MARYLAND

2015 FOREST ACTION PLAN: STRATEGY

2016-2020

MARYLAND
DEPARTMENT OF NATURAL RESOURCES

<u>The Mission of the Maryland Department of Natural Resources</u>
The Department of Natural Resources leads Maryland in securing a sustainable future for our environment, society, and economy by preserving, protecting, restoring, and enhancing the State's natural resources.

<u>Forest Service Mission</u>
To restore, manage, and protect Maryland's trees,
forests, and forested ecosystems to sustain
our natural resources and connect people to the land.

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Mark Belton, Secretary
Donald VanHassent, Acting Director,
Forest Service

Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401
Phone 410-260-8531, Forest Service TTY
via Maryland Relay: 711 (Within MD)
(800) 735-2258 (Out of State)
Toll Free #: 1-877-620-8DNR ext 8531
http://www.dnr.maryland.gov

DRAFT
Sept. 12,2015

Dear Friend of Maryland's Forests

Forests are the largest single land use in Maryland, integral to Maryland's landscape, environment, and economy. To help Marylanders better understand the value of our trees and forests and the actions needed to keep and improve their contributions in the state, the Maryland Department of Natural Resources, and the Maryland Forest Service are pleased to present the 2015 Maryland Forest Action Plan, with a Strategy for 2016 to 2020, built on the 2010 Forest Action Plan.and Forest Resource Assessment..

Keeping forests in Maryland is important for all of us. Forests once grew on more than 95% of the state's landscape, but now only cover 39%, less than half of their former area. These losses are reflected in our continuing struggles with water quality, air quality, stream health, and the many other forest-related benefits. Maryland has some significant forest blocks in public ownership, but private landowners are responsible for keeping the majority (76%) of our forests present and managed well for the future. Maryland's cities and towns are growing; nurturing trees and forests where we live will be increasingly important for clean water, clean air, and livable communities in a changing climate.

We're pleased with some of the progress since 2010. Landowner eligibility for incentives expanded and no-net-loss goals were reinforced with the 2013 Forest Preservation Act. Community planning and outreach helped limit risks and damage from emerald ash borer. The Delmarva fox squirrel, listed as endangered since 1967, is in the de-listing process based in large part on sustainable management plans on State forest land. Urban forestry expanded with the innovative Lawn to Woodland Program and new continuing education requirements for licensed tree experts. Forestry actions are an important component in Maryland's Greenhouse Gas Emissions Reduction Plan(2012).

Challenges abound. New pests have arrived since 2010, like thousand cankers disease of black walnut. Some challenges have greatly expanded, such as emerald ash borer and hemlock woolly adelgid, as well as declining wildlife populations, from bats to golden-winged warblers. Forest patch sizes and overall area shrink as land passes from owner to owner. More people and homes near the woods increase vulnerability to wildfire. Many streamsides and shorelines still lack natural forest vegetation. New pests, weeds, land conversion, and out-of-balance deer populations affect the forest's ability to renew itself.

The future beyond 2015 also brings opportunities. New forest product or environmental services markets can be developed, Partnerships can build bridges to meet shared goals. With good planning and thoughtful stewardship, sustainable forests with environmental and economic benefits are achievable. We invite you to join with other partners and volunteers to enhance the benefits of our hard-working forests and trees.

Sincerely,

Donald VanHassent
Acting Director/State
Forester,
MD DNR Forest Service

Executive Summary

The Maryland Forest Action Plan lays out an updated five-year strategy. Consistent with the long-term nature of forests, the Plan takes a long-term approach to reaching desired conditions for Maryland's future forests. The Forest Assessment characterized a maturing forest base that supports considerable biological diversity, expanding potential for sawtimber and other wood products, greater tree growth than removal, net gains in carbon sequestration, and protection of water quality. The 2015 update based on new USFS data showed increasing natural mortality. Forest land conversion to other uses is considered the greatest threat to many of these forest benefits, since forest land is being lost at almost 3% per decade, much more than is conserved. Forest health issues are of concern with the increasing trend of natural mortality..

The Strategy retained the five major areas for action from the 2010 Strategy: Sustaining Forests, Forest Health, Watershed Forestry, Community Forestry and Jobs, and Climate Change. Progress has been made in each category.
Sustaining Forests: The 2013 Forest Preservation Act expanded landowner eligibility for incentives and codified no-net-loss goals. The Delmarva fox squirrel, listed as endangered since 1967, is in the de-listing process based in large part on sustainable management plans on State forest land. Habitat for declining warblers has expanded on public and private land.
Forest Health: Community planning and outreach helped limit risks and damage from emerald ash borer. Community Wildfire Protection Plan coverage expanded in several counties, and support for wildfire suppression.
Watershed Forestry: The Backyard Buffer program expanded to 16 counties, helping landowner plant seedlings by backyard streams.
Community Forestry and Jobs: Urban forestry expanded with the innovative Lawn to Woodland Program and new continuing education requirements for licensed tree experts.
Climate Change: The 2012 Plan for Maryland's Greenhouse Gas Emissions Reduction Act includes multiple forestry contributions. Partners collaborated to produce a landowner's guide, Helping Your Woodland Adapt to a Changing Climate.

To sustain forests on Maryland's working landscape, core programs for forest management plans, tax incentives, and financial assistance will remain critical. Responsible management of State Forests will play an important role in demonstrating sustainable forest management on public lands and strategically addressing forest health issues. New laws and regulations are expanding focus on arborist training, harvesting BMP training, and tree cover data for local planning. Keeping and increasing sustainably certified forests will require efforts to update stewardship plans. Streamlining forest harvest permitting for forests with stewardship plans is a priority. Responses for forest health will require keeping effective treatments of major forest pests such as emerald ash borer and hemlock woolly adelgid, increasing understanding of new threats like thousand cankers disease of walnut, and better supporting development of biocontrols. Chesapeake Bay commitments are reinforcing interest in riparian forest buffers and urban tree canopy, underscored by the 2013 Forest Preservation Act goal for maintaining 40% tree cover. Issues to address in the next five years include keeping a viable forest industry while protecting declining bat populations, expanding young forest habitat for declining bird populations, addressing climate resiliency through regional

partnerships, and maintaining readiness to address wildfire and prescribed fire. New opportunities will be sought to better address fire equipment needs and expanding tree planting.

To continue supporting priority goals, functions protecting forests from wildfire, pests, and other injury will be maintained. Actions addressing chronic harm from stresses like deer browse, invasive plants and pests, elevated wildfire risk, uncontrolled recreation, and land use change will be addressed in priority areas with a range of partners. The conservation, care, and planting of trees will be used to support Chesapeake Bay commitments for riparian forest buffers, targeted forest conservation for water quality, and expanded urban tree canopy. Technical and financial assistance will support landowner assistance and urban forestry practices essential to building livable communities throughout the state.

Table of Contents

Introduction

Maryland's forests are the foundation of healthy watersheds, scenic beauty, and a renewable natural resource-based economy in the State. Maryland faces many challenges in sustaining healthy, ecologically functional, and economically viable forests in the face of rapid urban development. Once, more than 90% of Maryland was forested. Today, 39% of Maryland's 6.2 million acres is covered by forest. Maryland is the nation's fifth most densely populated state, with more than 5.9 million people (MD Dept. Planning 2015). Population has more than doubled since 1950. There is less than one half acre of forest per person. There are 157,000 forest landowners in Maryland, 84 percent of which own tracts of 10 acres or less.

Maryland has been called "America in Miniature" because it spans eco-regions 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 Allegany 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 livable communities. Many take for granted that forests support healthy streams, fish and wildlife habitat, and clean air. Forest products contribute renewable natural resources for a rural economy and urban wood manufacturing centers, as well as wood for bio-energy. The intersection of the diverse forests, rising population, and varied demands yields an abundance of issues for Maryland's forests.

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 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 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 change in high priority areas. The 2008 and 2014 Farm Billls 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 the Cooperative Forestry Assistance Act.:

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

State Forest Assessments — In order 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 U.S. Forest Service 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 Criterion of Forest Sustainability** established through the Montreal Process:

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

Vision of Maryland's Future Forests

Maryland's forests are resilient in the face of changing stresses and protected from major harm. The forest ecosystems are healthy, diverse and capable of renewing themselves. Land owners and other citizens are confident that investments made in forests will bear fruit, and voters are aware of the multiple benefits from forest products, clean water, clean air, thriving wildlife, and green jobs. Forests support a diverse and sustainable resource-based economy with a variety of sustainable forest products, living wage sustainable jobs, and multiple ecosystem markets. Increased tree canopy and forests foster more livable communities where people of all ages enjoy a greater connection to the natural world.

The conditions, trends, threats and opportunities are laid out in a companion document, the 2010 Forest Resource Assessment.

Forest Strategy — With the background provided by the State Forest Resource Assessment, to the Maryland DNR Forest Service worked collaboratively with partners and stakeholders to develop a State Forest Resource Strategy. Maryland's Forest Resource Strategies describe how Maryland proposes to invest state and federal dollars, in combination with other available income streams, to address national priorities to produce desired outcomes in accordance with priorities identified in the State Forest Resource Assessment.

The Maryland's Forest Strategy:

- Describes how 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 specified 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 condition, a vision of Maryland's future forests (sidebar). 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 2015 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 Resource Strategy. The assessment also identifies priority areas to focus targeted actions addressing threats that vary across Maryland's forested landscape.

Findings: Maryland Forest Resource Assessment, 2010-with 2015 Update

1. Conservation of Biological Diversity
   - Loss of forest land to development, 151,500 acres between 1986 and 2008, and fragmentation of existing forests are among the most wide-spread threats to biodiversity.
   - Maryland is characterized by a maturing forest mostly between 40 and 100 years old, with relatively low acreage in old growth (<1%) or early successional forest (9%).

2. Maintaining Productive Capacity of Forest Systems
   - The proportion of larger, sawtimber-sized trees (76%) is increasing as forests mature.

- Sixty-three percent of Maryland's forests are in the oak-hickory forest type.
- Less than 58% of average annual growth of forests is removed by harvesting, although in some pine areas of the Lower Eastern Shore, removals are closer to annual growth.

3. Maintaining Forest Ecosystem Health and Vitality
   - As with biodiversity, the greatest threat to forest health is considered to be forests converted to development, anticipated to increase 48% between 1990 and 2015. Development threat is highest in the central portion of the state.
   - Wildfire is being effectively controlled, and current trends show declines in acreage of unplanned wildfire ignitions.
   - Future shifts of species assemblages are likely in response to changing climate, with increases in pine and losses of sugar maple/beech/birch forests.
   - Invasive species pose significant threats to forest health, with current damages from exotics like Hemlock Woolly Adelgid, Emerald Ash Borer, Gypsy Moth, Beech Bark Disease. Future damage is likely from pests like *Sirex* wood wasp present in neighboring Pennsylvania, while efforts are underway to avoid introduction of problems like Sudden Oak Death.
   - Other forest stresses include damage from high populations of white-tailed deer and an array of invasive, exotic plants.

4. Conserving and Maintaining Soil and Water Resources
   - Forests are the most protective land use for water quality, so the conversion of forests to other land uses is one of the most significant threats to Maryland's water quality.
   - Riparian areas and other hydrologically active areas like seeps, springs, and toe slopes are especially important locations to have forests present on the landscape.

5. Maintaining Forest Contributions to Global Carbon Cycles
   - Maryland's forests are contributing an increasing amount to sequestration of carbon, tied to the greater size of trees in the maturing forest landscape.
   - Estimates of carbon in forest biomass suggested a 31% increase from 2004 to 2008.

6. Maintaining and Enhancing Long-term Multiple Socioeconomic Benefits to Meet the Needs of Societies
   - Forest industry is a significant economic engine in Maryland, a $4+ billion industry and the fifth largest economic sector; the greatest influence of primary forest harvesting and management

     activity is in the rural areas, Eastern Shore, Western Maryland, and Southern Maryland, but is present statewide.
   - Recreation is an important forest use, but safety and environmental issues with motorized recreation like all-terrain vehicles are increasing.
   - Maryland's forests are 76% privately owned. Most people who own forests don't plan to manage the forest primarily for timber; 84% of landowners own less than 10 acres of forest.
   - Acreage of lands protected from development has been increasing through state and local acquisitions as well as easements and donated easements.

