

## II. Existing Conditions

### A. Watershed Description

The 1994 *Public Access Plan for the Sudbury Watershed* provides a detailed geographic overview of the watershed system. Such a comprehensive inventory of the watershed resources was needed to determine appropriate management for the ongoing operation and protection of the Sudbury System and its natural and cultural resources. That information provides a basis to assess user impacts and develop management alternatives for MDC watershed lands. The overview and inventory from the 1994 Plan has been used extensively, with some additional updated information, to provide guidance for the Public Access Plan Update. Copies of the 1994 inventory are included in Appendix A.

The Sudbury System is part of the greater Sudbury-Assabet-Concord (SuAsCo) drainage basin in Massachusetts (see **Figure 2: SuAsCo Watershed**). The MDC drinking water supply system consists of 75 square miles within two sub-basins that comprise the Sudbury System watershed. These sub-basins are divided geographically and referred to as the North and South Basins of the Sudbury System. The Sudbury System represents only 8.8% of the entire SuAsCo watershed. The current system consists of four supply reservoirs: the Sudbury Reservoir and Framingham Reservoirs Nos. 1, 2, and 3. The system also contains five aqueducts: the Sudbury, Weston, Wachusett and Hultman Aqueducts, and the new MetroWest Tunnel. Both the North and South Basins drain into Reservoir No. 1. Releases from Reservoir No. 1 flow into the Sudbury River at the Winter Street Dam and continue east towards the Assabet and Concord Rivers.

#### 1. North Basin

The Sudbury Reservoir watershed North Basin is contained within five municipalities: Framingham, Marlborough, Southborough, Westborough and Northborough, Massachusetts. Water flows from Stony Brook through the North Basin in a west to east direction.

The North Basin area contains two reservoirs, the Sudbury Reservoir and Framingham Reservoir No. 3. Four aqueducts, the Wachusett, Hultman and Weston Aqueducts and the MetroWest Tunnel, are also contained within the North Basin. The Wachusett Aqueduct delivers water to the Sudbury Reservoir directly from the Wachusett Reservoir. The Wachusett Aqueduct connects the Wachusett and Sudbury Reservoirs at Shaft C, which is located in Marlborough and is part of the north Sudbury basin. Water from the Wachusett Aqueduct flows directly into the Sudbury Reservoir through the Wachusett Open Channel. This is currently the only active supply of drinking water within the entire Sudbury System. Water from Sudbury's North Basin can be used for a DEP declared emergency if the water is boiled prior to consumption. The Sudbury System was last used as an emergency supply in 1981 during a temporary shutdown of City Tunnel for repair work.

Several easements exist which allow residents to draw water directly from the Wachusett Open Channel. The Wachusett Open Channel, from the terminal chamber to Deerfoot Road, is under the jurisdiction of the MWRA. The Authority prohibits public access to the Wachusett Open Channel and all aqueducts.

**Table 1: Sudbury Reservoir Watershed System Facts and Figures**

**Table 1A: Reservoir Information**

<i>Attribute</i>	<i>Sudbury Reservoir</i>	<i>Foss Reservoir (Framingham #3)</i>	<i>Brackett Reservoir (Framingham #2)</i>	<i>Stearns Reservoir (Framingham #1)</i>
<b>Year Built</b>	<b>1896</b>	<b>1878</b>	<b>1878</b>	<b>1878</b>
<b>Volume Capacity</b>	<b>7.254 billion gallons</b>	<b>1.074 billion gallons</b>	<b>562.6 million gallons</b>	<b>311 million gallons</b>
<b>Surface Area</b>	<b>1,292 acres</b>	<b>250 acres</b>	<b>134 acres</b>	<b>154 acres</b>
<b>Watershed Area</b>	<b>22.3 mi<sup>2</sup></b>	<b>27.6 mi<sup>2</sup></b>	<b>45.1 mi<sup>2</sup></b>	<b>74.66 mi<sup>2</sup></b>
<b>Length of Dam</b>	<b>2000'</b>	<b>1,640'</b>	<b>1,340'</b>	<b>758.8'</b>
<b>Maximum Depth</b>	<b>65'</b>	<b>24'</b>	<b>20'</b>	<b>16'</b>

