communities and prioritizes Maryland's vanishing natural landscapes to highlight those areas that are most important to conserve the full complement of terrestrial and freshwater species and natural communities currently found within the state. The criteria used within BioNet primarily focus on the most irreplaceable species and habitats, as well as the habitats where larger numbers of rare species are concentrated. In addition to focusing on vanishing species and habitats, and on high quality common habitats, the criteria were designed to incorporate the larger landscapes required for migratory animals, population dispersal, and habitat shifts resulting from climate change.

These areas are prioritized into a five-tiered system based on a continuum of rarity, diversity, and quality, with Tier 1 being the highest or most critically significant for biodiversity conservation. Examples of Tier 1 areas include habitats with the only known occurrence of a species in Maryland, with any occurrence of a globally critically imperiled species or vegetation community, with high quality occurrences of globally rare species or communities, or with hotspots where 10 or more state rare species or communities are concentrated."

Strategy I.B.4. Provide habitats for rare native species dependent on forest ecosystems, particularly priorities in the 2015 Maryland's State Wildlife Action Plan (SWAP).

Example Tactics:
- Protect high-quality contiguous forest blocks.
- Identify and plant areas to create contiguous forest and improve habitat for forest interior dwelling species and other rare species (see Figure 2).
- Implement the Habitat Conservation Plan for the Delmarva Fox Squirrel, emphasizing public forest management.
- Cooperatively address declines of the Northern long-eared bat, contributing to solutions that maintain a viable forest industry and actively manage forests to improve future habitat.
- Manage for ecological functions in High Conservation Value Forests identified on certified forest land (usually 30 to 40% of the certified land base).
- Seek opportunities to restore native forest communities such as Atlantic white-cedar, shortleaf pine, pond pine, cherry bark oak, American chestnut, ash, and others using local genotypes to the extent possible.
- Provide local seed source for selected species to the state nursery to provide appropriate native genotypes for restoration, including important species to support pollinators.
- Work with partners to improve deer herd management and reduce over browsing of native trees.
- Work with Native American communities to identify species of interest, such as sturgeon or red wolf, and evaluate feasibility of protection or reintroduction.
- Evaluate impacts of and mitigating practices for wind and solar energy generation on forest biodiversity.

Objective I.C. Invest in Forest Management for a Renewable Rural Economy

Managing forests sustainably can provide green jobs and support communities while generating little demand for community services and protecting clean air and water. Renewable resource economies help meet the needs of today's people while preserving the ability of future generations to realize the same benefits, producing timber, other forest products, food, and energy. Without appropriate markets, forest management is not affordable or widely practiced, decreasing forest health and incentives for keeping forests on private land. Our forests are also of immense social importance, enhancing quality of life, sustaining scenic and culturally important landscapes, and oftentimes defining the essence of a community.

Strategy I.C.1. Partner with forest industry and environmental stakeholders to maintain and attract markets to support sustainable forestry and building practices.

Example Tactics:

- Provide a reliable regulatory environment, implementing the Memorandum of Understanding with the Maryland Department of the Environment (MDE) for the Maryland Forest Service to provide staff trained in forest harvest site review for technical assistance, augmenting the existing roles of MDE, Soil Conservation Districts, and local jurisdictions who handle permitting and enforcement.
- Develop options to help landowners afford effective land management actions, considering landscape approaches and marketing of aggregated services and products.
- Encourage adoption of wood certification programs to improve sustainable building practices.
- Expand certification for forest management and wood processing/ chain-of-custody to provide consumer products that are reliably sourced through sustainable means.

Strategy I.C.2. Work with rural development partners to create green jobs and promote a diverse forest products industry for sustainable communities.

Example Tactics:
- Work with the Maryland Agriculture and Resource-Based Industry Development Corporation (MARBIDCO) and other partners to help forest products businesses expand with innovation grants or low-interest loans.
- Expand forest management and income streams for rural landowners, working with the Rural Maryland Council and targeting grant requests through the Maryland Agricultural Education and Rural Development Assistance Foundation (MAERDAF), Rural Maryland Prosperity Investment Fund (RMPIF), and other assistance.
- Utilize the resources of the Maryland Rural Enterprises Development Center to encourage the success of small enterprise development, including considering options for military veterans.
- Integrate forest products into local farmers' markets, craft markets, and Buy-Local campaigns, developing a "Buy Maryland Forest Products" marketing strategy.
- Expand training for green jobs for resource management and restoration, including urban stormwater and green infrastructure projects.
- Expand quality contractors available for tree planting, invasive species control, timber stand improvement, thinning, variable density regeneration harvests, and other forest management practices.
- Encourage businesses based on perennial woody crops, such as Christmas trees, greens, and decorative cuttings.

Strategy I.C.3. Support market-based approaches to encourage private investments in conserving private forests.

Example Tactics:

- Pursue market-based approaches such as water-quality trading, conservation banking, mitigation banking, tax incentives, renewable energy credit trading, and carbon-credit trading, in accordance with the 2013 Forest Preservation Act.
- Sponsor pilot programs and demonstration projects that test and evaluate market mechanisms and innovative approaches.
- Identify options and additions for environmental restoration and resiliency and renewable energy legislation and policies to include forestry contributions, long-term sequestration from durable forest products, new market opportunities, and mitigation and adaptation activities.

Strategy I.C.4 Develop markets for clean-burning, high efficiency woody biomass technology.

Example Tactics:
- Work with MDE to use renewable fuels and reforestation efforts to help meet the state's Clean Energy Goals and Greenhouse Gas Reduction Act goals.
- Demonstrate use, air quality standards, efficiency, and convenience of modern biomass technology at one or more state facilities.
- Identify a reliable supply of biomass from public and private lands through projects that are compatible with sustainable healthy forests, such as thinning for future sawtimber or timber stand improvement to improve forest health.

Strategy I.C.5. Coordinate research needed to support sustainable forestry and efficient markets.

Example Tactics:
- Collect and analyze data pertaining to timber consumption and usage, industrial output, and business trends, sharing with local, state, and federal partners for use in planning and economic development.
- Develop and apply a spatially-based wood resource availability tool to identify forest product markets that could tap under-utilized forest resources to help diversify forest habitats, manage tree stocking for better forest health, or reduce hazard fuels.
- Work with researchers and forest product operations to develop beneficial uses for wood waste streams that improve the economics of forest product operations and support zero-waste and sustainable materials initiatives.
- Develop techniques for agroforestry practices, product harvesting, and market outlets.
- Identify and market potential sources of underutilized biomass supply for forest products for the future.
- Quantify carbon sequestration with partners, applying relevant research to develop useful estimates for policies and programs.
- Quantify the benefits of Maryland forests across the urban-rural gradient, complementing I-Tree estimates for urban trees and adding spatial distribution.
- Track landowner demographics, attitudes toward management, and patterns of land development related to intergenerational transfer/inheriting land.

Strategy I.C.6. Effectively train public and private forestry, arborist, and natural resource staff and renew that training,sto provide good service to Maryland citizens.

Example Tactics:
- Provide training in State laws and responsibilities to Maryland Forest Service staff, offering Warden School when 8 or more new or uncommissioned staff members have need.
- Build a career ladder for attracting and retaining diverse talents and backgrounds with core competence in forestry in state, local, nonprofit, and private settings.
- Maintain clear standards and institutional structure for Maryland Licensed Forester and Maryland Licensed Tree Expert.
- Coordinate with partners such as the Society of American Foresters, Maryland Arborist Association, and International Society of Arboriculture to provide and publicize continuing education in foresters and arborists.
- Provide staff training to support transition to greater scope or responsibility, including supervision, grant writing, grant management, budgets, and leadership.
- Increase coordination and interaction between and among other DNR units and encourage cross-training and mentorship exchange.

Strategy I.C.7. Improve social acceptance of prescribed forest and tree management practices.

Example Tactics:
- Increase use of forest-related curricula by schools, Project Green Classrooms, and other youth organizations such as 4-H, Future Farmers of America, and Young Farmers, integrating with Environmental Literacy requirements.
- Use Walk in the Woods programs to share forest management opportunities with interested citizens.
- Develop Maryland- or region-specific video of the forest to product pathway and connection to a cycle of sustainable forest renewal.
- Expand interpretation of practices on Demonstration Forests and other DNR forest lands and provide themed signage.
- Implement forest practices on school properties to improve resource sustainability and serve as demonstration areas for classes ("tending the forest garden").
- Implement forest management on local government properties or other lands to serve as demonstration areas for citizens.

Objective I.D. Demonstrate Sustainable Forest Management on Public Lands
Use public forest lands to demonstrate the practice of sustainable forest management that could be emulated on private land and supply scarce landscape elements like old-growth and early successional habitat for the public good.

Strategy I.D.1. Maintain capacity for forest management, including maintaining necessary workforce levels and appropriate skill sets.

- Evaluate and address staffing needs for mandated sustainable forest certification
- Provide appropriate training, equipment, compensation, and job classifications to state forest land management staff
- Address institutional capability, both in workforce levels and transfer of knowledge.
- Provide priorities for filling vacancies and analyze future needs, particularly for maintenance staff to service additional state forest acreage.

Strategy I.D.2. Continue sustainable third-party certification of state forests to improve the practice of ecological forestry with independent oversight.

Example Tactics:
- Maintain certification of all major state forests.
- Maintain database and documentation capacity to support certification and adaptive management, including derogations to maintain the use of treatments to address invasive species that threaten native species.
- Develop and use a series of indicators to measure sustainable forestry on state lands and at the landscape level.

Strategy I.D.3. Provide a diversity of forest types and ages across the landscape, coordinating with interdisciplinary and advisory teams to assure a balanced approach to multiple resources.

Example Tactics:
- Develop long-term plans that increase diversity over time, increasing extent and quality of older forests and early successional habitat.
- Protect natural systems through best management practices and enhance native ecosystems, using diversity to manage risk with changing conditions, and considering a balance between fire suppression to protect communities and prescribed fire to restore fire-dependent forest types.
- Develop agreements for public lands with allied local, regional, and federal partners to be leaders in cooperating with integrated pest management approaches and development of effective biocontrols for problematic invasive species.
- Support sustainable forest management in state and local parks and wildlife management areas to meet overall land management objectives.
- Integrate measures of landscape context to increase benefits of the diverse forest types and plan for shifting conditions over time, including on prior minelands or degraded lands.

Strategy I.D.4. Maintain a regularly updated natural resources inventory and capabilities for monitoring forest conditions and health.

Example Tactics:
- Invest in needed protocol development, personnel, equipment, and training.
- Collaborate with federal and state partners to maximize utility of inventory data and ability to exchange information.
- Identify additional information needs such as road location and condition, ecological importance, economic analysis, economic forecasts, and other data gaps.

Strategy I.D.5. Provide a diversity of sustainable recreation opportunities on public lands.

Example Tactics:

- Identify and utilize funding sources to develop recreational opportunities in balance with sustainable forestry practice
- Create interpretive signage, exhibits, or web interfaces to increase public understanding and appreciation of forestry during recreational activities.
- Develop partnerships with recreational user groups to aid creating and maintaining recreational resources.
- Address uncontrolled destructive recreational use on public lands.
- Maintain/promote primitive/passive recreation opportunities.
- Improve public access to waterways adjacent to public lands (incl. John Smith Water Trail).

