

5 Management Plan Objectives and Methods: 2001 – 2010

5.1 Land Protection

5.1.1 Land Acquisition: Summary Objectives

5.1.1.1 1985-2000 Land Acquisition Program Objectives and Accomplishments

5.1.1.1.1 Program History

A major tenet of watershed management is protection through ownership and control of watershed lands. Owning and managing undeveloped lands (particularly forested land) surrounding a water supply source is recognized as the most direct and proven method of protecting the source's long-term quality.

When the Wachusett Reservoir was completed in 1905, the commonwealth had purchased 4,170 acres of land to be flooded, and 5,608 acres of watershed land, or 7.9% of the total watershed. The next 80 years saw only limited and sporadic land acquisition on the Wachusett Reservoir watershed, usually triggered by impending development on critical parcels near the reservoir. In several cases, original watershed holdings were sold out of state ownership for various municipal and private interests.

5.1.1.1.2 Program Goals and Accomplishments

Over the past 15 years, the MDC has conducted a watershed land acquisition program “*to protect sensitive watershed land from urbanization and to restore and maintain stable forest cover on this land.*” The primary purpose of this program is to help maintain high water quality into the future. Land acquisition helps prevent urbanization-related water quality degradation caused by bacteria, pathogens, nutrients, sediments, heavy metals, and other pollutants associated with increased stormwater discharge caused by impervious surfaces.

The MDC Watershed Land Acquisition Program has been funded from three bonds and a fiscal year budget allocation. These include Commonwealth open space bonds established in 1983 and 1987 of \$3 million and \$30 million, a \$135 million bond established by the Watershed Protection Act of 1992, and a fiscal year budget allocation of \$16 million in FY 1997.

To determine the most effective watershed protection outcome for these land acquisition funds, MDC created the Land Acquisition Policy Panel (LAPP), consisting of MDC and MWRA staff members representing all facets of watershed management expertise. LAPP developed a unique and comprehensive GIS computer model for the Wachusett watershed that scores the sensitivity (watershed index) of all land using twelve weighted criteria and three basin multipliers. The watershed index, calculated by the computer model, indicates areas that are rich in water resources and sensitive to degradation caused by human activity. The criteria include proximity to the reservoir and tributaries, slopes, zoning, aquifers, wildlife habitat protection, and threat from development.

From the beginning of the program (1985) through June 2001, MDC increased the percentage of agency land at the Wachusett watershed from 7.9% to 24.7% with the purchase of 280 properties. This represents the acquisition of 10,446 acres in fee, and 1,501 acres in watershed conservation restrictions. The total MDC acreage at Wachusett now stands at 17,547. With the reservoir included, the total area of MDC controlled area is 21,717 acres, or 30.6% of the watershed.

In August of 1998, the MDC and the Department of Environmental Management signed a *Memorandum of Agreement Concerning Care and Protection of the Water Supply Watersheds of the MDC Watershed System, Including the Wachusett and Quabbin Reservoirs and the Ware River*. 2,100 of the 6,100 acres delineated in this agreement are within the Wachusett watershed. With this Care and Control agreement added to the Wachusett MDC holdings, the total MDC protected acreage becomes 19,647, or 27.7% not including the reservoir. Including the reservoir places that figure at 23,817 acres, or 33.5% of the watershed.

Land acquisition goals and parcel selection criteria, originally outlined in a 1987 MDC report, were further refined in the 1991 Wachusett Reservoir Watershed Protection Plan (WPP). The WPP called for the acquisition of 10,500 additional acres on the Wachusett, bringing the total MDC ownership level on the watershed to 25% (not including the reservoir). The WPP Executive Summary (1992) stated that this goal would be reached over the next 15 years, or in 2007. [Correspondence from EPA has called for 25% ownership, not including the reservoir, by August 1998.]

Since FY91, the MDC has acquired 11,947 acres on the Wachusett watershed (as of 7/01). Land acquisition progress at Wachusett is ahead of the schedule set in the WPP Executive Summary. In 9.5 years of the 15 year schedule (63% of the time frame), MDC has completed the acquisition of 99% of the recommended high risk acreage called for in the 1991 WPP.

5.1.1.2 Land Acquisition Goals for 2001 and Beyond

MDC is required, by law, to continue to purchase priority land, with an \$8 million per year allocation, on the active watersheds until the remaining funds in the bond are spent. This will occur in 2007. The majority of the remaining \$48 million in acquisition resources will be spent on the Wachusett watershed. Land acquisition goals for the Ware River and Quabbin watersheds will be implemented based on Wachusett and Ware River computer model analysis and staff expertise.

The present combined total of MDC and Other Protected Open space on the Wachusett watershed stands at 39,417 acres (21,870 acres including the WsPA Primary Zone, and 17,547 acres of MDC non-reservoir land), or 55.5% of the watershed. Approximately 10% of the watershed is developed for residential and commercial/industrial uses. The remaining privately owned undeveloped land (about 33% of the watershed) will be the focus of a revised and updated land acquisition modeling effort to best prioritize parcel selections based on watershed sensitivity indices and remaining available funds.