Information from MDC/DWM records

**Table 1-B: Land Cover and Land Use Data**

<b>Land Cover and Land Use in the Sudbury System Watershed*</b>														
<b>*includes reservoirs</b>														
<b>(area in acres)</b>														
<i>Watershed</i>	<i>Forest</i>		<i>Wetland</i>		<i>Agriculture</i>		<i>Residential</i>		<i>Commercial/ Industrial</i>		<i>Open Water</i>		<i>Other</i>	
	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>
North Basin	6,669	37.5%	221	1.2%	998	5.6%	4,983	28.0%	1,568	8.8%	1,467	8.2%	1,876	10.5%
South Basin	15,220	50.6%	662	2.2%	1,330	4.4%	8,115	27.0%	1,334	4.4%	1,296	4.3%	2,101	7.0%
<b>Total Sudbury System</b>	<b>21,889</b>	<b>45.6%</b>	<b>883</b>	<b>1.8%</b>	<b>2,328</b>	<b>4.8%</b>	<b>13,098</b>	<b>27.4%</b>	<b>2,902</b>	<b>6.1%</b>	<b>2,763</b>	<b>5.8%</b>	<b>3,977</b>	<b>8.3%</b>

Information derived from MassGIS data

**Table 1-C: Open Space Ownership**

<b>Open Space Ownership in Sudbury System Watershed*</b>							
<b>*includes reservoirs</b>							
<b>(area in acres)</b>							
<i>Watershed</i>	<i>Total Area</i>	<i>MDC/DWM Protected</i>		<i>Other Protected</i>		<i>Total Protected</i>	
		<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>	<i>Area</i>	<i>%</i>
North Basin	17,782	3,865	21.7%	1,275	7.2%	5,140	28.9%
South Basin	30,058	1,078	3.6%	4,872	16.2%	5,950	19.8%
<b>Total Sudbury System</b>	<b>47,840</b>	<b>4,943</b>	<b>10.3%</b>	<b>6,147</b>	<b>12.8%</b>	<b>11,091</b>	<b>23.1%</b>

Information derived from MassGIS data

**Figure 2: SuAsCo Watershed**

go to [www.mass.gov/dcr/waterSupply/watershed/documents/2002Sudplanfig2.pdf](http://www.mass.gov/dcr/waterSupply/watershed/documents/2002Sudplanfig2.pdf)

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Headwaters for the Sudbury's North Basin lie in Crane's Swamp, which is located in Northborough and Westborough. The Wachusett Aqueduct terminates at Shaft C, located in Crane's Swamp, and flows eastward through the Wachusett Open Channel which is the main tributary of the Sudbury Reservoir. Water from the reservoir is released at the Sudbury Dam and flows into the Stony Brook open channel. The Stony Brook Channel fills Framingham Reservoir No. 3 and then drains into Framingham Reservoir No. 1, where it is released into the Sudbury River and flows northward.

## 2. South Basin

The South Basin is located within six municipalities: Framingham, Ashland, Marlborough, Westborough, Southborough, and Hopkinton. Water flows through the South Basin in a westerly to northeast direction. The South Basin area contains one aqueduct, the Sudbury Aqueduct, and two reservoirs: Framingham Reservoirs No. 1 and No. 2. MDC lands also include a portion of the Sudbury River and Cedar Swamp. Headwaters for the Sudbury River originate from brooks in the towns of Upton and Westborough and empty into Cedar Swamp. Water from Cedar Swamp flows into the Sudbury River and drains into Framingham Reservoir No. 2 at the Sudbury River Dam. Water from Reservoir No. 2 flows north and is released into Reservoir No. 1 at the Brackett Reservoir Dam. The South Basin also includes the Ashland, Hopkinton and Whitehall Reservoirs, which are managed as State Parks by the MA Department of Environmental Management.

Since the late 1960s, the Sudbury North Basin system has primarily been used as a conduit to convey water from the Wachusett and Quabbin reservoirs to supply distribution reservoirs located within the Boston Metropolitan area. The Sudbury South Basin has not been used for water supply since 1930. Impacts from the Nyanza Superfund Site and mercury contamination of the basin sediment have made Sudbury's South Basin unusable for public water supply.

