dcr
Massachusetts

The newsletter for owners of land protected by a Watershed Preservation Restriction (WPR) held by the Department of Conservation and Recreation (DCR), Division of Water Supply Protection.

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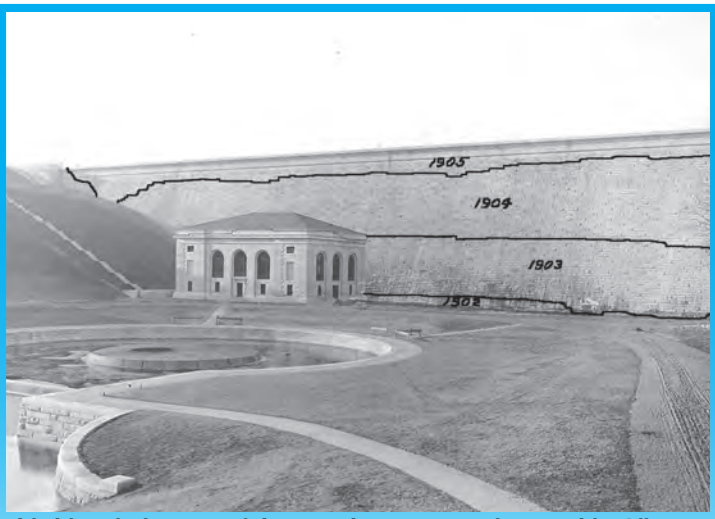
A short history of the DCR/MWRA water supply system

The water supply for 2.5 million Massachusetts residents, mostly in the greater Boston area, is a complex system of reservoirs, infrastructure streams and rivers, protected open space...including your WPR!

Quabbin and Wachusett Reservoirs hold a combined 477 billion gallons of water when filled, and the system, which includes the Ware River watershed, can safely deliver about 300 million gallons per day (mgd) of clean drinking water. In 2012, the demand averaged about 195 mgd – well below what the system could support. While the current system is well suited to provide plentiful, high quality water well into the future, its history is a saga of scarcity and westward expansion.



This historic image of the Wachusett Dam, located in Clinton, MA, shows the annual progress during construction. The dam holds back the flow of the Nashua River to create the Wachusett Reservoir. It was the world's largest reservoir at the time of completion in 1905, adding 65 billion gallons of capacity to the water supply system.

Photo: DCR Files

Early residents of Boston used local wells or rain barrels for their domestic water, but by the late 1700s this wasn't enough to meet the city's needs. In 1795, a private company tapped Jamaica Pond with wooden pipes to carry water to Boston. By the 1840s this system was polluted and insufficient to meet the needs of a growing city.

The city of Boston looked west and dammed a tributary of the Sudbury River to create Lake Cochituate. With a capacity of 2 billion gallons and a safe yield of 10 mgd, Lake Cochituate seemed like a good solution, but it was short lived.

Boston grew rapidly in the mid 1800s, and by 1870 the city's population was over 200,000 and was consuming 17 mgd of fresh water. Boston turned its eye further west; between 1875 and 1898 seven reservoirs were constructed in the upper Sudbury watershed. This new system of reservoirs could safely supply about 75 mgd of domestic water to the Boston metropolis. However, it still wasn't enough.

During the late 1800s indoor plumbing became common in Boston – a fact that city planners had not foreseen. The result, coupled with an estimated 25% "leakage" rate, was once again a shortage of fresh water. An 1895 state Board of Health study identified the need to secure yet another source of water for metropolitan Boston. They narrowed the potential list to the Nashua River, the Merrimack River, and Lake Winnipesaukee.

The Board settled on the Nashua River, where construction of the Wachusett Reservoir began in 1897. The Wachusett, when finished in 1905, was the largest reservoir in the world, with a safe yield capacity of 118 mgd. The capacity of the system increased to 155 mgd.

Demand on the system grew to 131 mgd by 1920. The Board of Health met again in 1922 to recommend diverting the Ware River and creating Quabbin Reservoir. They projected that without the addition of these new resources, demand would exceed supply by

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Meet the Staff

Jonathan Yeo, Director of the Division of Water Supply Protection

Jonathan Yeo has managed water resources in Massachusetts for 26 years, with a particular focus on water supply protection. He began his career with the state as a Water Resources Planner at the state Office of Water Resources, then spent 16 years at the Massachusetts Water Resources Authority (MWRA) working as a planner, project and program manager, and ultimately Communications Director. He has directed DCR's Division of Water Supply Protection since 2005, encompassing both watershed management for the Quabbin-Ware-Wachusett system and the statewide Office of Water Resources, which addresses lakes and ponds issues, flood hazard management, river hydrology and water needs forecasting.

Jonathan has a particular interest in seeing watershed land and water management issues in person; he tries to spend only three days a week in his Boston office. He has worked closely with Jim French, attorneys, and the MWRA over the years to acquire more watershed land for long-term protection. Many of these parcels are new WPRs.

While born in Boston, Jonathan was raised on the shores of Lake Michigan in Wisconsin where he developed a passion for environmental issues. Summer trips to Cape Cod and Lake Winnipesaukee helped as well. Jonathan is a graduate of Wesleyan University (BA in Earth Science) and Harvard University (Masters in Public Policy). He lives in Newton, where he has been an elected member of the Newton School Committee for the past eight years. His wife Gail is a Regional Director at Mass Audubon.

Jonathan shows off his prize find while working in the field. These moose antlers are on display in DCR's West Boylston Field Headquarters.