Maryland Goal II. Manage Forest Health and Fire

(Supports National Priority II, Protect Forests from Threat)

The incredible range of benefits from forests relies on maintaining the health of the trees and forest communities over time. The stresses endured by forests have changed over time, and require some changes and additions to management actions. The settled landscape comes with an altered fire regime that demands widespread suppression, more variety and extent of invasive exotic species, and populations of white-tailed deer unrestrained by native predators. Keeping the natural resilience of the forests to storms, pests, and other threats requires addressing both sudden events and chronic stresses.
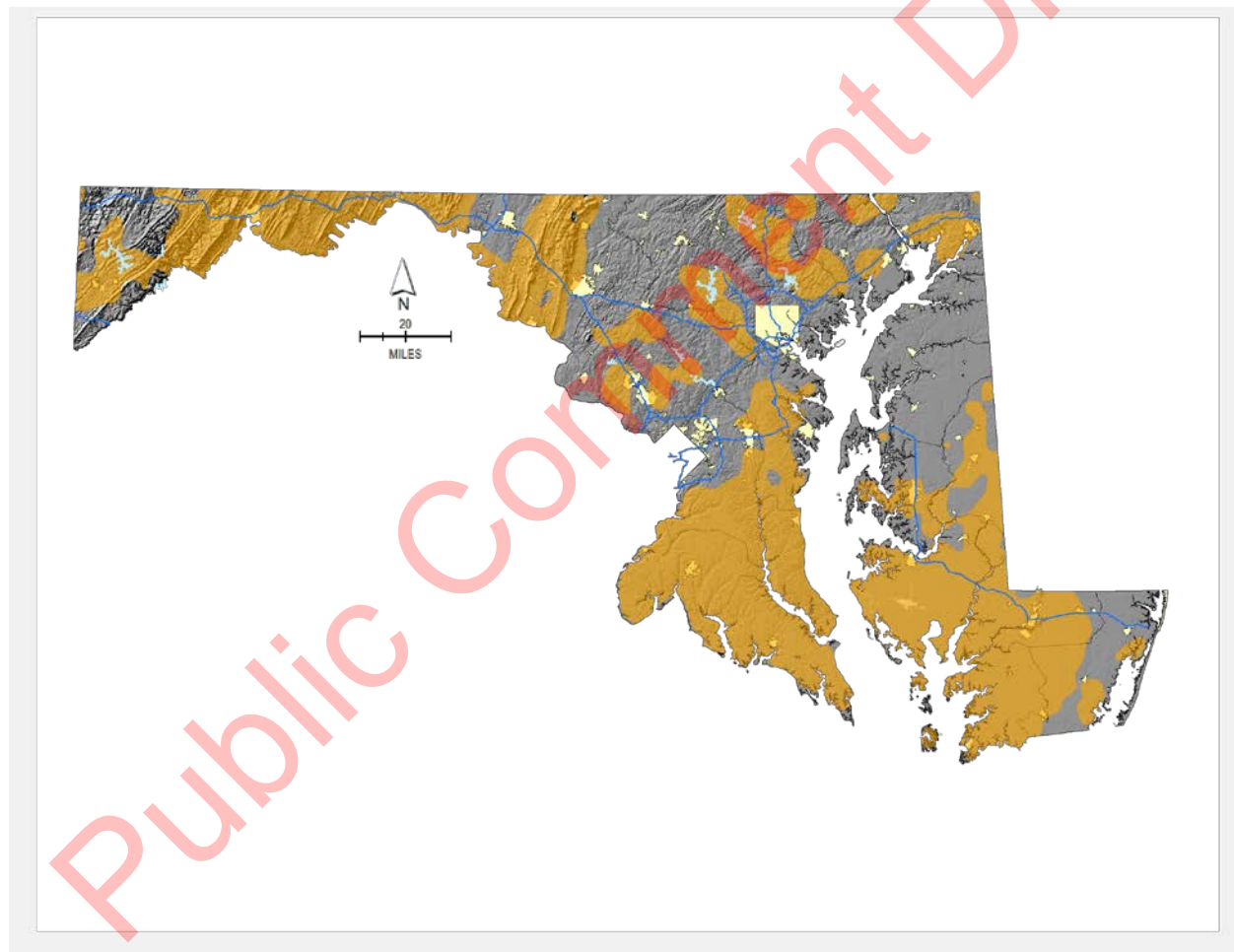

Figure 3: Priority areas for wildfire suppression and risk reduction

Objective II.A. Provide Emergency Response to natural resource threats.

Trained personnel, partnerships and resources are needed during disasters like wildfires, storms, and other deadly threats that require immediate action to protect forests and minimize damage.

Strategy II.A.1. Provide timely and effective fire suppression for wildland fires, maintaining skills for an incident command system.

Example Tactics:
- Maintain levels of trained personnel to effectively control wildfires, maintaining services to priority areas (Figure 3).
- Provide readily accessible wildfire training to agencies and other emergency responders.
- Identify staff in each region of the state with appropriate commercial driver's licenses so that each region of the state can readily move firefighting equipment such as bulldozers onto trailers during emergency response, providing training and support for needed licensure if needed to maintain minimum functional staffing.
- Work with partners to share training and expertise to expand statewide capacity for forestry practices, such as the training and coordination that expands prescribed fire capability through the Fire Learning Network.

Strategy II.A.2. Provide timely and effective response to other emergencies or disasters affecting forests (invasive species, storm damage, earthquakes….).

Example Tactics:
- Use the Incident Command System (ICS) to provide a disciplined and effective response to emergencies.
- Develop policies to guide the response to identified catastrophic threats.
- Develop funding sources for the Forest Health Emergency Contingency Program authorized by the 2009 Sustainable Forestry Act, an emergency response fund similar to the Beach Replenishment Fund.
- Develop pre-approved procurement and strategically located sort yards for better wood utilization during and following emergency responses.

Strategy II.A.3. Maintain partnerships and build response capacity with fire departments and emergency response agencies.

Example Tactics:
- Participate in State and local emergency response planning, assuring compatibility among responders and clarity of supporting roles.
- Provide grant funding opportunities to volunteer fire departments for effective wildland fire response.
- Address wildland fire equipment needs through partnerships, adding participation in programs such as the Fire Fighter Program to pursue a supply of relevant equipment.
- Participate in the Mid-Atlantic Forest Fire Compact for regional coordination of emergency response needs and contributions to the National Cohesive Wildland Fire Strategy.
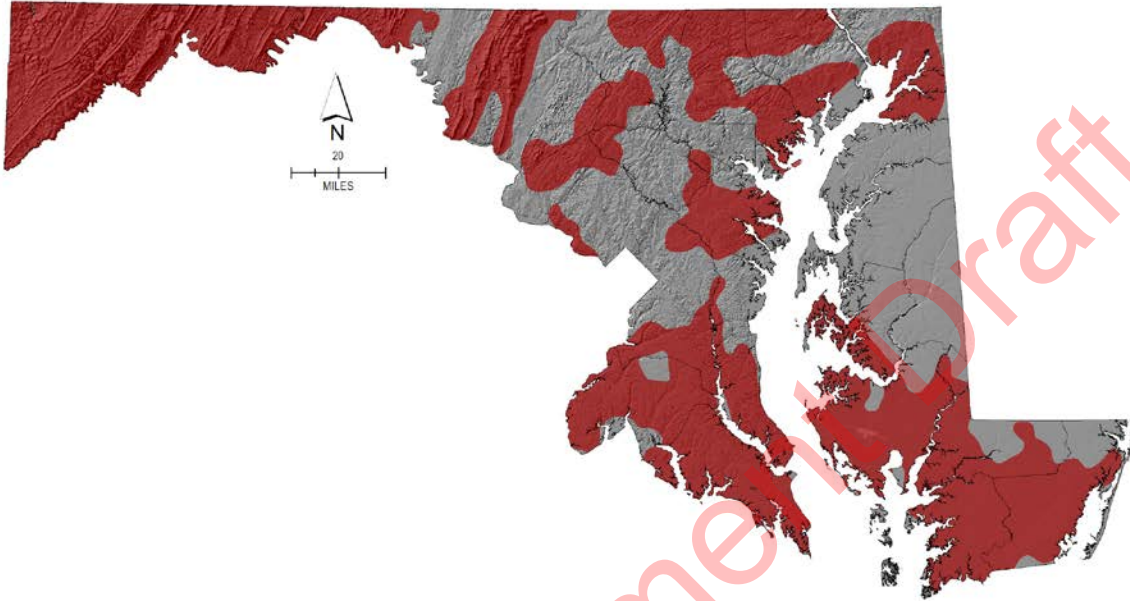
Figure 4: Priority areas for addressing forest health issues

Objective II.B. Develop approaches to reduce threats from long-term stressors to forests.

There are many threats to forests that act gradually and cumulatively and over time, are changing the health, composition, and resilience of our forests. A tailored response identifies gaps in information and actions needed, builds on existing partnerships and planning, and promotes actions that can shift trends toward more sustainable conditions.

Strategy II.B.1. Pursue control of deer browsing where normal forest regeneration is threatened.

Example Tactics:
- Work with DNR Wildlife staff to identify trends in forest regeneration from long-term USFS Forest Inventory and Analysis data, and shifts in stand composition from older to younger forests.
- Work closely with wildlife agencies to support effective deer management policies and rules.

- Develop cost-effective options appropriate to Maryland conditions to regenerate native trees at various levels of browse pressure, including less-preferred species and fencing options.
- Develop and share informational materials for landowners on seedling protection options.

Strategy II.B.2. Control invasive plants where normal forest growth and regeneration is threatened.

Example Tactics:
- Expand awareness of invasive plants through forest stewardship planning and statewide coordination of invasive species control efforts using an integrated pest management approach.
- Provide invasive plant control planning assistance to local jurisdictions and landowners, increasing local capacity to effectively control exotic plants and allow forest regeneration.
- Improve control recommendations in forest management plans and implement the DNR Do-Not-Plant policy for exotic invasive species.
- Improve capacity to quickly control new invasions and reduce damage from established invasive plants, using approaches that protect rare species.
- Prioritize efforts on species of greatest concern for tree regeneration and forest quality, using pilot projects to identify effective approaches for control and targeting.
- Train field staff in invasive species control techniques, supporting pesticide applicators license training and testing.
- Provide annual pesticide recertification training in topics to advance the practice of sustainable forest management, addressing current and emerging forestry issues.

Strategy II.B.3. Control invasive pests, destructive insects and diseases to prevent widespread forest mortality and loss of native forest types.

Example Tactics:
- Work with partner agencies and groups to identify infestations, their extent and severity, and carry out available responses. This includes biocontrol releases and surveys, targeting priority areas in Figure 4.
- Improve capability for rapid response for control.
- Develop long-term action plans to reduce severity of damage and increase resilience of forest ecosystems.
- Develop data on species composition and distribution in urban and rural areas.
- Use Integrated Pest Management practices to minimize unintended effects on non-target organisms like butterflies and beneficial insects.

Strategy II.B.4. Reduce wildfire risk in areas of Wildland Urban Interface.

Example Tactics:
- Develop Community Wildfire Protection Plans to address fuels, hazards, response capability, interactions with recreation, and defensible space in priority locations not already covered (Figure 5).
- Reduce hazard fuels through prescribed burning or mechanical treatments.
- Reach private forest owners with information on managing fire risk on forested property.

DRAFT Maryland Fire Priority Areas Compared
with Community Wildfire Protection Plans (CWPP)
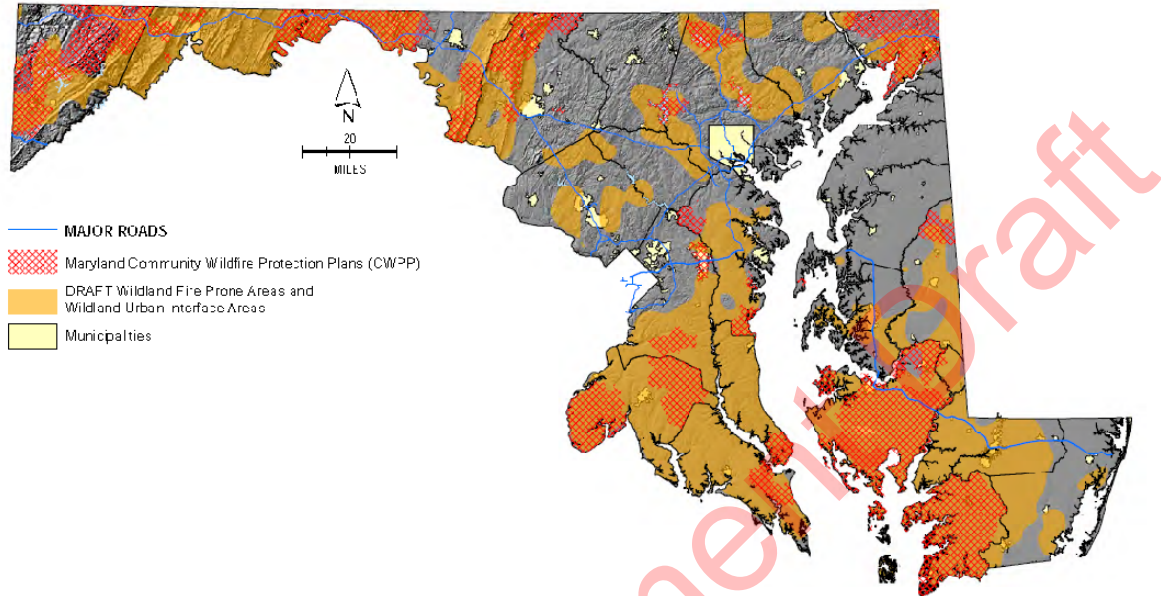
Figure 5: Community Wildfire Protection Plan coverage and State Fire Priority Areas

Strategy II.B.5. Promote scientifically based management practices including prescribed fire to maintain native forest composition and balanced age distribution altered by fire suppression and other ecological disturbances.

Example Tactics:
- Expand use of prescribed fire to counter long-term ecological impacts of wildfire suppression on native plant communities, coordinating with partners through the Nature Conservancy (TNC) Fire Learning Network or other fire ecology training efforts to best take advantage of limited seasonal windows of opportunity to apply fire.
- Provide information on management needs and forest management options for a variety of parcel sizes through an integrated forest landowner information portal like Forestry for the Bay.
- Identify successful elements from other regions (e.g., longleaf pine management in South or New Jersey Pinelands), evaluate relevance to Maryland forest ecosystems, and incorporate into local programs.
- Where prescribed fire is not readily applicable, use other practices to restore natural disturbance regimes and diversity in age structure in support of native plant communities like oaks and other mast-bearing species important for winter wildlife food.
- Use available cost-share such as the Conservation Reserve Enhancement Program (CREP) to support rare species habitat restoration.

Strategy II.B.6. Address resource damage from uncontrolled recreation across stakeholders.

Example Tactics:
- Work with stakeholder groups, landowners, and other interested citizens to develop policies, rules, areas, and fees that can balance access with resource protection.
- Support BMPs for providing private recreation opportunities/markets.
- Address fire risks from recreation.
- Support restoration of damage from uncontrolled recreation.

