Changing Landscapes

Land use planning curriculum for natural resource professionals

P rinciples, people, and policies
L and planning and pressures
A pproaches
N atural resource planning tools

N5: Planning for Healthy Forests and Timber Operations

Stewardship requires us to look beyond our immediate personal gain to leave a living legacy for society and future generations.

Overview

States that do not have authorities to regulate forestry activities often use municipal zoning ordinances. If these ordinances are not written properly, they may inadvertently support incorrect forestry operations and techniques. Or, they are simply not complete and lack important provisions. This factsheet provides useful information that can be used to develop high-quality stewardship plans that can then be incorporated into comprehensive plans, zoning, and other land use regulations.

Introduction

Forest stewardship is the wise use of forest resources to ensure forest health and productivity. Sound forest stewardship ensures the long-term management of the environmental processes and economic and social benefits forests provide. Stewardship requires us to look beyond our immediate personal gain to leave a living legacy for society and future generations.

In addition to resource management, forest stewardship brings groups of concerned people together in a collaborative process to address threats to productive forests and solutions. Stewardship involves a social learning and action network of people concerned with the interaction of human and environmental issues.

A forest is more than a collection of trees. It is a dynamic ecosystem, defined by interactions of living organisms and their environment. Forest stewardship challenges us to understand and protect the natural processes that take place in a forest. This is necessary to ensure that when we affect these processes with timber harvests, development, or other actions, we do so in a way that continues to enrich short- and long-term forest health. Because we all use and enjoy wood and paper products, because we all benefit from clean air and water, and because we desire the peace and beauty of our forests, we must work to maintain a balance that allows us to use our forests while ensuring their long-term vitality. If planned for and managed properly, there is no inherent conflict between the economic use of forests and forest stewardship.

Forest Service
Northeastern Area State and Private Forestry
11 Campus Blvd., Suite 200
Newtown Square, PA 19073
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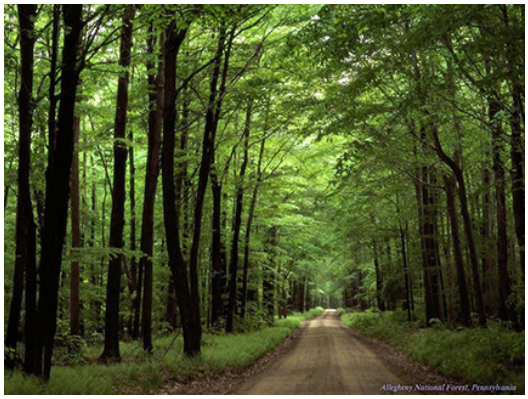
Forest Stewardship

- Is a component of the more broadly used term "landscape stewardship," which is an inclusive civic process for sharing diverse perspectives and information to promote resource conservation.
- Manages forests for long-term economic, environmental, and social benefits.
- Uses both practical and scientific management approaches.
- Expresses concern and respect for both human and environmental values.
- Provides a conservation focus that brings people together to learn and jointly take action.

Threats to Forest Stewardship

- Climate change
- Fire
- Changing plant communities
- Invasive insects, diseases, and plants
- Conversion of forests to nonforest uses through development
- Economic pressures related to intergenerational transfer of forests
- Growing rural and suburban populations
- Lack of understanding of the environmental, economic, and social benefits forests provide
- Ordinances and regulations that preclude science-based forest management objectives



It is important to have a well-conceived stewardship plan to guide forest management decisions.

Forest and Landscape Stewardship Plans

Many forest owners value their forests but do not adequately understand how to obtain the benefits they want to realize from managing them. Research conducted in Pennsylvania shows that forest landowners are motivated by many factors other than economic gain. Because timber harvesting and other management activities that are completed without proper planning can have undesirable long-term consequences, the importance of having a well-conceived stewardship plan that guides management decisions cannot be understated. By engaging consulting foresters and other natural resource professionals in planning, forest landowners can benefit considerably during timber harvesting and greatly increase the productivity and health of their forests over time.