Using the analysis from the GIS computer models and staff expertise, MDC will allocate the remaining \$48 million of land acquisition funds among the Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds. The highest priority will remain the Wachusett watershed, the closest reservoir to consumers and with the least percentage of sensitive watershed land protected.

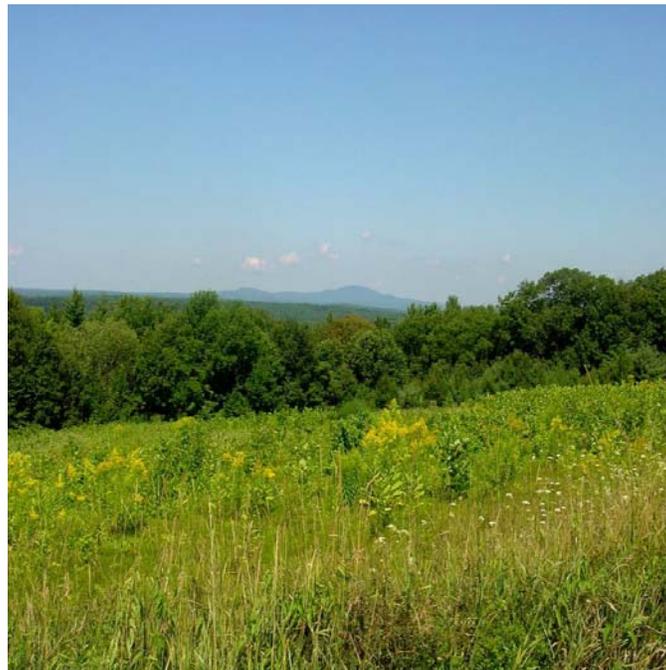
The relative sensitivity of Wachusett watershed lands has been determined by an in-depth analysis of the importance of various land criteria with respect to protecting the water quality of the

FIGURE 4. WACHUSETT RESERVOIR WATERSHED LAND ACQUISITION PROGRAM: COMPARISON OF MDC HOLDINGS IN 1985 AND 2000

go to www.state.ma.us/mdc/WachusettLMPfig4.pdf (file size: 1.8 MB)

Wachusett Reservoir (MDC Land Acquisition Plan, April 1998). Overlapping weighted criteria multiplied by one of three overlay basins in which they fall results in a Land Sensitivity Index. As all land in the watershed is assigned a discrete sensitivity index, the number of acres of land with the same index was multiplied by the index value in order to implement the Land Sensitivity Index at Wachusett. For example, if 125 acres have an index of 45, these two figures will be multiplied. This process was completed for all land in the watershed to calculate a total figure for the entire watershed.

The present MDC owned land, totaling 24.7% of the watershed area, represents a total Land Sensitivity Index of 32+%. After subtracting already developed land and Other Protected open space, the model determines the remaining available privately owned land that might be purchased on the watershed. The model then scores and maps this undeveloped private land, allowing DWM staff to better estimate the amount of high priority acreage that can be purchased with remaining land acquisition funds.



P. Morrone

View of Mt. Wachusett from Tower Hill

5.1.1.3 Payments In-Lieu of Taxes (PILOT)

After land is acquired for watershed protection, the MDC/DWM is required by MGL Ch. 59, §5G to make Payments In-Lieu of Taxes (PILOT) on these properties. This law took effect for Wachusett Reservoir watershed lands in 1987. The PILOT amount is calculated by multiplying the local commercial tax rate by the land valuation as determined by the Department of Revenue (DOR). While the program is administered by the MDC/DWM, the PILOT funds come from the MWRA. The DOR is required to value the land at its “highest and best” use; this means that property that is under Article 97 open space protection is still valued as developable parcels. A key provision of this statute is that the PILOT amount can never be less than the previous year’s amount, even if the tax rate or valuation diminishes. In

FY2000, \$1.06 million was distributed to Wachusett Reservoir watershed communities through the PILOT program.

Revaluation of state property occurs, by law, only once every five years. Unfortunately for the communities, this means that any property acquired within this cycle will not be included in determining PILOT amounts. However, MDC does pay the remainder of the existing year's taxes at the time of acquisition, and if the sale occurs in the second half of the fiscal year, it is obligated to pay the following year's taxes as well. Furthermore, if a property is being purchased out of Chapter 61 or 61A (the Forestland Taxation program), the agency is required to pay "rollback" taxes to the town, rebating the previous four years' tax abatements.

The state lands revaluation by the Department of Revenue that concluded in June of 2000 placed the value of MDC property in Wachusett Reservoir watershed communities at \$107,300,400, which is more than 100% greater than the 1995 valuation. This increase, which took effect with the FY2001 PILOT, reflects both the additions in MDC land ownership (particularly of valuable "prime lots" that could have been developed) and the rise in property values throughout the watershed. It is estimated that starting in FY2001, the PILOT program will distribute approximately \$2 million to the Wachusett Reservoir watershed communities.

The PILOT program provides a significant benefit to the Wachusett communities. They receive the same revenue from permanently protected open space that they would have received from developed land, without the associated municipal costs of police, school and fire services. MDC/DWM will continue to implement the PILOT statute, work with the MWRA to ensure proper payments, and assist the DOR in its revaluation efforts.