Tom Darden

7. Legal, Institutional, and Economic Framework of Forest Conservation and Sustainable Management
   - Maryland has a robust suite of laws for protecting forests, from the 2013 Forest Preservation Act and Sustainable Forestry Act of 2009 to the Forest Conservation Act, Critical Area Law, Nontidal

Wetlands Law, sediment and erosion control requirements, and local government comprehensive plan requirements.
- Maryland has committed to practice sustainable management on forests and third-party certify all State Forests under both Forest Stewardship Council and Sustainable Forestry Initiative standards.
- Chesapeake Bay commitments in the 2014 Chesapeake Bay Agreement include expanded riparian forest buffers, increased forest conservation in priority areas, and urban tree canopy goals.

2015 Assessment Update:
- The natural mortality in the most recent USFA Forest Inventory and Analysis has increased to 1%, suggesting a greater pressure from pests and diseases (25% increase since 2008).
- Tree and forest canopy were calculated from 1-meter forest cover developed by the Univeristy of Maryland, Carbon Monitoring System. Statewide averages using mostly 2011 imagery averaged 49.8% canopy (trees + forests), and 42.6% forests greater than 1 acre. Data by major jurisdictions are in Appendix D.

NATIONAL PRIORITIES- Maryland Highlights

CONSERVE AND MANAGE WORKING FOREST LANDSCAPES FOR MULTIPLE VALUES AND USES,

Maryland's Forest Management Is Helping Rare Species

Maryland has pursued sustainable certification for forests through a number of routes, most notably, on State Forests. The management approaches and commitments to careful management for suitable wildlife habitat is reducing current and future impacts of the US Endangered Species Act for private landowners. The certified forests on Chesapeake Forest and Pocomoke State Forest, and the management for large areas of mixed pine hardwood are central factors in the process now underway to de-list the previously endangered Delmarva Fox Squirrel. Thanks to the public commitment to multi-resource management, private landowners will have fewer impediments to managing their working forests.

Management on Green Ridge State Forest includes areas suitable for golden-winged warblers, efforts intended to avoid the species being listed as threatened in the future, a status that can limit flexibility in restoration options. These birds depend on an increasingly rare habitat in the State, young forests. Other projects to develop habitat for cerulean warblers are underway, habitats that will need mature trees but also more open canopies. A National Fish and Wildlife Foundation grant and partnership with Indiana University of Pennsylvania are helping support work on private lands as well. Carefully designed harvests are helping keep our local wood products flowing, and building good habitat for the future too. Stay tuned to see how this work will be affected by rules designed to protect the northern long-eared bat, hard-hit by white-nose syndrome.

PROTECT FORESTS FROM THREAT

Maryland is Fighting Invasive Species on Multiple Fronts

Maryland, like many other states, is experienced growing problems from invasive pests, plants, and diseases, and is responding with a multi-faceted approach, much of it funded with assistance from federal partners.

Fuel reduction projects have sought to reduce invasive plants, particularly those that increase flammability of the landscape or are ladder fuels, like many vines. Fire managers looked for those opportunities, and are helping us manage smarter with limited resources.

Emerald ash borer has spread widely in the State, and proactive response through grant funding has resulted in 9 community response plans, greater capacity in partner jurisdiction to limit risks to their

citizens, and trees treated in several communities while it was still an option. The ash trees at the Allegany County Fairgrounds are the major source of shade for summer fairgoers; the trees that were able to be treated will be greeted with relief for years to come, even as the ash dwindles in the surrounding landscape, and the new trees slowly branch out.

We've learned a lot of lessons on how to protect our biodiversity hotspots from invasive threats through a partnership with Wildlife and Heritage Service. WHS's BioNet mapping was used to identify biodiversity hotspots, and areas of concern with invasive species were identified. The patterns of invasion in the hotspots were different than some of our more disturbed landscapes, spottier and requiring more protection of non-target plants.We learned that not all contractors were well equipped to fine-tune their control effots, that early detection was even more critical than usual, and volunteer help would be needed in identification and followup.

Maryland has since passed invasive species legislation limiting distribution of the most problematic species, and requiring labeling of others to increase public awareness of problems and alternative plants. Wildlife and Heritage Service also has developed a Statewide Eyes program to help scout for invasive plants.The understanding built through the hotspots project emphasized the need, and informed the design of these efforts.

ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS.

Maryland's Tree Planting bolsters water quality, air quality, and quality of life. Programs focused on tree planting are transforming pieces of Maryland's landscape. The innovative Lawn to Woodland program partnered with the National Arbor Day Foundation, offering homeowners with more than an acre of lawn to plant with free trees, planting, and early maintenance. The 2013 Forest Preservation Act expanded flexibility of mitigation programs, freeing funding to help people expand forest and reduce "mindless mowing". Homeowners will be enjoying the increased shade, beauty, privacy, and wildlife habitat for decades to come. This should benefit human health as well, as evidenced by the increasing evidence that trees and natural vegetation are beneficial for healing, spiritual renewal, and outdoor recreation for the most enjoyable preventative medicine.

Tree planting is critical to meeting State water quality goals for the Chesapeake Bay Total Maximum Daily Load, particularly through forest buffers and urban tree canopy. Allegany County in western Maryland relied on forest buffer planting more than many jurisdictions, and has made great progress. A combination of technical assistance from MFS and other partners, and state implementation funding through the Governor's Stream Restoration Challenge helped them meet water quality goals and restore their local streamsides, with a lot of help from local students and volunteers. These projects are teaching as well as restoring.

Baltimore County has long been a leader in sustainable forestry, and breaking new ground yet again with the Prettyboy Resource Collaborative. It is taking a landscape approach to identify opportunities for cooperative stewardship and activate markets and bulk pricing even for small landowners through voluntary aggregation. It will be a project to watch!

Maryland's Forest Strategy addressed the priorities identified in the national strategic planning effort by the U.S. Forest Service. The national priorities addressed by the Maryland Issue are identified below the issue titles. The goals and objectives identify and respond to the current situation in Maryland's forests, and reference priority areas from the 2015 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.

Maryland Issue I. Restore and Sustain Forest Landscapes

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

When the health and integrity of our lands deteriorate, so do the environmental, economic, and social benefits they provide, with enormous impacts on drinking water, carbon emissions, climate, wildlife, recreation, community health, and prosperity. To maintain these vital functions, the Maryland Forest Service will work with partners to restore and sustain forest landscapes and provide incentives to prevent the loss of private forests and other working lands to development. 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.
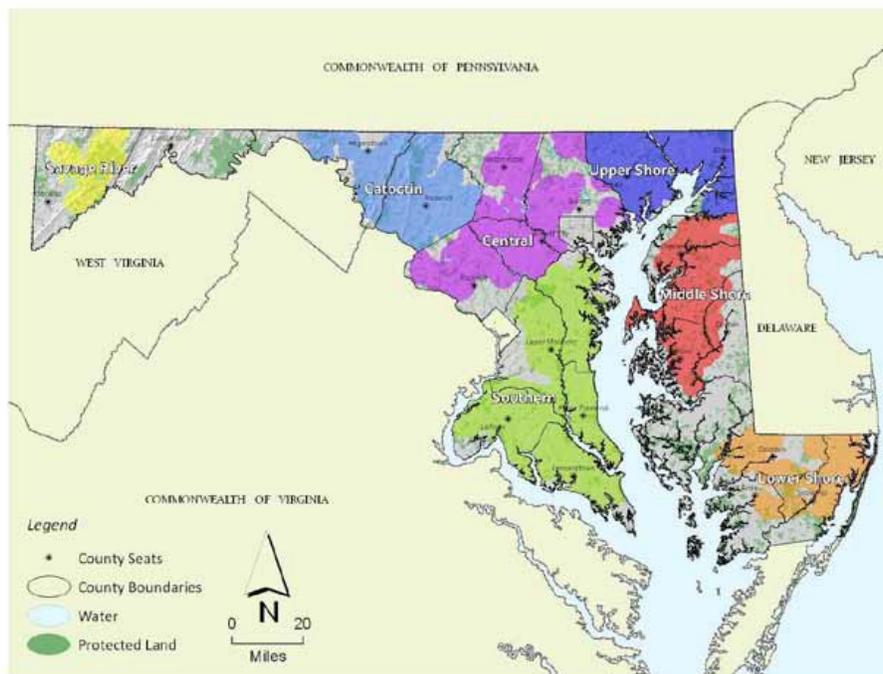
Figure 1: Priority areas to address forest fragmentation and risk of development.

Goal I.A. Keep Forests as Forests – Prevent the loss of private forest land and forested landscapes through technical assistance, tax guidance, incentives, and mechanisms such as land acquisition and conservation easements.

Strategy I.A.1. Improve the economics of private forest management and promote sustainable forest management through the Forest Stewardship Program.
Example Tactics:

- Continue to work with NRCS, Soil Conservation Districts, University of Maryland Extension, and others to provide forestry assistance to landowners
- Update forest stewardship plans to support certification of private forest lands through programs such as American Tree Farm.
- Streamline forest harvest permitting, especially for landowners with stewardship plans
- Work with landowners to prepare, implement, and monitor sustainable forest management plans, tailoring State technical assistance to regional needs and partner capacity to share relevant information and avoid duplication of technical assistance
- Promote opportunities for good forest management by facilitating diversified markets
- Develop options for forest income on smaller forest parcels (< 10 acres)

Strategy I.A.2. Develop and share forestry resources for landowners with emphasis on outreach to new and future owners to help them maintain and manage forests.
Example Tactics:

- Build capacity for landowners to educate themselves through programs such as Maryland Woodland Stewards that will encourage cooperative land management and effective access
- to professional forest management assistance
- Initiate detailed surveys on private landowner demographics to target outreach and education
- With partners like Forestry for the Bay and University of Maryland Extension, provide enhanced portals for private landowners to access educational, technical, and financial assistance, leveraging strengths of multiple organizations through effective partnership
- With partners like the volunteer Forest Conservancy District Boards and University of Maryland Extension, expand awareness of forestry issues, good practices, and available resources for private landowners on silviculture, applied forest ecology, and economic implications for common forest harvest options.
- Target landowners with small acreage to encourage forest management and transition of lawn to natural areas through programs like Woods in Your Backyard

Strategy I.A.3. Provide incentives to maintain forest cover.
Example Tactics:

- Implement changes in tax and state policies in the 2013 Forest Preservation Act to provide economic incentives for keeping large and small forest parcels
- Provide a fair, stable, and effective regulatory structure with timely permitting
- Remove barriers for family and industrial landowners to maintain their working lands and transfer unfragmented lands to the next generation
- Remove the cap on Woodland Incentive Program funding from forestland conversion transfer tax

- Develop brownfield project planning and seek funding for implementation
- Provide incentives for small acreage owners to convert lawn to natural areas through programs like Lawn to Woodland

Strategy I.A.4. Reduce the trend toward fragmentation and parcelization, working with local, regional, and state governments and other stakeholders to target important forests, maintain working rural landscapes, and support responsible forest harvesting.
Example Tactics:

- Provide technical forestry information to local land use planners and decision-makers and periodic forest and tree cover information required by the 2013 Forest Preservation Act
- Learn from and expand use of local programs that are conserving rural land and working forest
- Educate legislators and local government officials to support informed decisions on sustainable resource management, using programs such as Local Government Exchange
- Work with local governments to avoid burdensome restrictions for acceptable forestry practices, emphasizing use of forestry for wildlife habitat improvement and implementing recommendations from the Rural Economies Workgroup of the Maryland Sustainable Growth Commission
- Reach youth with forestry training, coordinating with organizations such as vocational ag programs and environmental clubs
- Transfer technology to local planners, focusing on messages related to planning goals and requirements such as protecting priority woodlands, setting goals for open space, and improving water quality

Strategy I.A.5. Implement no-net-loss of forests through the Forest Preservation Act of 2013.
Example Tactics:

- Expand tree planting on public and private land to offset forest loss.
- Consider refining the Forest Conservation Act, related laws, and planning guidance to minimize losses of forests important for water quality.
- Identify important large tracts of forests not currently protected from development.
- Use conservation easements, purchase of development rights, Forest Conservation Management Agreements, and other land preservation techniques to protect priority forest lands.
- Improve ability of land preservation programs to protect important forest areas, such as the increased coordination of Maryland Agricultural Land Preservation Foundation with Forest Conservancy District Boards through the annual meetings required by the 2009 Sustainable Forestry Act.
- Work with local jurisdictions to develop land use rules that support sustainable resource management, a viable resource-based economy, and conservation of priority working forests.

