

2020

2020 Pennsylvania Forest Action Plan

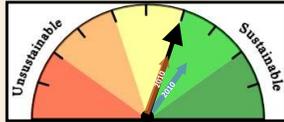
Executive Summary

Conditions and Trends

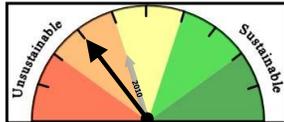
To assess the conditions and trends for Pennsylvania’s forests, the 2010 Forest Action Plan introduced the concept of “Sustainability Meters” based on the 18 Indicators of Forest Sustainability for the Northeastern US. In the 2020 Plan, for each indicator we briefly describe the indicator, discuss relevant data, and provide a conclusion regarding sustainability. A faint grey arrow has been included on the gauges to represent the 2010 “reading” along with a black arrow that indicates the 2020 assessment level.

Sustainability Meters: Criteria & Indicators of Forest Sustainability

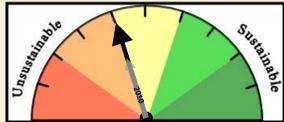
Indicator 1. Area of total land, forest land, protected forest land, and forest ownership



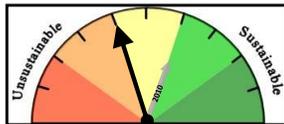
Indicator 2. Forest type, size class, age class, and successional stage



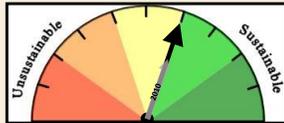
Indicator 3. Extent of forest land conversion, fragmentation, & parcelization



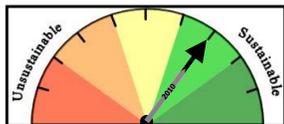
Indicator 4. Status of forest/woodland communities & associated species of concern



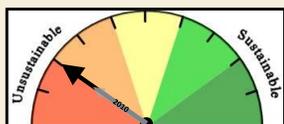
Indicator 5. Area of timberland



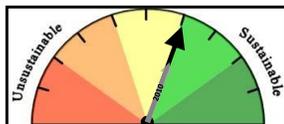
Indicator 6. Annual removal of merchantable wood volume compared with net growth



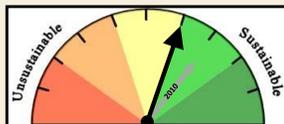
Indicator 7. Area & percent of forest land affected by biotic & abiotic processes and agents



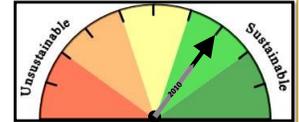
Indicator 8. Soil quality on forest land



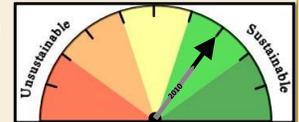
Indicator 9. Area of forest land adjacent to surface water, and forest land by watershed



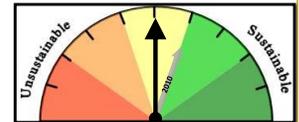
Indicator 10. Water quality in forested areas



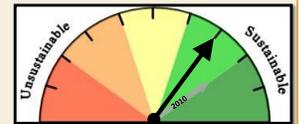
Indicator 11. Forest ecosystem biomass and forest carbon pools



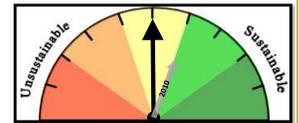
Indicator 12. Wood and wood products production, consumption, and trade



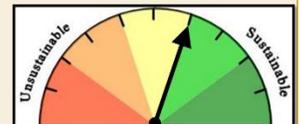
Indicator 13. Outdoor recreational participation and facilities



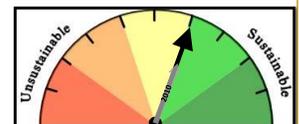
Indicator 14. Investments in forest health, management, research, and wood processing



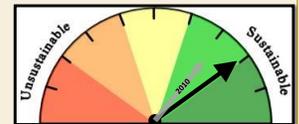
Indicator 15. Forest certification



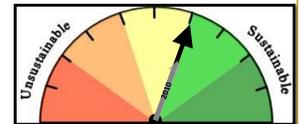
Indicator 16. Employment and wages in forest-related sectors



Indicator 17. Forest management standards/guidelines



Indicator 18. Forest-related planning, assessment, policy, and law



Priority Issues

For each issue, key threats and opportunities related to that issue are provided. Then, relevant data and an assessment of each issue are discussed, setting the foundation for establishment of long-term strategies. The Forest Action Plan long-term strategies are presented in a table at the conclusion of each issues sub-section, wherein linkages are made to State and Private Forestry National Priorities.

1. Land Use Change
2. Forest Health
3. Sustainable Forest Management
4. Climate Change
5. Communicating Natural Resource Values
6. Energy Management & Development
7. Wildland Fire and Public Safety
8. Plant and Animal Habitat
9. Forest-related Economy and Jobs*
10. Forest Recreation*
11. Water and Soil*

*New section since 2010

Issue 1: Land Use Change

Highlights

Issue Statement: Maintaining the forest land base is critical to ensuring functional ecosystems and providing various resources and values. Although the forested acreage in PA is vast and net acreage has been stable for decades, these forests are threatened due to several factors that convert forest to non-forest and fragment existing forestland. The threats and intensity of land use changes differ by region. In addition to the net acreage of forestland, the composition, distribution, and character of the forests are important to consider, as forests possess differing features and may not contribute equally to ecosystem services and functions and the spatial arrangement of forests has important implications for diversity and connectivity.

Threats

- *Changing ownership dynamics (lack of legacy planning leads to subdivision)*
- *Urbanization & forest loss due to development*
- *Fragmentation of forested landscapes*

Opportunities

- *Conservation easements and acquisition of forests into protected ownerships*
- *Private landowner outreach & education in forest stewardship and legacy planning*
- *K-12 outreach & education, to increase societal value of forests*
- *Urban & Community Forestry programs that encourage local municipalities and residents to manage their*

forests and trees responsibly

- *Afforestation, reforestation, and restoration programs*
- *Forest carbon and other ecosystem services as revenue sources to support forest conservation and management*

Land Use Strategy

1. **Easements:** Promote acquisition of priority forestland in fee or through permanent easements.
2. **Funding:** Identify and promote new funding mechanisms to finance forestland conservation.
3. **Forestland Conversion:** Slow the present rate of forestland conversion (in certain areas) by fostering state and local government cooperation and by incentivizing conservation of privately-owned forest land and riparian forest buffers.
4. **Fragmentation and Parcelization:** Address forest fragmentation and parcelization due to poor practices, especially during intergenerational land transfers.
5. **Forest Cover:** Maintain or increase forest land cover by supporting reforestation/afforestation, forest retention, abandoned mine land restoration, and meadow creation efforts.