5.1.1.4 Land Disposition Policy

The Division of Watershed Management must contend with ongoing pressure from both private and municipal parties for disposition of lands for purposes inconsistent with water supply protection. While there are certain areas of land ownership throughout the water supply system that may not be deemed of critical importance to water supply protection, these areas require careful and consistent scrutiny prior to disposition. The MDC/DWM will consider land disposition only under exceptional circumstances.

The MDC/DWM Land Disposition Policy, approved in April, 1998, provides a framework for the agency to properly discharge its obligations to protect the water supply and to protect the Commonwealth's broader interests in open space protection under Article 97 of the Constitution of the Commonwealth. The intent of the Watershed Land Disposition Policy is to provide additional watershed-specific instructions to the Executive Office of Environmental Affairs on disposition of Article 97 lands.

5.1.2 Technical Assistance to Private Forest Landowners

As described in Section 2.1, almost 30,000 acres within the Wachusett watershed are “unprotected,” privately owned forestland. This figure does not include forestlands protected by various private organizations in the Wachusett watershed. The Division’s plans for further acquisition of the most critical parcels of unprotected private land at Wachusett are outlined in Section 5.1.1. above. Activities on the remaining unprotected lands are of major concern from an overall watershed protection standpoint. The current Watershed Protection Plan for Wachusett Watershed outlines the threats associated with conversions from forestland to developed land. Thus, a program of land protection through technical assistance to encourage the maintenance of these lands in forest cover seems well justified.

The Watershed Protection Plans have rated the threat from logging on private watershed lands to be moderate to high. In addition to keeping lands in forest, this program will also strive to reduce impacts to the watershed from forest cutting on private lands, as there is a substantial amount of forest cutting occurring on these lands.

In 1998-99, as part of a landowner education program, the Division established the “Stillwater Farm Interpretive Trail.” This project was completed in conjunction with the Friends of the Wachusett Reservoir and the Massachusetts Forest Stewardship Program. The Forest Stewardship Program encourages landowners with many different objectives to become active stewards and to strengthen their desire to keep land in forest cover. The Stillwater Farm Interpretive Trail provides a self-guided tour through the land use history and management practices on this typical farm woodlot.

In 1995, the Division started a program of direct technical assistance to forest landowners at the Wachusett Reservoir watershed, where nearly 50,000 acres of unprotected forest lands existed. The Division hired a Private Lands Forester, with funding provided jointly by MDC and the U.S.D.A. Forest Service (in conjunction with the Department of Environmental Management). The need for a Private Lands Forester had been noted in the past two Quabbin land management plans. This forester assisted DEM foresters in administering MGL Ch.132 (the Forest Cutting Practices Act) on the Wachusett watershed. In addition, duties included outreach to private landowners to encourage land protection through programs such as MGL Ch. 61 (Forest Tax Law) and the Massachusetts Stewardship Program. The Division also encouraged general use of its Conservation Management Practices for forestry operations on watersheds, as is recommended in the 1991 Watershed Protection Plan for both the Quabbin and Wachusett watersheds. The Private Lands Forester worked to encourage private landowners to manage their forests and wildlife to meet watershed-wide goals, looking beyond their individual property boundaries and designing management strategies that address the issues of the larger ecosystem.

In order to increase landowner participation in Chapter 61 and the Stewardship programs, the Division contracted to hire private consultant foresters to complete forest management plans for landowners wishing to gain entry into these programs. In FY 95, \$40,000 was dedicated to completing plans for approximately 2,000 acres of private forestland and to cost-share practices that benefit the watershed, such as tree planting and erosion control on roads.

The Private Lands Forester worked closely with the Land Acquisition Coordinator so that lands that should be added to acquisition lists (due to imminent development, etc.) could be more easily identified. The Land Acquisition Coordinator also directed landowners with a strong aversion to selling their land to the MDC to the Private Lands Forester, so that intermediate protection measures (Chapter 61 or Stewardship) could be utilized.

A related alternative to the purchase of land is the utilization of Conservation Restriction purchases to prevent development while leaving land ownership in the current hands. For example, MDC/DWM currently holds conservation restrictions on 19 properties totaling more than 1,273 acres in the Wachusett Reservoir watershed, and additional properties are under consideration. The private lands assistance program works directly with the Land Acquisition Coordinator to identify opportunities for CRs. It is important to note, however, that Division experience with CRs has shown that CR acquisition costs are often nearly the same as fee simple acquisition, and somewhat less desirable in that they require regular monitoring to assure compliance with the restriction specifics and with general watershed protection standards.

At the conclusion of the contract for a full-time Private Lands Forester, the Division shifted responsibilities for maintaining the private lands stewardship program to the staff in the Natural Resources Section. The program has continued, and as of the end of 1999, approximately 4,000 acres of private properties had been accepted for the program, while 10-year forest management plans were completed for approximately 2,600 acres. The average cost to the Division to provide this level of protection is approximately \$13 per acre.

5.1.3 Boundaries

5.1.3.1 Maintenance

Given the generally suburban nature of the Wachusett watershed, the proper marking of MDC boundaries is perhaps even more important than it would be in a more rural setting. The primary purpose of marking property boundaries is the avoidance of encroachment. A well maintained, obvious boundary is far less likely to be illegally crossed.