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 lforest 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.
- Partner with efforts like the Woods in Your Backyard and Forestry for the Bay to provide quality information on managing forests of all sizes, even small parcels (<10 acres).

Goal I.B. Manage for Resilient Forests- Apply ecologically sound forest management now to keep healthy native forests and habitats into the future, countering stresses from the altered ecology of Maryland's landscapes.

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:

- Assure the ready availability of affordable professional forestry expertise
- Support ongoing partnership with the Society of American Forester and other professional organizations to provide training to maintain a cadre of well-trained professionals with access to current skills and science
- Support Forest Certification programs, landowner cooperatives for more efficient management, 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. Focus restoration and conservation efforts using priority areas and working across ownerships incorporating all lands
Example Tactics:

- Prioritize activities based on mapped priority areas for urban forestry, fire risk, water quality, forest stewardship need, and Forest Legacy.
- Work with NRCS, Soil Conservation Districts, 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

Strategy I.B.3. Strengthen landscape restoration initiatives to improve ecological function and connectivity, bringing integrated support utilizing science, land management, and technology transfer expertise
Example Tactics:

- Improve forest conservation and connectivity over time by targeting afforestation and land protection programs
- Coordinate with land conservation stakeholders to design complementary actions that support overall landscape conservation and restoration strategies statewide, learning from Pennsylvania's Conservation Landscape Initiative
- Partner with other landscape initiatives, such as USFWS Landscape Conservation Cooperatives and other regional or national frameworks for landscape conservation
- Encourage landscape diversity, including older forests and early successional forest habitat
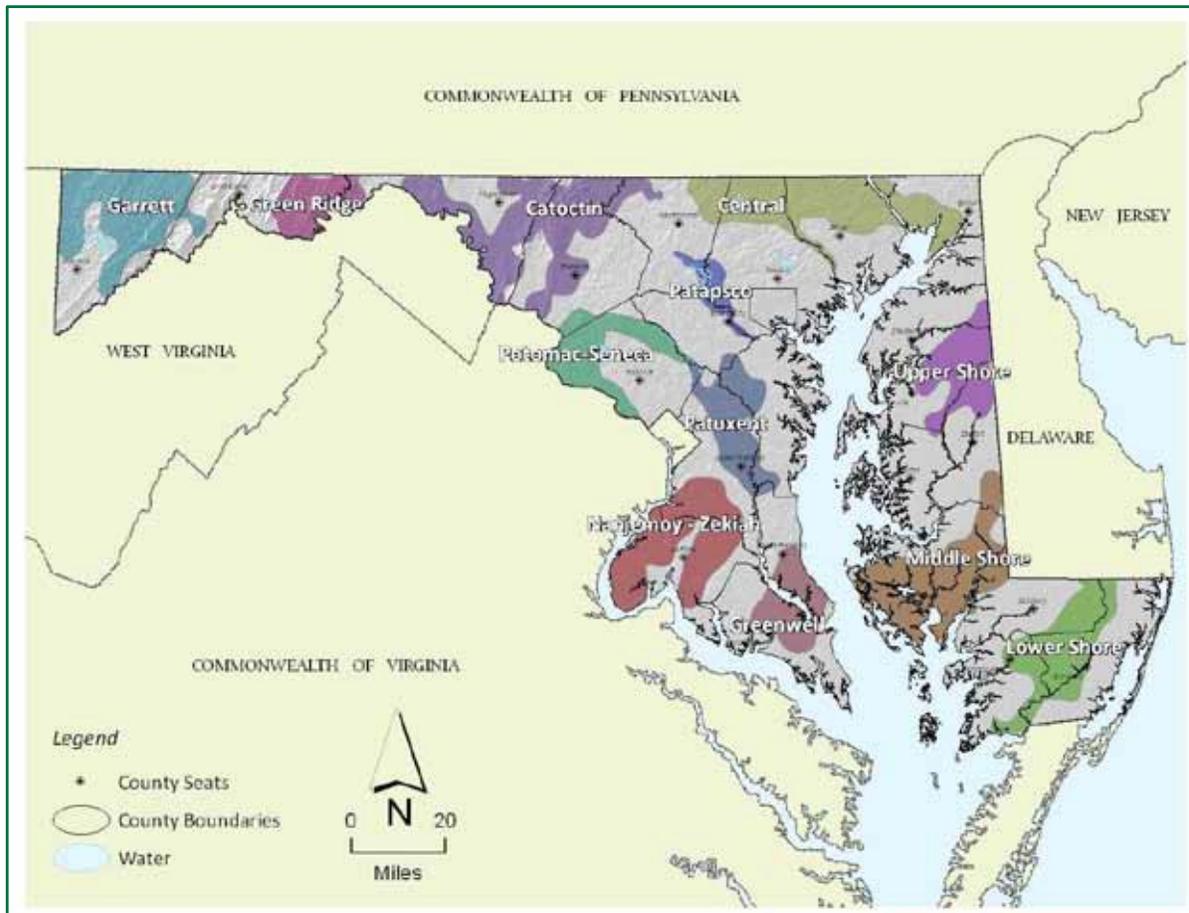
Figure 2: Priority map for fish and wildlife habitat

Strategy I.B.4. Provide habitats for rare native species dependent on forest ecosystems, integrating efforts with landscape restoration and conservation and reflecting priority actions for forested habitats in the 2015 Maryland's State Wildlife Action Plan (SWAP)
Example Tactics:

- Protect high-quality contiguous forest blocks
- Implement the Habitat Conservation Plan for Delmarva Fox Squirrel, emphasizing public forest management.
- Cooperatively address declines of 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 on 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, cherrybark 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 overbrowsing of native trees.
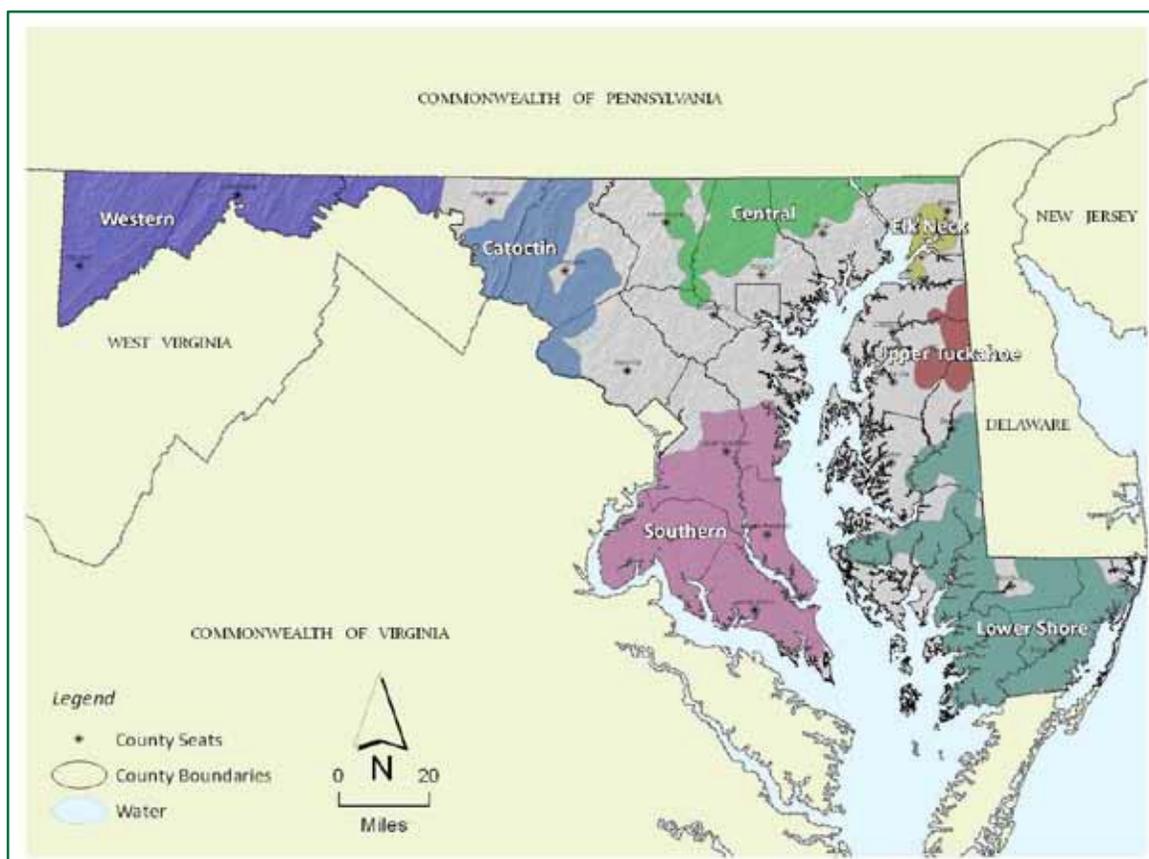
Figure 3: Priority areas for supporting a forest-resource-based economy

Goal I.C. Support Traditional and Emerging Markets- Develop sound policies and programs that allow markets to support good forest management, and ensure the continued right to practice forestry. Without appropriate markets, forest management is not affordable or widely practiced.

Strategy I.C.1. Maintain and Diversify Markets for Forest Products – Use markets for forest products to create rural wealth, retain jobs, and ensure a robust forestry infrastructure and economic diversity to perform critical restoration and management activities.

Example Tactics:

- Establish pilot projects with a sound research basis to explore product viability, value-added products, new markets, and income options to support the development and expansion of diverse and innovative markets for sustainable forest products.
- Support growth and expansion of forest-based markets, and products and ensure a balance between new and existing utilization infrastructure
- Increase local capacity to facilitate local market development and oversight
- Communicate with landowners, local governments, investors, and entrepreneurs to convey technical and financial assistance programs, value-added uses of forest resources, their role in helping communities thrive, and public awareness of new opportunities
- Help develop new and expanded markets for bio-energy and bio-based products, using available programs such as Biomass Crop Assistance Program wisely to avoid damaging existing sustainable forest product markets. Capture emerging

opportunities, find markets for various uses of woody biomass and new products, and enable cost-effective biomass utilization at both local and regional levels
- Facilitate a reliable and sustainable supply of biomass from public and private lands through projects that are compatible with sustainable healthy forests.
- Use public policies and regulations that support efficient forest industry (truck weights, fumigation, low-interest capital, favorable tax treatment, marketing, role of public lands, government agency support, Dept. of Business and Economic Development)
- Uphold rights for landowners to lawfully practice forest management, established in the Sustainable Forestry Act of 2009
- Open markets to all green building standards and all wood certification programs, encouraging meaningful certification standards that improve practices
- Facilitate greater participation in certification for forest management and wood processing/chain-of-custody.

Strategy I.C.2. Support Ecosystem Markets - Support the development of emerging ecosystem markets to encourage private investments to conserve private forests
Example Tactics:
- Advance and support market-based approaches to the conservation and enhancement of ecosystem benefits, such as water-quality trading, conservation banking, mitigation banking, tax incentives, renewable energy credit trading, and carbon-credit trading
- Sponsor pilot programs and demonstration projects that test and evaluate market mechanisms and innovative approaches
- Ensure that climate change and renewable energy legislation and policies recognize forestry contributions, include new market opportunities, and mitigation and adaptation activities

Strategy I.C.3. 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
- Identify and market potential sources of underutilized biomass supply.
- Encourage utilization of biosolids, poultry litter and other wastes to grow short-rotational woody crops and enhance growth of existing forest
- Quantify carbon sequestration with partners, applying relevant research to develop useful estimates for policies and programs
- Develop estimates for carbon and water services supplied by rural forests to complement ecosystem services estimates available for urban forests.
- Track landowner demographics, attitudes toward management, and patterns of land development related to intergenerational transfer/inheriting land.