## **B. Natural Resources**

The ecological diversity and scenic quality of the Sudbury System's lands and waters have significant and important value. Although the amount of MDC property in this watershed is relatively small when compared with the Quabbin Reservoir, Ware River, and Wachusett Reservoir watersheds, the 4,943 acres of forest, wetlands, waterways, and reservoirs that comprise the Sudbury System provide some of the most significant open space within Boston's MetroWest suburbs (see **Figure 3: Open Space Protection in the Sudbury Reservoir Watershed System** and **Figure 4: Land Use/Land Cover Classification in the Sudbury Reservoir Watershed System**).

These lands were originally acquired by the Commonwealth solely for drinking water supply protection; however, they also provide protected open space that is vital for the conservation of plant and wildlife communities in urbanized areas. In addition to meeting primary goals for water supply protection, MDC/DWM's management at the Sudbury provides lasting protection for thousands of acres of forests, water bodies, scenic vistas, and wildlife habitat (see **Table 1: Sudbury Reservoir Watershed Facts and Figures**).

This section of the inventory will discuss the natural resources that are under the care and control of the MDC. Information will be presented for water resources, vegetative cover, wildlife habitat, and scenic landscapes. Inventory data for these resources is documented in Appendices B through D. This information will also be used for the development of future interpretive and environmental programs in the Sudbury Reservoir watershed, as described in Section V, Plan Implementation.

## 1. Water Resources

Inland waters within the Commonwealth of Massachusetts are classified under 314 CMR 4.03. These classifications are based on actual or intended use of the water resource. Class A waters are designated for use as a source of public (drinking) water supply. Class B waters are designated for the protection and propagation of fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Class C waters are designated for the protection of fish, other aquatic life, and wildlife, and for secondary contact recreation.

The Massachusetts DEP classifies all surface waters within the Sudbury Reservoir watershed North Basin as Class A waters. This designation applies to the Wachusett Open Channel, the Sudbury Reservoir, Stony Brook Open Channel and Reservoir No. 3. The safe yield of drinking water from the North Basin reservoir system is approximately 20 million gallons per day. Water from the Sudbury Reservoir and Framingham No. 3 can be used as an emergency water supply if properly treated.

Although Reservoirs Nos. 1 and 2 are part of the Sudbury Reservoir watershed supply system, they are identified as Class B waters and are not used for drinking water purposes. The basin sediment of Reservoirs Nos. 1 and 2 (which are hydrologically separate from the North Basin reservoirs) has been contaminated with mercury from the Nyanza Superfund Site. However, EPA has stated that the mercury is contained within the sediment and does not affect the water quality of these reservoirs.

## 2. Vegetation/Habitat

The 4,943 acres of MDC owned watershed land and water within the Sudbury System is comprised of a mixture of habitats that include open field areas, pine plantations, hardwood forests, and wetlands. The diversity of wildlife is directly dependent upon the diversity of vegetation and the range of habitats within its environment. According to the Natural Heritage and Endangered Species Program within the Massachusetts Division of Fisheries and Wildlife, there are several areas of critical wetland habitat within the Sudbury

**Figure 3: Open Space Protection in the Sudbury Reservoir Watershed System**  
go to [www.mass.gov/dcr/waterSupply/watershed/documents/2002Sudplanfig3.pdf](http://www.mass.gov/dcr/waterSupply/watershed/documents/2002Sudplanfig3.pdf)

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**Figure 4: Land Use/Land Cover Classification in the Sudbury Reservoir  
Watershed System**

go to [www.mass.gov/dcr/waterSupply/watershed/documents/2002Sudplanfig4.pdf](http://www.mass.gov/dcr/waterSupply/watershed/documents/2002Sudplanfig4.pdf)

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Reservoir watershed. Only one of these critical habitat areas exists on MDC watershed land and it is located in Cedar Swamp.

**a) Cedar Swamp**

Cedar Swamp is a state designated Area of Critical Environmental Concern (ACEC). Cedar Swamp has been classified as a southern northeast acidic seepage swamp that contains three Certified Vernal Pools and one plant species designated as Special Concern. Acidic seepage swamps are located at the base of slopes near the margins of wetlands groundwater discharge areas. These swamps occur throughout the state and are richer in both nutrients and species diversity than the more common basin swamps.

The Cedar Swamp is the second largest remaining wetland area in central Massachusetts (the Great Meadows National Wildlife Preserve is the largest). The MDC is a major landowner of Cedar Swamp and has worked with municipal and community conservation groups to produce a Protection Plan for Cedar Swamp. The protection plan provides a thorough documentation of the resources and environmental issues that determine the ecological structure and vitality of Cedar Swamp.