When the reservoir was built, all MDC boundaries were fenced and a forty-foot wide firebreak constructed that was mowed annually. These boundaries made it clear that one was entering MDC/DWM land. During the latter half of this century, dwindling labor resources have made the maintenance of the fence and firebreaks unfeasible. The firebreaks long ago lost their effectiveness as obstacles to wildfire, as field and pasture have been replaced by forest. In addition, much of the new boundary associated with recent acquisitions has never been well marked.

For the last twenty years or so, marking the MDC/DWM boundaries has been a responsibility of the Forestry staff. Recently, the Ranger staff has volunteered to assist. The goal of marking all boundaries on a ten-year cycle has not been met due primarily to the continued acquisition of new lands, which results in redrawn property lines. Regular boundary marking will continue to be an important goal. Careful planning is required to ensure that boundary marking efforts are not wasted (e.g., blazing along a stone wall only to have that wall become an internal feature following a predictable acquisition).

5.1.3.2 Encroachment

The following is a list of the types of encroachments that have been discovered on MDC property:

- ◆ Water and Soil Impairment
 - ✘ dumping of debris and hazardous materials
 - ✘ storage of hazardous materials

- ◆ Forest and Land Destruction
 - ☒ cutting, removal and damage of trees and plants
 - ☒ disturbance or removal of soil and ground cover
 - ☒ paving or covering of soil and ground cover
 - ☒ grading or filling land

- ◆ Construction
 - ☒ installation of fences
 - ☒ construction of sheds, walls, signs and buildings

- ◆ Boundary Destruction
 - ☒ removal or destruction of stone and concrete bounds, iron pipes and witness trees

The Natural Resources Section is currently resolving encroachments. Since 1989, 19 encroachments have been discovered and resolved. Most resolutions occur through a series of letters following field investigation. Rarely has court action been required.

In order to reduce the number of encroachments, it is recommended that all new land purchases be surveyed prior to purchase unless recently recorded survey plans for the land exist. Currently, only parcels that are to be subdivided and a portion of those with poor deed descriptions or unclear boundaries are surveyed prior to purchase. However, at an average cost of \$10,000 per survey, the Division needs to dedicate increased resources to surveying as part of its land acquisition program.

5.1.3.3 Cooperation with Abutters

DWM staff work hard to educate abutters about the agency's objectives for watershed protection. As the largest landowner within the Wachusett Watershed, it is extremely important for the Division to maintain a good relationship with abutters to MDC property. Setting a good example of proper land stewardship for neighboring property owners may positively influence an owner's actions on their own property. By having a good relationship with abutters, it is more likely that neighboring landowners would report unauthorized uses or encroachment problems that may occur on MDC land.

5.1.3.4 Rights-of-way

Although 52 % of the Wachusett watershed is protected (through direct ownership by MDC, other public or private conservation groups, or through regulatory control) much of the watershed is considered urbanized. Urbanization necessarily includes public utilities to meet residential, commercial/industrial, and transportation needs within the watershed.

When the Wachusett reservoir was constructed during the early 1900's, railroads, secondary roadways, power lines, and other public utility facilities existed throughout the watershed. Many of these facilities were relocated or discontinued due to the construction of the reservoir. Rights-of-way (ROW) were granted to the various entities to relocate, maintain, repair, upgrade, and replace utilities, which now pass through Division property.

During the years numerous requests have been received for new ROW or changes to existing ones. These requests are addressed through permits, leases, and easements on, over, or through Division watershed property. Requests for new or revised ROW are primarily received from electric power companies, railroads, telephone companies, and town utilities. Requests are considered on a case-by-case

basis. The primary consideration of the review is to prevent adverse environmental impacts to any watershed resource. The applicant must agree to follow all applicable regulations and specific terms and conditions proposed by the Division before the ROW is approved and any construction is permitted to proceed.

Maintenance of certain rights-of-way follows procedures for resource identification and notification established in the document dated January 2, 1997, entitled: *Memorandum of Understanding between the Massachusetts Department of Food and Agriculture, Pesticide Bureau and the Metropolitan District Commission, Division of Watershed Management, on: Identification of Water Features within the Quabbin, Ware and Wachusett Watersheds, which are subject to protection under DFA Pesticide Regulations 333 CMR 11.00.*

5.1.4 Public Education

5.1.4.1 Role of MDC Watershed Rangers in Land Protection

The MDC directly manages about 40% of a 257,000-acre watershed and reservoir system, which provides drinking water for over 2.4 million people, but also provides access for both appropriate and inappropriate uses by the visiting public. For several decades prior to 1992, the Metropolitan Police, who had jurisdiction in any town that contained MDC property, patrolled the system. In 1992, the MDC police force was consolidated with the State Police and other police departments. A Memorandum of Understanding was established with the MA State Police to provide the same services to the MDC watersheds that were carried out by the former Metropolitan Police. Following the consolidation, the MDC as an agency and the Division of Watershed Management felt it would be prudent to create a limited ranger program to complement the efforts of the police. The Watershed Protection Plan of 1998 specifically recognized a need to hire additional Watershed Rangers, seven of which were identified for the Wachusett Watershed. MGL Ch. 92, s. 34b specifies the authority of these rangers, as follows:

“ The Metropolitan District Commission is hereby authorized to establish a park ranger program within the department to preserve, maintain and protect the parks, reservation, historic sites and open space and to ensure the environmental integrity of properties under the care, custody and control of the commission.”

