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## Introduction

The main objective of forest management for the HWW watershed is to maintain the high quality water of the surface water sources. The quality of water and the rate at which it is produced is dependent on the type of management the watershed land receives. Managed forests of young, vigorously growing trees provide the best watershed protection. The tree cover acts as a layered filter for purifying the water that passes through it. The tall crowns of the forest overstory add depth to this filter and provide temperature regulation of the surface, ground, and stream waters. The forest understory provides uninterrupted recovery from the overstory losses. The layers of the forest overstory canopy, the forest understory, the vegetated ground cover, and the organic mat of decomposing matter on the forest floor, as well as root systems interspersed within the mineral soil below, all work in concert to produce water of high quality.[[1]](#footnote-1)

Silviculture, the practice of controlling forest establishment, composition, and growth, is critical for watershed management. Sound forest management must involve controlling nonpoint source pollution during and after silviculture activity. The harvest of needed forest resources should not be at the expense of water quality, forest productivity, or aquatic life. Silviculture impacts water quality of the surface water sources by causing erosion and raising sediment/turbidity levels and dissolved nutrient concentrations, and by changing water temperatures.

The major silviculture practices that contribute to nonpoint source pollution include:

1. Road construction and use, which can cause unnecessary erosion. Tearing up the topsoil and vegetation on the forest floor destroys its filtering capabilities while compacting the soil affects surface water absorption.
2. Timber harvesting, which reduces the leaf cover thereby decreasing soil moisture losses due to evapotranspiration. Treetops also reduce the impact of falling rain as it passes through the branches and leaves. Removal of large stands of coniferous trees can cause accelerated melting of snow cover in the spring, which may result in soil erosion.
3. Mechanical equipment operation, which changes the soil cover characteristics by compaction, thereby reducing the amount of rainfall and snowmelt that can infiltrate the soil.
4. Site preparation, which may affect the source water temperature via the removal of riparian vegetation.

## Forest Management Program Goals

The aim of the management plan is to increase the yield of water and maintain its high quality for the City of Holyoke by means of producing and selling the associated timber while taking into account recreation, wildlife production, and aesthetics. HWW’s forest management goals are summarized as follows:

1. Establish a vigorous forest cover, diverse in species composition and tree sizes, across the vast majority of the watershed.
2. Maintain forest cover that balances active growth and nutrient assimilation, dense filtration, temperature regulation, and active reproduction.
3. Prevent erosion of sediments and nutrients from the watershed forest.
4. Salvage dead and downed material in areas where this salvage will reduce the threats of fire or nutrient transport.
5. Conduct any forest management activity such that the resulting benefits outweigh any potential negative impacts.

## Program Description

The forestry management practices within the HWW watershed area are managed by New England Woodland Management, Inc. (NEWM). NEWM ensures compliance with all State, Federal, and local regulations and requires, through the cutting contract, compliance with Best Management Practices as described by Vermont Foresters. These practices are similar to those published in Massachusetts. Refer to the Appendices for the Management Plan for the watersheds.

**The Tighe-Carmody Watershed** - Presently, no large-scale commercial forestry activity occurs within the Tighe-Carmody watershed. According to local residents privately held lands are logged only on a small scale. HWW land holdings include 52% of the watershed and approximately 80% of the areas are immediately adjacent to the reservoir and to the Manhan River. HWW logging activities constitute the bulk of the timber harvesting within the watershed.

**The McLean Watershed** - The Forest Management Plan was developed for the McLean watershed, but due to the small total area and the local public opposition, no timber harvesting has occurred within the McLean watershed.

**The Ashley Reservoir Watershed** - The Forest Management Plan was developed for the Ashley Reservoir watershed, but due to the small area, limited timber harvesting has occurred.

**The Whiting Street Reservoir Watershed** – The Forest Management Plan was developed for the Whiting Street Reservoir watershed, but due to the small area, limited timber harvesting has occurred.