Issue 2: Forest Health

Highlights

Issue Statement: Insects and disease, invasive plants, inadequate forest regeneration, and over-abundant deer populations are critical and ongoing threats to the health of the forests of the commonwealth. These and other issues have compounding impacts on the well-being and function of PA forests and require coordinated, strategic action at appropriate scales and across ownerships.

Threats

- *Established and newly introduced pests and pathogens*
- *Damaging native species*
- *Continued spread of invasive plants, exacerbated by increased forest fragmentation and climate change*
- *Factors that exacerbate forest health challenges, such as stress due to climate change, fragmentation and novel vector opportunities, poor management practices, lack of outreach & education about these threats*
- *Poor regeneration of certain overstory species (poor management, deer overabundance, invasive species, poor soil health), making maintenance of diversity and desirable forest composition a challenge*
- *Loss of diversity and regeneration due to over-abundant deer and herbivory on native plants*

Opportunities

- *New collaborations and cross-ownership partnerships to address these issues at the landscape-level scales on which they occur*
- *Continued partnerships with related agencies (e.g., PA Game Commission) to address deer populations and offer land managers the opportunity to enroll in programs such as Deer Management Assistance Program (DMAP) to address over-abundance at targeted locations*

- *Research of operational strategies to combat these threats*
- *Building a united educational strategy focused on sustainable forest management that is available to land managers, including private and industry practitioners.*

Forest Health Strategy

1. **Integrated Pest Management:** Focus on integrated pest management strategies for control of pathogens and insects jeopardizing forest health.
2. **Monitoring:** Use a permanent plot system to monitor forest pests and forest health conditions.
3. **EDRR:** Use early detection and rapid response for invasive species of concern when feasible.
4. **High-risk Habitats:** Identify and conserve high risk habitats threatened by invasive species, such as eastern hemlock ecosystems.
5. **Collaboration Across Ownerships:** Implement invasive species management projects on DCNR-managed lands and on private lands through the Forest Stewardship and Urban Forestry programs; and through cooperative agreements with county governments and municipalities.
6. **Partnerships & Collaboratives:** Create & utilize new partnerships such as CISMAs (Cooperative Invasive Species Management Areas) or Forest Health Collaboratives to engage partners and private citizens in regional invasive species training opportunities and management projects.
7. **Forest Regeneration:** Monitor and report forest regeneration progress on public and private lands through integration of available datasets to better understand dynamics and factors affecting success, as well as continuing to partner with collaborators to promote healthy, diverse forest regeneration.
8. **Deer Management:** Develop an adaptive management framework for deer management and forest health management and support basic scientific research regarding deer management and forest health issues.
9. **Climate Change Interaction:** Examine relationships between climate change variables and forest insects and disease dynamics, including growing season, host response, and interactive effects. Use findings to develop plans to minimize and mitigate negative impacts.
10. **Eastern Tree Breeding Improvement Coalition:** Work with partners to implement an Eastern Tree Breeding Improvement Coalition to address disease- and pest-threatened species such as ash, hemlock, beech, and butternut.

Issue 3: Sustainable Forest Management

Highlights

Issue Statement: Sustainable management of forests across Pennsylvania is essential to maintain the vital benefits and services that forests provide. Implementation of sound management can be challenging in light of balancing uses, conflicting information and misinformation about best practices, limited availability of reliable data, fluidity of markets for forest products, and changing ownership dynamics. Ultimately, management practices must address the future biological diversity, ecosystem values, and productivity of forests.

Threats

- *Poor harvesting practices*
- *Competing and conflicting forest uses*
- *Fragmentation*
- *Parcelization from changing ownership dynamics*
- *Barriers to 3rd party certification to ensure sustainable management on private land*
- *Forest product market variability*
- *Water quality impacts from loss of forests or poor forest management practices*
- *Landowner reluctance to seek professional assistance*

Opportunities

- *Increasing third-party forest certification*
- *Promoting a variety of markets, including carbon credits and biomass energy*
- *Landowner education and outreach regarding management practices and legacy planning*
- *Community forest management engagement*
- *Continued monitoring and sharing of data of forest conditions*
- *Incentives for sustainable management practices on private land, such as tax relief for ecosystem services provided or funding assistance for management projects*

Forest Management Strategy

1. **Sustainable Practices:** Support sustainable forest management practices by investing in training on current issues, research, trends, and technologies, using effective and innovative tools, programs, venues, and opportunities throughout the urban to rural continuum.
2. **Forest Certification:** Promote forest certification programs for public and private land, such as SFI, FSC, and TreeFarm.
3. **Forest-dependent Communities:** Develop and promote approaches to conserving and revitalizing local communities and industries that depend on forests, including using forest restoration to help communities adapt to the impacts of climate change.
4. **Stewardship:** Support comprehensive forestland stewardship initiatives.

Forest Management Strategy

5. **Urban Trees:** Promote tree canopy expansion initiatives in developed areas by supporting assessments of urban tree canopy and promoting sustainable management of trees by municipalities.
6. **Tax Programs:** Continue to leverage and adapt existing open space tax incentive programs, such as Clean and Green.
7. **Planning:** Engage in county/community planning efforts, ensuring that both rural and urban forestry planning are considered.
8. **Monitoring:** Support and utilize monitoring efforts to assess the conditions and trends of forests of the commonwealth.

Issue 4: Climate Change

Highlights

Issue Statement: Pennsylvania's forests are increasingly affected by climate change, necessitating adaptation for and management of these impacts. Maintaining healthy forests will be critical in carbon sequestration for mitigation and ensuring diverse ecosystems and landscapes is important for creating resilience and opportunities for adaptation.

Threats

- Warmer temperatures and longer growing seasons may benefit invasive species
- Changing conditions may exacerbate existing stressors
- Increased intensity and frequency of natural disturbances (drought, wind, ice storms, fires, floods, etc.)
- Changing weather patterns and increased extreme weather events
- Habitat becoming unsuitable, especially for species near edge of their range and other vulnerable populations

Opportunities

- Implementation of the DCNR Climate Change Mitigation and Adaptation Plan
- Managing forests for species, age, and functional diversity
- Controlling invasive species
- Establishing protocols and plans for natural disasters
- Maintaining and creating riparian forest buffers in floodplain areas to mitigate flooding
- Conserving forestland and carbon sequestration by maintaining and growing forests
- Reducing carbon emissions in DCNR operations through green energy implementation and efficiencies
- Selecting for species expected to fare well under changing conditions
- Strategically conserving natural habitat to allow for migration and adaptation
- Identifying and monitoring vulnerable ecosystems and species
- Support markets for durable wood products, which provide long-term storage of carbon

Climate Change Strategy

1. **Forest Resilience:** Promote resilient forests by managing for species, age, and functional diversity; promoting healthy, diverse regeneration; protecting forests from pests; promoting habitat connectivity; and selecting for species expected to adapt well to future conditions.
2. **Private Landowner Support:** Support private forest landowner education and foster implementation of BMPs.
3. **Vulnerable Species and Ecosystems:** Identify, survey, manage, and monitor species and ecosystems most vulnerable to climate change.
4. **Invasive Species Management:** Promote and support invasive species management, through partnerships, funding, and technical guidance.