Watershed Rangers provide a visual presence and proactively patrol to help solve problems, such as vandalism, inappropriate recreation uses, illegal dumping and accidents within the watershed that may degrade water, forest, wildlife and cultural resources. The rangers rely on rules education rather than enforcement to seek compliance. Rangers do not have law enforcement powers. When situations occur that require law enforcement personnel, Watershed Rangers communicate these to the State Police and other enforcement agencies.

Watershed Rangers are “good will ambassadors” and not only show a positive presence but also speak on behalf of the agency and the DWM about proper watershed stewardship and drinking water protection to community or organization gatherings, children, school groups, service organizations, senior groups, etc. The primary goals of the Metropolitan District Commission’s watershed rangers are to educate the public on the importance of watershed protection and help protect the drinking water supply. Through their positive interaction with visitors, rangers protect these open spaces and encourage all people to do the same by obeying all watershed rules and regulations for specific MDC reservoirs and the system as a whole.

Watershed Rangers provide security for MDC facilities and other designated buildings, and regularly monitor potential trouble spots on the watershed. Special use and group permits may be checked by rangers to ensure that permittees are in compliance with their permit. Through the course of patrolling, the rangers keep a daily log of their activities. Incidents are documented and are referred to the appropriate individual. Rangers also aid in placement of regulatory signage throughout the watershed.

5.1.4.2 *Interpreting Land Protection/Management Priorities*

The MDC/DWM staff engages in both formal and informal education programs to enlighten the public about the Division's land management and land protection efforts. The staff tries to explain to interested parties what management and protection activities we undertake and the reasons behind these efforts. We work to clarify for the public that our activities in fulfilling the Division's mission are based on scientific fact and mandated by law.

The Division is charged with protecting the MWRA drinking water supply. Past experience and present scientific information have determined that the highest quality water comes from a forested landscape. The legislature has approved and mandated that the Division engages in an active land-purchasing program to preserve the present character of the watersheds and stop activities that are deemed harmful to water quality. The Division gears interpretive efforts towards explaining to the public why so much land is being purchased, how the agency buys the land, and the ways in which this activity impacts town tax bases (generally very positively; see 5.1.1.3, Payments In Lieu of Taxes)

The Division actively manages its land to ensure high quality drinking water. Many of the activities the division pursues (forestry, wildlife management, public access controls, limits on recreation opportunities and limits on growth and development) are controversial in nature. The Division supports a professional staff making decisions based on research, study, standard practice in the field, years of experience, and careful deliberation, including the active solicitation of public input. The educational effort seeks to build a sense of partnership and stewardship between the area town governments, local population, and the MDC/DWM.

5.1.5 Fire Protection

Forest fire is a potentially significant threat to water quality, forest health and public safety. Serious fires are capable of killing overstory and understory vegetation, consuming soil organic matter thereby exposing mineral soil, increasing nutrient loading to tributaries as well as destroying personal property and endangering people's lives. Fortunately, these types of fires are very rare occurrences in the forest types in this part of the country. The vast majority of wildfires are low intensity, relatively cool, low flame height fires that burn little more than a portion of the leaf litter and kill little of the understory or groundcover vegetation. However, any fire is a potential threat to the visiting public and private property and therefore it is in the public interest to control all wildfires on MDC property. This is especially true in the relatively highly developed Wachusett watershed where the MDC's landholdings are often highly interspersed with private land.

The records of past forest fires at Wachusett are, unfortunately, incomplete. During the past six years, seven fires have burned about 60 acres. The Metropolitan Water and Sewer Board (predecessor of the MDC) kept account of fires from 1909 to 1920 in the annual reports. During this time period, forty fires burned 700 acres of woodland and young plantation. Most occurred in spring when low humidity combines with dry fuels. Sparks from passing coal-powered steam locomotives were the typical cause.

However, the landscape of the Wachusett watershed was vastly different 90 years ago than today. The primarily agricultural terrain resulted in drier soils, finer fuels and generally windier conditions at ground level; all prime conditions for easily set wildfire. Today, the mature even-aged forest is far less susceptible to fire due to its high, closed canopy, more humid microclimate and generally moist forest floor. However, during times of drought, during most any summer on the drier hilltops or adjacent to the remaining fields and pastures, fire still poses a threat that must not be ignored.

Other than the rare wildfire started by sparks from a passing train, the visiting public causes nearly all other fires. The risk of these types of fires can be minimized by the strict enforcement of the regulations against the setting of campfires (many fires are the result of escaped campfires built by fishermen), increased patrolling during times of increased fire risk, and the elimination of all public access during times of extreme fire danger. MDC property was closed to public access in October of 1984 during a period of extreme fire danger conditions. The addition of the MDC Ranger staff has made a significant difference in the ability to detect violations and enforce restrictions.