Strategy II.B.7. Reduce impacts to forests due to fire suppression and change in land use (development or roads) at state or local levels and promote beneficial mitigation locations.

Example Tactics:
- Mitigate development impacts through coordinated implementation of laws like the Forest Conservation Act, Chesapeake and Atlantic Coastal Bays Critical Area Law, Nontidal Wetlands Law, land use planning laws, Reforestation Law (5-103) and other local programs.
- Offset forests lost to road construction with effective mitigation in proximity to the affected forests.
- Expand use of prescribed fire to restore fire-dependent ecosystems, building skills through the TNC Fire Learning Network and further coordinating multi-agency/organization burn teams.

Maryland Goal III. Provide Clean Water

(Supports National Priority III: Enhance Public Benefits from Trees and Forests)

Forests are vital to providing clean and abundant water for Maryland. Our public lands are the source of fresh drinking water and more than a quarter of our fresh water flows from and is filtered by these lands. The threats of erosion, sedimentation, wildland fire, invasive pests, severe storm events, and increasing development pressures impact the quantity, availability, and quality of Maryland's water resources and the health of its watersheds. The Maryland Forest Service will promote the restoration and maintenance of watersheds to ensure abundant clean water, the protection of soils, and the health of aquatic and terrestrial ecosystems. Total Maximum Daily Load (TMDL) requirements have been developed for many of Maryland's watersheds, and a TMDL is being finalized for the Chesapeake Bay main stem. Keeping and restoring forests in key locations is a fundamental path to reduce many pollutants in waterways with TMDLs, including nitrogen, phosphorus, sediment, and biological impairment. Forests offer long-term, sustainable improvements in water quality, particularly if pollutants are also controlled at sources.
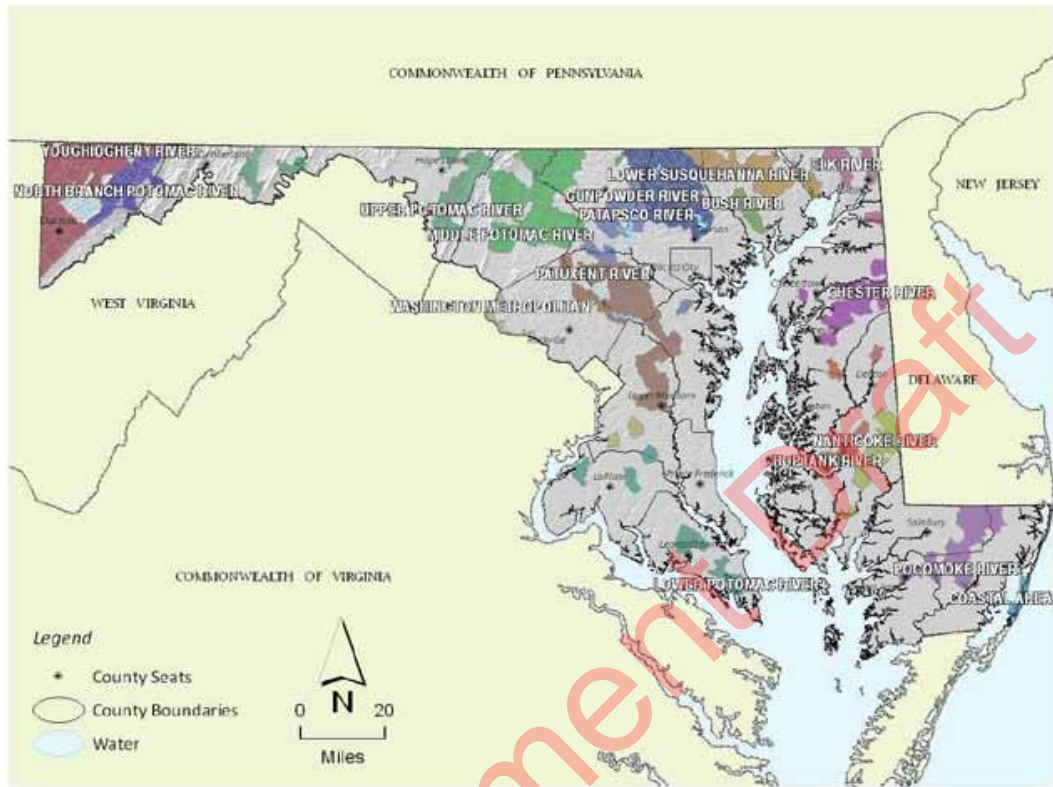
Figure 6: Priority areas for protecting water quality and supply, with emphasis on drinking water supply areas.

Objective III.A. Revitalize the Chesapeake Bay and other priority waters

Work with partners to identify and revitalize waterways critical to the social, economic, ecosystem health of communities.

Strategy III.A.1. Collaborate with local partners to use forests and trees to improve watershed conditions.

Example Tactics:
- Focus resources in targeted areas to bolster progress in important watersheds such as those identified in Figure 6, develop innovative approaches, and expand information on using forests for watershed health.
- Use pilot projects to develop effective approaches for management challenges like urban watersheds, green infrastructure protection, or ecosystem-based management.
- Tap available funding programs to fund well-designed tree and riparian projects, including the Chesapeake and Coastal Bays Trust Fund, National Fish and Wildlife Foundation grants, and Chesapeake Bay Implementation Grants.
- Mitigate forest loss and restore functional forests on a watershed basis to maintain water quality.
- Expand public-NGO partnerships to tap new sources of funding for tree planting

- Support Watershed Implementation Plans with targeting, outreach, new tree planting, and maintenance strategies
- Bolster and learn from other watershed organizations and efforts, sponsoring opportunities for training and information exchange.
- Provide the Tree-Mendous Tree Order form to provide trees at a discounted rate for public land plantings.

Strategy III.A.2. Protect 70% of Maryland streamsides and shorelines with riparian forest buffers.

Example Tactics:
- Identify new forest buffer planting funding to address potential forest buffer sites with willing landowners not eligible for other major incentive programs such as the Conservation Reserve Enhancement Program (CREP).
- Work with USDA and the CREP Advisory Committee to continue to improve the ability of the CREP and CRP programs to restore riparian function.
- Increase assistance to landowners in maintaining and managing riparian forest buffers.
- Coordinate and promote forest buffer restoration efforts among multiple agencies and organizations, guided by the Stream ReLeaf Coordinating Committee and high-level interagency coordination.
- Combine voluntary and regulatory approaches to maintain and expand forest buffers on streams and shorelines.
- Track progress in, measure effectiveness of, and establish a robust verification protocol for restoring riparian forest buffers to improve successful outcomes.
- Analyze unbuffered streams and shorelines, identify areas most critical for water quality improvements, such as the Susquehanna and Potomac, and develop targeting at a scale useful for planning projects.
- Identify barriers to restoring and conserving forest buffers in priority areas, prioritize significance and approachability of barriers, and develop strategies to change or minimize barriers.
- Identify opportunities where forest buffers can contribute significant improvements to meet Total Maximum Daily Load (TMDL) reduction.
- Support and expand the Backyard Buffer program to supplement voluntary landowner plantings along buffers on private property.

Strategy III.A.3. Conserve forests important for water quality.

Example Tactics:
- Expand awareness of programs and approaches available to conserve forests important for water quality, coordinating with adjacent states.
- Update targeting of forests that disproportionately contribute to water quality.
- Track progress of forest conservation through multiple land conservation efforts including purchase and donation of easements and other land conservation instruments, and effective regulation such as local zoning.
- Develop other alternatives to increase forest conservation using conservation financing.

Strategy III.A.4. Protect important aquatic habitats and water-dependent terrestrial wildlife.

Example Tactics:

- Ensure that water quality targeting addresses the aquatic life aspect of water quality.
- Collaborate with DNR Fisheries, Resource Assessment, and Wildlife units and MDE to develop long-term approaches for protecting priority habitats and sensitive resources.

Objective III.B. Manage Forests for High-Quality Drinking Water

Connect people to healthy forests through clean drinking water initiatives in priority watersheds.

Strategy III.B.1. Identify priority watersheds and work with communities to improve source water protection through watershed forestry.

Example Tactics:
- Offer technical forestry assistance for forest management to protect drinking water supplies.
- Identify and address risks, like wildfire, that threaten community water systems and other important water resources.
- Use science to design new conservation strategies for drinking water protection /disinfection byproducts/interaction with filtration systems.

Strategy III.B.2. Collaborate with watershed partners to restore watershed quality from the headwaters to rivers, through farms and working lands into urban centers.

Example Tactics:
- Share learning from watershed partnerships, pilot projects, and monitoring to encourage use and improve success of forest restoration for watershed health.
- Develop guidelines or best practices for incorporating forest restoration and conservation effectively into relevant land use planning for the long-term improvement of streams and watersheds.
- Integrate forest and urban tree opportunities into planning tools such as the Park Equity Mapper, considering diversity, equity, inclusion, and justice in restoration efforts and recreation planning.

Objective III.C. Advance use of forest harvesting best management practices (BMPs).

Strategy III.C.1. Expand awareness and monitoring of BMPs.

Example Tactics
- Provide on-site monitoring, working with loggers and landowners to use BMPs effectively, partnering with Soil Conservation Districts, local governments, MDE , Master Logger, and the University of Maryland Extension.
- Coordinate with MDE to assure predictable use of BMPs and enforcement, implementing the 2019 Memorandum of Understanding.
- Assess effectiveness and implementation of BMPs at least every five years.

Strategy III.C.2. Improve implementation of BMPs.

Example Tactics:

- Collaborate with the Master Logger Program and MDE to support effective and efficient implementation of sediment and erosion control requirements.
- Improve capacity of operators to minimize impacts through appropriate equipment choice, using low-interest loan programs to promote light-on-the-land harvesting.
- Share techniques for improved haul road BMPs that may be needed for changing weather patterns, such as less frozen conditions for low-impact winter logging and more instances of heavy rainfall.

Maryland Goal IV. Create Healthy, Livable Communities with Trees and Forests

(Supports National Priority III: Enhance Public Benefits from Trees and Forests)
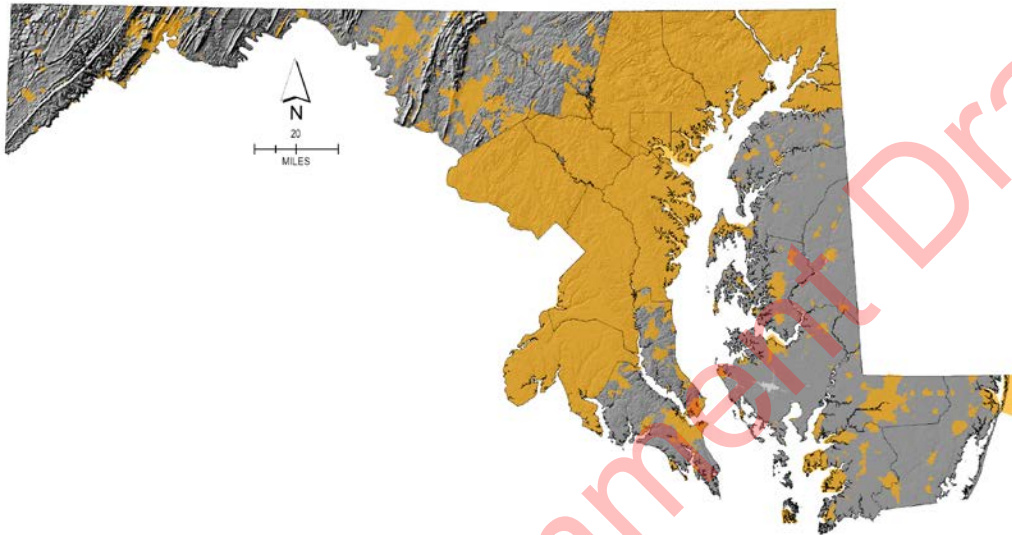
Figure 7: Priority areas for urban and community forestry goals.

Objective IV.A. Connect people to trees and forests for healthy lifestyles.

Evidence is mounting on the numerous ways that trees and forests help people live healthier lives and heal faster. These benefits are needed in all types of communities, from major urban centers to small, rural towns.

Strategy IV.A.1. Promote diverse nature-based solutions for healthy lifestyles and healing.

Example Tactics:
- Engage community leaders in projects that use trees and forests to meet community needs, from reducing heat islands to engaging new neighbors in community improvement and expanding recreational options.
- Partner with health care facilities to take advantage of therapeutic uses of trees and forests, nominating qualifying projects at residential health care facilities for Arbor Day Foundation Tree Campus, Health Care recognition.
- Expand awareness of the benefits of urban greening and the expanding research basis, such as at Green Cities/Good Health.

- Communicate tree planting opportunities, benefits of forests and trees, and other forestry topics through social media to increase public awareness.

Strategy IV.A.2. Provide accessible forest-based recreation and education, addressing issues for diversity, inclusion and equity, particularly in underserved communities, urban or rural.