Climate Change Strategy

5. **Wildfire Risk:** Prioritize high wildfire risk environments for plan development and fuel mitigation.
6. **Wildfire Response:** Build the capacity for wildfire response and for prescribed fire implementation.
7. **Riparian Forest Buffers:** Support establishment of riparian forest buffers by providing funding and technical assistance; incentivize conservation of intact forested riparian buffers on private land.
8. **Unique Ecological Sites:** Conserve unique ecological sites and key tracts of land through acquisitions, easements, and stewardship plans, with emphasis on refugia, habitat connectivity and migration corridors.
9. **Carbon Sequestration:** Research methods for increasing the amount and longevity of carbon within forest and soil sequestration pools.
10. **Emissions:** Limit emissions associated with disturbance to soils and burning fossil fuels.
11. **Wood-products Carbon Storage:** Utilize durable wood-based products whenever possible in construction projects and research innovative wood products.

Issue 5: Communicating Natural Resource Values

Highlights

Issue Statement: Communication (education, interpretation, outreach) is critical to the maintenance of healthy forest systems and ensuring stewardship of natural resources. Engagement of citizens, forest landowners, partners, and youth is essential and a primary responsibility of natural resource managers. Availability of high-quality, accurate, consistent information regarding the forests of the commonwealth is imperative.

Threats

- Public disengagement and disconnection from the natural world
- Lack of coordinated and consistent messaging about forests from statewide, regional, and national perspective
- Lack of public understanding of resource management and the breadth of forestry (beyond timber management)
- Misinformation about best practices
- Lack of engagement of youth to inspire a new generation of forest stewards and natural resource professionals
- Lack of funding for research into marketing and development of communication tools
- Increasing number of private landowners to reach with educational materials

Opportunities

- Youth engagement
- Urban tree programs as opportunity for outreach
- Coordination with K-12 education and incorporating forest-related topics
- Using recreation as a vehicle to engage and educate forest stewards
- Using water as a theme to connect people to the value of forests
- Ensure inclusive messaging and equitable access to outreach and educational programming and services
- Ensure consistent messaging
- Reach audiences that have been historically underrepresented or disenfranchised
- Conservation Landscapes as opportunity for communication and outreach

Communications Strategy

1. **Expand Education and Interpretation:** Expand and improve the conservation education and interpretation efforts; focus efforts on reaching underserved populations and new audiences through new approaches, inclusive messaging, diversified materials, and collaborative programs
2. **State Forest Interpretative Plan:** Develop a statewide interpretive plan for state forest system to engage/connect people with resource values and benefits.
3. **Appropriately-formatted Communications:** Communicate relevance of natural resources research and technical information in audience-appropriate formats (professionals, landowners, youth, etc.).

Communications Strategy

4. **Collaboration:** Use collaboration to enhance natural resource education.
5. **Recreation:** Use recreational interest on forest land to promote forest stewardship.
6. **Stakeholder Research:** Conduct research of key forest conservation stakeholders/audiences to better understand their needs/knowledge of forest resource issues.
7. **Consistent Messaging:** Coordinate messaging on forest values and benefits with other key stakeholders and environmental educators.
8. **Regional Collaboration:** Develop regionally specific communications tools to enhance citizens' understanding of forest sustainability issues.
9. **Technical Assistance:** Develop communications and outreach tools to aid in the delivery of technical assistance in group settings.

Issue 6: Energy Management & Development

Highlights

Issue Statement: *Reliable energy sources are key to our society. Extraction of energy resources must be carefully managed and continually adapted to ensure protection of common natural resources while responsibly extracting or harnessing energy to power our communities. In PA, shale gas infrastructure and utility and pipeline rights-of-way have substantial overlap with forests of the commonwealth, and coordination across ownerships is essential to ensure that these industries are managed responsibly and in a way that avoids, minimizes, mitigates, and monitors impacts wherever possible. In addition, seeking and promoting use of renewable energy sources and minimizing energy consumption is a shared responsibility of all Pennsylvanians, but resource management agencies such as the DCNR have the unique opportunity to provide a model for these efforts.*

Threats

- *Fragmentation of forests from infrastructure due to the rapid expansion of shale gas development (over 13,000 wells drilled statewide since 2010)*
- *Introduction of invasive species through development*
- *Irresponsible management of development and infrastructure*
- *Water quality concerns related to extractive processes, increased traffic and disturbance, and loss of forests due to energy development*
- *Air quality concerns with increased traffic and industrial activity*
- *Noise pollution and soundscape alteration with development, traffic, and extraction activity*

Opportunities

- *Avoid, minimize, mitigate, and monitor impacts on state-owned lands*
- *Use BMPs used on state lands to serve as an example for other landowners via the Guidelines for Administering Oil & Gas Activity on State Forest Lands*
- *Promote markets for biomass energy, as a renewable energy source and as a means to make management of sites with low-grade woody biomass feasible to landowners*
- *Restoration and reclamation of previously developed lands and resources (well plugging, ROW reclamation, abandoned mine land restoration, etc.)*

Energy Management & Development Strategy

1. **Permitting and Environmental review:** Continue careful environmental review processes through leases, surface-use agreements, as well as permitting and regulation by state and federal regulatory agencies.
2. **Proactive Planning:** Continue practice of proactive planning to avoid, minimize, and mitigate impacts to natural resources and maximize benefits on state forest land and encourage private landowners to do the same.

Energy Management & Development Strategy

3. **State Forests and BMPs:** Manage oil and gas activities on State Forests through BMPs that minimize environmental and social impacts of shale gas development and promote these gas management protocols as an example for other landowners.
4. **Monitoring:** Support monitoring systems that address potential social and environmental impacts and encourage communication of results.
5. **Energy Efficiency:** Improve energy conservation, energy efficiency, and sustainable design.
6. **Energy Conservation:** Promote energy conservation with partners and the public.

Issue 7: Wildland Fire and Public Safety

Highlights

Issue Statement: The Department of Conservation and Natural Resources has a legal mandate to provide protection from wildfire, which is accomplished through wildfire prevention, suppression, investigation, and preparedness. In addition, the use of prescribed fire is increasing as a fuel reduction tool, as well as to restore and maintain fire-adapted ecosystems. DCNR's Forest Fire Protection Division also has key roles in emergency response and public safety issues and may be engaged by PEMA or other entities managing natural disasters and other emergency incidents.