The first step in developing realistic forest stewardship goals and objectives is to inventory and map forest tracts. Inventory and map all priority resources on the site, including vegetative communities, water resources, soils, slopes, and unique areas with rare species. Use enough detail in the initial inventory to begin developing management objectives. Often a more detailed inventory can be completed later to support more specific timber harvesting and other activities. The inventory and mapping will help direct the development of management objectives during the writing of the stewardship plan. Management objectives often include issues related to improving water quality, reducing invasive plants and ferns, decreasing wildfire risk, and harvesting timber. Include a map that shows the location and size of management units in a stewardship plan as well as a timetable for completing all activities.

Public and private landowners can work together to use their forest stewardship plans to develop larger scale landscape stewardship plans. These plans provide an opportunity for landowners to collaborate on priority resources and actions related to larger scale issues such as wildfire management, forest products, source water protection, wildlife habitat, and insects and diseases that impact forests without regard to land ownership.

Landscape Stewardship

Expanding on the concept of forest stewardship, the U.S. Forest Service released a landscape stewardship guide in 2011. This guide provides a collaboration process that can direct landscape-level stewardship to achieve desired social, economic, and environmental objectives that are shared by stakeholders. Landscape stewardship is an "all lands" approach to forest conservation that works across multiple ownerships through community and landowner engagement to address issues and opportunities. Landscape-level stewardship planning is intended to address broader and more collective goals of many landowners and is not intended to replace a private landowner's site-specific forest stewardship goals and objectives.

Developing a Forest Stewardship Plan

- Seek assistance from a State agency or consulting forester committed to stewardship principles and sound forest management practices.
- Gather information and develop an inventory and map of the property that identifies management units, unit acreage, and objectives. Management units often require different treatments. For instance, pine groves would not receive the same type of treatment as hardwood groves.
- Define objectives related to ownership, use, and management of your land. Think about how you and your family will use the land and the activities you enjoy, and incorporate them into long-term objectives during the stewardship planning process.
- Develop management recommendations and strategies. To achieve objectives, make recommendations clear and practical and discuss what to do, why to do it, and when to do it. Document these objectives in management strategies within your stewardship plan.

Best Management Practices (BMPs)

The growth of individual trees and entire forests can be managed by manipulating the overall structure of the forest. This is done using silvicultural prescriptions and treatments to harvest and regenerate a forest. When done properly, these practices are known as Best Management Practices, or BMPs. Forest management BMPs are widely accepted management activities that can have positive outcomes that minimize negative effects on forest ecosystems when carried out properly. Some BMPs are multipurpose. For example, buffer strips along streams control erosion and sedimentation and also serve as wildlife corridors and aquatic habitat. BMPs provide the basic, minimum acceptable standards of sound forest management, although many landowners often choose to do more.

Forest Stewardship and Timber Harvesting Ordinances

In States that do not have statewide regulations guiding forestry practices, municipal zoning and other ordinances often regulate timber harvesting and other forest stewardship activities. In Pennsylvania, for example, forestry is classified by the State planning code as a land use, such as commercial or residential development, that can be regulated by local municipal zoning ordinances. By contrast, timber harvests in California that exceed certain acreages are regulated by the State forestry department and require state-approved timber harvesting and regeneration plans as well as bonding to ensure regeneration success. Regardless of whether forest land is regulated by municipal or State laws, it is important to incorporate relevant BMPs into ordinances and other policies.

Regardless of how forest land is regulated, it is important to incorporate relevant BMPs into ordinances and other policies.

Often zoning and other municipal ordinances that regulate forestry operations and whose intent is to provide environmental protection can actually discourage the use of valid timber harvesting and regeneration techniques. An example of this is a ban on clearcutting and other even-aged harvesting treatments for forest regeneration that is often found in ordinances. In other instances, local zoning ordinances may be incomplete or lack important provisions that are important to forestry operations. Common omissions include regulations related to logging road design, storage and staging area construction, and clean up requirements. Municipalities must be careful to develop and adopt a forest stewardship ordinance that requires an approved timber harvesting plan based on relevant, high-quality BMPs.

