



# Silviculture *an*

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**S**ilviculture is the fundamental basis for good forest management. It combines knowledge with proven experience to help people manage forests in ways that satisfy the needs and values of all generations. In general terms, silviculture requires knowing how trees work, the basics of forest ecology, and how people interact with and depend on trees. Landowners who properly follow a silvicultural approach are stewards of their land. They work with the natural forest ecosystem, make forest management decisions with an eye on the entire life cycle of the forest, and strive to protect natural resources in a sustainable manner. Each forest activity is done with future goals and objectives in mind, including establishing trees, stand management, harvesting, and renewing the cycle with reforestation. When landowners correctly practice silviculture, they ensure that our forests produce maximum benefits while conserving all natural resource values, including water quality.

Protecting water quality is essential to all silvicultural activities. Success depends on understanding how forest hydrology works. In a natural and undisturbed setting, trees help distribute, cleanse, and store water through processes such as evapotranspiration, interception, soil absorption, and forest floor runoff. These processes are especially helpful for wetlands. Forests help wetlands function to moderate flooding, trap sediment, retain and remove pollutants, support biodiversity, and provide timber products. But when human disturbances occur, there is an increased risk that wetlands could be degraded. If poorly planned or incorrectly implemented, forest activities could:

- Increase sedimentation
- Alter water drainage
- Obstruct stream flow
- Compact soil
- Contaminate water

So, can a forest landowner safely practice silvicultural activities while protecting water quality? There will always be cases where surface features are too sensitive to allow forest practices,

and these sites should be protected from human disturbances. But when the forest activity is appropriate to the site, precautions are included in the planning, and activities are implemented properly, then it can be done.

Typically, there are four silvicultural practices that need precautions to protect water quality. These include road construction, timber harvesting, site preparation and regeneration, and the application of forest herbicides.

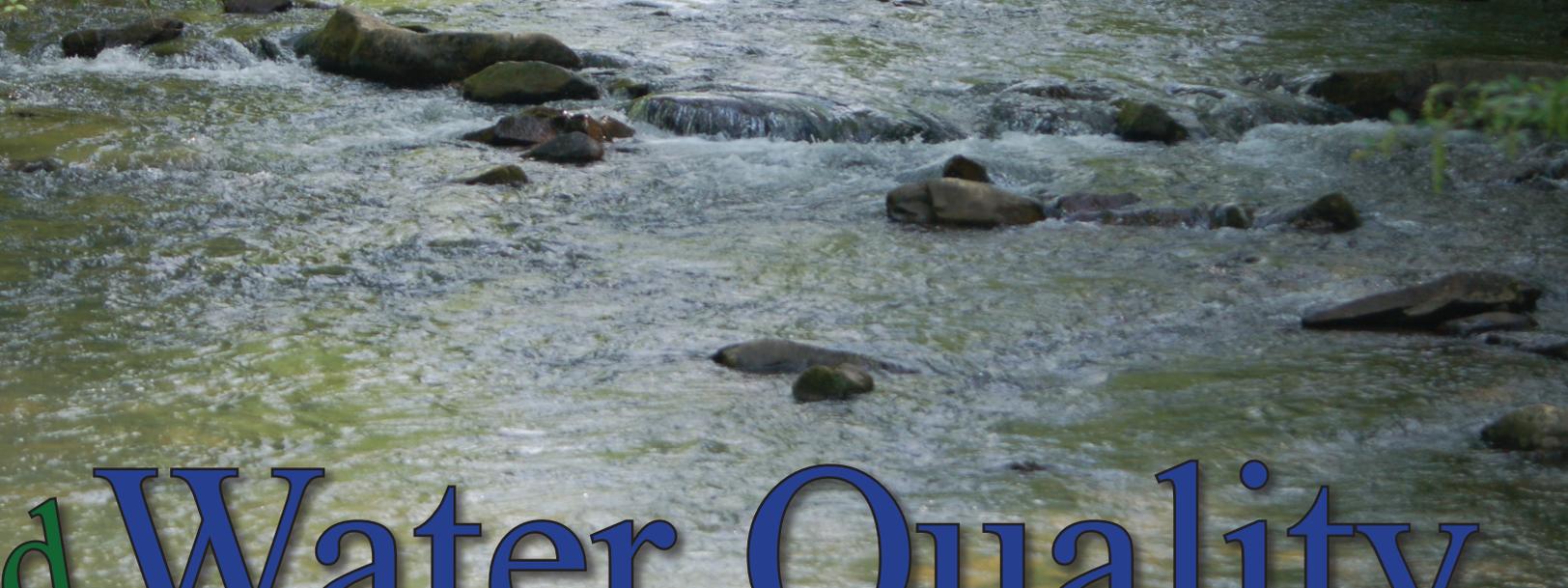
Be aware there are federal and state laws and regulations that apply to wetlands. Landowners considering a silvicultural practice in a wetland should first contact local state or federal natural resource agencies to learn of any rules or regulations that may apply.