The legal responsibility for the suppression of all wildfires, even on MDC property, resides with the local fire departments. All suppression activities performed by MDC staff is in a supporting role under the direction of the town Fire Chief. Typically, the initial suppression is performed by the local fire department with the responsibility for mop-up, at least in part, turned over to the MDC.

The internal road system on MDC property is the link that allows fire-fighting equipment to get to the fire. Therefore, the improvement and maintenance of these roads is key to the ability to suppress wildfires. Of concern is the vast acreage acquired since 1989 and the often insufficient access into these lands (see the next section for a discussion of this issue).

The ability of the MDC to effectively respond to wildfires has been markedly improved over the past several years and this trend needs to continue. Two 100-gallon slip-on tanks have been acquired and are installed on vehicles throughout the fire season along with fire-fighting hand-tools. Communication has been greatly improved by the addition of a radio system comprised of base, vehicular and hand-held units. Most lacking is the proper training of MDC personnel in wildfire control techniques. The certification of all willing employees in the U.S. Department of the Interior, National Park Service, Wildfire Control Training program will be a goal for the immediate future.

The MDC has a Forest Fire Policy that is periodically updated. This policy specifies the steps necessary for the suppression of wildfires on MDC lands, including involvement with other state and municipal agencies. The complete, current policy is available upon request.

5.1.6 Access Roads

5.1.6.1 Road Maintenance: Priorities and Objectives

The internal forest road network at Wachusett provides access for important watershed management activities such as forest management, fire protection, water quality sampling, patrolling and policing and emergency access. The purpose of this section will be to discuss the current state of the road network and maintenance needs and to examine the adequacy of the existing network regarding both condition and coverage.

There are currently 70.5 miles of roads on MDC property in the Wachusett watershed. The condition of these roads varies widely from paved (less than 3%) to solid well drained roads that are usable most of the year (about 17%) to lower quality roads that are often compact loam with few if any

drainage features (about 80%). The lower quality roads are unusable for a significant portion of the year. These 70.5 miles of road occupy about 237 acres, or 1.5% of the watershed. The best quality roads usually originated as well engineered and built town roads (as least well engineered for the time, considering that Wachusett construction was coincident with the invention of the “horse-less carriage”). Many of the lower quality roads originally provided access to fields, pastures and woodlots and were improved to various degrees by the MDC following reservoir construction.

The density and the access provided by the road network varies widely throughout MDC property. Averaged over all 15,338 acres of state ownership, there is approximately 20 feet of road per acre of land (this is almost exactly the same as at the Quabbin Reservoir). However, this number ranges from 67 feet/acre in the Gate 26 to 35 Sub-basins to 0 feet/acre in the Malagasco Brook Sub-basin. It is clear that the highest density of roads is in the 5,608 acres of land that pre-date the latest acquisitions that began in 1985. In the six Sub-basins that cover this “original” ownership, road density averages 44 feet/acre with 78% of the total road network. On the 9,730 acres of land recently acquired, road density averages 7 feet/acre with 22% of the total.

These numbers indicate that there is wide disparity in the current level of accessibility between newly acquired lands and land owned before 1985. In order to improve access into these 9,730 acres of land, road construction is required. A conservative estimate is that 15 miles of new road are required. This number will only increase with future acquisitions. The decision where to build a new road requires the careful consideration and balancing of many factors. It is not as simple a formula as “every property needs a road.” Some properties are small enough that frontage along an existing town road provides all the access required. However, these small disjointed parcels are relatively few and will become increasingly so with future acquisitions.

Access for watershed management activities can also be access for unwelcome activities that can pose a threat to water quality. Such threats include simply the increased attractiveness that a road creates, thereby encouraging the increased use of an area by the general public, and the greater potential for dumping. Conversely, better access allows for better patrolling and monitoring by MDC Ranger staff, which can minimize these threats. The threat of fire, accidental or intentional, is also increased with improved access, but fire detection and suppression activities are enhanced. All road construction decisions must be made on a case-by-case basis while keeping the overall objectives of watershed management in mind.

The proper maintenance of forest roads is important to both ensure reliable access and to minimize erosion and the resulting sedimentation of tributaries. A properly crowned road surface comprised of well-packed material with adequate drainage features should be the goal for all of the primary access roads on MDC property. The secondary roads have less stringent requirements with the stability of the surface material being the minimum standard. This is often met merely by the maintenance of a healthy grass cover.

The amount of maintenance the road network requires is highly variable from year to year depending largely on weather and management activities. The minimum that has been provided in the past is annual mowing and the removal of downed woody material following storm events. Re-grading, the addition of gravel and the replacement or repair of drainage structures has occurred to a limited degree (on approximately six miles of road in the last ten years) and appeared to be adequate to maintain the roads. However, the addition of 9,730 acres of land since 1985 has added over 13 miles of forest roads. In addition to the continuing use of access for forest management activities and shoreline maintenance work, there is greatly increased year-round use of the entire road system by the Ranger staff (added in 1995), and by employees participating in the Bird Control Program (started in 1993). The result is that the overall quality of the road network has been declining.