BMPs for Forest Stewardship and Timber Harvesting Ordinances

At the very least, make sure ordinances regulating forestry activities mandate a timber harvest plan that is reviewed and approved by the municipality. Make sure that timber harvesting plans and ordinances include all BMPs that specifically address forest operations and aesthetics.

Forest Stewardship Operations: Regeneration and Renewal

Adequate regeneration of trees and other plants is a primary objective of a properly planned and executed timber harvest. Silvicultural prescriptions such as clearcutting and shelterwood harvesting not only remove trees, but focus on establishing, protecting, and releasing regeneration in the future stand. The goal of harvesting techniques such as clearcutting is forest regeneration and renewal rather than the often mistaken assumption that harvesting will have a negative impact on regeneration.

Having adequate tree regeneration is a primary objective of a properly planned and executed timber harvest. (Photo: Arlyn Perkey, U.S. Forest Service (retired))

In many Eastern States, forest regeneration depends on the natural recruitment of seedlings, seed sources, and root and stump sprouting. Conduct a preharvesting assessment of existing seedlings and seed sources to better understand and plan for regeneration. White-tailed deer have broad impacts on forest plant communities and can reduce or even eliminate certain type of tree seedlings such as oak, maple, and ash. Forests with an overabundance of deer often require special considerations such as fencing or hunting to protect seedlings so that adequate regeneration can occur naturally.

Forest Regeneration and Renewal BMPs

Determine which harvesting techniques will be used, such as clearcutting or selection cutting, after thoroughly considering the amount of sunlight and other biological needs of the tree species targeted for regeneration. Some trees, such as cherry, need more sunlight to regenerate and grow. Not providing enough light can reduce the number of black cherry, white ash, hickory, yellow-poplar, and northern red oak seedlings.

Assess the ability of existing tree seedlings, seed sources, and potential stump and root sprouts to grow following the cutting. Assess and, if necessary, control competing vegetation such as ferns, grasses, and other undesirable understory plants to minimize competition. Common plants that compete with tree regeneration and growth include hay-scented and other rhizomatous ferns, grasses, striped maple, American beech, mountain laurel, ironwood, and musclewood. Herbicides are often used to control competing vegetation. If properly prescribed and applied, their use can provide effective control with low risk to people.

Forest Operations: Protecting the Residual Stand, Site Quality, and Productivity

Careless cutting and removal of trees and equipment often compacts the soil and damages tree canopies, trunks, and the roots of seedlings and other desirable trees. This damage can have long-term consequences that reduce site quality and result in poor tree form.

Protecting the Residual Stand, Site Quality, and Productivity BMPs

Avoid high grading, diameter limit cuts, or other selection harvests that reduce species diversity, leave poor-quality trees, and negatively impact regeneration. From an economic perspective, a diameter-limit cut takes the most profitable trees and leaves the rest. Such a cut removes the fastest growing individuals, which are often economically the most valuable, and leaves lower valued trees. Although this kind of harvest provides a profit, this technique lowers the ability of a forest to provide economic and environmental benefits in the future. When looking at net present value and other economic analysis, some economists insist that diameter-limit cuts actually reduce the ability of landowners to realize a longer-term profit from the timber in their forests. Clearcut, shelterwood, or seed tree harvests usually provide optimal economic and environmental benefits in eastern forests.

When planning a harvest, loggers, contractors, and landowners must understand the importance of protecting soils and using care not to damage desired trees. Take care when applying stand thinning operations to avoid opening the forest up to too much sunlight that encourages the establishment of vegetation that competes with regeneration. Use topographic maps and soil surveys to design and lay out skid trails, roads, and log landing areas. Keep the footprints of storage areas and road networks as small as possible. Use waterbars and other erosion control structures on skid trails and roads to remove surface water. Take care not to contaminate soils with fuels, lubricants, or other materials. Avoid working on soils saturated with water from heavy rains or snow melt. Minimize soil compaction by matching equipment operation with soil types and moisture levels. Mark and protect unique vegetation or areas to be protected before logging activities begin.