Example Tactics:
- Partner with communities to assess tree canopy expansion options on school campuses that can be used for outdoor education.
- Use the Arbor Day Poster Contest in grade schools to build awareness and enthusiasm for the benefits provided by trees and forests.
- Provide youth programs that build a career ladder for encouraging diversity in natural resource careers and urban forestry (e.g., Conservation Jobs Corp, the Maryland Conservation Corps, summer camp at UMD, Natural Resource Careers Camp).
- Tap the expertise of diversity workgroups and organizations to build interest in trees and forests in underserved communities.
- Collaborate with stakeholders, agencies, and organizations to develop plans, projects, and maintenance guidelines that improve recreational safety and maintain environmental functions in urban and rural communities.
- Address equity issues and underserved communities in varied ways, including local and regional greenways, city parks, restored urban stream corridors, street trees, and other urban forests.

Objective IV.B. Support Livable Green Communities
People like to live in communities with green space and trees, which is reflected in higher real estate values where well-tended trees are present. Trees and forests grow environmental services like cleaning air and water, and build demand for green jobs in tree care and landscaping.

Strategy IV.B.1. Provide urban and community forestry assistance to cities, suburbs, and towns to enhance and restore open space and expand urban tree canopy.

Example Tactics:
- Work with the Maryland Urban and Community Forestry Committee to identify approaches and actions to improve urban forests and opportunities for urban forestry workshops.
- Provide technical assistance for assessing urban tree and forest canopy, developing canopy goals, and targeting new areas for tree planting to meet the Chesapeake Bay Program goal of 2,400 acres by 2025 in the Vital Habitats Outcome.
- Track urban tree canopy goals and quantify benefits of planted trees with science-based assessment tools.
- Provide opportunities for community-based volunteer tree planting, supporting tree plantings for Earth Day, Arbor Day, and other events.
- Support tree planting on public lands, providing low-cost containerized trees through the Tree-Mendous MD program, Gift of Trees, and other means.
- Use recognition programs such as PLANT (People Loving And Nurturing Trees), the Arbor Day Foundation, and the Mid-Atlantic Chapter of the International Society of Arboriculture awards to highlight and reward urban forestry programs in communities.

Strategy IV.B.2. Share urban forestry and agroforestry techniques and tools and continue working with municipalities to establish and maintain local urban forestry programs.

Example Tactics:
- Assist communities with creating and maintaining programs that establish, maintain, and replace urban trees and forests.
- Expand options for and awareness of financial assistance for tree planting and urban tree canopy expansion.
- Expand options and techniques for successful urban tree planting and maintenance.

Strategy IV.B.3. Develop tools to help communities strategically connect open spaces to build a functioning green infrastructure.

Example Tactics:
- Develop and share information and tools to help local leaders and planners strategically protect parks, riparian areas, source water protection areas, and wetlands.
- Integrate land planning, management, and conservation to build an interconnected green infrastructure that provides stormwater management, recreation opportunities, and a high quality of life for urban and suburban citizens.

Objective IV.C. Improve health and survival of urban forests.
Each city, town, and neighborhood has unique challenges and opportunities for incorporating trees and forests; working across all land types is needed, reaching public and private landowners, managers, and service providers.

Strategy IV.C.1. Ensure professional and safe urban tree care.

Example Tactics:
- Maintain and improve a state licensing program for tree care professionals with standards of practice and expertise, training, and testing.
- Ensure continuing education opportunities for tree care professionals, including topics on urban tree-related technology and new laws, regulations, and policies.
- Encourage expansion of species palette and use of native species by landscape architects to improve diversity of the future urban forest.

Strategy IV.C.2. Manage conflicts of natural tree growth with public utilities and existing infrastructure.

Example Tactics:
- Maintain capacity to regulate tree care practices in public right-of-ways.
- Promote the Right Tree/Right Place approach to tree establishment.
- Improve tree care practices in public right of ways.
- Implement roadside-tree programs to maintain healthy tree canopy near roadways that does not interfere with safe travel on roads.

Strategy IV.C.3. Identify appropriate standards and recognize beneficial urban tree care programs and practices in localities.

Example Tactics:

- Recognize communities that have demonstrated good urban tree care and progress in tree cover through programs such as PLANT (People Loving and Nurturing Trees), Tree City USA, Tree Campus USA, Tree Campus Health Care, and other local initiatives.
- Provide technical assistance to aid communities in improving tree health as part of tree canopy expansion and urban forest management.

Maryland Goal V. Respond to Changing Weather Patterns

(Supports National Priority III: Enhance Public Benefits from Trees and Forests)

Observed trends today including warmer winters, drier summers and more heavy rainstorms lead to increased carbon dioxide fuels which contribute to faster growth for many plants. Managing landscapes to be more resilient to these changes will require an adaptive management approach based on maintaining ecosystem health, diversity and connectivity. A "no-regrets" approach is pursued to prioritize actions that will meet other desired outcomes, including clean water, more attractive neighborhoods, and areas for outdoor recreation, building on the inherent multiplicity of forest benefits.

Objective V.A. Plant and Care for Trees and Forests to Mitigate for Weather and Natural Hazards Impacts

Trees are nature's original solar panel and carbon storage solution. They provide environmental services and health benefits while they grow and are renewable resources to meet today's needs for shelter and heat when harvested. How we replant and care for young trees can greatly affect the types and rates of future benefits from trees, including carbon sequestration. Partnerships and leadership are needed to realize gains in forest and tree-planting that optimize contributions to combat weather and natural hazards-related impacts.

Strategy V.A.1. Target expanded tree and forest planting to improve carbon sequestration, air quality, urban heat, and stormwater management.

Example Tactics:

- Use expanded tree and forest planting programs in Goal I to address mitigation needs, identifying opportunities to better implement actions through existing forestry programs and regional partnerships.
- Partner to develop planting programs targeted at urban heat islands, incorporating research-based design principles on size and distribution of forest patches and pairing with other goals for attractive communities and healthy lifestyles.
- Identify new funding sources that tap public interest in addressing identified changes and build on the efficiencies of existing partnerships, such as voluntary carbon credits tracked through Chesapeake Bay Program verification practices for tree and forest planting.
- Expand options to help Marylanders plant trees and forests, such as expanding lawn-to-woodland plantings and Marylanders Plant Tree coupons in partnership with local tree nurseries.
- Organize stakeholder meetings, expanding information on financing options for landowners in voluntary markets.

Strategy V.A.2 Improve tree survival and growth for greater mitigation potential.

Example Tactics:
- Provide tools to help identify the right tree for site conditions and expected changes in temperature and rainfall, and planting site preparation for better growth.

- Encourage use of tree species that grow to large sizes where space and soil rooting volume permit, tapping their greater potential for carbon storage, shading, and reduced energy use for cooling.
- Develop and communicate information on care needed at different stages of tree growth and provide aids to implement needed care, such as prompts for when to water or not water recently planted trees, and best seasons for mulching, weeding, and pruning.
- Expand digital resources and communication on tree care information and where to find licensed tree care when needed.
- Develop training networks for neighbor-to-neighbor strategies to improve tree maintenance in communities and/or on private land.
- Expand availability of contractors able to perform cost-effective maintenance and management for small woodlots and forest patches, expanding training for interested service providers, such as landscaping and lawn care contractors.

Strategy V.A.3. Improve tracking and coordination of tree planting and operations contributions to mitigation and response.

Example Tactics:
- Help coordinate and track actions related to Maryland's Climate Action Plan, Greenhouse Gas Reduction Act, Clean Energy goals, Coastal Resiliency planning, and Saltwater Intrusion Plan.
- Support and inform research and tools to improve estimates of carbon sequestration, energy efficiency gains from tree canopy shading and urban heat island reduction, and other mitigation contributions.
- Improve tree planting reporting and tracking to quickly assess contributions to carbon sequestration and hazards mitigation.
- Promote and track mitigation and energy conservation through urban tree canopy expansion and tree planting programs like Marylanders Plant Trees.
- Identify improvements in operations that offset or reduce impacts, such as using energy efficient designs for facility upgrades or rehabilitation.
- Identify target areas for planting that reduce erosion and aid in the stabilization of coastal areas.

Objective V.B. Innovate forest management for climate-adapted future forests.

Managed forests were recognized as a foundation for nature-based solutions to climate change (IPCC report, May 17, 2019). Climate impacts exacerbate other stressors in a developing landscape and means that forest management needs to address even more factors to keep healthy, native forests on the landscape. Data-driven forest management, experimentation, monitoring actions, and cross-boundary coordination will help managers adjust actions as conditions change.

Strategy V.B.1. Incorporate climate change adaptation into forest management strategies.

Example Tactics
- Use silvicultural techniques and management guidelines that address climate variability, such as warmer, wetter winters and drought in summers, maintaining appropriate tree stocking levels for greater tree vigor in the face of changing weather patterns.

- Coordinate with restoration partners to augment climate resilience projects with additions of forests, trees, and healthy forest management planning, within project designs or as a complementary practice in the watershed.
- Identify species less adapted to current climate trends and match to refuge sites where they could continue to live, such as higher elevations, northern aspects, or moister sites.
- Manage for drought-tolerant species and spacing to encourage resilience in the face of changing climate and ecology.
- Conserve migration corridors and geologically complex portions of the landscape with more options for short distances between varied sites.
- Consider assisted migration of southern species in parts of the landscape where conditions are changing most rapidly and have the greatest stresses. Ensure representation of species, habitats, and protection during land management activities.
- Design mitigation plantings to support adaptation needs (like forest diversity, pollinator habitat, or afforesting stream buffers) to the extent possible. Educate landowners about woodland adaptation strategies, incorporating state and regional guidelines for climate resilience, and holding a stakeholder meeting on financing options for landowners to access carbon markets

Strategy V.B.2. Mitigate climate change with sustainable forest management.

Example Tactics:
- Work with DNR, the Center for Economic and Social Science, American Forests, and U.S. Climate Alliance to improve estimates of carbon captured in common forest management scenarios and economic outcomes.
- Quantify carbon impacts (emissions and sequestration) of forest management and wood production over the life-cycle of production, use, and disposal with comparison to alternative products.
- Share knowledge on how to manage forests for continued rapid growth, carbon sequestration, and healthy trees.
- Deploy the needed information and technology on the growth, resilience, and adaptability of forests considering climate change effects.
- Increase CO2 sequestration in forest biomass and carbon storage in durable wood products through varied approaches, from optimizing growth to extended rotations and value-added markets that create long service lives for wood products.
- Implement pilot projects for carbon sequestration on public and private lands to optimize benefits of fee-in-lieu mitigation or other funding sources, supporting green infrastructure expansion, reforestation offsets under RGGI, and anticipating wetland migration.
- Provide information on landowner opportunities for carbon sequestration, tax incentives, and markets, targeting properties with forest stewardship plans.

Strategy V.B.3. Adapt sustainable forest management to rising sea level, salt intrusion, and changing forest health stressors.

Example Tactics:
- Widen riparian forests where sea-level rise and erosion are threatening existing forests.
- Avoid epidemics and forest dieback by managing for diverse and resilient forests and reducing stresses from deer and invasive species (plants, pests, diseases).
- Identify sensitive species and plan for continuity of habitat (restoration, refugia, replication, and relocation if needed).

- Address effects of sea level rise and geologic subsidence through appropriate planning of buffer areas and species selection.
- Continue working with the Maryland Department of Planning on Maryland's Saltwater Intrusion Plan.
- Collaborate with regional efforts to characterize risks and adaptation priorities, including coastal resiliency planning, ecoregion climate change vulnerability assessments, use of green infrastructure to improve climate resiliency such as Greater Baltimore Wilderness Coalition, and improving capacity for wood utilization following disasters.

Objective V.C. Diversify forests and develop markets to optimize carbon sequestration and long-term carbon storage.

Strategy V.C.1. Advance renewable energy policies that foster forest land use and habitats.

Renewable fuel sources like woody biomass reduce fossil fuel emissions, with the regrowth offsetting emissions except for energy used in harvesting, transport and energy generation. Most biomass projects in Maryland are expected to focus on harvest residues, portions of trees not used in other wood product markets, rather than land dedicated to farming woody biomass crops. Contributions will help meet goals for the Clean Air Act, the Maryland Clean Energy Act and the Greenhouse Gas Reduction Act.

Example Tactics:
- Identify facilities where forest biomass could provide locally sourced, reliable, low-cost, renewable energy such as combined heat and power with modern, low-emission technology, especially where natural gas is not available.
- Complete at least two pilot projects in Maryland that would demonstrate the benefits of woody biomass as a renewable energy source.
- Provide technical assistance in right-sized design, fuel sourcing, and effective maintenance of high-efficiency, low-emission woody biomass systems.
- Share successful examples of cost savings and wood sourcing that reduces urban wood waste.
- Promote energy efficient, light-on-the-land harvesting, handling, and processing technologies for woody biomass.
- Facilitate new uses and technologies for converting woody biomass into energy and other bio-based products.
- Contribute to green power for State facilities and renewable energy portfolio.

Strategy V.C.2. Use diverse forest markets to increase production of durable forest products with long life cycles that lengthen carbon sequestration.