Goal 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
Example Tactics:
- Provide appropriate training, equipment, compensation, and job classifications.
- Address institutional capability, both in workforce levels and transfer of knowledge

- Provide priorities for filling vacancies and analyze future needs

Strategy I.D.2. Continue sustainable third-party certification of State Forests to improve the practice of ecological forestry with independent oversight.
Example Tactics:

- Integrate certification into the long-term planning on all major State Forests.
- Develop and 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 BMPs and enhance native ecosystems
- Develop agreements for public lands to be leaders in cooperating with integrated pest management approaches and development of effective biocontrols for problematic invasive species
- 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 use funding sources to develop recreational opportunities in balance with sustainable forestry practices
- 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 Issue II. Ensure Healthy and Resilient Forests

(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, an increased variety and supply of invasive exotic species, and unprecedented populations of white-tailed deer. Keeping the natural resilience of the

forests to storms, pests, and other threats requires addressing both sudden events and chronic stresses.
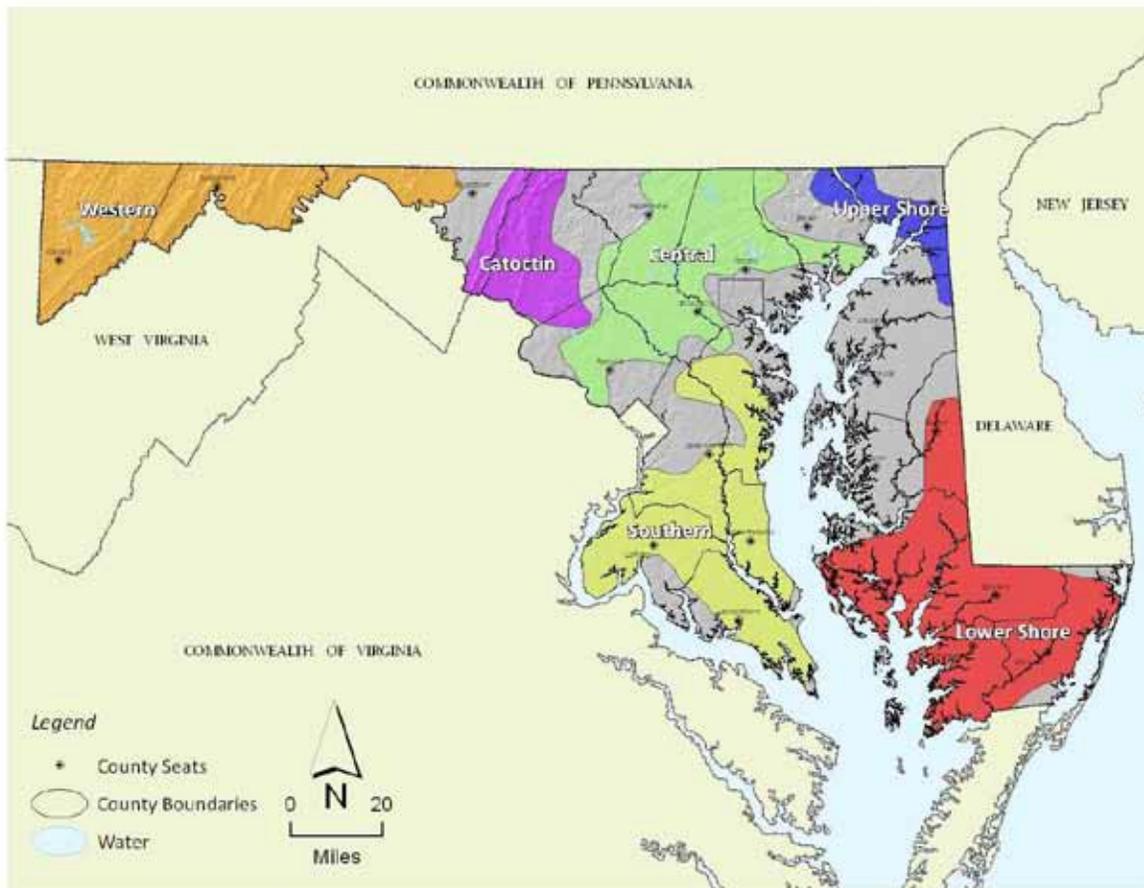
Figure 4: Priority areas for wildfire suppression and risk reduction

Goal II.A. Provide Emergency Response to natural resource threats. Develop the trained personnel, partnerships and resources needed during disasters like wildfire, 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
- Provide readily accessible wildfire training to agency and other emergency responders.
-

Strategy II.A.2. Provide timely and effective response to other emergencies or disasters affecting forests (invasive species, storm damage, earthquakes….)
Example Tactics:
- Use incident command structure to provide a disciplined and effective response to emergencies
- Develop policies to guide 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
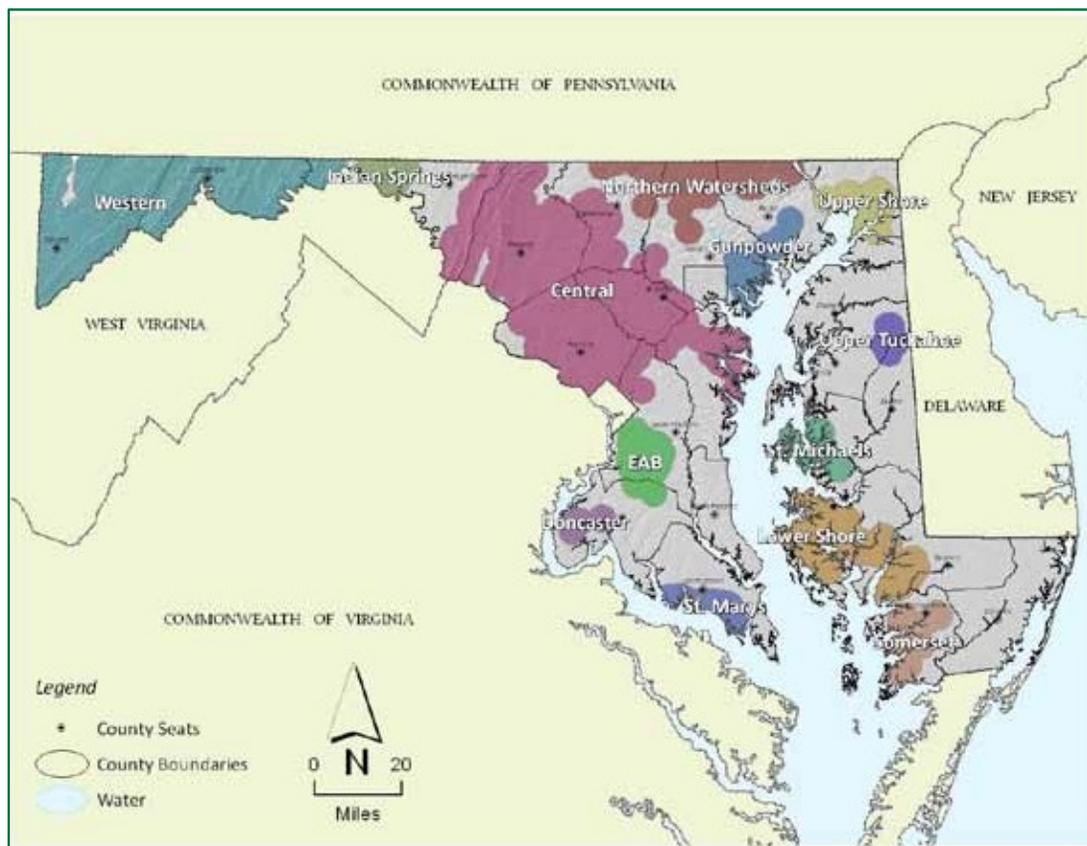
Figure 5: Priority areas for addressing forest health issues

Goal II.B. Develop approaches to reduce threats from long-term stressors to forests. Address the many threats to forests that act gradually and cumulatively but over time are changing the health, composition, and resilience of our forests. Use a tailored response that 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 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

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.
- Improve control recommendations in forest management plans and implement a 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.

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, extent, and severity, and carry out available responses, including biocontrol releases and surveys.
- 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, and defensible space in priority locations.
- Reduce hazard fuels through prescribed burning or mechanical treatments
- Reach private forest owners with information on managing fire risk on forested property.

Strategy II.B.5. Promote scientifically based management practices to maintain native forest composition altered by fire suppression and other ecological disturbances.
Example Tactics:

- Provide information on management need and forest management options for a variety of parcel sizes through an integrated forest landowner information portal like Forestry For the Bay.
- Use prescribed fire and other practices to restore natural disturbance regimes in support of native plant communities like oaks and other mast-bearing species important for winter wildlife food.
- Use available cost-share such as CREP to support rare species habitat restoration.

Strategy II.B.6. Address resource damage from uncontrolled recreation across ownerships
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.
- Support restoration of damage from uncontrolled recreation.

Strategy II.B.7. Reduce impacts to forests due to 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 Forest Conservation Act, Chesapeake and Atlantic Coastal Bays Critical Area Law, Nontidal Wetlands Law, land use planning laws, State Highway mitigation (5-103) and other local programs.
- Offset forests lost to road construction with effective mitigation in proximity to the affected forests.

Goal II.C. Develop approaches to improve health and survival of urban forests. Work with public and private landowners, managers, and service providers to address the unique challenges to health for trees in cities, towns, and neighborhoods.

Strategy II.C.1. Assure 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
- Assure 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 II.C.2. Manage conflicts of natural tree growth with public utilities and built 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.
- Work with efforts to improve tree care practices in public right of ways.

Strategy II.C.3. Identify appropriate standards and reward 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, Tree City USA, Tree Campus, 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 Issue III. Ensure Clean and Abundant 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 climate change, 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 requirements have been developed for many of Maryland's watersheds, and a TMDL is being finalized for the Chesapeake Bay mainstem. 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

Goal 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, support Watershed Implementation Plans,, and bolster and learn from other watershed organizations and efforts.
Example Tactics:

- Focus resources in targeted areas to bolster progress in important watersheds, 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.
- Mitigate forest loss and restore functional forests on a watershed basis to maintain water quality.

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

- 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 and measure effectiveness of restoring riparian forest buffers
- Analyze unbuffered streams and shorelines, identify areas most critical for water quality improvements, 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.

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, considering.

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.

Goal III.B. From Forest to Faucet – 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 long-term improvement of streams and watersheds.

Goal III.C. Avoid water quality impacts from prescribed forest management activities through the effective and widespread use of harvesting best management practices (BMPs)

Strategy III.C.1. Expand awareness of BMPs
Example Tactics
- Provide logger and landowner education and training on efficient and effective use of BMPs, partnering with Soil Conservation Districts, local governments, MD Dept. of Environment, Master Logger, and the University of Maryland Extension.
- Expand public awareness of need for BMPs and well-trained operators

Strategy III.C.2. Improve implementation of BMPs
Example Tactics:
- Collaborate with MD Dept. of Environment to support effective and efficient implementation of sediment and erosion control requirements.
- Improve capacity of operators to minimize impacts through appropriate equipment choice, using programs like the EPA LILAC low-interest loans to promote light-on-the-land harvesting.
- Assess effectiveness and implementation of BMPs at least every five years.
- Assess soil conditions to assure soil quality is being maintained for water quality and long-term productivity.

Maryland Issue IV. Create Jobs and Sustainable Communities

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

The restoration and conservation of forests and working lands can provide jobs and support sustainable communities – generating economic value by sustaining green jobs, and producing timber and other forest products, food, and energy.   Our forests are also of immense social importance, enhancing rural quality of life, sustaining scenic and culturally important landscapes, oftentimes defining the essence a community.

