Boston

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State engineers ensured that Boston would never run out of water in one breathtaking stroke in 1937 when they flooded an entire river valley to create the Quabbin Reservoir, driving 2,500 people from their homes in the process. Since then, even during long droughts, the 2.5 million customers of the Massachusetts Water Resources Authority have faced few water restrictions because, even without rain, the reservoir holds enough water for two years.

Yet, despite the abundance and purity of the Quabbin's water, eastern Massachusetts still faces serious water issues, virtually all of them related to transporting water the 65 miles from the rural Quabbin to the 41 cities and towns served by the MWRA. For instance: gulls defecate in uncovered storage areas; the main aqueduct has no backup that would allow it to be closed for repairs; ancient water mains leak millions of gallons into the ground; and many household pipes still contain toxic lead.

In response, the MWRA has undertaken a $1.7 billion water system modernization that for the first time will subject the Quabbin's water to centralized treatment, while also replacing old pipes and protecting reservoirs from contamination. Contractors already have begun building a 17.6-mile-long underground transport tunnel that will finally allow the MWRA to repair dozens of leaks in its main aqueduct.

By some measures, the modernization is already bearing fruit, as pipe repair and replacement helped drop total water use in the region by about 15 percent since 1987. Likewise, new corrosion controls have cut lead levels in tap water by as much as 30 percent since 1996, though many households with old lead pipes still have dangerously elevated readings.

However, the US Environmental Protection Agency believes that the MWRA relies too much on good fortune, shocks of chlorine, and the water's initial cleanliness to prevent outbreaks of giardiasis and other waterborne diseases. The EPA has sued the MWRA to force the agency to add a $180 million filtration system to the $261 million ozone treatment plant the agency plans to open in 2004.

EPA officials argue that, without a fine filter system to physically remove microbes from the water, MWRA water is vulnerable to contamination, especially at the Wachusett Reservoir that stores much of the Quabbin water as it heads east. The MWRA has had a long-running battle with thousands of gulls that like to roost for the night in the Wachusett. The case, which hinges on the fine print of the Safe Drinking Water Act, has been a legal quagmire.

Still, water-poor communities in eastern Massachusetts would gladly trade problems with the MWRA. Brockton, a city of 90,000, is so short on water that it has considered building a costly desalinization plant to make sea water potable. And limits on outdoor water use are a ubiquitous part of summer for many communities north and south of Boston. Not surprisingly, some of these towns petition to join the MWRA practically every year.