MDC staff has identified approximately 15 miles of road that require improvement beyond ordinary maintenance. This work is required to upgrade existing roads on newly acquired lands that have no other access or roads for which use is too seasonally restrictive. The addition of bank-run gravel, topcoating with processed gravel, grading and the construction and installation of storm water structures are required and will consume an estimated 30,000 cubic yards of material. The construction of the estimated 10 miles of new road would consume an additional 25,000 – 35,000 cubic yards of material. All new road construction will be submitted to an internal review process that will include review by Environmental Quality staff, the Division wildlife biologist, and the MDC archaeologist. After satisfying review by these staffs, final approval must be given by the Wachusett Reservoir Superintendent before construction can begin.

To date, virtually all of the gravel used to maintain the road system has come from MDC owned pits. There are presently three active gravel pits from which material is being extracted for use. They are:

- ◆ South Meadow Rd., Clinton (off watershed)
- ◆ Lily Pond pit, inside Gate 28, West Boylston
- ◆ Sundin pit, north of Asnebumskit Brook, Holden

There is an estimated combined total of approximately 50,000 cubic yards remaining in these pits.

The South Meadow Road and Lily Pond pits are the two primary sources of material and significant deposits remain. The Sundin pit has been recently used but may be “played out” with primarily sandy deposits remaining. Its location makes it potentially useful for future roadwork in the immediate area therefore further investigation will be made before abandoning this pit. (See Section 5.3.7.3 for a discussion of gravel pit reclamation.)

Over the last 9 years, the existing Maintenance Equipment Operator (MEO) crew at Wachusett has averaged 0.6 miles of road constructed, repaired and maintained (beyond annual mowing) per year. With 25 miles of road needing repair and construction, it is clear that the current MEO crew, given all of the other tasks that they are required to perform, is insufficient to meet the needs of the future. A crew whose primary responsibilities will be to construct and repair forest roads where needed should be created. This crew should consist of an appropriate combination of MEO I’s and II’s, supervised by someone with significant road construction and civil engineering expertise and provided with all of the necessary equipment.

5.1.6.2 Conservation Management Practices for Road Maintenance

The objectives of forest road maintenance on the watershed are to provide for vehicle access to support key watershed management activities, and to minimize adverse water quality impacts associated with this road system. Activities that are dependent upon a good access road system include fire protection, forest management, water sampling, research, and police patrols. These activities require stable, properly shaped and ditched road surfaces with adequate structures to manage stormwater. Division staff and equipment accomplish the vast majority of road maintenance on MDC properties.

To accomplish these objectives Division crews use various mitigating procedures to protect stream water quality during routine maintenance activities. These procedures are outlined below. It should be noted that specific sites might require special systems not described here, such as the use of geotextile, erosion control blankets, subsurface drainage, and riprap materials. In addition, wildlife conservation practices will be considered when constructing new roads (see section 5.5.2.2.2).

- ◆ *Shaping Road Surface:* The basic component of a stable road is the proper crowning and ditching of the road to allow stormwater to flow off the travel surface and be collected in the roadside ditch.
- ◆ *Relief Ditches, Relief Culverts, and Waterbars:* The frequent removal of storm water from the roadside ditch is important to limit the amount of soil and gravel that is washed from an area during an event. The spacing of the relief structures is determined by combining site data such as slope of the road, slope of adjacent woodland, soil type and depth, and physical structure of the road. The general rule of thumb is to place relief structures as often as the landscape allows on most slopes. Relief structures, wherever possible, will discharge stormwater not less than 50 feet from streams or wetlands.
- ◆ *Detention and Retention Basins:* These basins will be installed where needed during road reconstruction activities to reduce the velocity of stormwater and increase infiltration.
- ◆ *Dry Season Work:* Except for emergency repair work, some major bridge work (which may extend beyond dry periods), and emergency culvert replacement, road work will generally be accomplished during dry periods (primarily summer), when low water flow and stable soil conditions will help mitigate impacts from soil disruption.
- ◆ *Use of Silt Fence/Hay Bales:* Whenever road maintenance work requires disturbance near wetlands, the wetland will be protected by properly installed hay bales or industry standard silt fence.
- ◆ *Seeding of Disturbed Areas:* Upon completion of road maintenance projects areas of disturbed soil will be graded and seeded with quick growing grass species. The Division has purchased a “hydro-seeder” for this purpose.
- ◆ *Special Road Surfaces:* Because of the huge variation of historical forest road construction and use, alternative road surface materials may be appropriate in limiting loss of material through erosion. Forest roads that are rarely used may be shaped and seeded with grass. Yearly mowing and culvert cleaning would then maintain these roads. Depending on location and use, these roads may also be blocked by use of barways to keep out all but essential traffic.

Two additional road surface materials will be examined in this management period: 1) paving (which is currently prohibited by legislation) to stabilize steep road sections and 2) calcium chloride applications to control dust (a form of erosion) and consolidate fine surface materials in high traffic areas. The benefits of utilizing these materials will be carefully weighed against any potential threats to water quality, and there are no plans for wide application of either without thorough investigation of their effects and proper authorization.