Goal IV.A. Use forests to support a robust and growing economy- Provide a variety of forest-based outputs that help maintain viable communities, allowing jurisdictions to realize benefits from open space and manageable demand for service
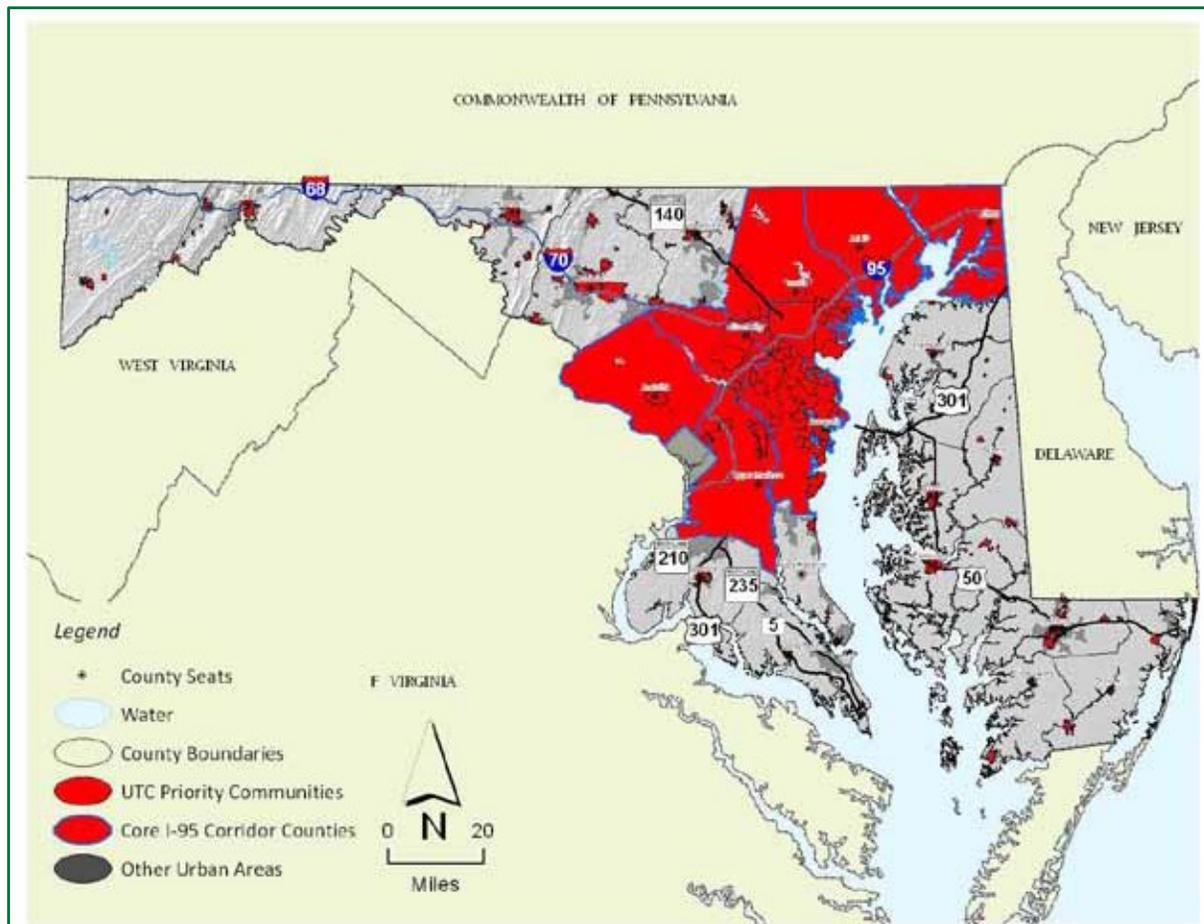
Figure 7: Priority areas for urban and community forestry goals

Strategy IV.A.1. Aid communities in developing diverse natural-resource based economies centered on forest ecosystem restoration, renewable energy, and sustainable forest and agro-forestry products.
Example Tactics:
- Collaborate with local agencies and organizations to identify potential forest-based products and services that can be sustained with local resources and economic infrastructure
- Develop options to help landowners afford effective land management actions, considering landscape approaches and marketing of aggregated services and products.

Strategy IV.A.2. Create green jobs and promote a diverse forest products industry to support sustainable communities.
Example Tactics:
- Develop innovation grants or low-interest loans for forest products businesses
- 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.

Strategy IV.A.3. Improve social acceptance of prescribed forest and tree management practices
Example Tactics:

- Increase use of forest-related curricula by schools and other youth organizations such as 4-H, Future Farmers of America, and Young Farmers
- Expand interpretation of practices on Demonstration Forests and other DNR forest lands
- 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 or other lands to serve as demonstration areas for citizens

Strategy IV.A.4. Provide accessible forest-based recreation that maintain healthy forests and support healthy lifestyles
Example Tactics:

- Collaborate with stakeholders, agencies, and organizations to develop plans, projects, and maintenance guidelines that improve recreational safety and maintain environmental functions

Goal IV.B. Support Livable Green Communities – Support the use of trees and forests in communities to create green jobs, support healthy living, and connect people with the forests and natural systems on which their quality of life depends. Work with a range of community types, from major urban centers to small, rural towns.

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 to improve human and community health and environmental justice in underserved communities.
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 on assessing urban tree and forest canopy, developing canopy goals, and targeting new areas for tree planting.
- Track urban tree canopy goals and quantify benefits of planted trees with science-based assessment tools, including increasing documentation of human health benefits.
- Provide opportunities for volunteer tree planting.
- Support tree planting on public lands.

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 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 ecosystem services, recreation opportunities, and a high quality of

life for urban and suburban citizens.

Maryland Issue V. Make Landscapes More Resilient to Climate Change
(Supports National Priority III: Enhance Public Benefits from Trees and Forests)

Climate change is one of the great challenges facing modern society, and has the potential to dramatically reshape how the Maryland Forest Service will deliver on its mission of sustaining the health and diversity of Maryland's forests. Managing landscapes to be more resilient to climate change will require an adaptive management approach based on maintaining ecosystem health, diversity and connectivity. Specific management approaches include planting more diverse species, conserving migration corridors, and assisted migration of species. Experimentation, learning from experience, monitoring actions, and changing methods and techniques will help managers adjust actions as conditions change.

Goal V.A. Engage in Leadership for Climate Change by working with partners as a leader to convene, connect, restore and maintain focus on climate change priorities on a landscape scale.

Strategy V.A.1. Develop and improve strategies for forest mitigation and adaptation in collaboration with other state and federal agencies and other stakeholders, supporting Maryland's Climate Action Plan.
Example Tactics:
- Participate in coordination and tracking of actions related to Maryland's Climate Action Plan, Greenhouse Gas Reduction Act, and Coastal Resiliency planning
- Identify opportunities to better implement actions through existing forestry programs, and regional partnerships such as the Greater Baltimore Wilderness Coalition.
- Organize a climate stakeholder meeting, expanding information on financing options for landowners in voluntary markets

Strategy V.A.2. Increase the use of woody biomass to create local, renewable energy – such as combined heat and power – while also restoring forest health. Using renewable fuel sources like woody biomass reduces 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 Clear Energy Incentive Act, and the Greenhouse Gas Reduction Act.
 Example Tactics:
- Develop new silvicultural techniques and management guidelines
- 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.A.3. Improve sustainable operations through green infrastructure development, efficiencies and energy savings.
Example Tactics:
- Implement DNR Green Procurement policies and energy efficiency measures
- Use energy efficient designs for facility upgrades or rehabilitation

Goal V.B. Promote Sustainable Forest Management and Operations in Response to Climate Change – work with partners to enhance opportunities for sustainability in forest management and urban communities.

Strategy V.B.1. Apply a climate change mitigation strategy to sustainable forest management
Example Tactics:
- 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.
- Promote and track mitigation and energy conservation through urban tree canopy expansion and tree planting programs like Marylanders Plant Trees.

Strategy V.B.2. Apply a climate change adaptation strategy to sustainable forest management
Example Tactics:
- 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).
- Assure 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.
- Address effects of sea level rise and geologic subsidence through appropriate planning of buffer areas and species selection.
- Educate landowners about woodland adaptation strategies.
- 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, and improving capacity for wood utilization following disasters.

Table 1: Maryland Forest Service Programs and Partners contributions to Strategy Elements

	Strategy Elements	Website	Plans, Tech. Assist., Stew. Comm.	Tax Incentives/Cost-share	Forest Certificalton (TF, SFI, FSC)	Forest Legacy	Nursery	State Fire Asst.&Interagency Coord.	Training, Vol. Fire Crews, and Repts.	Vol. Fire Asst., FEPP Eqmt, Invstgtn.	Comm.Wildfire Prot.Plans/Risk Red.	Outreach/Smokey Bear	Prescribed Burning, Burn Permits	Environmental Review	Licensed Tree Experts	Local Govt. Asst./Enforcement	Planting Programs	Urban Tree Canopy/Goals, Plans	Awards&Tech. Assist.	Silviculture, Planting, Maintenance	Planning/Inventory/Certification	Recreation and Trail Grants	Data mgmt/GIS	Tech support and Planning Liaison	Forest Certification Support	Utiliz. (Biomass, Assmt., TA, FA)	Logger Training/Operator Licensing	Utilization/Marketing Liaison	Outreach/Volunteers	Ches. Bay-Buffers, Forest Cons.	Watershed and Reservoir Pship	BMPAssessment	Survey/Detect/Educ. (MDA)	Suppress/Treatmt(MDA)
1	**Restore/Sustain For. Landscapes**																																	
1A	Keep Forests as Forests																																	
1	Improve economics, sust. forestry	X	X	X	X	X														X				X						X				
2	Develop/deliver forest mgmt info	X	X																					X						X			X	
3	Provide incentives to keep forests	X	X	X	X	X	X																											
4	Reduce fragmentation/parcel.	X	X	X	X	X	X									X			X					X										
5	No-Net-Loss of forests	X	X	X	X	X	X							X		X	X	X	X					X					X					
6	Supply of expertise and materials	X	X				X																											
1B	Manage for Resilient Forests																																	
1	Improve management	X	X	X	X											X					X			X		X	X							
2	Focus restoration/cons.	X																						X						X	X			
3	Strengthen landscape initiatives	X																						X						X	X			
4	Habitat for rare native species	X	X											X									X	X	X					X				
1C	Support Tradit./Emerging Markets																																	
1	Maintain/Diversify markets	X			X															X						X	X	X						
2	Support Ecosystem Markets	X																										X						
3	Coord. research-mgmt, markets	X																								X		X						
1D	Sust. Forest Mgmt/Public Lands																																	
1	Capacity/Training	X																					X	X										
2	Certification	X			X															X	X		X	X	X									
3	Diversity of forest types/landscapes	X																		X	X		X	X	X									
4	Inventory/monitoring	X																			X		X	X	X									
5	Recreation	X																		X	X	X	X		X									
2	**Ensure Healthy/Resilient Forests**																																	
2A	Emergency Response																																	
1	Fire Suppression	X						X	X	X						X																		
2	Other Emergency Response	X							X							X																		X
3	Partnerships (FD, MEMA)	X						X	X	X	X	X	X			X																		X
2B	Long-Term Stressors																																	
1	Deer	X	X													X														X				
2	Invasive Plants	X	X	X							X					X													X	X			X	X
3	Invasive Pests/Diseases	X	X	X												X													X				X	X
4	Reduce wildfire risk							X			X	X	X																					
5	Native Forest Composition/Mgmt		X	X	X						X		X																					
6	Uncontrolled Recreation	X														X					X													
7	Land Use Change/mitigation	X												X		X			X															

TABLE 1, CONTINUED (MARYLAND FORESTRY PROGRAMS- DNR/MDA, STRATEGY ELEMENTS 2C TO 5)