Example tactics:
- Use markets for thinning, such as pulpwood, chips, or pellets, to make management for larger trees and longer rotations financially feasible for landowners.
- Expand market options for selling sawtimber, pine and hardwood, and veneer to create incentives for longer rotations and higher conversion rates to durable products that sequester carbon for longer.
- Expand awareness of and demand for mass timber products that promote long-term sequestration and use of renewable, sustainably sourced materials for a variety of construction types.

V.C.3. Expand use of renewable, recyclable, biodegradable wood products that displace use of nonbiodegradable products.

Example tactics:
- Partner with product developers to find packaging solutions that reduce problems with plastic and micro-plastic pollution that does not biodegrade.
- Work with sustainable materials and zero waste programs to expand wood-based solutions that build incentives for keeping more forests growing on the landscape.
- Expand awareness of benefits to forest health from choosing renewable, recyclable plant-based materials, especially within the context of strong rules conserving forests, voluntary sustainable forest certification, and programs for tree planting and restoration.

Timeline and Funding

To implement scientific forest management is to take the long view. Forests mature over decades, even centuries, showcasing past management practices long afterwards. Maryland's Forest Action Plan was developed with goals focused on long-term improvements in conditions, and tactics that can be implemented in the near term. The annual work plan process will be used to identify yearly priorities and actions based on existing resources and to plan for future resource needs.. Unknown stressors or opportunities such as new invasive species or forest product technology changes are likely to occur. New conditions can change priorities quickly, and may require interim revisions of short-term priorities. Assessments will be reviewed for needed updates on at least a five-year cycle.

State and Federal Laws: Other priorities are set by ongoing legal obligations. Maryland has a robust set of laws protecting forests and environmentally sensitive areas, detailed in the Socioeconomic Setting prior to the Goals. Maryland's Sustainable Forestry Act of 2009 and the 2013 Forest Preservation Act are the newest legislation, and the Sustainable Forestry Council provides guidance to DNR on implementing these.These responsibilities are incorporated into the Forest Strategy and will require ongoing commitments of state resources to implement.

Supporting Actions: Success of many of the top priority goals depends on carrying out other key supporting actions. The goal of more livable communities is needed to encourage development patterns that better conserve existing forest. Reducing fire risk in communities through appropriate planning and hazard mitigation is needed to make wildfire suppression practical in the wildland urban interface. Working with partners to address long-term impacts of deer browse and invasive species is needed to allow normal forest regeneration, even if the forests are protected from the primary threat of conversion. **Many of these projects will require additional support to have effective results, and some will be included in federal requests that primarily support identified priority actions and places.**

The estimated work force needed to deliver all of the desired priorities is substantially more than existing funds can support. Resources already have been allocated to priority goals like keeping forests, but the reduction of more than a third of forestry agency staffing over the past several years (see Appendix C) has translated into restrictions on scope of activities. Federal funding requests have generally made up less than 15% of Maryland Forest Service budgets, so federal funds are not expected to fill the gap, merely to provide an avenue for priority actions in appropriate priority areas. Partner and volunteer contributions are not included in the funding analysis, but these are significant existing contributions and have the potential to be even greater.

Targeted program delivery is expected to make up 85% of requests for USFS funds and competitive proposals addressing specific issues and priority areas could make up another 15% of USFS funds requests. Maryland priorities for federal funding will focus on sustainable forests, jobs, water, forest health, and climate actions.

Top priorities related to keeping forests are expected to be included in state and federal funding consistently, although some market development activities may not be submitted for federal funding every year. State land management and certification will be carried out with state funds.   Other supporting goals are needed to bolster the quality of existing

forest systems, and are expected to require more funding than is available from state funds. These include wildfire control and hazard mitigation, forest pest inventory and control, urban and community forestry, and watershed forestry actions to support Chesapeake Bay restoration. The least critical supporting actions are expected to be included in federal requests with less frequency and in response to specific needs in priority areas (like urban tree health in the I-95 Corridor multi-state area). Even though these goals were considered to be a second tier in priority, they were included in the strategy because they play critical supporting roles. They are considered important and necessary, even if they command less attention and resources. Partnerships will be important at all priority levels to augment and effectively use state and federal funds.

Partner and Stakeholder Involvement

The 2020 Forest Action Plan was presented and distributed to a variety of stakeholder groups, including the Sustainable Forestry Council, the MD/DE Society of American Foresters, the Maryland Invasive Species Council, and others.

The 2020 MD Forest Action Plan was developed with input from stakeholders and related planning efforts, including the Growing for Good Forestry Literacy survey, the Maryland Wildlife Action Plan, the 2014 Chesapeake Bay Agreement, the University of Maryland Extension survey on future sustainability of forest industry, Maryland Climate Action Plan, Rural Economies Workgroup of the Sustainable Growth Commission, and other State goals.

In May 2019, MD DNR Forest Service held 6 statewide Listening Sessions, staffed by the Maryland Forest Service and members of the Harry R. Hughes Center for AgroEcology.

Western MD - Wednesday, May 8, 2019
6:30 p.m. to 8:30 p.m.
Allegany College of Maryland, Continuing Education Building, Room 12/14
12401 Willowbrook Road, Cumberland, MD 21502

Central MD (Frederick) - Thursday, May 9, 2019
1 p.m. to 4 p.m.
Urbana Regional Library, Anthony M. Natelli Community Room
9020 Amelung St., Frederick, MD 21704

Annapolis - Monday, May 13, 2019
2 p.m. to 5 p.m.
Department of Natural Resources, Room C-1
580 Taylor Ave., Annapolis, MD 21401

Lower Eastern Shore - Tuesday, May 14, 2019
6:30 p.m. to 8:30 p.m.
Ward Museum of Wildfowl, Legacy Center
909 South Schumaker Drive, Salisbury, MD, 21804

Upper and Mid-Eastern Shore - Wednesday, May 15, 2019
9 a.m. to 12 p.m.

Chesapeake College, Room HPAC-127
1000 College Circle, Wye Mills, MD 21679

Southern MD - Monday, May 20, 2019
1 p.m. to 4 p.m.
Potomac Branch Library, Potomac Meeting Room
3225 Ruth B. Swann Drive, Indian Head, MD 20640

The Forest Action Plan issues were presented and discussed at the State Forest Stewardship Committee meeting 10/22/19 (with Forest Legacy Assessment of Need), the Maryland-Delaware Society of American Foresters on Nov. 5, 2019, and the Maryland Forest Service Annual Meeting in September 2019.

> Outreach list suggested by State Forest Stewardship Committee 10/22/19
> National Urban Community Forestry Advisory Committee- national UCF Strategy
> National Research Council
> MD Climate Change Commission
> MD Sustainable Growth Commission
> Soil Conservation Districts
> Economic Development, Chamber of Commerce
> Greater Cumberland Committee
> Appalachian Regional Committee
> Chesapeake Bay Program
> Federal partners with significant forest holdings, including the United States Department of the Interior Fish and Wildlife Service, the National Park Service, the Department of Defense, the United States Department of Agriculture, and the National Aeronautics and Space Administration.

The results of previous work were considered, including Chesapeake Bay goal state implementation plans, and priority area mapping efforts, in addition to the broad-based public input from the public outreach process. Links to previous work include:

- [Maryland's Strategic Forest Resource Plan](#) – 2006
- [No Net Loss of Forest Task Force](#) -- January 2009
- [Guiding Maryland's Forest Community into the 21st Century](#) – December 2000
- [Maryland's Green Infrastructure Assessment](#) – May 2003
- [The Importance of Maryland's Forest: Yesterday, Today, and Tomorrow](#) – September 2003
- [The Impact of Resource Based Industries on the Maryland Economy](#) - 2005
- [Forests and Land Use](#)
- [Governor's Commission for Protecting the Chesapeake Bay through Sustainable Forestry](#) - October 2006
- [Forest Inventory Analysis Findings (5th Statewide Inventory)](#) - 1999
- [The State of Chesapeake Forests](#) – September 2006
- [Maryland Sustainable Forestry Act of 2009](#) (SB 549)
- Maryland's Strategic Forest Land Assessment – October 2003 http://www.dnr.state.md.us/
- [forests/planning/sfla/intro.htm](#) or http://www.dnr.state.md.us/forests/download/sfla_report.pdf
- Maryland Stream ReLeaf Implementation Plan - 2005 http://www.dnr.state.md.us/forests/
- [download/Stream%20ReLeaf%20Plan%202005%20-%202010.pdf](#)

- Maryland Forest Conservation Goals – 2007 http://www.dnr.state.md.us/forests/pdfs/MFCP43007.pdf
- Tjaden, R., D. Rider, E. Campbell, and A. Hudson. February 2015. Maryland's Forest Resources in a Dynamic Environment: Assessing the future confidence and sustainability of Maryland's forest industry. University of Maryland Dept. of Environmental Science and Technology. 107p. https://dnr.maryland.gov/forests/Documents/sfc/SFC_ConfidenceIndex.pdf
- Maryland Sustainable Growth Commission Rural Economies Workgroup Report, 2015

Stakeholders and Review Process for the Action Plan:

The Maryland Forest Service partnered with the Harry R. Hughes Center for AgroEcology for Forest Action Plan outreach. A Constant Contact survey was developed and distributed through available mailing lists and posted on DNR's Maryland Forest Service website's front page between April and June 2019. Results were compiled in July 2019 (Appendix E).

Six Listening Sessions were held around the state during May 2019.

Surveys were distributed through distribution lists for coordinating committees, including the Stream ReLeaf Coordinating Committee, State Forest Stewardship Committee, Maryland Urban and Community Forestry Advisory Council, the Baltimore County Forest Sustainability Network, State Water Quality Advisory Committee, and broader list serves on the Alliance for the Chesapeake Bay Chesapeake Network, Maryland Group. Comments were solicited from all units within the Maryland Department of Natural Resources. Partners included:

- Maryland Department of Natural Resources
- Maryland Department of the Environment
- Maryland Department of Agriculture
- Maryland Department of Planning
- Maryland Environmental Services
- University of Maryland
- Maryland Environmental Trust
- Maryland Association of Counties
- Maryland Municipal League
- Maryland Association of Forest Industries
- Maryland Forests Association
- Sustainable Forestry Council
- Chesapeake Bay Program, (Forestry Work Group and USFS)
- Chesapeake Bay Trust
- Chesapeake Bay Foundation
- Chesapeake Bay Commission
- Partnership for Sustainable Forestry
- Maryland Association of Forest Conservancy District Boards
- MD/DE Society of American Foresters
- Maryland State Firemen's Association
- Maryland Alliance for Greenway Improvement and Conservation
- Interstate Commission on the Potomac River Basin
- US Forest Service
- US Fish & Wildlife Service

- Natural Resource Conservation Service (State Technical Committee)
- US Environmental Protection Agency – Chesapeake Bay Program
- Forestry for the Bay
- Alliance for the Chesapeake Bay
- The Nature Conservancy
- The Conservation Fund
- Trust for Public Land
- Forest Resource Association
- Eastern Shore Land Conservancy
- Chesapeake Conservancy
- Maryland Arborist Association
- US Department of Defense
- National Park Service
- National Aeronautics and Space Association

The Maryland Forest Service manages the Forest Legacy Program, so current priorities for Forest Legacy and anticipated future directions were considered in the development of the Action Plan.

The DNR Wildlife and Heritage Service was consulted with particular attention to recommendations for fish and wildlife priority areas and preferred data sources. A review of the Maryland State Wildlife Action Plan draft was consulted for Forest Action Plan revisions.

Coordination with other Resource Management Plans

Forests are one of Maryland's many natural resources, and often interact with planning for related resources. Other plans were consulted for opportunities to coordinate management.

Forest Legacy Assessment of Need - An "Assessment of Need for the Maryland Forest Legacy Program" was originally approved by the US Forest Service on January 22, 1996, and a revised version was approved in March 2014. The Forest Legacy areas identify priority areas for conserving working forests, and are an important resource for Maryland Goal I. The Maryland Forest Service will continue to coordinate the Forest Legacy goals into implementation of the overall Forest Strategy.

Maryland State Wildlife Action Plan - Recommendations for all forested habitats identified in the plan http://www.wildlifeactionplans.org/maryland.html were compared to strategies identified in the Forest Action Plan. Frequently recommended actions included:
- Conserve large blocks of contiguous forest where appropriate.
- Protect old-growth forest habitat and adequate forested buffers.
- Establish and maintain landscape-scale protected forest habitat and movement corridors.
- Minimize fragmentation of large contiguous forest blocks.
- Develop and implement protocols to control invasive species in a manner compatible with species of Greatest Conservation Need.
- Protect forests/wetlands through easement/acquisition.
- Incorporate forest conservation into land use and land planning efforts by local, state, and federal agencies.
- Conserve appropriate corridors for movement and dispersal of rare species.

Maryland is developing a detailed mapping resource for conserving rare species and their habitats called BioNet. The Forest Service will collaborate with the Wildlife and Heritage Service to use this and other data sources for targeting forest conservation and restoration where appropriate.

Community Wildfire Protection Plans - CWPPs are included in the State Priority areas for fire/forest health s, and are directly represented in the responses to long-term stressors under Maintaining Healthy Forests.