It is the Division’s intention to limit washouts by replacing under-sized culverts with structures that will meet standards for a 50-year flood (defined as flood levels with a 2% chance of occurrence in any given year). Both culverts and ditches will be kept open and clear of all restrictions in order to prevent the back up of stormwater and the resulting washout. Beaver control structures in use on the watershed will be designed to accommodate the full, specified flow of water through the culvert. In addition, the Division will continue installation of overflow spill areas (reinforced, low areas on a road adjacent to major streams) capable of spilling the flow from a 100 year flood (1% chance of occurrence in any given year) on major tributaries.

Other general road maintenance occurring on a regular basis includes grading, removal of hazardous roadside trees, roadside mowing (which facilitates drainage and keeps roads open), and the processing and spreading of gravel as needed.

As part of its land acquisition program, MDC/DWM acquires access roads or the land abutting these roads. It is the Division's policy to install gates to limit access to all newly acquired roads in order to minimize erosion and illegal dumping along these roads. Division Forestry staff maintains records of road areas where gates are proposed, and more specific and complete descriptions of the current road maintenance plan (including standard operating procedures for road work and road standards for different uses).

5.1.7 Areas with Special Management Restrictions

The recognition of a category of land that requires "special" management was first proposed in the 1972 Quabbin Reservoir Watershed Management Plan. That plan recognized those areas as "Protection Areas" where management would not be allowed due to potentially negative water quality or other impacts. Sites falling into this category included islands, rock quarries, mill sites and exceptional forests among others. This idea was further refined in subsequent Quabbin plans and that tradition and concept is carried forward into this first Wachusett Reservoir Watershed Land Management Plan.

Areas where special management restrictions are deemed necessary fall into two general categories:

- ◆ Areas where regular forest management are either impractical or may result in unacceptable impacts.
- ◆ Areas with uncommon, rare or potentially rare resources.

The first category includes areas that are commonly occurring but are also fragile, sensitive or impractical such as forested wetlands, marshes, bogs, vernal pools or steep slopes greater than 30%.

The second category includes areas such as uncommon forest types, locations of rare, endangered or threatened species of plant or animal, and historic or prehistoric sites. A new addition to this category is areas known as "Primitive Woodlands." Henry David Thoreau discussed the concept of primitive woodlands as part of an overall forest classification system. He adapted this system from a land classification system put forth by the English landscape architect William Gilpin. Thoreau defined primitive woodlands as those that have always been forested, even though they may have been cut one or more times in the past. The critical characteristic is that these woodlots were never used for agricultural purposes and that they therefore have always had a forest floor. (Foster, D.R. 1999) Many questions need to be answered before specific management recommendations can be made. What ecological value do primitive woodlands have? Does the presence of these areas add to the biological diversity of the area? How many acres and where are the primitive woodlands on MDC/DWM lands? Initial investigations looking at 1830 survey plans of each town indicate that there is the potential for a significant acreage of primitive woodlands. These plans show the areas within each town that were still forested at the peak of agricultural clearing. However, how many of these areas that were forested in 1830 were subsequently cleared? The Division hopes to further investigate this intriguing concept.

The MDC/DWM has identified approximately 2,000 acres of land in the Wachusett watershed that will be classified as "Areas with Special Management Restrictions."

TABLE 21. AREAS WITH SPECIAL MANAGEMENT RESTRICTIONS

Area Description	Restrictions
Islands 58 acres	No management
Steep Slopes	No management
Wetlands 1,630 acres	No management except limited beaver control (see beaver policy)
Rare and endangered species habitats 3,164 acres (includes reservoir surface)	Subject to restrictions by MassWildlife/NHESP
Riparian zones adjacent to tributaries and the Reservoir shore 576 acres	Subject to restrictions of FCPA (Ch. 132); limited non-harvest silviculture
Poutwater Pond Nature Preserve 213 acres	Restricted according to The 1997 MDC Protection Plan for Poutwater Pond Nature Preserve
Disturbance-sheltered areas	Relatively low intensity management
Areas of Historic, Cultural or Natural Significance	Varies from no management to selective restoration and management
Primitive Woodlands	Yet to be determined

5.2 Management of Forested Lands

5.2.1 Description of Forest Management Approach for 2001 – 2010

5.2.1.1 Objectives of Wachusett Forest Management

The primary goal of management of the Wachusett forest is the creation of a forest that best supports the production of high quality drinking water from the land. This watershed protection forest is vigorous, diverse in species and ages, actively accumulating biomass, and actively regenerating.

The first forest management plan for any DWM property, written in 1960 for the Quabbin forest, proposed that a predominantly uneven-aged forest provides the best protection for a high quality water supply. Every Quabbin plan since then has agreed with this statement including the latest 1995 – 2004 plan. This first Wachusett Plan continues this tradition with a conviction based on the most up-to-date information, the latest review of relevant information and literature, and the experience of the professional staff in the management of the Wachusett forest.

The conversion of the present even-aged forest to a forest comprised of at least three age classes has already begun, although at a slower pace than is now required, given the significant increase in acreage resulting from the land acquisition program. When the forestry program began in 1979, the MDC owned approximately 5,600 acres in the watershed compared to the 16,822 acres owned as of the writing of this plan. The creation of three well-defined age classes in any section of the forest necessitates that one-third of the forest be regenerated to a new age class followed by the creation of another age class some appropriate length of time later. This length of time will be about 20 to 30 years, a sufficient span