

Forests for Healthy Waters, Sustainable Communities

Principles and the practices for using forests and trees in land planning

Forests are one of the most cost-effective and most often overlooked ways to find that balance between economy and ecology, the basis for sustainable living and cost-effective planning. Is your community using them to their full extent?

An overall strategy for keeping healthy streams and clean water should build on a watershed perspective that considers sources and pathways for pollutants. How does the water get into our streams and waterways? Forests let the water soak in, filter through the soil, and release slowly to maintain stable stream flows.

Forests are most useful when they are part of an approach that also limits impervious surfaces, avoids connecting concentrated runoff directly into streams, and limits pollutant sources like excess fertilizer, road salts, and other contaminants. The specifics of where forests are most effective will vary from place to place, but there are some general principles and practices that apply widely.



PRINCIPLES FOR FORESTS IN PLANNING

Keep the trees and forests, especially where it matters most for water, wildlife, and recreation. Conserve where you can; it's usually the least expensive option with the most ability to foster good habitat as well as clean water. Restore where it makes the most difference, like near streams, shorelines, seeps, bottomlands, steep slopes, and headwater areas. Wider buffers, usually 100 to 300 feet, are more likely to last and work well over time.



Support sustainable forest

management.

Altered ecology and changing conditions mean that nature is taking a different course than before the landscape was so settled and fragmented by roads and buildings. Good forest management is needed to maintain our native plants and wildlife while still providing the renewable materials that people need. Most forest land is private, so good forest products markets help people keep their woods healthy and pay their taxes. Seeking a forester's assistance can guide management so that those renewable products are harvested in ways that also build a healthy forest for the future.

Keep communities cool. Urban tree canopy helps keep us and our homes more comfortable. The shelter of the trees means we use less energy heating and cooling, less air pollution is created, and the trees are adding oxygen while pulling carbon dioxide out of the air.

Soak it up! Trees are a great part of practices to control stormwater. Forests have the highest infiltration rates for soaking up rainfall. That water filters down through the soil, coming out clean and keeping our streams flowing more regularly. Trees use some of that water during the growing season, making even more room to store stormwater runoff.

PRACTICES

What do these principles look like in practice? Consider common zoning categories.

Rural Resource Areas

Rural resource areas are one of the most important areas for long-term protection of watersheds. Areas where impervious surfaces like roads and buildings are less than 5% of the watershed are generally able to maintain healthy streams and fisheries.

Support the resource-based economy:

- 🍁 Maintain low density zoning that will sustain viable resource-based economies, such as 1 house per 20 acres or less dense.
- 🍁 Maintain policies that support working forests and farms, with common-sense environmental protection like buffers and management plans.
- 🍁 Have efficient and accessible permitting processes that don't create costly delays for time-sensitive resource management practices.
- 🍁 Plan for access for management during subdivision reviews, so thinning, timber stand improvement, invasive species treatments, and regeneration harvests can take place in the future as the forests grow and change.
- 🍁 Encourage Buy-Local efforts for local renewable resources and artisans.



Target land conservation and restoration

- 🍁 Know where your jurisdiction's most ecologically valuable lands are, like Maryland GreenPrint Targeted Ecological Areas (TEAs). The TEAs consider rare species habitats, forests important for water quality, the healthiest stream and watersheds, areas important for coastal fisheries, and areas with critical connections for habitat.



- ✿ Maintain more than half the watershed in forest and more than three quarters of the riparian zone in forest for the best chance of keeping healthy streams. (Goetz et al. 2003)
- ✿ Identify areas where land protection, zoning, or policies could be used to limit future demand for services like water, sewer, schools, and landfills in unsuitable areas, and avoid future damage from natural disasters like flooding, storm surges, or slope failures. Residential areas typically require services that cost 130% of the revenue from the added tax base (Am. Farmland Trust 2006). Keeping those working farms and forests may be the more affordable option, avoiding the trap of increased services costing more than the new tax revenue.
- ✿ Promote use of land conservation programs like Program Open Space, Rural Legacy, and donations to land trusts in these targeted areas.
- ✿ Cultivate opportunities for restoration projects or mitigation banking in priority areas. Use native species for broader, more enduring benefits, and pursue greater connectivity of habitats where possible.



Large Lot Development Areas

When areas develop beyond about 10% impervious surfaces, damage to streams and fisheries usually appears, even with sediment and stormwater controls. Much more investment is needed to maintain basic ecological function, seen in the increased scope and scale of costs for stabilizing streambanks, restoring streams, repairing damaged pipes and bridges, and expanded conservation.

- ✿ Limit impervious surfaces, and avoid continuous connections like down spouts to driveways that concentrate flow and deliver it directly to streams. Reward low-impact development designs that infiltrate stormwater close to the source.
- ✿ Encourage clustering to protect forest blocks, wetlands, and slopes, considering location of forest on adjacent parcels.
- ✿ Check that subdivisions accommodate future access for managing forests to maintain healthy growth over time.
- ✿ Maximize forest buffer widths, 100 to 300 feet and potentially greater where there are large floodplains, seeps, steep slopes or important habitat connections. (Zhang et al. 2010).
- ✿ Provide incentives such as stormwater credits for planting trees on larger lots. Helpful resources include the Woods in My Backyard publication from University of Maryland Extension and the Sustainable Sites Initiative (SITES™).