Some of the logging requirements defined in the Forest Management Plan to minimize the danger of soil erosion and water quality reduction are as follows:

1. Leave buffer strips of timber along stream bottoms and small waterways to prevent slash and logging residue from entering the streams.
2. Construct roads on lowest grades possible and prevent water concentration both by use of frequent water bars and dumping water into brushy areas not likely to gully.
3. Avoid logging all areas over 50% slope.
4. If clear cutting is followed on steep slopes, it should be in small patches of 20 acres or less.
5. Stumps shall be cut no higher than the top of the root swell and shall be cut so as to leave the paint marks clearly visible on the stumps.
6. All trees shall be utilized up to the lowest possible top diameter for commercial sawlogs.
7. Unmarked trees and reproduction will be protected against unnecessary damage during logging, and wood roads will be left clear of brush and tops. Skid roads will be left to a minimum number.
8. The logger must abide by the Forest Fire and Forest Cutting Practice Laws of the Commonwealth of Massachusetts. The logger shall exercise extreme care against the starting and spreading of fire.
9. Tops and limbs will be lopped sufficiently to lie within two feet of the ground.
10. Timber should not be removed during the wet months of the spring, or during periods of extreme fire conditions.

Refer to the Appendices following this section for additional information.

## Best Management Practices

Forestry, or silviculture, practices can have a severe impact on surface waters if not conducted properly. Forestry-related impacts include sedimentation of waterways from forest roads and harvesting machinery, water temperature increases from removal of shade trees, fertilizer and pesticide contamination, and depletion of dissolved oxygen in water bodies as a result of accumulated organic matter. Such impacts are of great concern in watersheds of public water supplies and can be minimized by following best management practices. HWW’s forest management program adheres to “Massachusetts Forestry Best Management Practices Manual”, which is included in Appendix E. Some of HWW’s adopted forest management practices are presented as follows:

1. Preharvest Planning - Prior to harvesting an area, locate all waterbodies and sensitive areas such as wetlands and highly erodible soils. Consider the potential water quality impacts from any forestry activities within these areas and give consideration to existing water quality impairments in the harvest area.
2. Forest Road Design - Locate and design forest road systems so that water quality impacts are minimized. Use existing roadways wherever possible and design roadways to minimize road widths, slopes, and lengths. Avoid highly erodible or steeply sloped areas and minimize stream crossings.
3. Road Surfaces - Ensure that road surfaces are properly drained to avoid destruction by storms from grade weakening, surface erosion, and landslides. Leave crowns on roads so that water drains laterally into roadside drainage ditches. Culverts may be placed intermittently to allow passage of water from one side of the road to the other.
4. Skid roads - Cut shallow ditches across skid roads to divert surface runoff. After final use of skid roads, cover with slash and brush to slow the velocity of runoff and prevent erosion.
5. Landings - To minimize erosion and sedimentation, locate landings away from surface waters on well-drained, gently sloping ground to avoid pooling of water. Use diversions such as shallow ditches to keep water away from the area.
6. Buffer strips - Leave undisturbed buffer areas of forest land around waterways so that they can act as sediment traps for runoff coming from cleared areas. To avoid soil compaction, keep equipment out of these areas.
7. Selective Cutting - Clearcutting causes high turbidity levels in nearby waterbodies. In contrast, selective cutting, combined with erosion control practices, results in much lower turbidity levels.
8. Revegetating Disturbed Areas - By revegetating or reseeding disturbed areas immediately after disturbances, erosion and sedimentation are reduced significantly. In general, the use of mixed species and careful attention to high priority areas such as steep slopes has the best effects.

The implementation schedule for the forest management program is summarized as follows:

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| **Action Item** | **Implementation Schedule** |
| Adhere to Massachusetts Forestry Best Management Practices Manual | On-going; implemented in May 1982 |

1. O’Connor, Robert, Thom Kyker-Snowman, Paul Lyons, Bruce Spencer. *Quabbin Watershed: MDC Land Management Plan 1995 - 2004*. June 21, 1995. [↑](#footnote-ref-1)