

**IN DEFENSE OF TREES ON EARTHEN DAMS
PARTICULARLY AT THE ARLINGTON RESERVOIR
Call for Further Research in View of Treed Dams
Holding up Through the Last 100 years of Storms!**



**Erosion on Boston Hill, Robbins Farm Park, Arlington
after October 1998 50 year Storm — None at Forested
Menotomy Rocks Park with Equal Slope Nearby**

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OUTFLOW OF THE RES AND THE EARTHEN DAM

Trees Buttress and hold together Earthen Dams; Arlington Reservoir Dam & many others have held 100 years.

It is proposed to cut all the trees down and remove their roots from all the earthen dams across the State of Massachusetts. The engineers take the view, contrary to everyone's understanding of the utility of trees to prevent erosion in hilly terrain, that trees undermine the stability and safety of earthen dams. Their claim is that the tree roots "wick" the pond water through the earthen dam to eventually create a breach. They also claim that if a tree dies or is blown down by the wind, that this process is accelerated.

Removing trees and their roots from every dam in Massachusetts is a very expensive proposition! Obviously if safety is at stake, it should be undertaken. I propose to show that the engineer's proposed project is unwarranted, mostly by pointing to treed earthen dams that have not been breached by a hundred years of storms. My particular interest is the Arlington Reservoir (known as the "Res"), a twenty eight acre pond at the Arlington / Lexington line, where presently the Arlington DPW is about to let out a contract to remove all the trees from the dam, \$482,000 capital outlay having been set aside for the project.

The Res earthen dam is massive. It averages 20 feet across at the top, 15 feet to the swamp side, 13 feet to the pond, and 14 feet high measured from the swamp side (the latter measurement according to the engineer's report). It is my understanding the State engineers are also mandating the removal of trees on the dam that creates the upper Mystic Lake in Arlington / Medford, which is half again more massive than the Res Dam. Does not the size of the earthen dam make a difference? I understand that the engineers have decided to let the trees stand at the Res where the earthen embankment is over a hundred feet wide.

But even much smaller treed earthen dams have withstood the test of time. At Borderland State Park* in the town of North Easton, Leach Pond, a 200 acre shallow pond, is formed by a 300 yard earthen dam less than half the size of the Arlington Res dam, 8 feet across at the top, about 8 feet to the swamp, only 2 feet to the pond (the pond is higher on the dam), and that earthen dam has been there since General Leach dammed the pond for his iron works back in Colonial times! It is treed along its entire length with swamp maples interspersed with birch, oak and pine trees, with high bush blueberry bushes and swamp azalea growing along both sides. That dam withstood the 1938 Hurricane (which had flooding rains, and blew down perhaps a quarter of the maple and oak trees along its length), the twin hurricanes in 1956, more recently Hurricane Bob and some very heavy rain storms, as have the dams at the Res and the Mystic.

At Borderland Park there is another longer earthen dam connecting various islands to form Upper Leach Pond. That dam when still new and hence treeless, was breached twice in the 1940s by spring rains. Clay was added to the mix of fill to make the dam, and it has held fine since then — 60 years — now treed all along its length with birch and aspen. That dam measures 12 feet on the top, 8 feet to the swamp side, 2 feet to the pond (again the pond comes up much higher on the dam than at the Res), and is about five feet high on the swamp side.

The State did recommend removal of trees on these dams about 20 years ago. The Advisory Council and the Friends of Borderland strenuously objected, citing

the beauty and also the utility of the trees along the dams. The State relented, partly because of the low height of the pond water versus the lower land, and partly because of the extensive swamps into which the pond could flood without harm.

A nearby pond in North Easton known as Fly-a-Way Pond washed out in a 1968 6 inch rainstorm causing considerable damage in the Town (cars overturned, trees uprooted, etc., but no loss of life); there the outlet was insufficient to contain the force of the water, and it washed out. Do not most dam failures happen because of inadequate outflows, not the main dike? For instance, it is my understanding that the treed dike at Horne Pond in Woburn held well even though the water was flowing over the top several springs ago.

At the Arlington Res the trees — maples and birches and oaks — form a beautiful canopy along the dam that would be destroyed — see photographs. But more important, it would remove a buttress to the dam, all the intertwining tree roots that hold the soil and prevent erosion. Perhaps they do wick water along their roots, but surely the holding of the soil and prevention of erosion is the same on an earthen dam slope as it is on a New Hampshire hill! It is my understanding the engineers purport to replace the trees and bushes with turf. Turf is not so easy to grow — what happens in the interim? And after the trees are removed, no great roots to hold.

OK, what if a hurricane blows a tree down? A fair sized oak blew down at the Res in a recent storm, the roots not holding in the swamp. Note from the photograph that the rootball is mostly only a foot deep or less, and that the whole incident is incidental to the stability and integrity of the dam. If a tree dies, greater wicking happens, but in comparison with the size of the dam, again one tree or even several is insignificant. Few trees die, as they are so well supplied with water at that location. Note that at the Res, there are a number of good-sized oak trees growing on hillocks just outside the earthen dam itself which should not be cut down under any theory of tree removal.

Do dam engineers follow Dutch or Western dike tradition too closely? Lets have a new look before spending millions of dollars destroying the beauty and utility of the trees along the dams here in Massachusetts! Questions to be answered by new research: Why have treed dams survived, particularly where trees have blown down? How does dam size figure regards safety? What about other factors involved in treed dam failure such as outflow inadequacy, insufficient clay in the fill? What about the period of time between tree removal and establishment of new cover regards erosion danger?

Recommendation: put a hold on cutting and removing the Res Dam trees until further research is completed. The fact that the Res dam has withstood the tests of several hurricanes, two flooding rainstorms in the last 10 years, and more than one hundred years in safety, and in fact holding back flood waters from the Town, these factors mandate postponing the capital outlay for said tree removal!

*Borderland was once my Grandparents' place — am member of Park "Friends" and Advisory Council.

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FALLEN TREE; MATURE OAKS 15 FEET FROM DAM



OUTFLOW AND EARTHEN DAM SHORE AT LEACH POND



LEACH POND DAM SHOWING ROOTS & SWAMP SLOPE



UPPER LEACH POND OUTFLOW AND EARTHEN DAM