Targeted Growth, Revitalization, and Established Areas

Most of our developed areas have enough roads and buildings that healthy impervious surface limits are exceeded. Many practices can improve water quality function and stream stability, even if fisheries can't be restored to prior levels.

Look for opportunities to infiltrate runoff (early and often).

- 🍁 Identify places in the landscape where stormwater practices could be retrofit, avoiding clearing mature forest to do so and making the problem worse.
- 🍁 Consider larger cutouts for sidewalk tree planting, structured soils, sunken planting beds, and other practices that let trees have more room to grow roots and infiltrate water. (See Green Streets link)
- 🍁 Map your urban green infrastructure, the tree canopy, parks, roadsides, schoolyards, sustainable landscaping, and stormwater facilities. (See iTree)
- 🍁 Encourage reducing impervious areas and disconnecting downspouts and other flow paths. Alternating roads and building with pervious areas like rain gardens, lawns, and forests can avoid direct runoff into local streams.
- 🍁 During development, keep buffers, wetlands, and steep slopes covered with natural vegetation and avoid concentrating runoff into any of these areas.

Expand urban tree canopy:

- 🍁 Plan for urban trees and parks for their multiple benefits for air quality, energy efficiency, rainfall interception, outdoor recreation and quality of life. Policies should help minimize conflicts between growing trees and infrastructure conflicts like power lines, gas lines, sidewalks (see Right Tree, Right Place information, and Green Cities, Good Health benefit summaries).
- 🍁 Encourage larger trees for larger benefits. Target plantings for the greatest energy savings, like on southwest exposures and over air conditioners.
- 🍁 Inventory the urban forest to understand risks and benefits of the current tree canopy and identify opportunities to expand. (See iTree)
- 🍁 Invest in maintaining urban trees for greater, longer-lasting benefits.



Planning Context



Maryland has many land use planning documents and authorities to make our future a more sustainable one for us and our children. What are some of the ways that these principles could be reflected in those planning tools?

- 🍁 Zoning maintains rural resource areas and protects drinking water supply watersheds.
- 🍁 Subdivision rules encourage retention of natural elements and considers the surrounding landscape.
- 🍁 The Comprehensive Plan reflects maintaining functional natural areas and their services, including:
 - The Water Resources element using planning to limit future demand and maintain future quality.
 - The Sensitive Areas element includes forests as well as buffers, wetlands, and rare species habitats.
 - The Priority Preservation Area considers productive woodlands as well as traditional agriculture.
- 🍁 Development in Tier II watersheds is limited and carefully designed to avoid degrading of high quality streams that have greater biodiversity (Maryland Dept. of Environment Tier II designations)
- 🍁 The local Land Protection, Park, and Recreation Plan sets goals for forest and agricultural resources as well as recreational facilities.
- 🍁 Growth tiers, defined by the “Septics Law” (SB 236), provide a road map for future growth and rural resource conservation.

Recent legislation (SB 706) established a statewide goal of 40% tree canopy, establishing a minimum standard to avoid further loss. Some areas may want to set higher goals. Local research has found that healthy streams are better supported when forests are greater than 45% of the watershed, forest buffers are along more than 70% of the streams, and impervious surfaces are less than 5% (Goetz et al. 2003).

What’s the payoff? Most people want the quality of life that healthy trees and forests provide, from an attractive neighborhood to parks for walks in the woods and drinking water protected by forests. Local governments benefit from development patterns where services like water and sewer can be provided efficiently and the natural areas maintain clean water and air at low cost.



Resources for more information

American Farmland Trust. 2006. Cost of Community Services Fact Sheet. Farmland Information Center, Northampton, MA 6p.

Goetz, S. J., R. Wright, A. J. Smith, E. Zinecker, and E. Schaub. 2003. IKONOS imagery for resource management: tree cover, impervious surfaces, and riparian buffer analysis in the Mid-Atlantic region. *Remote Sensing of Environment* 88(1-2): 195-208.

Green Streets. Background and project examples from Low Impact Development Center, Inc. (programs available in multiple cities).

<http://www.lowimpactdevelopment.org/greenstreets/background.htm> Accessed 6/10/2013.

Green Cities, Good Health. A summary of urban forestry and urban greening research

http://depts.washington.edu/hhwb/Top_Introduction.html Accessed 6/10/2013.

iTree. Tools for assessing and managing community forests. <http://itreetools.org/>

Accessed 6/10/2013.

Right Tree in the Right Place. National Arbor Day Foundation summary at

<http://www.arborday.org/trees/rightTreeAndPlace/>. Accessed 6/10/2013.

Sustainable Sites Initiative, voluntary national guidelines for sustainable land design construction and maintenance. www.sustainablesites.org Accessed 6/10/2013.

Zhang, X., X. Liu, M. Zhang, and R. A. Dahlgren. 2010. A review of vegetated buffers and a meta-analysis of their mitigation efficiency in reducing non-point source pollution. *Journal of Environmental Quality* 39: 76-84.

Want help with how to manage forests or planting trees?

Contact a forester: http://dnr.md.gov/forests/county_map.asp or call 410-260-8531



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