Threats

- Trend of declining numbers of volunteer firefighters and Fire Wardens across the commonwealth
- Relatively high number of acres considered Wildland-Urban Interface
- Inadequate staffing to address wildfire suppression and prescribed fire needs
- Aging wildland fire equipment
- Public education gaps about fire safety, prevention, and abundance of human-caused wildfire

Opportunities

- Increase the local response capacity for wildfire
- Restore and maintain resilient landscapes using prescribed fire and other fuels mitigation
- Support fire prevention programs and public safety awareness outreach and education
- Promotion of fire adaptation activities lead by local communities
- Support and expand training opportunities to increase capacity and qualifications of wildland fire personnel, such as Mid-Atlantic Wildland Fire Academy
- Install additional remote automated weather stations
- Continue to adapt and fully implement Community Wildfire Protection Plans (CWPPs)
- Increased use of prescribed fire for fuels reduction and forest health management
- Continue to engage in statewide, regional, and national wildfire planning and initiatives
- Conduct Incident Command System (ICS) training for staff to be prepared to respond to wildfires and other emergencies and natural disasters.
- Utilize partnerships between public and private entities to increase capacity and training for prescribed fire

Wildland Fire & Public Safety Strategy

1. **Bureau of Forestry Capacity:** Build capacity within the Bureau of Forestry to safely and effectively respond to wildfires.
2. **Forest Fire Wardens & Volunteers:** Build capacity within the Forest Fire Warden organization and the volunteer fire service to safely and effectively respond to wildfires. Broaden recruitment efforts where feasible by engaging with local communities, career counseling services, etc.

Wildland Fire & Public Safety Strategy

3. **Incident Response:** Ensure the Bureau of Forestry is trained, prepared, and equipped to respond to all-risk incidents as needed.
4. **Wildfire Prevention:** Support and engage in efforts to mitigate wildfire impacts and to prevent human-caused wildfires. Prioritize outreach to WUI areas.
5. **Prescribed Fire Use:** Ensure the safe use of prescribed fire and build capacity for its safe and legal implementation statewide.

Issue 8: Plant and Wildlife Habitat

Highlights

Issue Statement: Pennsylvania is a haven of biodiversity and contains critical habitat for numerous species. Several factors threaten the integrity of habitat and impact ecosystem function. Many efforts are underway to combat these challenges and restore or maintain diverse habitats and resilient ecosystems.

Threats

- Climate Change
- Invasive species
- Habitat loss and degradation
- Regeneration challenges and understory “super competitors”
- Overstory species decline
- Degradation and conversion of wetland and aquatic habitats and riparian corridors
- Diseases

Opportunities

- Using partnerships to acquire funding and share resources
- Invasive species management
- Research into habitat management prioritization and best practices
- Riparian habitat conservation and restoration
- Outreach and education around habitat and conservation
- Pennsylvania Wildlife Futures Program
- Pennsylvania Plant Conservation Network
- Implement PA Wildlife Action Plan in coordination with PA Game Commission and PA Fish & Boat Commission
- Increase use of prescribed fire where appropriate

Plant & Animal Habitat Strategy

1. **Species and Habitats of Concern:** Identify species and habitats of special concern using Natural Heritage information, SWAP, etc.
2. **Landscape-scale Planning:** Develop regional or landscape level plans and collaboration to promote protection and restoration of contiguous forest landscapes that encompass a diverse mosaic of habitat types, including young forests and forests with old-growth characteristics.
3. **Aquatic Ecosystems:** Conserve wetland and aquatic habitats.
4. **Invasive Species:** Assist in developing effective identification, tracking, and management of invasive species and provide training about habitat specific concerns to technical service providers, land managers, and landowners.

Plant & Animal Habitat Strategy

5. **Tree Species Diversity:** Maintain forest tree species diversity through silvicultural BMPs, selective breeding, invasive species management, etc.
6. **Understory Vegetation:** Restore and manage forest understory vegetation communities degraded by browsing, acid deposition, and other influences.
7. **Collaboration:** Coordinate and collaborate with partners to share resources, data, management strategies, etc.
8. **Public Education and Outreach:** Educate the public about forest habitat values.
9. **Comprehensive Approach:** Ensure an inclusive approach and broad values in habitat improvement efforts that include both game and non-game species, particularly Species of Greatest Conservation Need.

Issue 9: Forest-related Economy and Jobs

Highlights

Issue Statement: Pennsylvania forests support a \$21 billion forest products industry and many other jobs, directly or indirectly maintained by the presence of the forest itself, with a total economic impact estimated around \$37 billion. Jobs and forests are inextricably linked in the commonwealth, as forests supply raw materials and space to sustain the forest products industry including non-timber products, recreation, and restoration jobs.

Threats

- All threats that impact health and productivity of forests, such as fragmentation, invasive species, regeneration issues, and poor management practices
- Lack of younger people joining natural resource-based careers, including the forest products industry
- Loggers and road-bonding issues; need for tax and financial assistance
- Global market volatility and decline
- Domestic market decline

Opportunities

- Industry modernization may lead to new opportunities and jobs
- Working forest conservation easements
- Safety training to assist in lowering worker's compensation insurance costs to operators
- Promotion of non-timber forest product production and economic growth potential for landowners through value-added product development
- Promotion of PA Hardwoods marketing campaign and work of HDC and other key advocates
- More quantification of values (e.g., recreation, ecosystem services) of PA forests, beyond forest products
- Work toward broader inclusion of underrepresented groups in natural resources professions
- Expand education on sustainable forest management and what healthy forests look like, through examples such as demonstration areas or interpretative forest tours
- Promote public awareness of the importance of forests to clean water
- Expansion of forestry topics in secondary education and career counseling
- Implementation of Green Ribbon Task Force recommendations

Forest-related Economy & Jobs Strategy

1. **Conservation Easement Program:** Adopt a statewide working forest conservation easement program.
2. **Tax Incentive Programs:** Revise the current Clean & Green and PILT programs and promote additional tax incentive programs for landowners.
3. **Invasive Species:** Provide additional funding to combat invasive plant and pest damage and adopt a plant labeling program.

Forest-related Economy & Jobs Strategy

4. **Good Neighbor Authority:** Support Good Neighbor Authority agreement between DCNR and Allegheny National Forest (ANF).
5. **Forest Industry Challenges:** Remove barriers for forest industry, such as exempt loggers from road-bonding requirements and age-related workplace restrictions.
6. **Training for Workers:** Expand safety and other training to encourage insurance companies to lower worker's compensation rates.
7. **Recruitment to Forest-related Professions:** Broaden recruitment efforts, develop more pipelines between schools and industry, and promote inclusion of forestry and forest occupations in K-12 education and career counseling. Prioritize efforts that engage underrepresented groups. Support and engage with local, county, & regional workforce development partnerships.
8. **PA Wood Products Marketing:** Promote marketing of Pennsylvania-grown wood products and ensure sustainable staff and funding for the Hardwoods Development Council. Explore additional emphasis on new products and emerging markets, especially for sustainably harvested low-grade wood.
9. **Forest-related Industries:** Support existing and emerging forest-related economic engines and forest products industries in rural and urban landscapes, including NTFPs, carbon market, and the biomass industry.
10. **Education on Forest Importance:** Expand public awareness and education efforts to promote the importance of forests to clean water and the value of forestry in general, including forest tours and demonstration areas.