Photo: DCR Staff

A New Resource Protection Program

Q2W: The Quabbin to Wachusett Mountain Conservation Initiative

Some of you came into the Watershed Preservation Restriction (WPR) circle a few years ago via the Quabbin Corridor Connection Forest Legacy project. A new Forest Legacy application, called Quabbin to Wachusett Mountain, or Q2W, has recently received the nod of approval from the U.S. Forest Service with a $5 million grant. The application was ably prepared by the North Quabbin Regional Landscape Partnership folks, including Mt. Grace Land Conservation Trust, East Quabbin Land Trust, North County Land Trust, and the Nashua River Watershed Association. It is worth noting that the Q2W application ranked second in the nation out of 69 applicants! The pressing need to preserve wide swaths of the remaining rural New England landscape was recognized at the federal level.

A primary goal of this exciting project is the further protection of privately held forested watershed tracts between the Wachusett and Quabbin Reservoirs. This project will have more than 3,000 acres under agreement with several landowners. Most will opt to place a WPR on their land; many have agreed to sell the WPR at a discounted rate in order to help meet the match required by the Forest Service for the grant.

DCR is proud to partner with the participating landowners and Land Trusts. The agency has agreed to hold the interest in many of the properties involved, in addition to providing the funding for much of the appraisal, title, and document preparation work.

Q2W is yet another exemplary private/public collaboration, leveraging federal, state, non-profit, and private funds to yield benefits beyond what each organization could accomplish on their own.

- Jim French

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1930. In reality, it wasn't until 1942 that demand was greater than supply, but by then Quabbin Reservoir had been built.

Thus, the Boston area reached out a fourth time to western Massachusetts in the quest for water. Landing in the Swift River Valley, construction of Quabbin Reservoir began in 1936. Creating this new body of water would prove vastly more complicated than the previous reservoirs.

Because the newly constructed reservoir was so large, it was going to flood most of four towns. In a dramatic move, residents of Enfield, Dana, Prescott, and Greenwich were forced to sell their land and property and find new places to live. Over 2,500 valley residents were displaced. The towns were disincorporated, as 1,100 structures, 31 miles of railroad, and 7,613 grave sites were also removed or relocated.

All of these sacrifices are not forgotten as Quabbin Reservoir commemorates its 75th anniversary. DCR works diligently to manage one of the largest water supply in the world as well as the surrounding lands, which are some of the largest, contiguous forests in southern New England. *- Dan Clark*

The 25 mile Quabbin Aqueduct connects Quabbin and Wachusett Reservoirs via the Ware River. Shown above during construction in 1935, the aqueduct is 11' wide by 13' high, and can deliver up to 600 million gallons per day.

Photo: Quabbin Visitor Center

These three views from the Enfield Lookout show the progression of the Quabbin Reservoir's development. The top photograph, taken in 1927, shows Enfield Village and the surrounding hillsides before the commencement of construction. The middle view is from 1939 when the earthwork was completed, including the removal of all structures and organic plant materials, as well as scraping the topsoil. The bottom view was captured in 1986, long after the completion of the Winsor Dam, located in Belchertown near the Quabbin Visitors Center. The dam stopped the flow of the Swift River which now lays at the bottom of the reservoir.

Photos: Courtesy of Friends of Quabbin

Wildlife on Your Land

The North American Porcupine

At one time or another you have probably seen a porcupine lumbering around your property. Never in a hurry, they hunker down when threatened because their best defense is always with them. Those nasty barbed quills are quite effective at fending off any woodland creature, unwitting person, or overly rambunctious pet.

This large rodent, scientifically known as *Erethizon dorsatum* (Latin for "Quill Pig"), sports a coat of up to 30,000 quills that lay flat, intermixed with their fur. When threatened, this 'defense perimeter' stands up to greet any oncomer with a sharp lesson in minding one's own business. The quills easily pull out from the porcupine, but contrary to myth, the porcupine cannot throw them. However, once inflicted upon the victim, these barbed quills have the natural affinity to work their way deeper into the skin, possibly causing infection and even death if they contact a vital organ.

The name porcupine is of Native American origin, meaning "one who rises up in anger." The porcupine was treated with great reverence. The quills were highly valued and useful; for example, snipping off both ends allows the resulting tube to be thread into decorative (and protective) bead work.

Porcupines live in burrows and inhabit forest and brush lands. They are excellent climbers and by day can be found high in the branches of trees. Another advantage to their hollow quills is they are buoyant, which makes porcupines avid swimmers.

Males are known as Boars and females as Sows, who, I am sure, are glad the Pups or Piglets are born with soft quills that harden within an hour of birth. Adults can grow up to 40 lbs. and live as long as 18 years. A collective group is known as an Array.

Porcupine's diet consists of leaves, grass and ferns, but like many woodland creatures, they crave salt. This craving is why they are known to damage property, often chewing man-made objects, like ax handles, in search of sweat residue or scraping plywood made with adhesives containing salt.

What to do after a porcupine encounter

Porcupine quills have many tiny overlapping barbs making removal difficult. The solution to this very painful situation is to snip the ends off the quills, causing them to deflate much like a balloon. Once deflated, the quills will slip out more easily and somewhat less painfully. Of course, the best bet is to not bother a porcupine in the first place. It is likely that nobody will need more than one such lesson to remember the excruciating results. *- Jim Taylor*

Never in a hurry, the North American Porcupine sleeps in a dug burrow, but spends leisurely days in the trees eating leaves. As we all know, best to leave them alone!

Photo: DCR Staff

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