“ In order to meet Section 404 exemption for an ongoing silvicultural operation, there are 15 mandatory BMPs to be implemented when constructing roads and creek crossing in wetlands. ”

## Road Design and Construction Practices

Forest roads are used to provide access for timber management, wildlife habitat improvements, fire control, recreation, and routine inspections of the property. They can be well-maintained with a surface capable of accommodating two-way traffic. They can also be low maintenance and used primarily for forest management access on an irregular, or as needed basis. Forest roads can induce sedimentation during active forest operations. This is a major concern. Landowners should use the services of a registered forester, engineer, or other qualified professional for help in forest road construction design and specifications.

Several considerations will help minimize impact of road construction on water quality. Landowners should plan forest road locations before harvest operations. Constructed forest roads should avoid streamside management areas and, wherever possible, crossing wetlands. If necessary, limit the total wetland road



# and Water Quality

miles to achieve landowner objectives. Make sure to know the type and depth of wetland soils to ensure proper design and construction. Build fill roads only when necessary. Minimize road width consistent with safety and road design considerations. Include upland road approaches to wetlands to divert surface runoff before entering wetland.

## Harvest Practices

Timber harvests are a primary source of revenue for landowners. Without the ability to earn income off the land, there is less incentive to make investments that improve forest health and productivity. However, landowners should remember that an actual timber harvest will involve more than cutting trees. It includes moving severed trees to a landing, processing, sorting, loading, and transporting offsite. Timber harvests will alter forest structure. They can also be detrimental to water quality if there is excessive and poorly planned movement of machinery on site and skidding of logs for delivery to mill.

Good planning is necessary for a successful timber harvest. A timber harvest plan should detail the actual harvest operation with consideration to what type forest or reforestation will follow. Good plans also ensure that all activities will take into account any impact on wetland function. A successful timber harvest will follow Best Management Practices (BMPs). This will help reduce potential nonpoint source pollution due to soil disturbance and loss of vegetative cover. BMP guidelines should also cover equipment operations and maintenance.

## Site Preparation and Regeneration

Timber harvests are usually followed, to some degree, with treatments that prepare the site for the next stand of trees. The method, species, and density are selected based on the goal of the landowner. Machinery, chemicals, and fire are tools used to prepare sites for tree planting, direct seeding, or natural seeding.

Water runoff, sedimentation, and nutrient losses will increase the more intensive the site treatment becomes.

Leaving forest floor litter intact can minimize soil disturbances that reduce water quality. Site preparation methods, such as the proper use of herbicides and prescribed burning, cause less disturbance to soil surfaces than mechanical practices. Natural regeneration, hand planting, and direct seeding are other methods used to further reduce soil disturbances.

## Forest Herbicides

Herbicide technology has radically changed forest management in the Southeast. Herbicides are commonly used to control vegetation so that landowners can enhance forest regeneration, increase timber growth, improve wildlife habitat, control invasive plants, and maintain forest roads. The proper use of herbicides during reforestation actually helps sustain water quality by reducing sedimentation, preserving organic matter, and limiting a decline in physical soil properties. Used according to label instructions, today's silvicultural herbicides quickly degrade after application. Studies indicate residue concentrations tend to be low, except where direct applications are made to temporary channels or streams, and do not persist for extended periods of time. Regional environmental impact statements show that forest herbicide presence in surface and groundwater is not a significant risk to water quality or human health.

Today's equipment is designed to control drift and should be used only during stable weather conditions. Herbicides, without an aquatic label, applied directly to the waters of Alabama violate state and federal law. Operations should incorporate no-spray buffer strips along streams, ponds, and swamps that contain standing water. These vegetative strips will be wide enough to prevent any movement of active ingredient to open water. ♣

“*Silviculture - “art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.”*

*-Silviculture of American Forester*”