	State Forestry Programs	Website	Stewardship: Plans, Tech. Assist., Stew. Comm.	Tax Incentives/Cost-share	Forest Certification (TF, SFI, FSC)	Forest Legacy	Nursery	Fire Ops.: State Fire Asst.&Interagency Coord.	Training, Vol. Fire Crews, and Repts.	Vol. Fire Asst., FEPP Eqmt. Invstgtn.	Fire Prev.: Comm.Wildfire Prot.Plans/Risk Red.	Outreach/Smokey Bear	Prescribed Burning, Burn Permits	Urban/Comm.: Environmental Review	Licensed Tree Experts	Local Govt. Asst./Enforcement	Planting Programs	Urban Tree Canopy/Goals, Plans	Awards&Tech. Assist.	Public Forests: Silviculture, Planting, Maintenance	Planning/Inventory/Certification	Recreation and Trail Grants	Planning: Data mgmt/GIS	Tech support and Planning Liaison	Forest Certification Support	Utilization: Utiliz (Biomass, Assmt., TA, FA)	Logger Training/Operator Licensing	Utilization/Marketing Liaison	I/E: Outreach/Volunteers	Water: Ches. Bay-Buffers, Forest Cons.	Watershed and Reservoir Pship	BMPAssessment	Health: Survey/Detect/Educ.	Suppress/Treatmt
Strategy Elements																																		
2C	Urban Tree Health																																	
1	Tree Care	X													X	X			X														X	X
2	Public utility	X												X	X	X		X	X															
3	Recognition/standards	X													X	X			X															
3	**Clean and Abundant Water**																																	
3A	Chesapeake Bay and priority waters																																	
1	Partnerships	X	X	X														X	X											X	X	X		X	X
2	Buffers	X	X				X							X	X								X							X	X	X		X	X
3	Conservation for Water Quality	X	X			X									X	X		X	X				X								X	X		X	X
4	Aquatic Habitat	X	X																												X	X	X	X	X
3B	Forest to Faucet																																	
1	Source Water Protection	X	X	X							X			X					X	X				X											
2	Partnerships	X	X	X														X	X													X			
3C	BMPS	X	X																								X	X					X		
4	**Create Jobs/Sust. Communities**																																	
4A	Rural Economy																																	
1	Resourced based economy	X																		X			X			X	X							X
2	Green jobs	X													X							X				X	X							X
3	Social acceptance of forest mgmt	X	X													X	X	X			X								X					
4	Forest based recreation	X																				X												
4B	Livable Green Communities										X																							
1	UCF/UTC technical asst./planting	X					X							X	X	X	X	X					X	X					X	X	X		X	X
2	Techniques/Urban For. Pgms	X													X	X	X	X											X	X	X			
3	Community Open Space/GI	X									X					X	X	X	X				X	X						X	X			
5	**Climate Change**																																	
5A	Leadership Climate Change																																	
1	Develop strategies, MD CAP	X																X												X				
2	Increase woody biomass	X																								X								
3	Sustainable Operations	X																																
5B	Forest Mgmt for Climate Change																																	
1	Mitigation	X						X							X	X	X	X					X							X			X	X
2	Adaptation	X						X	X		X				X	X	X	X					X							X			X	X

TABLE 1, CONTINUED (PARTNER PROGRAMS, STRATEGY ELEMENTS 1-2B)

Partner Programs

	Strategy Elements	DNR Wildlife and Heritage	Critical Area Law	DNR Land Acquisition/Planning	DNR Resource Assess/MBSS	Other DNR-Fish./Parks/IPR	Natural Resources Police	MD Dept.Ag.-For.Health/Res.Cons.	MD Dept. Planning	MDE-Wetlands/Source Water, Sed./EC	Univ. MD (Extension, Agroecology)	Master Logger	Maryland Fire and Rescue Institute	MD Emergency Mgmt Agency	MD Fire Service/MSFA	MD Dept. of Education	MD Env. Trust/Land Trusts	State Tax Assessment Dept	Ches.BayPgm(USFS/EPA/USGS/NOAA)	Natural Resource Cons.Service	Farm Service Agency	U.S. Fish & Wildlife Service	US Military (Dept. of Defense, other)	Other fed.(NPS/APHIS/NASA/BARC)	Balt. Eco. Study/Urban Waters Init.	Forestry for the Bay/AllianceCh. Bay	Bay Bank	Local Govts/MACO/MML	The Nature Conservancy	Trust for Public Land	Forest Industry(MFA/AF/FRA/MAA)	Consulting Foresters	Partnership Sust. Forestry	Society of Am. Foresters	RC&D, MD. Env. Service, TSPs	Other nonprofit(Am.Forests/NADF/NASF)	Watershed/Landowner Orgs.
1	**Restore/Sustain For. Landscapes**																																				
1A	Keep Forests as Forests																																				
1	Improve economics, sust. forestry			x							x	x								x						x					x			x			
2	Develop/deliver forest mgmt info				x						x	x														x					x	x			x		
3	Provide incentives to keep forests			x							x	x							x	x	x	x				x	x	x			x	x		x	x		
4	Reduce fragmentation/parcel.		x	x		x			x		x								x	x						x	x	x	x	x	x	x		x	x		x
5	No-Net-Loss of forests		x	x		x			x	x							x		x	x	x	x		x		x		x	x	x	x	x		x	x		x
6	Supply of expertise and materials										x	x									x				x	x					x	x			x	x	x
1B	Manage for Resilient Forests																																				
1	Improve management	x									x	x								x						x					x	x			x		
2	Focus restoration/cons.	x		x		x			x										x							x	x	x	x	x							
3	Strengthen landscape initiatives	x		x		x			x										x			x	x	x		x		x	x	x							
4	Habitat for rare native species	x		x		x				x												x	x	x													
1C	Support Traditional/Emerging Markets																																				
1	Maintain/Diversify markets										x															x					x	x	x	x			
2	Support Ecosystem Markets					x														x						x	x				x	x	x	x			
3	Coord. research-mgmt, markets																																				
1D	Sust. Forest Mgmt/Public Lands																																				
1	Capacity/Training	x		x		x			x	x	x														x									x	x		
2	Certification	x		x																																	
3	Diversity of forest types/landscapes	x																																			
4	Inventory/monitoring	x			x																																
5	Recreation			x		x			x																									x	x		
2	**Ensure Healthy/Resilient Forests**																																				
2A	Emergency Response																																				
1	Fire Suppression								x						x								x					x									
2	Other Emergency Response	x							x					x	x													x									
3	Partnerships (FD, MEMA)								x				x	x	x					x								x									
2B	Long-Term Stressors																																				
1	Deer	x																									x	x									x
2	Invasive Plants	x							x											x							x	x									x
3	Invasive Pests/Diseases								x											x							x	x									x
4	Reduce wildfire risk												x		x										x			x									x
5	Native Forest Composition/Mgmt	x																		x																	x
6	Uncontrolled Recreation								x																												x
7	Land Use Change/mitigation		x	x					x	x							x			x					x		x	x	x	x	x						x

Table 1, continued (Partner Programs, Strategy Elements 2C to 5)

Partner Programs

Code	Strategy Elements	DNR Wildlife and Heritage	Critical Area Law	DNR Land Acquisition/Planning	DNR Resource Assess/MBSS	Other DNR-Fish./Parks/IPR	Natural Resources Police	MD Dept.Ag.-For.Health/Res.Cons.	MD Dept. Planning	MDE-Wetlands/Source Water, Sed./EC	Univ. MD (Extension, Agroecology)	Master Logger	Maryland Fire and Rescue Institute	MD Emergency Mgmt Agency	MD Fire Service/MSFA	MD Dept. of Education	MD Env. Trust/Land Trusts	State Tax Assessment Dept	Ches.BayPgm(USFS/EPA/USGS/NOAA)	Natural Resource Cons.Service	Farm Service Agency	U.S. Fish & Wildlife Service	US Military (Dept. of Defense, other)	Other fed.(NPS/APHIS/NASA/BARC)	Balt. Eco. Study/Urban Waters Init.	Forestry for the Bay/AllianceCh. Bay	Bay Bank	Local Govts/MACO/MML	The Nature Conservancy	Trust for Public Land	Forest Industry(MFA/AF/FRA/MAA)	Consulting Foresters	Partnership Sust. Forestry	Society of Am. Foresters	RC&D, MD. Env. Service, TSPs	Other nonprofit(Am.Forests/NADF/NASF)	Watershed/Landowner Orgs.
2C	**Urban Tree Health**																																				
1	Tree Care						x	x																							x						
2	Public utility						x																					x									
3	Recognition/standards																											x								x	
3	**Clean and Abundant Water**																																				
3A	Chesapeake Bay and priority waters																																				
1	Partnerships							x									x		x							x	x	x							x		x
2	Buffers	x	x	x		x		x	x	x	x	x			x		x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
3	Conservation for Water Quality	x	x	x	x	x		x	x	x							x		x						x	x	x	x	x	x	x	x	x	x	x		x
4	Aquatic Habitat	x	x	x	x	x				x									x						x	x	x										x
3B	Forest to Faucet																																				
1	Source Water Protection									x									x							x											
2	Partnerships			x						x									x							x											x
3C	BMPS	x								x	x	x							x									x									
4	**Create Jobs/Sust. Communities**																																				
4A	Rural Economy																																				
1	Resourced based economy										x																				x	x	x				
2	Green jobs										x	x																			x	x	x				
3	Social acceptance of forest mgmt									x	x	x			x				x							x					x	x	x	x		x	x
4	Forest based recreation			x			x			x									x	x		x		x		x			x	x	x	x					x
4B	Support Livable Green Communities																																				
1	UCF/UTC technical asst./planting																		x							x										x	
2	Share Techniques/Urban For. Pgms																		x							x										x	
3	Community Open Space/GI	x	x				x		x																	x										x	
5	**Climate Change**																																				
5A	Leadership Climate Change																																				
1	Develop strategies, MD CAP					x				x																								x			
2	Increase woody biomass									x	x																				x	x	x	x			
3	Sustainable Operations					x																															
5B	Forest Mgmt for Climate Change																																				
1	Mitigation	x				x				x																x											x
2	Adaptation	x	x			x																				x											x

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, since staffing levels do not permit all actions to be pursued every year. 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.

Priority Actions: Stakeholder comments and strategic planning efforts both yielded a clear priority on keeping Maryland's forests as a first step to sustainability.This has long been a priority, but it is clear that increased efforts are needed to avoid irreversible changes that harm the forest economy, watershed health and quality of life in the state. Since most of Maryland's forests are privately owned, this is a multi-faceted endeavor that does not lend itself to simple solutions. One facet is to continue fundamental activities like Forest Stewardship Plans for private forests, Forest Conservation Management Agreements restricting development for 15 years, other tax abatement programs limiting development, existing land acquisition, and easement programs. Expanded efforts will be needed in support of maintaining and diversifying forest products markets, often the most compelling incentive for keeping private forests and a resource that can enable sound forest management. Additional efforts were recommended for expanding outreach and education for forest landowners, and effectively reaching forest owners whether they have large or small holdings. Greater involvement in and resources for local governments with planning authority are also needed. All these received high priority for implementation and funding requests. The Sustainable Forestry Council authorized in the Sustainable Forestry Act of 2009 will provide additional direction on efforts to meet goals for no net loss of forests.

State commitments: State tree-planting initiatives and existing State commitments also contribute to the goal of keeping Maryland's forests and trees. Other priorities are needed to meet commitments for the Chesapeake and Coastal Bays Programs and Maryland's Climate Action Plan. For the Chesapeake Bay, forest buffers and conserving other forests of high value for water quality will be near-term priorities based on existing commitments for 2017 and 2025. Two-year milestones have been established for several forest restoration practices to meet Chesapeake Bay nutrient reduction commitments. The Natural Filters strategy, focusing on revegetating buffers, wetlands and highly erodible lands, is part of Maryland's two-year milestones, and short-term priorities will reflect these needed actions on public and private lands. Federal funds may be requested to allow Maryland to meet these statewide and regional priorities more quickly and more effectively.

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. Maryland is responsible for implementing the Forest Conservation Act, Chesapeake and Coastal Bays Critical Area Law, Nontidal Wetlands Law, Sediment and Erosion Control regulations, the State Highway Reforestation Law, Seed Tree Law, Roadside Tree Law, and Licensed Tree Expert Law. Some areas have responsibilities to protect rare species under the federal Endangered Species Act, like the Delmarva Fox Squirrel on the Eastern Shore. 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 thes. 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 forest 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.

Actions that support climate change activities considered an important element to include, although not as high a priority as simply keeping land in forest use. Many of the actions taken to mitigate for or adapt to climate change also support other goals, like improving air and water quality and expanding forest and tree cover. Maryland will use actions needed to fulfill commitments on climate change to leverage progress towards related goals. Leveraged mitigation options include expanding tree planting in a fashion that supports urban tree canopy and buffer goals and diversifying forest product markets with renewable fuels or durable value-added wood products in a way that expands rural economies. Setting expanded urban tree canopy goals, developing tree canopy implementation plans, and planting new trees in urban areas supports water quality and air quality goals, along with contributing to more livable communities.