Supporting Forest Stewardship and Productive Forests

- Use proper BMPs in planning and management.
- Reward landowners for managing and retaining their lands by developing new markets for ecosystem services such as carbon sequestration.
- Develop State and local land use policies that reduce forest fragmentation.
- Develop State and local policies that promote conservation and the protection of natural resources.
- Promote diverse forest product markets that provide opportunities for alternative products such as biomass.
- Support tax, inheritance, and other policies that protect productive forests from development.
- Facilitate planning and management partnerships at watershed, ecosystem, or larger meaningful scales.

It is important to use care not to damage trees during timber harvesting. (Photo: J.P. Barsky, The Connecticut Agricultural Experiment Station)

When planning a timber harvest, loggers, contractors, and landowners must understand the importance of protecting soils and using care not to damage desired trees.

Forest Stewardship Operations: Water Quality

Using proper forest operations can protect water quality by reducing soil erosion, protecting existing vegetation, and buffering harvesting activities that can contribute sediments to nearby streams and water bodies.

Water Quality BMPs

Comply with all State laws regarding erosion, sedimentation, road design, stream crossings, cross-drain culverts, and other features. Provide adequate riparian buffers between roads and streams. Use properly constructed bridges and culverts to cross streams. Design roads and landings to prevent or slow and divert surface water flows. Avoid locating roads and landings on seasonally wet soils and, if possible, avoid steep slopes when laying out roads and landings. Cross wetlands only when absolutely necessary. If it is necessary to take heavy equipment into wetlands or onto saturated soils, do so during the driest periods or when the area is solidly frozen. Do not skid logs through water courses or springs. Grade and seed the road network at the completion of operations.

The forest riparian buffer along this small tributary to the Chesapeake Bay reduces sediment and nutrient runoff from adjacent farmland. (Photo: Ben Longstaff, IAN Image Library http://ian.umces.edu/imagelibrary/)

Insect, Disease, and Fire BMPs

Take appropriate control measures if there is the likelihood that insects, disease, or fire may threaten your forest. Use harvesting and regeneration strategies that increase species diversity and stand composition to make forests more resilient to these problems.

Forest Stewardship Operations: Insects, Disease, and Fire

Insects, disease, and fire can kill trees and devalue those that survive. Consider specific management objectives for each of these threats. Each can be minimized by using BMPs specific to pre- and post-harvesting activities. State service foresters can provide information and assistance for insect, disease, and fire-related issues.

Consider specific management objectives for threats from insects, disease, and fire.

Hiring a Consulting Forester

A forestry or resource consultant is a professionally trained individual who can help plan and carry out science-based forest management practices. Make sure the forestry consultant understands your short- and long-term objectives. It is important that a professional forester represents your interests because a poorly planned harvest can be long lasting and have severe economic and ecological consequences. Consider if the forestry consultant 1) shares your values about the land, 2) has the capacity to develop a prescription that embraces your values, 3) has a commitment to sustainable forestry, and 4) has an affiliation with a professional group that represents the forest industry.

Using Stewardship to Protect Forest Aesthetics

Much of the public opposition to timber harvesting and other forest management activities is due to the fact that the site looks different. The public is more accepting of the change if a harvested forest does not look degraded and "appears" to be functioning well.

Forest Aesthetics BMPs

BMPs that protect forest aesthetics can be a powerful component of a forest stewardship ordinance. Forest aesthetics BMPs can ensure that forests appear to be intact, healthy, and cared for during and after forest operations. Sound forest aesthetic BMPs that improve public perceptions include:

- Leaving a visual buffer (forested area left relatively undisturbed to lessen the visual or environmental impacts of timber harvesting) between forestry activities and roads, streams, homes, businesses, and important views.
- Removing broken, leaning, and badly scarred trees.
- Locating landing areas away from public view.
- Protecting rare and important plant species.
- Cutting up harvested tree tops and limbs near public roads, trails, or recreation areas.
- Removing trash daily.
- Grading and seeding landing areas when the operation has ended.
- Keeping mud off public roads.
- Minimizing runoff that can contribute sediment to waterways and water bodies.

Best Management Practices that protect forest aesthetics can be a powerful component of a forest stewardship ordinance.