Maryland Climate Action Plan - Commitments from the Climate Action Plan http://www.mde.state. md.us/Air/climatechange/legislation/index.asp and Greenhouse Gas Reduction Act were included in the State Strategy as priorities under the Maryland Goal, Respond to Climate Change. The Maryland Forest Service actively participated in mitigation and adaptation plan development, and continues to support tracking and implementation for climate change activities.

Chesapeake Bay Goals and Commitments - Commitments for forest buffers and forest conservation for water quality were included in the Maryland Forest Action Plan Strategy, Goal III, Provide Clean Water. The primary commitments are embodied in the 2014 Chesapeake Bay Agreement, and echo the 2007 Response to Forest Conservation Directive 06-1 http://www.chesapeakebay.net/content/publications/cbp_27761.pdf. The goals for forest buffers,

urban tree canopy, and conserving forests in areas important for water quality are ambitious, and require new resources.

Maryland Land Preservation, Park, and Recreation Plan (LPRP) -
http://www.dnr.state.md.us/land/ stewardship/pdfs/CompleteDNRORP.pdf The Maryland LPRP includes recommendations on improving outdoor recreation opportunities in the State. The plan projects rising usage of outdoor recreation areas with an expanding regional population, and along with it, increased conflicts among different users. It references additional plans for recreation, such as the Bay Access Plan and the Rails-to-Trails Study. The LPRP is included as an important strategy for forest conservation, Maryland Goal, Restore and Sustain Forest Landscapes. Many of the Strategy's goals and actions echo recommendations made in the LPRP, such as:

- Develop educational materials to increase understanding of natural systems.
- Connect schools and communities to natural areas using trails.
- Use youth community service projects for construction and maintenance on DNR lands.
- Partner with local schools, colleges, and universities for conservation education initiatives.
- Aid local governments with developing local parks and greenways.
- Partner with land trusts, local governments, and agencies to leverage greater land conservation.
- Clearly mark land boundaries.

Program Open Space - The targeting developed to identify forests important for water quality for the Chesapeake Bay Forest Conservation Directive is one of four critical resource layers used to rank and prioritize land acquisition through Program Open Space (POS), one of the State's major land protection programs.
http://www.dnr.state.md.us/land/pos/pos_eval_process.asp

Land conservation programs like POS are included as an important strategy for forest conservation, Maryland Goal, Restore and Sustain Forest Landscapes. The Sustainable Forestry Act also directs the Secretary of DNR to consider land conservation priorities that include conserving working landscapes and protecting and restoring forests from a wide variety of threats.

Maryland Emergency Response Plan for Invasive Forest Pests - The emergency response plan for invasive pests is modeled after the incident command structure used for wildfire response. This supports strategies protecting forests from threats.
http://www.mda.state.md.us/plants-pests/forest_ plan/title.html

Multi-State Issues

Many of the issues facing Maryland's forests are shared by neighboring states. Multi-state issues are being identified as areas (issue areas and/or landscapes) where activities are intended to be coordinated with adjacent states, detailed in the State Forest Assessment, Part I of the Forest Action Plan. Some multi-state issues will be approached through existing coordination groups, such as the Chesapeake Bay Program or Northeastern Area planning groups. Other multi-state projects will be coordinated on a project-by-project basis.

Chesapeake Bay - Work for the Chesapeake Bay multi-state issue will focus on actions needed to support Objective III.A. These include riparian forest buffers, forest conservation in areas of high value for water quality, and urban tree canopy. Invasive species issues affect most of these goals, and are included in watershed efforts. Since over 93% of Maryland is within the Chesapeake Bay watershed, most activities in the state affect the water quality downstream. Coordination will be pursued through the continued active engagement in the Chesapeake Forestry Work Group. Maryland has been involved in the Forestry Work Group since its beginning in the late 1980's and will continue to pursue collaborative projects and goals supporting restoration of the Bay and its tributaries.

Appalachian Mountains - Western Maryland is part of the chain of Appalachian Mountains and shares common issues like maintaining robust forest products markets, recreation pressures, surface mine reclamation, oil and gas development, wind energy development, and wildland-urban interface issues for wildfire control. Other issues like expanding ecosystem markets are applicable across a variety of landscapes.

I-95 Corridor - Interstate 95 connects a string of East Coast cities from Boston to Richmond. Many of the actions and solutions for urban forestry issues can benefit from learning from other states and sharing solutions for expanding urban tree canopy, dealing with invasive species, and incorporating more trees into developments.

Forest Health - Several forest health issues have the potential to change Maryland's forests within the next five years. Minimizing damage from forest pests almost always requires coordination with adjacent states and federal agencies like APHIS (Animal and Plant Health Inspection Service). The Maryland Department of Agriculture has primary responsibility for survey, detection, outreach, suppression or eradication of forest pests. Forest health issues anticipated to use a multi-state approach include emerald ash borer, hemlock woolly adelgid (HWA), and thousand cankers disease. Southern pine beetle, yellow-poplar weevil, and Sirex wood wasp are other potential multi-state projects. Fire suppression planning will continue to be coordinated with adjacent states through the Mid-Atlantic Compact.

Diminished Species Restoration - Some of Maryland's forest species historically present are now only in small areas of their former range. These include American chestnut, shortleaf pine, pond pine, and Atlantic white-cedar. Restoring these species may be addressed as a multi-state issue since ranges cross state boundaries and shared resources could increase efficiency and effectiveness of projects.

Delmarva/Mid-Atlantic Coastal Plain - The coastal peninsula linking Delaware with coastal areas of Maryland and Virginia shares geographic boundaries and socioeconomic similarities. Southern New Jersey has some similar areas of rural land, pine predominance, and extensive

wetlands. Cross-state coordination is occurring with Delaware for assessing forest harvest best management practices and developing a peninsula-wide approach for Delmarva. Other issues common to the peninsula include planning for sea level rise, maintaining robust forest product markets, protecting rare species like the Delmarva fox squirrel, and controlling pests targeting pines such as the southern pine beetle and Sirex wood wasp. Walnut twig beetles, carriers of thousand cankers disease afflicting black walnut, was found in late 2013 in Cecil County, and is expected to be a slow-moving future disease of concern for the Delmarva. Addressing the forest pests targeting the Shore or Atlantic white-cedar restoration would combine multi-state issues and geographies, and could facilitate sharing resources like genetically appropriate nursery stock or pest control approaches.

Readiness and Environmental Protection Integration Program Area- Maryland will work with federal partners to plan land conservation to support continued defense and training functions, which can span multiple states through REPI and other similar programs such as the Army Compatible Use Buffer (ACUB).

Measures for Tracking Progress

The Maryland Forest Service is responsible for reporting progress for a number of different commitments. Many of the forest stewardship, afforestation, urban forestry, fire suppression, and fire risk reduction activities are tracked to meet requirements for USDA Forest Service funding. Some forestry actions like riparian forest buffers, upland tree planting, forests conserved through the Forest Conservation Act, and sediment and erosion control harvest plans/implementation are reported as BMPs for credits in the Chesapeake Bay model. Progress in meeting Chesapeake Bay Commitments like the Forest Conservation Directive is tracked and reported through the Chesapeake Bay Program Forestry Work Group. The Forest Conservation Act requires annual reporting on forests cleared, protected, and replanted to a legislative oversight committee. Progress to meet other goals including the Maryland Coastal Bays Strategy and the Maryland Climate Action Plan mitigation goals are reported annually or more frequently. The Marylanders Plant Trees program http://www.trees.maryland.gov has an online tracking mechanism for trees planted statewide. Overall progress tracking will have to coordinate the needs and formats required for these reporting requirements. Progress measures are expected to include:

- Percent forest cover
- Average Diameter at Breast Height (DBH)
- Acres affected by forest pests and diseases
- Number of owners served- stewardship plans, afforestation, timber stand improvement, sediment and erosion control review, buffers, invasive species
- Number and acres of trees planted
- Number of acres affected- in and out of Stewardship (SAP) priority areas
- Number and acres participating in tax programs
- Number of seedlings produced
- Number of species of seedlings raised
- Number of landowners on stewardship plan wait lists
- Acres of certified forest, public and private
- Acres and miles of forest buffers
- Acres of forest protected from development and open to management (total and those within areas of high priority for water quality)
- New forest businesses and distribution in state
- Number of low-interest loans or technical assistance aid
- Number of licensed tree experts
- % canopy cover and acres of urban tree canopy
- Number of municipalities with urban tree canopy goals
- Number of active ecosystem markets
- Number of people reached with forestry training provided or supported (financial or technical assistance)
- Public land forest resource inventory updated
- Biomass and tons carbon sequestered

Additional measures will be tracked, consistent with recommendations from the National Association of State Foresters and USDA Forest Service State and Private Forestry.

Appendix A: Glossary

This glossary is designed to assist the reader of the Maryland State Action Plan better understand some of the terminology associated with forest management.

A

adaptive management - a dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, along with research results, to modify management on a continuing basis to ensure that objectives are being met

agroforestry - a land-use system that involve deliberate retention, introduction, or mixture of trees or other woody perennials in crop and animal production systems to take advantage of economic or ecological interactions among the components

B

basal area - the cross-sectional area of the trunk 4½ feet above the ground; (per acre) the sum of the basal areas of the trees on an acre; used as a measure of forest density

Best Management Practice (BMP) - a practice or usually a combination of practices that are determined by a state or a designated planning agency to be the most effective and practical means (including technological, economical, and institutional considerations) of controlling point and nonpoint source pollutants at levels compatible with environmental quality goals, conceptualized in the 1972 Federal Water Pollution Control Act

biological diversity or biodiversity - the variety of life in all its forms and all its levels of organization. Biodiversity refers to diversity of genetics, species, ecosystems, and landscapes

biomass (forest) – wood products used as a fuel or energy source that can replace fossil fuels with renewable fuels; usually considered to be wood not normally sold or utilized from a forest harvest, or a short-rotation tree crop grown for energy use

breast height - 4½ feet above ground level. See diameter at breast height

browse - parts of woody plants, including twigs, shoots, and leaves, eaten by forest animals

C

canopy - the continuous cover formed by tree crowns

carbon credit - A permit that allows the holder to emit one ton of carbon dioxide

carbon sequestration - the incorporation of carbon dioxide into permanent plant tissues, used to mitigate increasing carbon dioxide levels linked to climate change; tree growth captures carbon dioxide from the atmosphere and reduces it until the wood is burned or decayed

c*ertified forest* – forest land reviewed by a designated authority to attest that the management of forest land meets approved standards for sustainable forestry

clearcut - the harvest of all the trees in an area. Clearcutting is used to aid species whose seedlings require full sunlight to grow well

commercial forestland - any area capable of producing 20 cubic feet of timber per acre per year that has not been protected from such use by law or statute

commercial thinning - a harvest where all or part of the felled trees are extracted from useful products, regardless of whether their value is great enough to defray the cost of operation

conifer - any tree that produces seeds in cones. See softwood

conservation easement - the public acquisition, by purchase or donation, of certain rights on private lands or, in some cases, restricting the private owner's use of that land, usually restrictions on future buildings

cordwood - small diameter or low quality wood suitable for firewood, pulp, or chips. Cordwood is not suitable for sawlogs

crop tree - a young tree of a desirable species with certain characteristics desired for timber value, water quality enhancement, or wildlife or aesthetic uses

D

deciduous - shedding or losing leaves annually; the opposite of evergreen. Trees such as maple, ash, cherry, and larch are deciduous

den tree - tree with cavities suitable for birds or mammals to nest in

diameter at breast height (d.b.h.) - standard measurement of a tree's diameter, usually taken at 4 ½ feet above the ground

diameter-limit harvest - a timber sale in which all trees over a specified d.b.h. may be cut. Diameter-limit sales often result in high grading

dominant trees - trees that extend above surrounding individuals and capture sunlight from above and around the crown

E

ecosystem - organisms and the physical factors that make up their environment

endangered species - any species or subspecies in immediate danger of becoming extinct throughout all or a significant portion of its range

even-aged stand - a stand in which the age difference between the oldest and youngest trees is minimal, usually no greater than 10 to 20 years. Even-aged stands are perpetuated by cutting all the trees within a relatively short period of time

F

forest - biological community dominated by trees and other woody plants any, assessed by USDA Forest Service as any area of trees with at least 10% tree cover, at least 120 feet wide, and 1 acre in size measured from stem-to-stem from the out-most edges

forest certification – see certified forest

Forest Conservation Management Agreement (FCMA) - 15-year agreement that allows lower property tax assessments on forest land in exchange for landowners following a Forest Stewardship Plan and not changing land use

forest fragmentation - the subdivision of large natural landscapes into smaller, more isolated fragments. Fragmentation affects the viability of wildlife populations and ecosystems

forest management - the practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest —*note* forest management includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, and other forest resource values

forest types - associations of tree species that have similar ecological requirements. Maryland forest types include Allegheny hardwood, loblolly-shortleaf, northern hardwood, oak-gum- cypress, oak hickory, and oak-pine

forested wetland - an area characterized by woody vegetation taller than 20 feet where soil is at least periodically saturated or covered by water

forester - a degreed professional trained in forestry and forest management. In Maryland, all foresters must be registered with the state

forestry - the science of tending woodlands

G

green infrastructure - green infrastructure is strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations

group selection - a process of harvesting patches of trees to open the forest canopy and encourage the reproduction of uneven-aged stands