The estimated work force needed to deliver all of the desired priorities is substantially more than existing funds can support (Figure 8). Resources already have been allocated to priority goals like keeping forests, but the reduction of more than 36% in forestry agency staffing over the past several years (see Appendix C) has necessarily translated into restrictions on scope of activities. Federal funding requests have generally made up less than 15% of Maryland Forest Service budgets, so
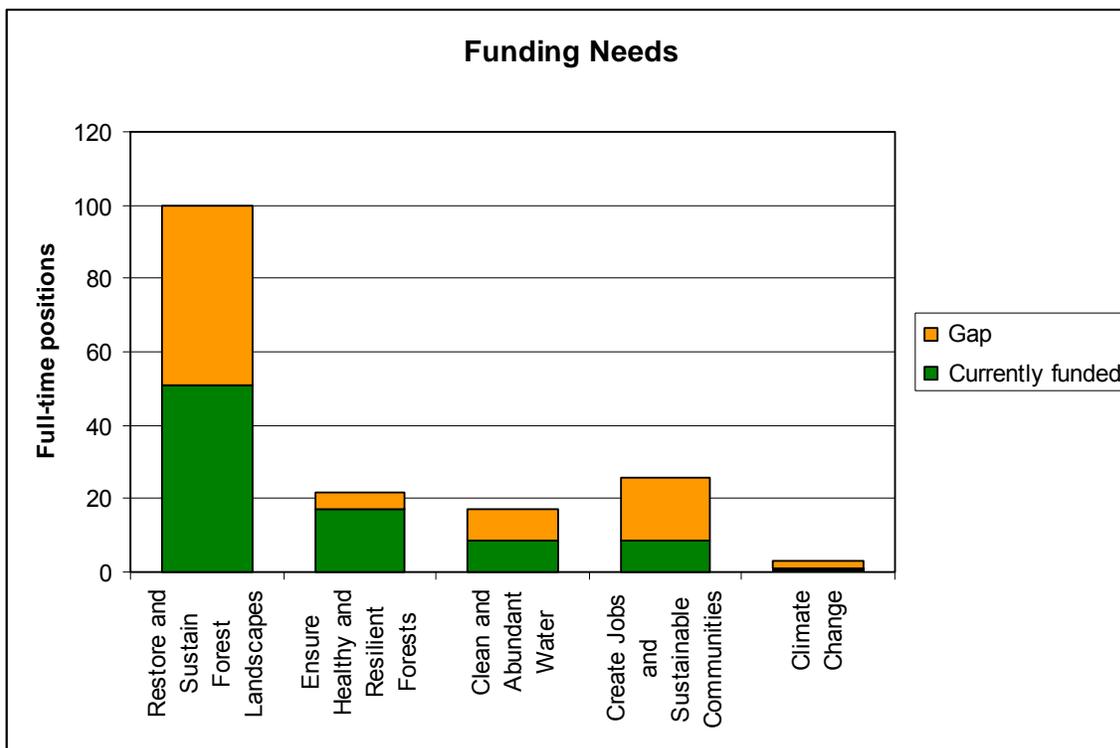
Figure 8: Estimated work force for delivering priority actions and comparison to existing funding with the state forestry agency

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 (dark green in Figure 9) 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 (lime green) are needed to bolster 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 (light green) 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.
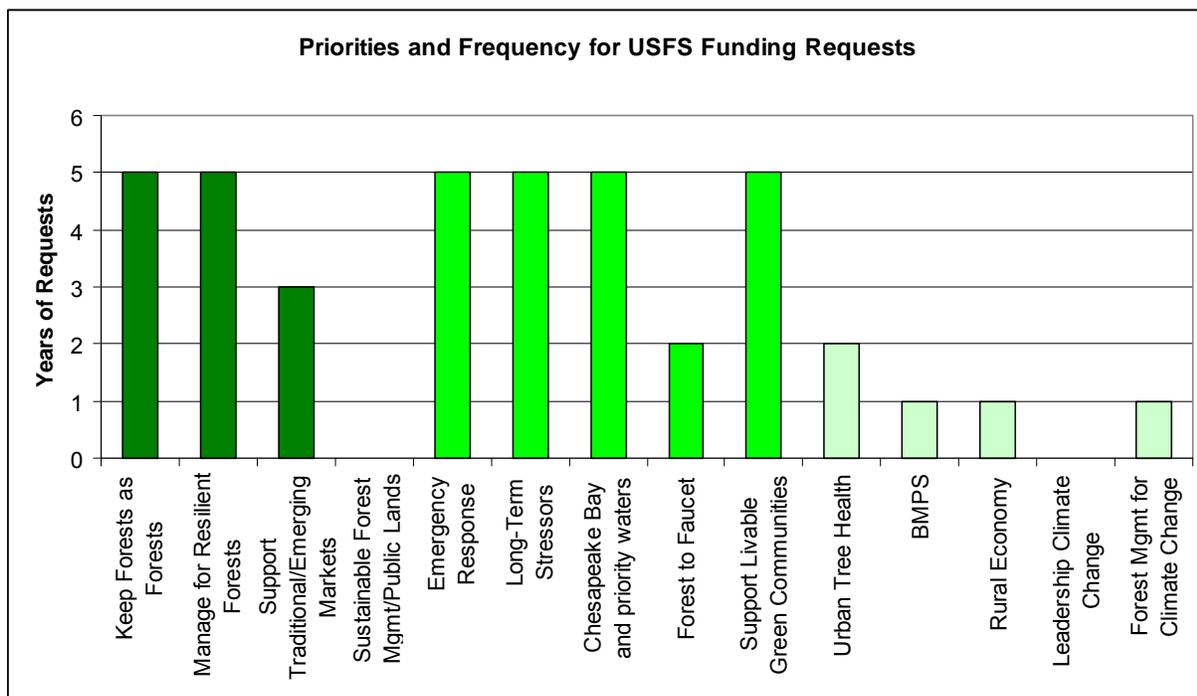
Figure 9: Expected uses for US Forest Service funding requests by priority ranking and expected frequency of request (dark green- top priority; lime green- supporting priority, light green- second tier supporting priority)

Partner and Stakeholder Involvement

The 2015 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. (To be completed)

The 2015 MD Forest Action Plan was developed with input from stateholders and close reference to related planning efforts, including the MD Wildlife Action Plan, the 2014 Chesapeake Bay Agreement, the UMD Extension survey on future sustainability of forest industry, Maryland Climate Action Plan, Rural Economies Workgroup of the Sustainable Growth Commission, and other State goals.

The 2015 Forest Action Plan is largely based on the 2010 Forest Action Plan, developed following the 2009 multi-stakeholder partnership led by the Harry R. Hughes Center for Agro-Ecology and the Maryland Department of Natural Resources – Forest Service. Sponsoring organizations included The Harry R. Hughes Center for Agro-Ecology; The Biophilia Foundation; Chesapeake Bay Program; Chesapeake Bay Trust; The Conservation Fund; Maryland Department of Natural Resources – Forest Service; Forest Industry; Maryland Agriculture Council; Maryland Forest Association; The Nature Conservancy; The Pinchot Institute; Town Creek Foundation; and University of Maryland Extension.
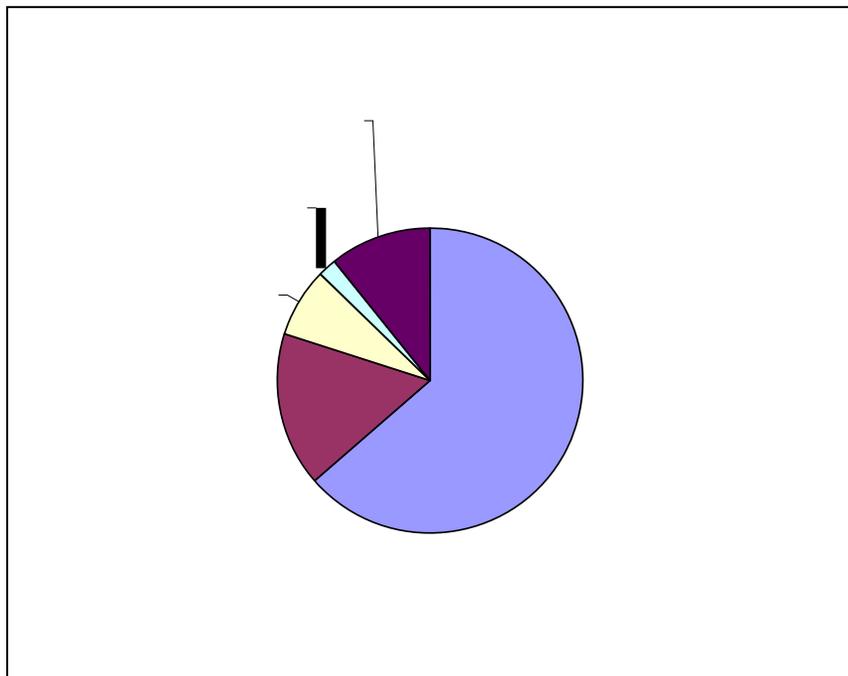
The public engagement plan included a public survey of Maryland's forestry leaders and other interested parties, five listening sessions held throughout the State in June 2009, and a Statewide Forestry Summit held in October 2009. A wide cross-section of forestry stakeholders was represented by survey respondents (26% response rate). The survey was forwarded to open networks of restoration and conservation interests including the Chesapeake Bay Program, and allowed to circulate freely. Anyone who chose to take the time to respond was counted.. The survey addressed five issue areas:
- Retention and Management of Private Forests
- Retention and Management of Public Forests
- Economic Viability of Forestry Industry in Maryland
- Maintaining Forest Diversity in Maryland
- Value-Added Alternative Opportunities

Common concerns among respondents included:

- Conversion of forests to other land uses, particularly development

- Lack of staff for public land management
- Viability of the forest products industry
- Lack of financial incentives for forestry enterprises, especially small to medium scale
- Coordination of urban forestry with urban renewal projects
- Damage from invasive plants and pests

Participants then proposed actions that they felt would address their concerns. The lists of recommended actions generated during the listening sessions fell into four issue categories:

Issue 1. Maintaining Viable Forests and a Viable Forest Industry
Issue 2. Demographic, Social, Cultural, and Economic Trends as Impediments to Forest Retention
Issue 3. Strengthening Forest Management by the Private Landowner
Issue 4: New and Emerging Markets for Forest-based Resources

The recommended actions were summarized and served as the basis for the State-wide Forest Summit. The Forest Summit gathered over 100 stakeholders on October 5, 2009 in Linthicum, MD.

More details and survey results can be found in Mapping a Sustainable Forestry Strategy for Maryland: Report on the Public Engagement Process (December, 2009).

In Winter 2009/2010, MD DNR Forest Service developed a draft strategy, assessment, and priorities. Expertise from all programs and regions was tapped to inform the draft strategy and priority area process, through multiple meetings and exchange of draft products. Previous work was consulted, including a State Forest Strategy in 2006, several Commissions and Task Force reports, Chesapeake Bay goal state implementation plans, and priority area mapping efforts were consulted for the strategy and assessment, 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
- Maryland Stream ReLeaf Implementation Plan - 2005
- Maryland Forest Conservation Goals – 2007

For the 2015 Action Plan additional documents included: 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. Maryland Sustainable Growth Commission Rural Economies Workgroup Report, 2015

Stakeholders and Review Process for the Action Plan:

Maryland Forest Service consulted with a wide variety of stakeholders during the development of the Forest Action Plan. These included the State Forest Stewardship Committee, DNR Wildlife and Heritage Service, and the Natural Resources Conservation Service StateTechnical Advisory Committee. Federal partners with significant forest holdings were contacted, including USDI Fish and Wildlife Service, National Park Service, Department of Defense, US Department of Agriculture, and National Aeronautics and Space Administration. 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.

Drafts were distributed directly to likely interested stakeholders not already linked into the plan development process through distribution lists for coordinating committees, including the Stream ReLeaf Coordinating Committee, Forest Conservation 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 Maryland Department of Natural Resources. Partners included:

- Department of Natural Resources
- Department of the Environment
- Department of Agriculture
- 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
- Maryland Forests AssociationSustainable 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 Fireman'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)
- EPA – 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
- Department of Defense
- National Park Service
- National Aeronautics and Space Association

The Draft Action Plan were posted on the website in September 2015, allowing access to the general public and ready distribution of requests for review by sending links to partners.

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 Issue 1, Restore and Sustain Forest Landscapes. 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
- and 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 issues, 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 Issue, Make Landscapes More Resilient to Climate Change. 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 State Strategy, Maryland Issue, Ensure Clean and Abundant 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- 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 Issue, Restore and Sustain Forest Landscapes. Many of the Strategy's goals and action 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 program. 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 Issue, 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. 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 Goal 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. Watershed partnerships will be one of the approaches for applying all these actions to priority areas within the larger Bay watershed. 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 Bay

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- 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 BMPs 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 Delmarva fox squirrel, and controlling pests targeting pines such as 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 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.