Issue 10: Forest Recreation

Highlights

Issue Statement: Recreation opportunities are becoming increasingly important, and many sources indicate that outdoor recreation activity has increased sharply in recent years. The ability to pursue recreational experiences in both rural and urban forests is an important expectation for many Pennsylvanians. Providing sustainable opportunities for recreation on and relating to Pennsylvania forests requires balancing visitor objectives/expectations, environmental capacity, and capacity to manage the required infrastructure and oversight to accommodate recreational use.

Threats

- Increasing recreational demand and diversification of types of recreational uses, leading to conflicting uses, overcrowding, and reaching ecological carrying capacity/resource degradation
- Inadequate funding and resource to manage recreation infrastructure and other staffing needs
- Extended yearly outdoor recreation use with longer warm seasons
- Increased costs to maintain and repair infrastructure with extreme weather events due to climate change
- Increased introduction of invasive species due to recreational users as vectors of spread
- Difficulty in maintaining areas with wild character amid increasing demands for outdoor recreation

Opportunities

- Conserve and protect Pennsylvania's natural places.
- Promote strategic outdoor recreation planning to minimize negative impacts
- Maintain existing park, trail, and recreation areas, and prioritize other infrastructure needs.
- Ensure the continued state and federal conservation and recreation funding sources (i.e. LWCF) and foster use of new revenue sources
- Reconnect people to the outdoors and promote natural resources stewardship through recreation
- Continue to strengthen connections between outdoor recreation and health in communities for people of all ages and abilities.
- Examine the built environment and encourage local communities to promote healthful transportation alternatives.
- Implement recommendations outlined in the Statewide Comprehensive Outdoor Recreation Plan

Recreation Strategy

1. **Data Analysis and Planning:** Use quantitative and survey data to improve the management and planning of recreation opportunities statewide.
2. **Range of Opportunities:** Provide a variety of experiences and opportunities while ensuring sustainable and appropriate forest recreation use.
3. **Forest Recreation for Everyone:** Create opportunities for everyone to engage in forest recreation by providing equitable access, amenities to serve a variety of needs, outreach that is inclusive, and staff & partners that are diverse.

Recreation Strategy

4. **Recreation as Gateway to Stewardship:** Promote forest recreation as a means to connect people to forests; promote recreation through existing programs such as Rx and human health benefits.
5. **SCORP:** Implement Statewide Comprehensive Outdoor Recreation Plan.
6. **Collaboration:** Continue collaborative efforts with other relevant state agencies, such as PennDOT, Game Commission, and Fish and Boat Commission; use advisory groups to guide policy development and implementation strategies.
7. **Mapping and Information Accessibility:** Continue GIS inventory and mapping of trails and forest-based recreation facilities; and promote a wide range of recreation opportunities on forest lands through easily accessed web information.
8. **Threats and Challenges:** Address emerging challenges such as user conflict, overcrowding, climate change impacts on infrastructure; increased usage and need for maintenance; increased tick and mosquito-borne illnesses with climate change.

Issue 11: Water and Soil

Highlights

Issue Statement: *Water quality and soil health are vitally important to maintaining healthy and fully-functioning forest and aquatic ecosystems. Clean, abundant drinking water is a shared need among all people. Various historic and ongoing influences affect the health of soil and water systems in Pennsylvania. To maintain the health of our forests and aquatic systems, we must minimize or avoid new impacts to these systems and mitigate past damage through restoration projects, implementation of BMPs, and education about the consequences of human activities on soil and water.*

Threats

- *Conversion of forests to developed areas and impervious surfaces*
- *Climate change and disruption of the water cycle*
- *Increasing demand for clean water*
- *Increases in costs of stormwater management and water treatment*
- *Erosion and sedimentation issues from agriculture and other disturbance activities*
- *Streams without riparian forested buffers*
- *Lack of stream connectivity (dams, improper road stream crossings, etc.)*
- *Acid deposition*
- *Aquatic invasive species*
- *Soil compaction due to development, recreational use, historic use (e.g., abandoned mine land)*

Opportunities

- *Protect existing forested cover (watershed protection and land conservation) and increase where possible, especially in urban landscapes and along streams*
- *Support community-based tree planting efforts in urban areas*
- *Reforestation of mine land sites*
- *Incorporate agroforestry practices into farms*
- *Acquire and share detailed soils data for PA, including information on soil biotic community*
- *Continue to support research pertaining to soil issues and management*
- *Continue to work with partners throughout the commonwealth to improve water quality and conserve aquatic ecosystems including headwaters, wetlands, and other aquatic habitats*
- *Continue to work with partners to meet watershed agreement goals, such as the Chesapeake Bay Agreement and associated goals and partners*
- *Foster partnerships within all major watershed in the commonwealth including the Delaware River watershed and the Chesapeake Bay*
- *Improve soil chemistry in impaired watersheds and restore degraded soils*
- *Improve connectivity in aquatic systems by improving stream crossings and removing dams*
- *Educate communities on the importance of watershed protection*
- *Promote flood resilience through floodplain restoration and stormwater management BMPs*

- *Forest soils have high carbon density and support carbon sequestration efforts*
- *Strengthen partnerships with state, federal, private, and community partners to maximize funding for sustainable forestry practices and to promote forestry education and programs*