**b) Forest**

The MDC has managed over 900 acres of pine and hardwood forest within the Sudbury Reservoir watershed for nearly ninety years. MDC watershed lands have been largely maintained in forest to provide protection to the water supply. Due to the protection offered by native forest cover, forest management is an integral part of the Division's resource management policy. Approximately fifty percent of the total forested acreage owned by the MDC in the Sudbury Reservoir watershed was planted to red and white pine trees prior to 1950. The remaining areas are primarily natural and second growth forests. Silvicultural practices focus on maintaining a stable and diverse forest cover to protect water resources. Forest cover is greatly affected by natural disturbances such as wind and ice storms and disturbances caused by insect and disease. Specific forest management practices for the Sudbury Reservoir watershed will be outlined in a MDC/DWM Land Management Plan to be developed in the near future by DWM staff.

For purposes of this report, watershed lands have been characterized by the type of vegetative cover that exists in both upland and lowland areas. An inventory of vegetative cover is provided in Appendix B. This inventory depicts four distinct landscape types, which represent basic plant and wildlife communities associated with the corresponding upland and lowland habitats:

1. Forested upland
2. Non-forested upland
3. Forested lowland
4. Non-forested lowland

Inventory data include plant species lists that document vegetative cover throughout the

Sudbury System. Plant species that are common to all MDC Sudbury lands are included in Table 1 of Appendix B, with a detailed listing of species recorded in Cedar Swamp provided in Table 2 of Appendix B.

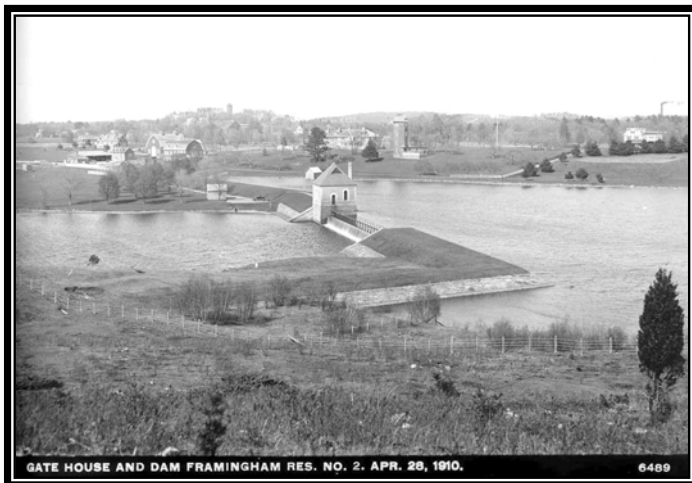
### c) Wildlife

MDC lands in the Sudbury System contain large areas of diverse habitat that support abundant wildlife species. Many wildlife species common to New England, both game and non-game species, thrive in habitats provided by MDC/DWM uplands, wetlands, and waters. The Cedar Swamp area in particular has a great diversity of vegetation, which has created a rich habitat for a number of Rare and Threatened species.

Areas that represent significant wildlife habitat are in Appendix B. The wildlife inventory includes one general listing of species that are common to all areas (Table 3) and provides a more detailed listing of species recorded within Cedar Swamp (Table 4). The inventory of existing plant and wildlife species for Cedar Swamp was taken from the 1990 Cedar Swamp Protection Plan. Common species were documented following observations by Division staff.

## 3. Scenic Landscapes

Scenic landscapes are important to the overall character of our Commonwealth. They are not only visually stimulating, but provide the Commonwealth's citizens healthy, inviting places to live or visit. Regional landscape surveys have played an important role in the preservation of the State's scenic quality since the late nineteenth century. The first statewide landscape



survey was completed in 1933 by the Trustees of Reservations. The Department of Environmental Management conducted a second survey in 1983 to assess the Commonwealth's scenic landscape inventory. This inventory describes six physiographic regions and includes only areas with consistently high visual quality that are larger than one square mile.

The Sudbury watershed system is part of the seaboard lowland region of Massachusetts. The 1983 Massachusetts Landscape Survey (DEM) indicates that much of the MDC North Sudbury basin

is designated as a *Distinctive* and *Noteworthy* scenic landscape. MDC's land management program works to sustain the forests on its lands, which in turn maintains and enhances the visual qualities of the watershed.