Measures for Tracking Progress

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 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 practible 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.

certified 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.

ecosystem market - organizational structure 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 land owners, or other land managers who can conserve or restore ecologically valuable land.

edge - the boundary between two ecological communities, for example, field and woodland. Edges provide wildlife habitat. Consideration of an edge can reduce the impact of a timber harvest.

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   ***fertilization*** - the addition of nutrient elements to increase growth rate or overcome a nutrient deficiency in the soil.

forest - biological community dominated by trees and other woody plants.

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 unevenaged 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   *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 can not 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 codominate 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-dependant 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 utilized for paper pulp. This type of harvest usually is preformed 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_2 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_2 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 dbh and suitable for conversion to lumber. Sometimes, trees 11 to 14 inches dbh are called small sawlog trees, and trees larger than 18 inches dbh 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 leading area or 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 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, <u>Forestry Terminology</u> provided the framework for this fact sheet. Some definitions have been modified for Maryland Department of Natural Resources purposes.

Some definitions were taken from <u>The Dictionary of Forestry</u>, 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 Sustainabiity 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've deduced from results of the three surveys are described below.

For Primary and Larger Secondary Forest Industry Owners:
- Provide state tax incentives for 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 lowinterest 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; the lack of access and availability is a big concern for forest industry business owners. To achieve this: maintain a steady and stable amount of state land available for harvests;
- 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;
- Increase tree planting efforts to provide raw materials for the future; and 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. That 60% of respondents indicated they currently had a forest management plan demonstrates 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, 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 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 nine years was 43 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 86 in FY2010, a 36.5% reduction. Since FY2010, MFS has lost an additional three positions.
`
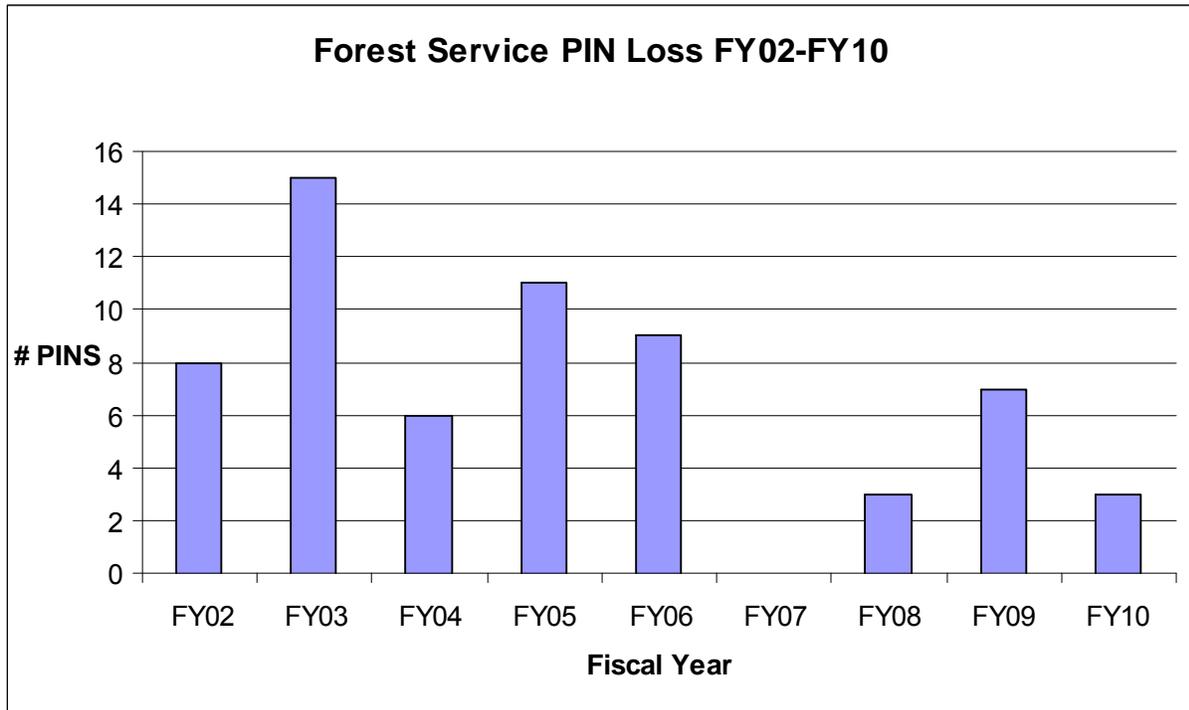
Figure 11: Number Maryland Forest Service permanent positions lost by Fiscal Year

The Maryland Forest Service has taken on new Chesapeake Bay goals, new programs like Lawn to Woodland 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 overall, even with the addition of some positions with the shift of the State Forests (Figure 12).

## Forest Service Authorized PINs FY01-FY10
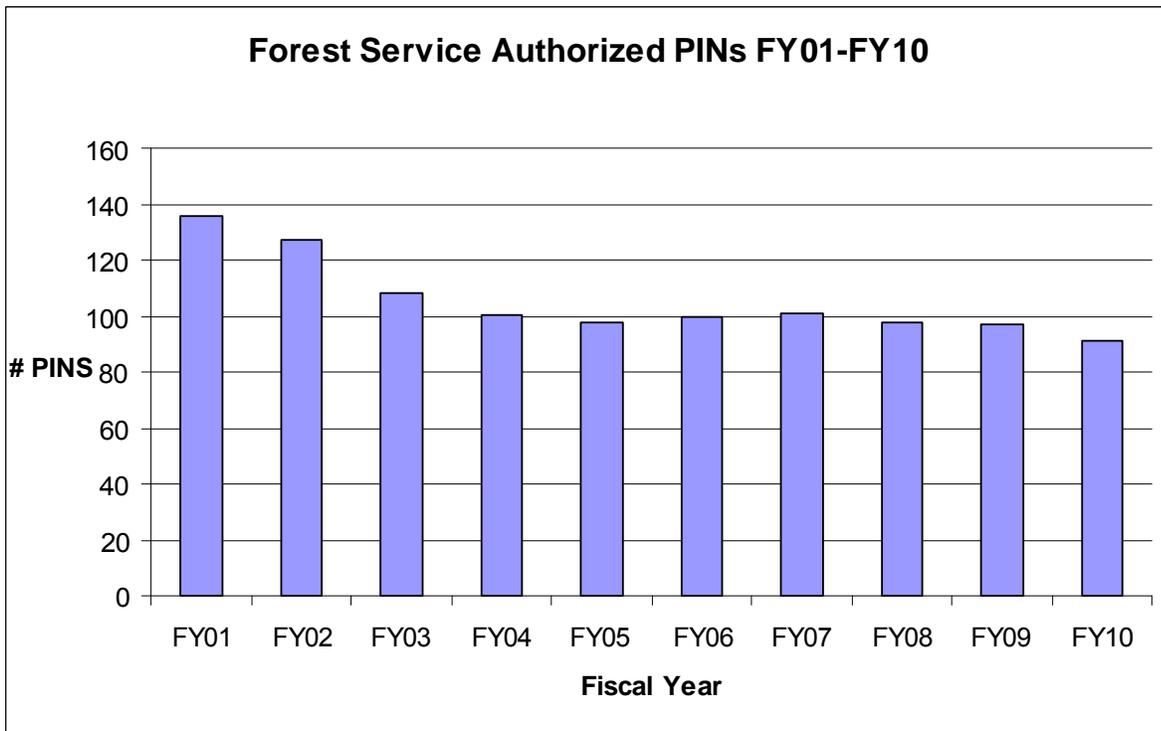
Figure 12: Number of full-time regular positions authorized for the Maryland Forest Service by Fiscal Year (July 1 to June 30)

Based on the long-term trend of declining PINs, the most likely scenario is that the Forest Service will continue to grow smaller as long as state budgets continue to experience shortfalls. Of course, if budgets stabilize, the Unit PIN count may also stabilize. However, to make realistic assessments of progress on priority tasks, the Forest Service needs to plan for accomplishing its priority tasks with the expectation it will remain a smaller workforce into the future.
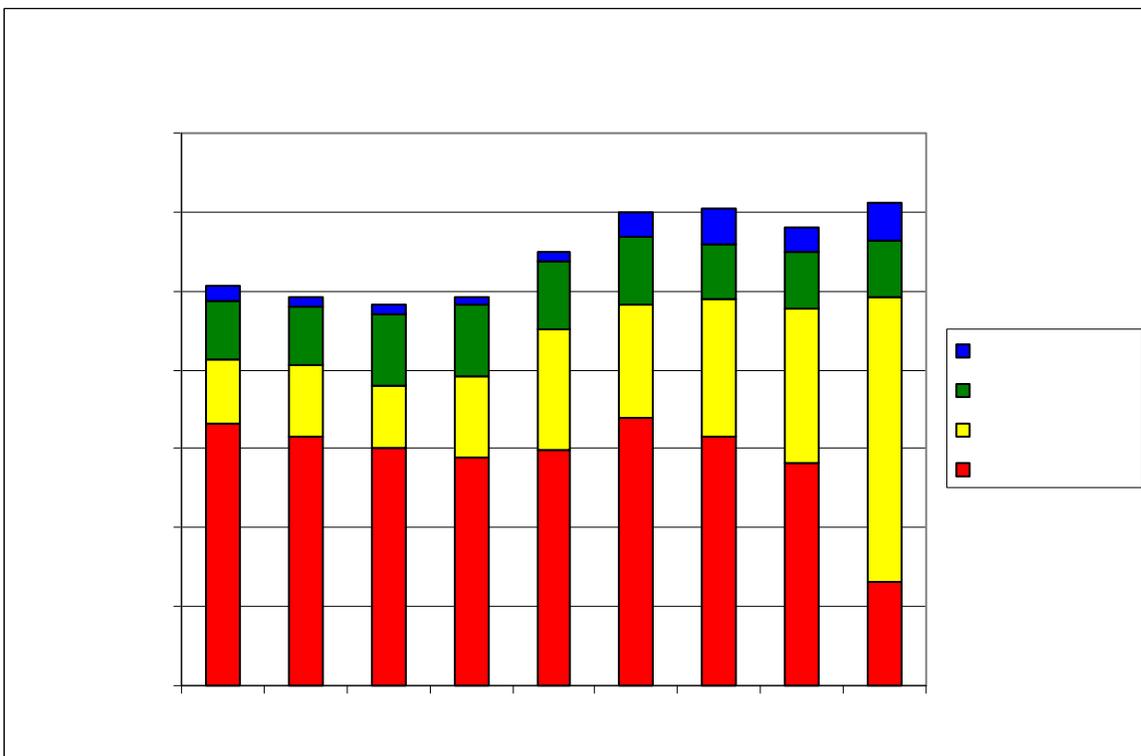
Partnerships and grants have long been significant contributors to strategies for meeting forestry goals, and they are likely to play an even greater role in the future. Federal funds primarily from USDA Forest Service have been a valuable and fairly stable element in MFS budgets, and are matched 50:50 with State funds, so requirements of USFS grant deliverables have significant influence on MFS activities and directions. However, the majority of MFS funding has been from General Funds from State tax dollars until FY2010 (Figure 13).

Since FY2010, MFS has relied primarily on Special Funds through the Forest and Park Reserve Fund. Recent budget legislation, unless changed by the upcoming legislature or supplemented with General Funds or other income sources, will cause a significant budget shortfall.

The overall trend toward less General Funds and more Special Funds places unsustainable expectations on the Maryland Forest Service. Special Funds are generated through sales and fees, including management plan fees, park entrance fees, timber sales, campsite fees, roadside tree permits, and similar sources. Timber sale revenue has declined due to the economic downturn. There are only so many licenses, permits, campsites and RT supervision opportunities. Special Funds are less predictable year to year than General Funds and will involve reliance on other units like the Park Service for basic expenses.

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 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

Jurisdiction	MD Dept. Planning (MDP) Land Area ACRES	UMD Canopy Cover Base Year	UMD Estimated Total Canopy Cover ACRES	Percent Tree and Forest Canopy Cover %	Estimated Urban Tree Cover (US Census Urban Areas 2010) ACRES	Estimated Forest Cover from UMD Data ACRES	Percent Forest Canopy Cover (>1 ac. patch) %
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