Forest Stewardship: Important Definitions

Basal area (BA)
The cross-sectional area of a tree trunk in square feet measured at 4½ feet above the ground. Basal area per acre is calculated as the sum of the basal areas of individual trees.

Board foot
A unit of wood 1 inch thick, 12 inches long, and 12 inches wide or a board containing 144 cubic inches.

Buffer strips
Forested areas left relatively undisturbed to lessen the visual or environmental impacts of timber harvesting.

Clearcutting
An even-aged harvesting and regeneration prescription that removes all trees, regardless of size, in an area in one cutting. It is often appropriately used with species like cherry and tulip popular that require full sun to reproduce and grow or to create specific early successional habitat for wildlife.

Crown class
A classification of an individual tree based on its crown's position in the overall forest canopy and the amount of sunlight it receives. Recognized categories include dominant, codominant, intermediate, and suppressed.

Diameter at breast height (d.b.h.)
The diameter of a tree measured at 4½ feet above ground level.

Diameter-limit cut
A timber harvesting treatment in which all trees over a specific diameter may be cut, often resulting in high grading. Along with negatively affecting forest health, diameter-limit cuts can reduce future economic gains by reducing the amount of high-quality timber that would have resulted from longer-term sound management.

Even-aged stand
A group of trees that do not differ in age by more than 10 to 20 years.

High grading
A type of timber harvesting where larger trees of commercially valuable species are removed with little regard for the quality, quantity, distribution, or regeneration left on the site.

Regeneration cut
A timber harvest designed to promote the natural regrowth of trees. Even-aged stands are perpetuated by three types of regeneration cuts: seed tree, shelterwood, and clearcutting. Uneven-aged stands are perpetuated by selection cutting that removes selected individual trees in all diameter classes, from small to large, or small groups of trees.

Seed tree cut
A regeneration cut where mature trees are left standing in a harvested area to provide seeds for regeneration of the cut-over site.

Shelterwood
A regeneration cut that supports reproduction by removing all overstory trees in a series of cuts over years. This gradual reduction of stand density and canopy protects understory trees, limits light for invasive species, and provides a seed source for stand regeneration.

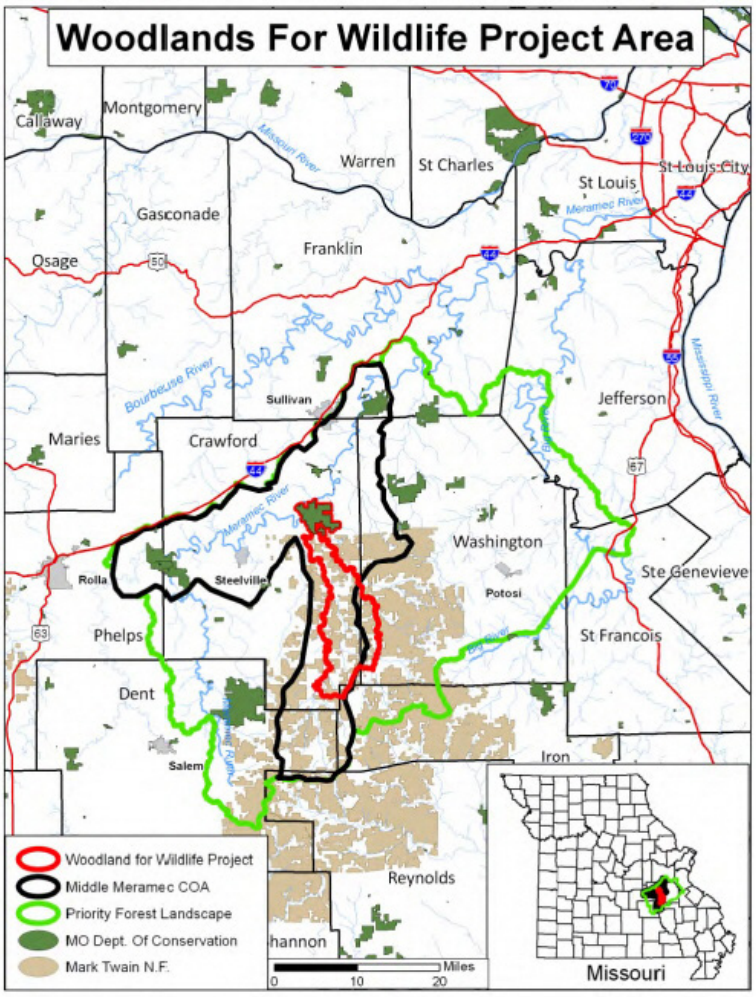
Thinning or intermediate treatment
A removal of some trees to encourage the growth of other trees that are left behind (residual trees). Residual trees may be selected based on species and age. A thinning may be classified as commercial if the removed trees have commercial value or as precommercial if smaller, less valuable trees are removed.