Water and Soil Strategy

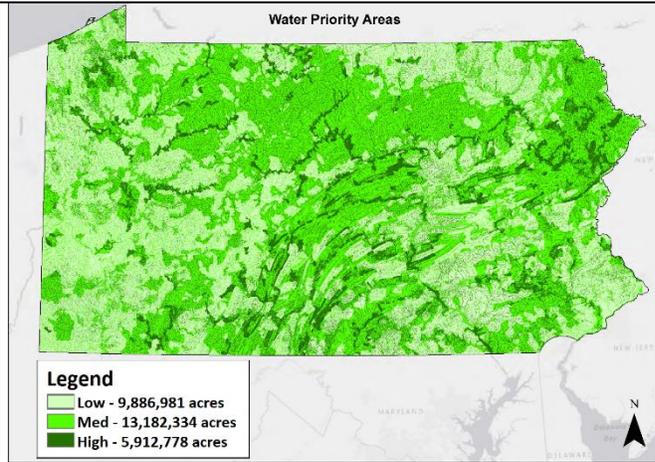
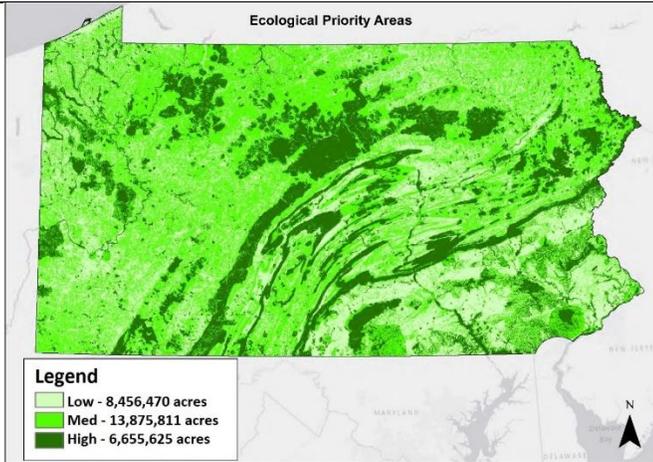
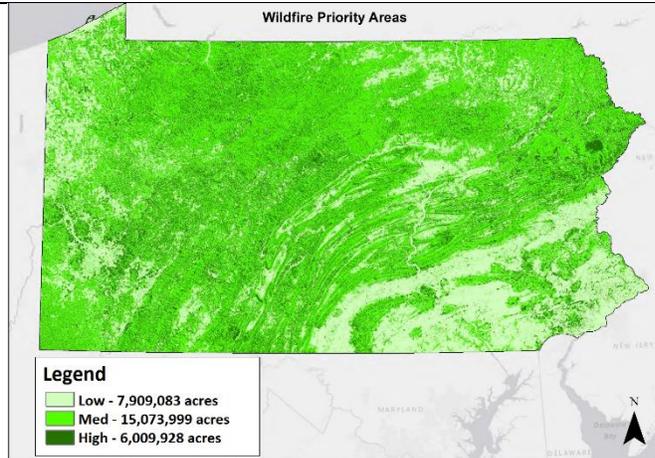
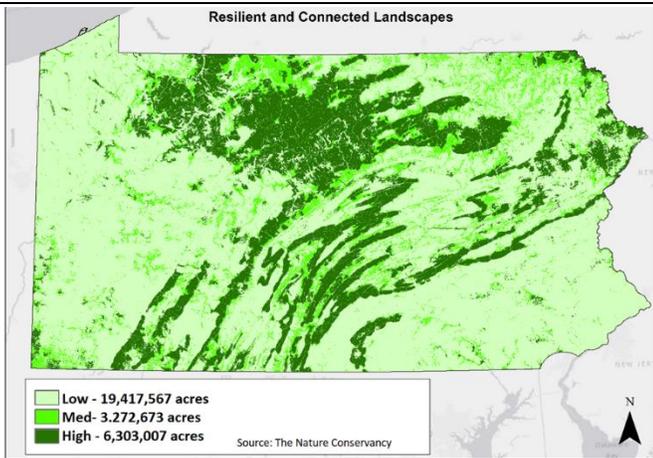
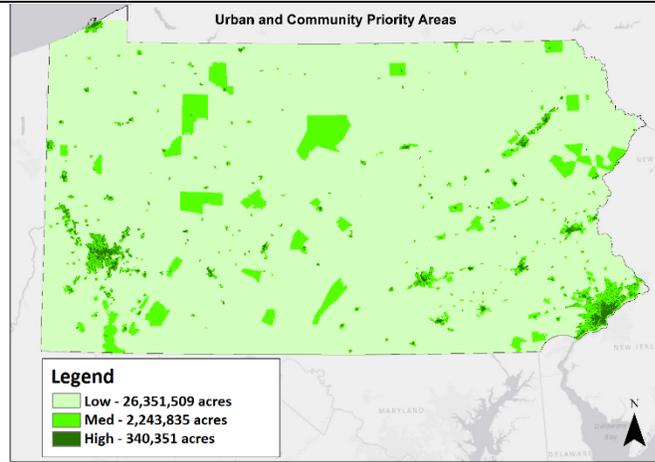
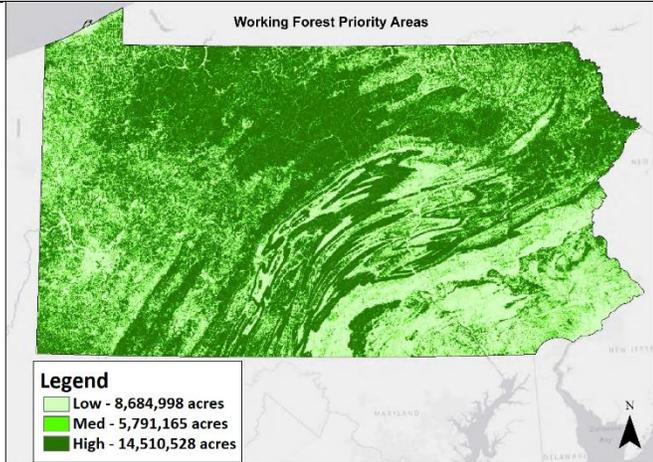
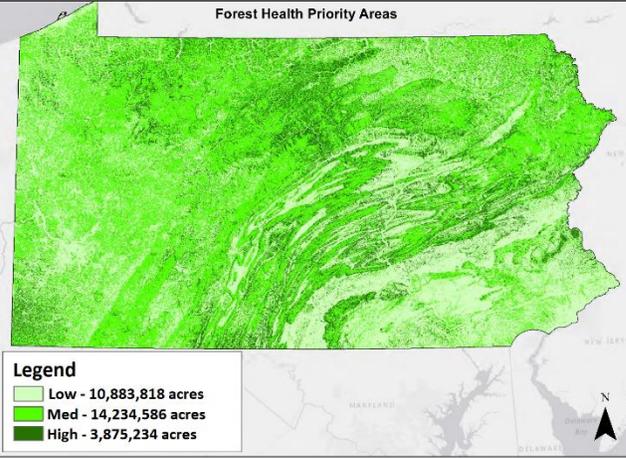
1. **Connectivity**: Improve connectivity in stream ecosystems.
2. **Flood Resilience**: Improve flood resilience in stream systems.
3. **Impaired Streams**: Improve water quality for impaired streams; and restore and maintain forests in headwater areas.
4. **Riparian Forests and Aquatic Habitats**: Improve, protect, and restore riparian buffer areas, forested headwater areas, wetlands, and other aquatic habitats.
5. **Riparian Forest Buffer Program**: Promote and provide resources for establishment, maintenance, and long-term conservation of riparian forest buffers.
6. **Soil Data**: Determine current forest soil chemistry conditions in Pennsylvania.
7. **Soil Degradation**: Restore degraded soils.
8. **Soil Chemistry**: Improve soil chemistry in impaired watersheds.