H

habitat -the ecosystem in which a plant or animal lives and obtains food and water

Habitat Conservation Plan – a legally binding plan prepared under the Endangered Species Act (ESA) by nonfederal parties and agreed to by the US Fish and Wildlife Service to protect a specified area as habitat for a threatened or endangered species; HCPs are required for those wishing to obtain permits for incidental taking of threatened and endangered species that may occur during land management activities

hardwoods - a general term encompassing broadleaf, deciduous trees

harvest - the cutting, felling, and gathering of forest timber

high grading - to remove all mature, good quality trees from a stand and leave inferior species and individuals. High grading should be distinguished from even-aged management in which mature and immature trees are removed to aid regeneration

I

improvement cut - a weeding done to remove less desirable trees in stands of pole-size or larger trees

incident command system - the facilities, equipment, personnel, procedures, and communications operating within an organizational structure and responsible for managing assigned resources to accomplish stated objectives pertaining to an emergency

industrial forester - a professional employed by a wood-using industry, usually a sawmill, who purchases timber from private woodland owners. Many industrial foresters offer free forest management or marketing services to the landowners who sell timber to the forester's employer

intergenerational transfer – the passing of assets such as land from older to younger family members

intermediate tolerance - a characteristic of certain tree species that allows them to survive, though not necessarily thrive, in relatively low light conditions

intolerance - a characteristic of certain tree species that does not permit them to survive in the shade of other trees

introduced species - a nonnative species that was intentionally or unintentionally brought into an area by humans

J

K

L

landing - a cleared area within a timber harvest where harvested logs are processed, piled, and loaded for transport to a sawmill or other facility

logger - an individual who harvests timber for a living

M

market based solutions - organizational structures for buying and selling units of environmental benefit, known as credits, created through the conservation or high-quality restoration of naturally functioning ecosystems (e.g., clean water, clean air, carbon sequestration, pollination, expanded habitat). An ecosystem market connects people willing to pay, usually businesses or governments required to offset environmental impact, with people who can take those actions, such as farmers, forest landowners, or other land managers who can conserve or restore ecologically valuable land

mast - nuts and seeds, such as acorns, beechnuts, and chestnuts, of trees that serve as food for wildlife

mortality - trees dying from natural causes, usually by size class in relation to sequential inventories or subsequent to incidents such as storms, wildfire, or insect and disease epidemics

N

nongame wildlife - wildlife species that are protected by state wildlife laws and cannot be hunted. Examples include songbirds, eagles, etc.

nontidal wetlands - wetlands not affected by ocean tides. Nontidal wetlands are subject to special regulations

northern hardwood forest type - an association of tree species common to the Northeastern United States that includes sugar maple, red maple, yellow birch, hemlock, and American beech

O

old-growth forest - a wooded area, usually greater than 200 years of age, that has never been altered or harvested by humans. An old-growth forest often has large individual trees, a multi-layered crown canopy, and a significant accumulation of coarse woody debris including snags and fallen logs

overmature - a quality exhibited by trees that have declined in growth rate because of old age and loss of vigor

overstocked - the situation in which trees are so closely spaced that they compete for resources and do not reach full growth potential

overstory - the level of forest canopy that includes the crowns of dominant, codominant, and intermediate trees

overstory removal - a silvicultural technique where the trees to be removed are all in the dominant or codominant crown class or position. This basically is performed to harvest mature trees and to remove competition from preferred understory trees

overtopped - the situation in which a tree cannot sufficiently extend its crown into the overstory and receive direct sunlight. Overtopped trees that lack shade tolerance lose vigor and die

P

parcelization - division of parcels of land into smaller parcels among multiple owners; usually precedes fragmentation, when gaps in forest cover occur

pole timber - trees 4 to 10 inches d.b.h.

precommercial thinning - a harvest made purely as investments in the future growth of stands so young that none of the cut trees are extracted and utilized. This treatment is usually completed by hand on trees 5-10 years of age. Precommercial operations improve species composition and increase the quality, growth, and vigor of remaining trees

prescribed fire - fires set deliberately, under proper supervision and certain conditions, to achieve a specific management goal such as enhancing wildlife habitat, encouraging fire-dependent plant species, reducing fuel loads that feed wildfires, and preparing sites for planting. Sometimes referred to prescribed burning.

provenance - the original geographic source of seed, pollen, or propagules

pruning - the act of sawing or cutting branches from a living tree. In forest management, pruning is done to promote the growth of clear, valuable wood on the tree bole

pulpwood harvest - a harvest where the trees are to be utilized for paper pulp. This type of harvest usually is performed as a commercial thinning where the trees are all pole sized (4" to 11" d.b.h.), but definitely less than sawtimber sized (11" d.b.h. or greater)

Q

R

reforestation – the reestablishment of forest cover either naturally (by natural seeding, coppice, or root suckers) or artificially (by direct seeding or planting)

regeneration - the process by which a forest is reseeded and renewed. Advanced regeneration refers to regeneration that is established before the existing forest stand is removed

Regional Greenhouse Gas Initiative (RGGI) - The   Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort by ten Northeast and Mid- Atlantic states to limit greenhouse gas emissions. RGGI is the first mandatory, market-based CO emissions reduction program in the United States. The states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont are signatory states to the RGGI agreement. These ten states have capped CO emissions from the power sector, and will require a 10 percent reduction in these emissions by 2018

release - to remove overtopping trees that compete with understory or suppressed trees

residual stand - the trees remaining intact following any cutting operation

riparian buffer - vegetated areas adjacent to or influenced by a perennial or intermittent stream or other bodies of water. These buffers are established and managed to protect aquatic, wetland, shoreline, and/or terrestrial environments

rotation - the number of years required to grow a stand to a desired size or maturity

S

salvage cut -herbaceous the removal of dead, damaged, or diseased trees to recover maximum value prior to deterioration

sapling - a tree at least 4 ½ feet tall and up to 4 inches in diameter

sawlog tree - a tree at least 11 inches d.b.h. and suitable for conversion to lumber. Sometimes, trees 11 to 14 inches d.b.h. are called small sawlog trees, and trees larger than 18 inches d.b.h. are called large sawlog trees

seed tree - a mature tree left uncut to provide seed for regeneration of a harvested stand

seed-tree harvest - the felling of all the trees in an area except for a few desirable individuals that provide seed for the next forest

selection or selective harvest - the harvest of all individual trees or small groups at regular intervals to maintain an uneven-aged forest. Selection harvests are used to manage species that do not need sunlight to survive

shelterwood harvest - the harvest of all mature trees in an area in a series of two or more cuts, leaving enough trees of other sizes to provide shade and protection for forest seedlings

silviculture - the art and science of growing forest trees

site - the combination of biotic, climatic, topographic, and soil conditions of an area

site index - a measure of the quality of a site based on the height of dominate trees at a specified age (usually 25 or 50 years), depending on the species

site preparation - treatment of an area prior to reestablishment of a forest stand. Site preparation can include mechanical clearing, burning, or chemical (herbicide) vegetation control

skidding - the act of moving trees from the site of felling to a landing. Tractors, horses, or specialized logging equipment can be used for skidding. Skidding methods vary in their impact on soils and the remaining stands

slash - branches and other woody material left on a site after logging

snag - a dead tree that is still standing. Snags provide important food and cover for a wide variety of wildlife species

softwood - any tree in the gymnosperm group, including pines, hemlocks, larches, spruces, firs, and junipers. Softwoods often are called conifers although some, such as junipers and yews do not produce cones

sprout - a tree growing from a cut stump or previously established root system

stand - a group of forest trees of sufficiently uniform species composition, age, and condition to be considered a homogeneous unit for management purposes

stand density - the quantity of trees per unit area, usually evaluated in terms of basal area, crown cover and stocking

stocking - the number and density of trees in a forest stand. Stands are often classified as understocked, well-stocked or overstocked

stumpage - the value of standing trees in a forest

succession - the natural replacement of one plant (or animal) community by another over time in the absence of disturbance

suppressed - a tree condition characterized by low growth rate and low vigor as a result of competition with overtopping trees. See overtopped

sustainable forestry - the practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations; criteria for sustainable forestry include (a) conservation of biological diversity, (b) maintenance of productive capacity of forest ecosystems, (c) maintenance of forest ecosystem health and vitality, (d) conservation and maintenance of soil and water resources, (e) maintenance of forest contributions to global carbon cycles, (f) maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies, and (g) a legal, institutional, and economic framework for forest conservation and sustainable management (Montréal Process, 1993)

sustained yield - an ideal forest management objective in which the volume of wood removed equals growth within the total forest

T

thinning - a partial cut in an immature, overstocked stand of trees used to increase the stand's value growth by concentrating on individuals with the best potential

threatened species - a species or subspecies whose population is so small or is declining so rapidly that it may become endangered in all or a significant portion of its range

timber stand improvement (t.s.i.) - any practice that increases the value or rate of value growth in a stand of potential sawtimber trees. Pruning and thinning are considered t.s.i.

tolerance - a tree species' capacity to grow in shade

Total Maximum Daily Load (TMDL) - regulatory term in the U.S. Clean Water Act (CWA), describing a value of the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards

tree canopy - any area covered by trees when viewed from above. This includes forests, trees in a yard or park, trees in an urban setting, orchards, and trees where animal grazing or other agricultural operations may be taking place below.

tree expert – a tree care professional practicing or advertising tree care services, requiring a license in Maryland; the applicant must possess adequate and related college education plus one year of experience under a LTE or have five years' experience under a Licensed Tree Expert (LTE), then have passed an exam and carry adequate amounts of liability and property damage insurance

U

understocked - a stand of trees so widely spaced that even with full growth potential realized, crown closure will not occur

understory - the level of forest vegetation beneath the canopy

uneven-aged stand - a group of trees of a variety of ages and sizes growing on a uniform site; also called all-aged stand

urban tree canopy - the layer of leaves, branches, and stems of trees that cover the ground when viewed from above

V

vegetation - low-growing, non-woody plants, including wildflowers and ferns, in a forest understory

veneer log - a high-quality log of a desirable species suitable for conversion to veneer. Veneer logs must be large, straight, of minimum taper, and free from defects

W

watershed - a region defined by patterns of stream drainage. A watershed includes all the land that contributes water to a particular stream or river

well-stocked - the situation in which a forest stand contains trees spaced widely enough to prevent competition yet closely enough to utilize the entire site

wildlife habitat - the native environment of an animal. Habitats ideally provide all the elements needed for life and growth: food, water, cover and space

windthrow - a tree felled by wind. Windthrows, also known as blowdowns, are common among shallow-rooted species and in areas where cutting has reduced stand density

woodland - see forest

working forest landscape - forest lands that are managed consistently with the requirements of a forest stewardship plan or a forest conservation plan, approved by DNR or a licensed professional forester, that advances sustainable forest management

X

Y

Z

Portions of this glossary is credited to Nancy Pywell, Extension forester, Pennsylvania State University, whose bulletin, Forestry Terminology provided the framework for this fact sheet. Some definitions have been modified for Maryland Department of Natural Resources purposes.

Some definitions were taken from The Dictionary of Forestry, John A. Helms, Editor. Society of American Foresters, 1998. http://dictionaryofforestry.org/dict/browse

Appendix B: Summary of Recommendations from the February 2015 Report, Maryland's Forest Resources in a Dynamic Environment: Assessing the Future Confidence and Sustainability of Maryland's Forest Industry

One overall recommendation is that similar surveys be performed on a five-year cycle by the University of Maryland or Maryland Forest Service. Specific recommendations we have deduced from results of the three surveys are described below.

For Primary and Larger Secondary Forest Industry Owners:
- Provide state tax incentives for the purchase of biomass energy systems.
- Provide low-interest loans for purchases of equipment. Owners of larger forest industries indicated they were more apt to make capital improvements but not hire new employees during the five years that followed. The availability of low-interest loans could help finance such improvements, which in turn could also stimulate the hiring of more employees. • Develop educational programs focused on safety regulations, regulations by U.S. EPA and MD Dept. of the Environment, product pricing/distribution, and new markets/new product development.
- Help the forest industry decrease its fuel costs through the installation of biofuel generators. Provide state incentives for biofuel installation and usage.
- Explore U.S. DOE energy-efficiency incentives, similar to those available to the poultry industry, to decrease energy consumption and costs.
- Increase access and availability of raw materials, as the lack of access and availability is a big concern for forest industry business owners. To achieve this:
  o maintain a steady and stable amount of state land available for harvests;
  o increase forest landowners' awareness of forest management options and forest management technology, which can help landowners meet their objectives, such as protecting wildlife habitat and transitioning the land for future generations;
  o increase tree planting efforts to provide raw materials for the future; and
  o help forest landowners understand forest management techniques, which include harvesting trees.