Uneven-aged stand
A group of trees made up of three or more age classes growing together on a site.

Case Study — Shoal Creek Landscape Stewardship Conservation Marketing Plan

The vision of the Shoal Creek project was "…to improve the native plant and animal communities of public and private lands now and in the future." It included objectives related to riparian areas and improving and restoring woodlands and glades, removing invasive species, and sharing forestry information and management assistance with landowners.

Missouri's 70,000-acre Shoal Creek Woodlands for Wildlife project faced a number of resource management challenges and opportunities—a patchwork of private, Federal, and State ownerships; the likelihood of residential development; overstocked forests; and degraded animal and song bird habitats. In addition, there was a significant need and opportunity to communicate the importance of maintaining and improving riparian corridor habitat conditions to landowners.



Missouri's Shoal Creek Woodlands for Wildlife project map. (Map: Woodlands for Wildlife: A Natural Resource Stewardship Action Plan. Middle Meramec Conservation Opportunity Area Partnership)

The Shoal Creek project developed a conservation marketing process. Conservation marketing is a planning, communication, and implementation process that delivers desired products and services to targeted customers. In this project, this process was used to benefit the environmental and socioeconomic needs of the landowners. First, the Shoal Creek project developed shared stewardship goals, objectives, and strategies. Then other marketing plan elements were developed that included 1) defining and profiling the socioeconomic conditions, including political cultures, attitudes, employment, industry, and land development potential; 2) clarifying the program's messages for landowners, business, and others; 3) developing a marketing strategy that used cost-share grants, partnerships, and education to disseminate information; and 4) evaluating change.

Within approximately one year, a landowner's committee was established to identify priority natural resource issues. Priority issues included reducing streambank erosion, increasing timber harvest education and assistance, and improving fish and wildlife habitat. Work continues to blend these shared issues into a landscape stewardship action plan that engages resource professionals to work with landowners.

Relevant Factsheets

P5 – *Principles of Ecosystem Services* – Strong forest stewardship standards ensure that ecosystem processes and the services they provide are protected.

A3 – *Managing Stormwater with Green Infrastructure* – Forests of all sizes slow surface water and are recognized as an integral component of green infrastructure solutions to stormwater management.

N2 – *Comprehensive Planning for Natural Resource Conservation* – Municipal comprehensive plans can address forest stewardship.

N3 – *Regulatory Approaches to Protecting Natural Resources* – Best Management Practices (BMPs) related to forestry and timbering activities are enforceable components of forestry ordinances.

N4 – *Nonregulatory Approaches to Natural Resource Conservation* – Long-term planning for the intergenerational transfer of private property and the provision of tax and other incentives help conserve privately owned forest properties.

N6 – *Planning Tools to Protect Water Quality* – Many forest stewardship BMPs protect water quality and address the management of surface water flow during timbering activities.

Resources

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Acknowledgements

Authors

William Elmendorf, Ph.D., Associate Professor of Urban and Community Forestry, Penn State
James Finley, Ph.D., Professor of Forest Resources, Penn State

Editors

Donna Marie Foster, U.S. Forest Service, Northeastern Area State and Private Forestry
Sandra Clark, U.S. Forest Service, Northeastern Area State and Private Forestry

Designer

Deborah Muccio, U.S. Forest Service, Northeastern Area State and Private Forestry