Priority Landscape Areas

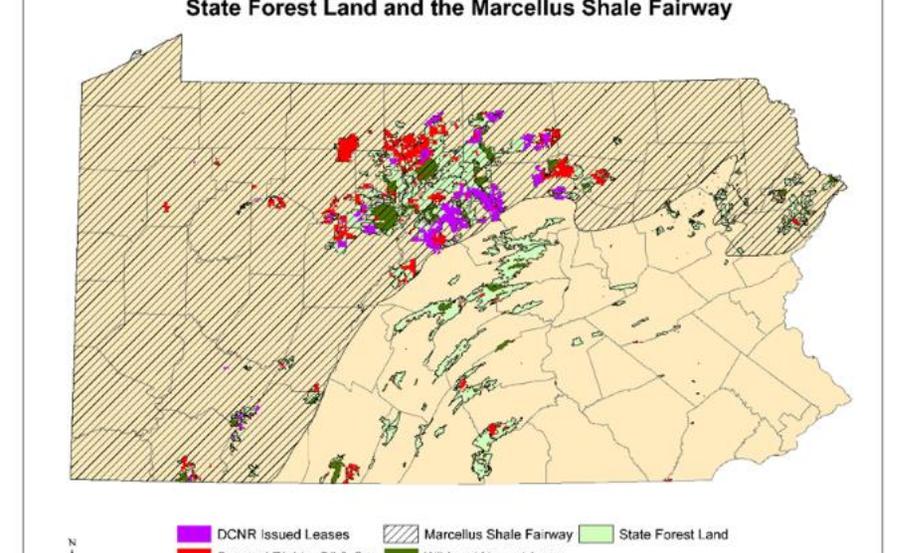
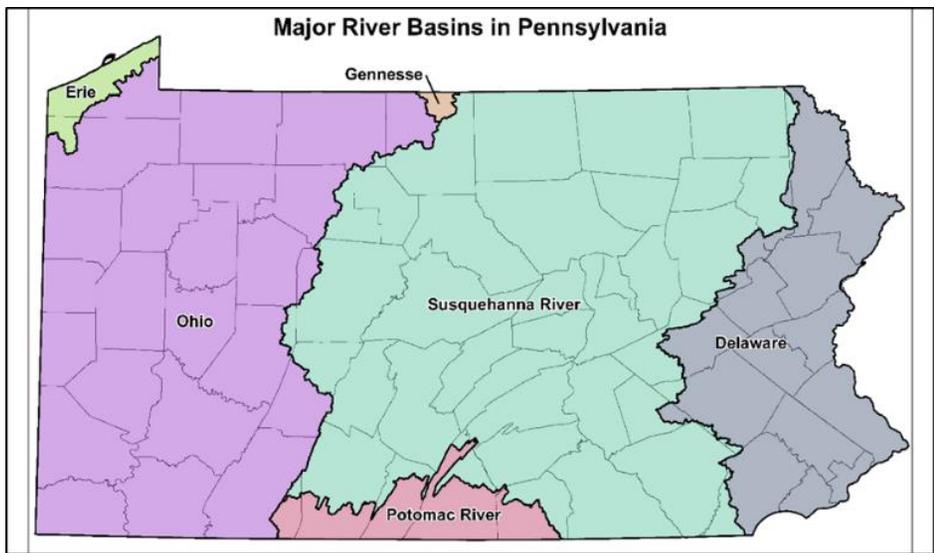
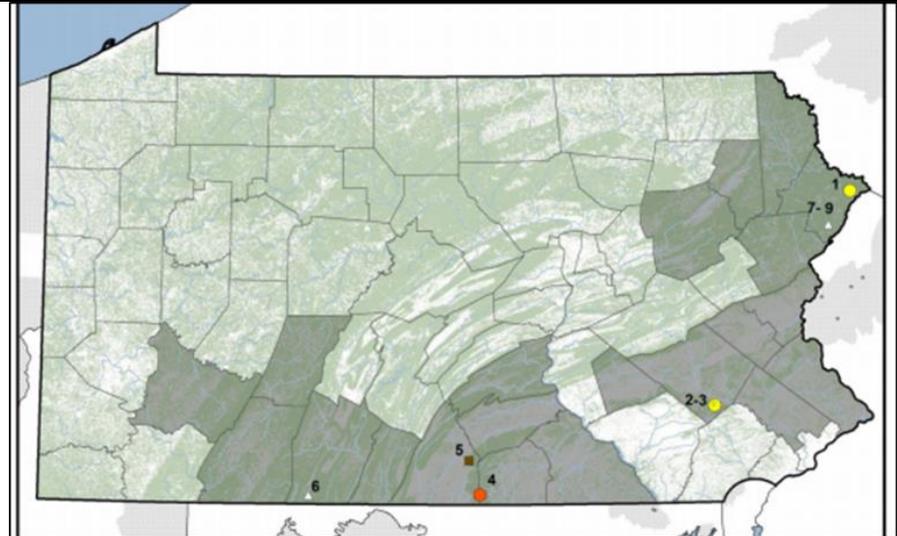
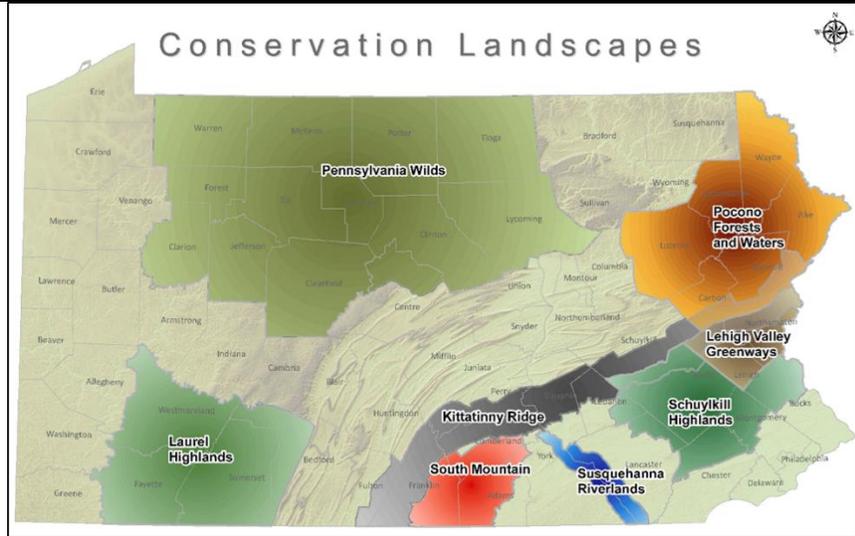
A landscape is a defined area of land that provides a basis for organizations, communities, sectors of government, and other groups of people to prioritize their individual work and/or to work together to achieve common goals. Landscapes are influenced by many factors including geology, the spatial arrangement and sizes of forested tracts, and local communities and development patterns. Understanding geography and landscape variability helps policy makers and program leaders tailor programs to meet specific local needs while working within a broader statewide context. In this Forest Action Plan, the bureau has used a variety of landscape variables and factors to define Priority Areas. The Priority Areas in Chapter 4 will be utilized as a basis for implementing the Strategies identified in Chapter 3. Three types of Priority Areas are identified:

1. Forest Resource Priority Areas: Semi-quantitative, GIS prioritization of land across PA related to seven environmental and community themes
 - a. Forest Health
 - b. Working Forest
 - c. Urban and Community Forest
 - d. Climate Change
 - e. Wildland Fire
 - f. Ecological
 - g. Water
2. Key Collaborative Landscapes: Polygon areas within PA that help to organize and direct efforts and funding related to the Strategies
 - a. Conservation Landscapes
 - b. Forest Legacy Areas
 - c. Major Watersheds & River Basins
 - d. Shale Gas Development Areas
3. Multi-State Priority Areas: Landscapes that involve multiple states in a collaborative effort to direct work efforts and funding related to the Strategies
 - a. Highlands Region
 - b. Chesapeake Bay Watershed
 - c. Delaware River Basin
 - d. Great Lakes
 - e. Ohio River Basin
 - f. Appalachian Region
 - g. Allegheny Plateau
 - h. Mid-Atlantic States (Fire Compact)

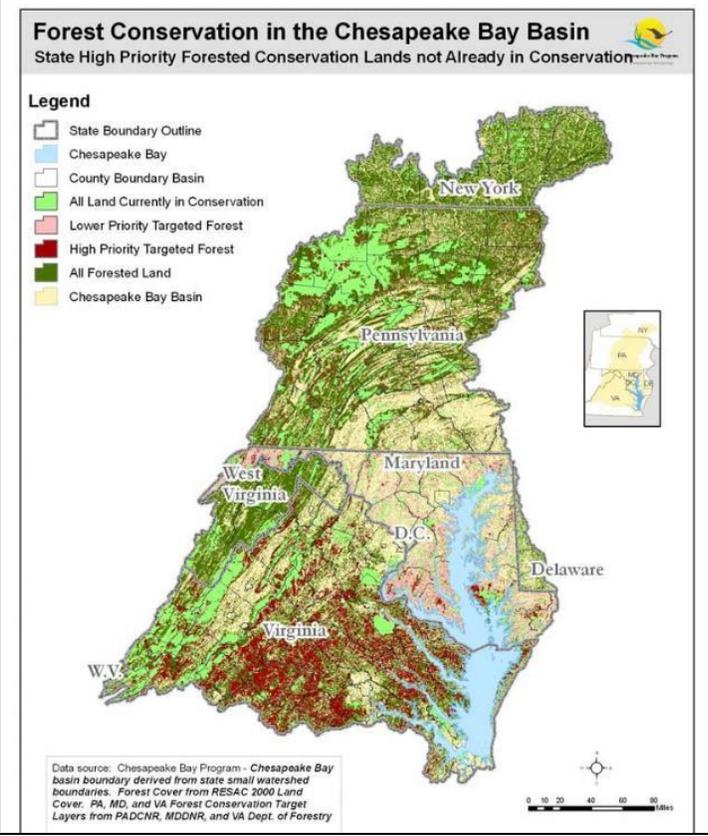
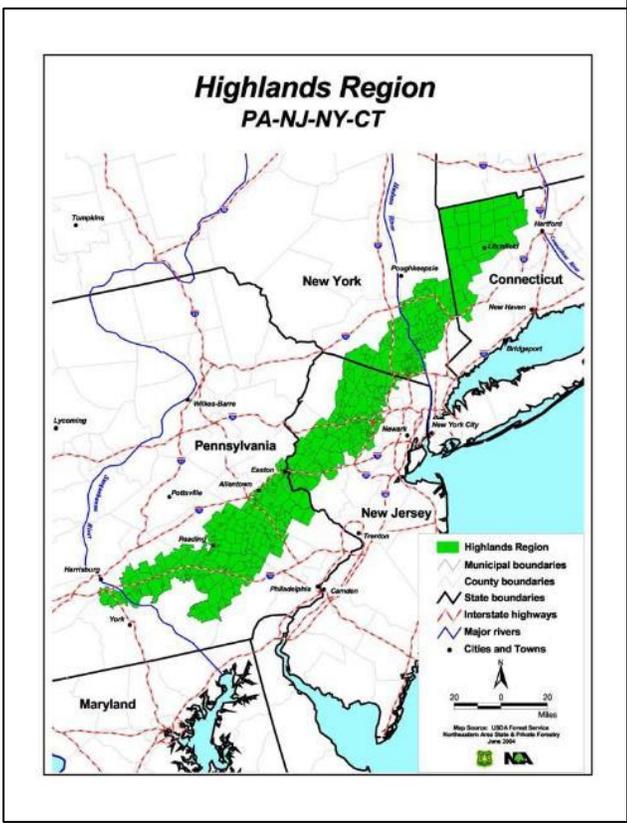
Forest Resource Priority Areas



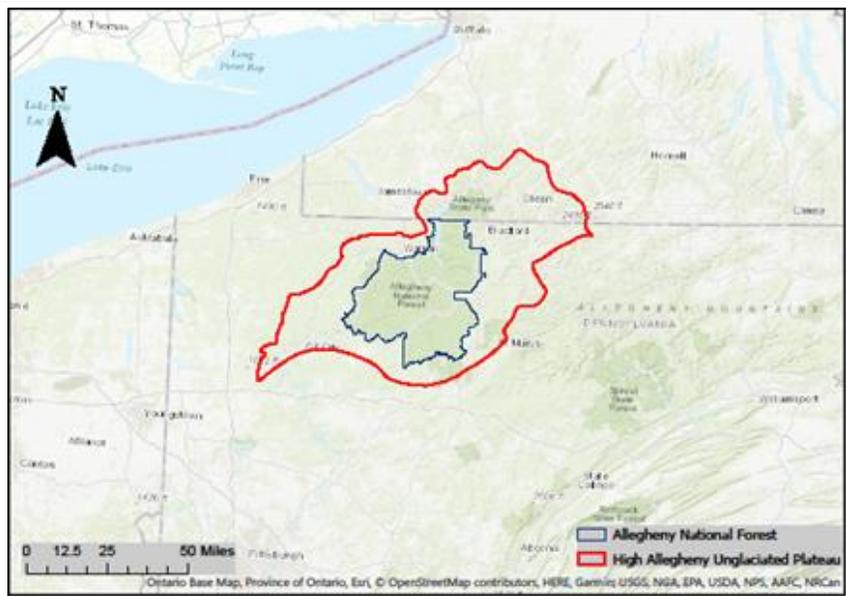
Key Collaborative Landscapes



Multi-state Priority Areas (1 of 2)



Multi-state Priority Areas (2 of 2)



States That Participate in the Mid-Atlantic States Fire Compact