For Loggers:
- Provide state tax incentives for purchase of chippers for use in the biofuels/ bioenergy market in Maryland.
- Add training programs to the Master Logger Program, concentrating on Maryland's Forest Resources in a Dynamic Environment 45 forest management planning, silvicultural options, safety, first aid, and CPR. Loggers directly buy 38% of harvested timber, providing an opportunity for this training.
- Continue to develop the Master Logger Program, already well received by existing loggers in the program.
- Solicit more loggers into the Master Logger Program.
- Promote the benefits of the Master Logger Program to forest landowners and promote the value of doing business with a Master Logger. Only 44% of Master Loggers indicated the Master Logger Program helped create respect for Master Loggers statewide with forest landowners.
- Encourage the state to explore potential biomass/biofuel markets and to develop state incentives to establish new markets and low-interest loans for new equipment. An

opportunity to develop statewide markets exists because only 8% of loggers have entered into the market.
- Explore federal programs for military veterans and their employers that could enhance the business environment and educational opportunities for veterans.

For Landowners:
- Focus on new forest landowners by developing and increasing educational efforts to help them understand the forest management options and assistance available to them.
- Encourage membership in forestry-related organizations and participation in educational programs and events.
- Increase efforts to educate forest landowners about how to develop forest management plans. 60% of respondents indicated they currently had a forest management plan, demonstrating that current efforts to educate forest landowners about planning have been somewhat successful.
- Increase landowners' awareness of available state and federal cost share programs that can help them in managing their forestlands. Only 29% of respondents indicated they had participated in cost share programs.

Appendix C: Maryland Forest Service Funding Trends

Like many agencies and organizations, the Maryland Forest Service is managing with a shrinking workforce and increases in responsibilities. Between Fiscal Year (FY) 2002 and FY 2010, the Maryland Forest Service lost 63 permanent positions. In 2006, the responsibility for managing the State Forests was assigned to the Maryland Forest Service, and some permanent positions were shifted with that responsibility (13 positions for over 130,000 acres on 10 State Forests). A few positions were allotted for critical functions as vacancies occurred. The overall net loss over the years was 52.5 permanent positions, even with the transferred and new positions and substantial new assignments. **Some of those positions were never filled, notably most (9 of 11) of the anticipated positions for the 58,000+-acre Chesapeake Forest acquired just prior to FY2002, which had been created to handle regular property management, the associated Sustainable Management Plan, and the State's first Certified Forest process. As can be seen, the Forest Service has experienced a loss of permanent positions (PINs) (Figure 11). The number of Forest Service authorized positions declined from 135.5 in FY2001 to 92 in FY2020, a 39% reduction.**

The Maryland Forest Service has taken on new Chesapeake Bay goals, new programs like Lawn to Woodland, Backyard Buffers, Healthy Forests/Healthy Waters, and Marylanders Plant Trees, and expanded State Forest Certification in recent years. Core activities like forest stewardship plans, urban forestry, riparian forest buffer establishment, and tree care responsibilities have become more important than ever as forest area declines and population expands. The total workforce for completing priorities with State forestry staff has declined significantly, even with the addition of some positions with the shift of the State Forests as 7 positions have converted from contractual status in the last few years (Figure 11).
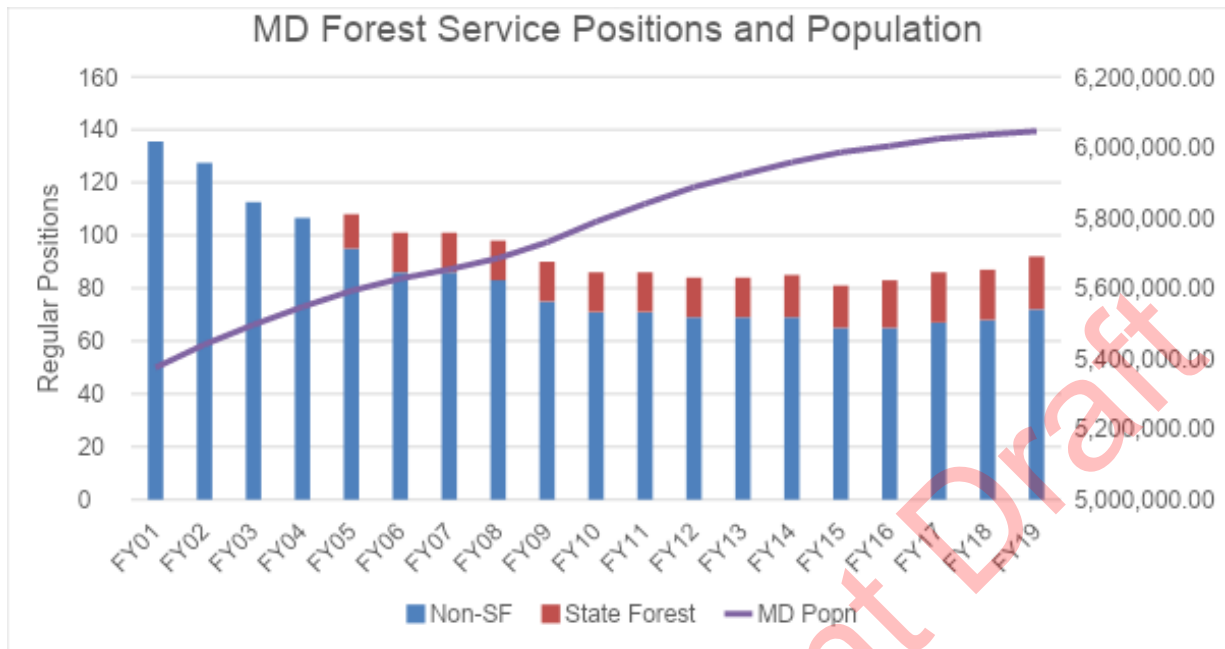
Figure 11: Number of full-time regular positions authorized for the Maryland Forest Service by Fiscal Year (July 1 to June 30), with State Forest management being added in 2005.

If budgets remain stable, the Unit PIN count may also stabilize. However, to make realistic assessments of progress on priority tasks, the Maryland Forest Service (MFS) needs to plan for accomplishing its priority tasks with the expectation it will remain a smaller workforce into the future.

Partnerships and grants have long been significant contributors to strategies for meeting forestry goals, and they are likely to play an even greater role in the future. Federal funds primarily from the USDA Forest Service have been a valuable and fairly stable element in MFS budgets, and are matched 50:50 with State funds, so requirements of USFS grant deliverables have significant influence on MFS activities and directions.

State funds comprise the majority of the MFS budget, with a mix of general tax revenue and various special funds. The mix of General and Special Funds varies from year to year but efforts are ongoing to maintain at least level funding to carry out existing laws and required functions. Special Funds are generated through sales and fees, including forest management plan fees, timber sales, campsite fees, shooting range fees, hunting leases, roadside tree permits. They also can include Program Open Space property transfer taxes authorized for operating State forests and parks.

The priorities and actions laid out in the Strategic Plan will have to take into account these budget realities and further shifts in funding sources. Clear priorities, robust partnerships, and the pursuit of targeted grant funding will be needed to make progress on the identified goals that will make a difference for Maryland's forests and its future.

Appendix D: Tree and Forest Canopy Cover in Maryland by Jurisdiction

	MD Dept. Planning (MDP) Land Area	UMD Canopy Cover Base Year	UMD Estimated Total Canopy Cover	Percent Tree and Forest Canopy Cover	Estimated Urban Tree Cover (US Census Urban Areas 2010)	Estimated Forest Cover from UMD Data	Percent Forest Canopy Cover (>1 ac. patch)
Jurisdiction	**ACRES**		**ACRES**	**%**	**ACRES**	**ACRES**	**%**
Allegany	271,462	2011	216,366	79.7%	12,431	200,237	73.8%
Anne Arundel	265,536	2007	155,233	58.5%	82,176	124,460	46.9%
Baltimore	382,912	2007	188,012	49.1%	74,138	141,188	36.9%
Calvert	136,416	2011	86,832	63.7%	20,894	76,593	56.1%
Caroline	204,429	2011	71,552	35.0%	1,729	65,035	31.8%
Carroll	286,464	2007	102,548	35.8%	17,179	81,225	28.4%
Cecil	221,613	2011	100,594	45.4%	16,068	89,063	40.2%
Charles	292,960	2011	203,009	69.3%	22,278	190,409	65.0%
Dorchester	346,093	2011	132,485	38.3%	1,848	119,538	34.5%
Frederick	422,541	2011	180,006	42.6%	22,504	144,562	34.2%
Garrett	414,144	2011	302,245	73.0%	1,213	291,077	70.3%
Harford*	279,738	2011	115,053	41.1%	33,311	93,370	33.4%
Howard	160,474	2007	81,572	50.8%	43,208	62,066	38.7%
Kent	177,299	2011	52,322	29.5%	466	44,123	24.9%
Montgomery	314,400	2009	157,230	50.0%	88,637	108,967	34.7%
Prince George's	308,922	2011	160,628	52.0%	85,606	126,978	41.1%
Queen Anne's	238,022	2007	75,538	31.7%	3,704	65,751	27.6%
St. Mary's	228,595	2011	141,944	62.1%	19,021	130,297	57.0%
Somerset	204,621	2011	85,529	41.8%	1,153	75,652	37.0%
Talbot	171,866	2011	57,937	33.7%	1,764	47,430	27.6%
Washington	292,979	2011	142,898	48.8%	11,440	116,544	39.8%
Wicomico	239,642	2011	115,331	48.1%	10,998	101,629	42.4%
Worcester	299,699	2011	157,792	52.7%	4,826	148,240	49.5%
Baltimore City	51,802	2007	14,143	27.3%	14,143	4,102	7.9%
Maryland	**6,212,629**		**3,096,799**	**49.8%**	**590,735**	**2,648,535**	**42.6%**
Excludes Aberdeen Proving Ground and Edgewood Arsenal				Source: UMD from LiDAR and 1m NAIP imagery			

Appendix E. Constant Contact Survey Results from Harry R. Hughes Center for AgroEcology

April-June, 2019

2. Association with forestry						
		Number of Response(s)	**Response Ratio**			
	Forestry Professional					
	Private Citizen					
	Forest Landowner					
	Other					
	Total					
3. If you are a forestry professional, what is your affiliation? (optional)						
		Number of Response(s)	**Response Ratio**			
	Government					

	Forest Products Industry					
	Tree Care Industry					
	Private Forest Consultant					
	NGO					
	Public					
	Other					
	Total					

4. How important are the following issues for Maryland forests?						
Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	**Not at all important**	**Slightly important**	**Important**	**Fairly important**	**Very important**	**No opinion**
Keeping land in forest		2				

		2%			
Addressing forest health and invasive species		2			
Suppressing and preventing wildfire					
Creating forest markets and jobs					
Caring for urban and community forests					
Increasing urban and community forests					
Using forests and trees to improve water quality					
Using forests and trees to address climate change					
Improving regulations for forest harvesting					
Other (please list in comments)					

		Number of Response(s)	Response Ratio			
45 Comment(s)						
5. Which of the following issues needs the most additional attention over the next decade?						
		Number of Response(s)	**Response Ratio**			
Keeping land in forest						
Addressing forest health, invasive species, and wildfire risk						
Creating forest markets and jobs						
Caring for urban and community forests						
Increasing urban and community forests						
Using forests and trees to improve water quality						
Using forests and trees to address climate change						

Improving regulations for forest harvesting					
Other					
Total					
18 Comment(s)					

6. How important are the following threats to Maryland forestry?					
Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	**Not at all important**	**Slightly important**	**Important**	**Fairly important**	**Very important**	**No opinion**
Declining Markets					
Funding					
Lack of Technical Assistance					

Urbanization					
Forest Health and Invasive Species					
Climate Change					
Increased Regulation					
Other (please list in comments)					
22 Comment(s)					

7. Which of the following resources would allow you to best improve the efficiency of your job/personal life as it relates to forestry in Maryland?					
		Number of Response(s)	**Response Ratio**		
Funding					
Technical Assistance					
Education					

Staffing					
Other					
Total					
13 Comment(s)					

8. If you selected education as a resource that you would benefit from, please select which of the following would be most useful.

		Number of Response(s)	Response Ratio		
Webpages					
Webinars					
Written materials					
In-Person Workshops					

Other						
Total						

9. Please rate how you feel Maryland DNR Forest Service has met the following goals outlined in the 2015 Forest Action Plan?

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	Poor	Fair	Average	Good	Excellent	Unsure
Restore and Sustain Forest Landscapes						
Ensure Healthy and Resilient Forests						
Ensure Clean and Abundant Water						
Create Jobs and Sustainable Communities						
Make Landscapes						

Public Comment Draft

Public Comment Draft

Resilient to Climate Change						
10. Would you be interested in attending a listening session that will help shape the direction of Maryland's updated Forest Action Plan?						
		Number of Response(s)	**Response Ratio**			
Yes						
No						
Unsure						
No Responses						
Total						
11. If you answered "no" or "unsure" to question 10, asking if you would be interested in attending a listening session for updating the Forest Action Plan, please elaborate on factors that are giving you pause.						
30 Response(s)						

12. If you are interested in attending a Forest Action Plan listening session, which of the following would you want more information about? (Check all that apply)						
		Number of Response(s)	Response Ratio			
New forest mapping and assessment						
Trends in forest cover						
Trends in wildfire						
New forest health issues						
Urban and community forestry programs						
Trends in forest products markets						
Potential for energy forest products and markets						
Tree planting programs						

Ideas from other states' Forest Action Plan				
Other				
Total				