



Watershed Protection in Developed & Undeveloped Areas

John McNabb

Cohasset, Mass. Water Commission

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johnmcnabb@comcast.net

www.cohassetwater.org

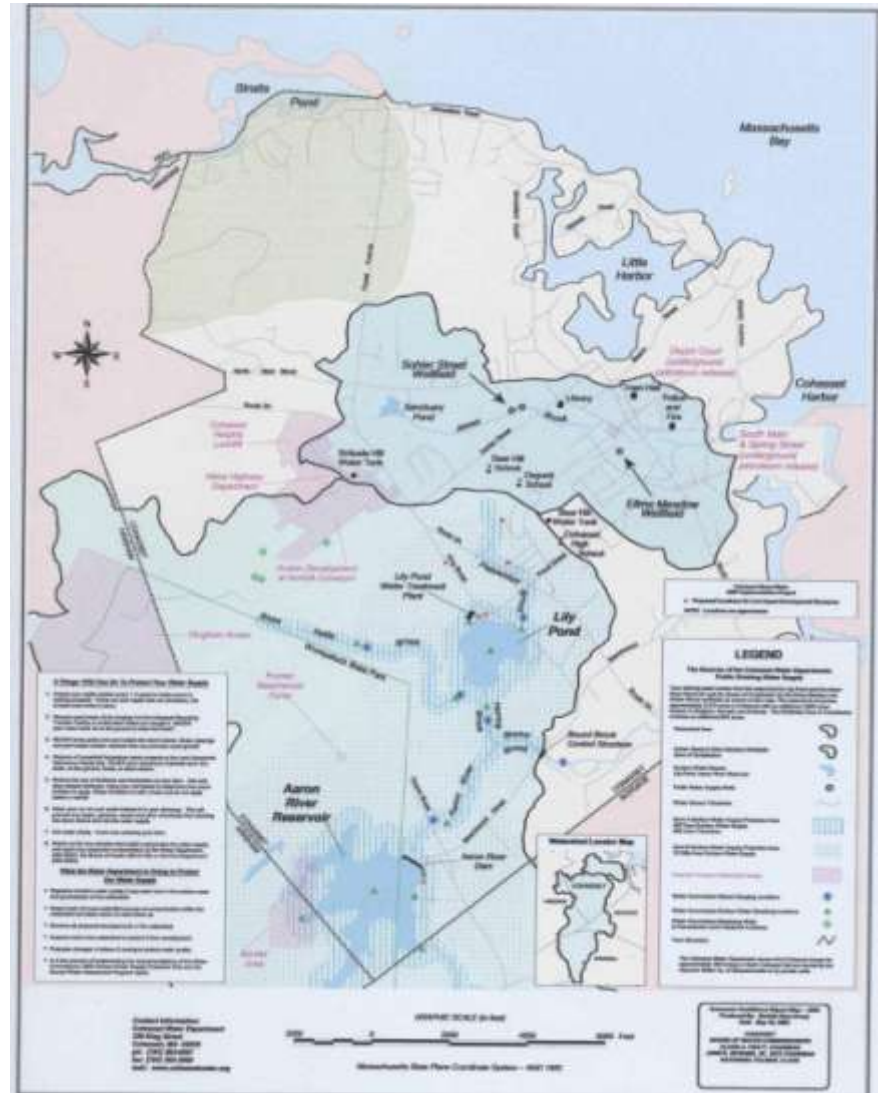
Cohasset Water Dept.

- Small town of 7,200 on South Shore of Boston
- Serves about 90% of Cohasset; Aquarion 10%
- About 2,500 service connections, 38 miles of water mains, 750 valves, 400 hydrants
- 2 storage tanks; the 2 MG Bear Hill Tank built 1965, 1.8 MG Scituate Hill Tank built 2001
- I am an elected Water Commissioner, since 1997



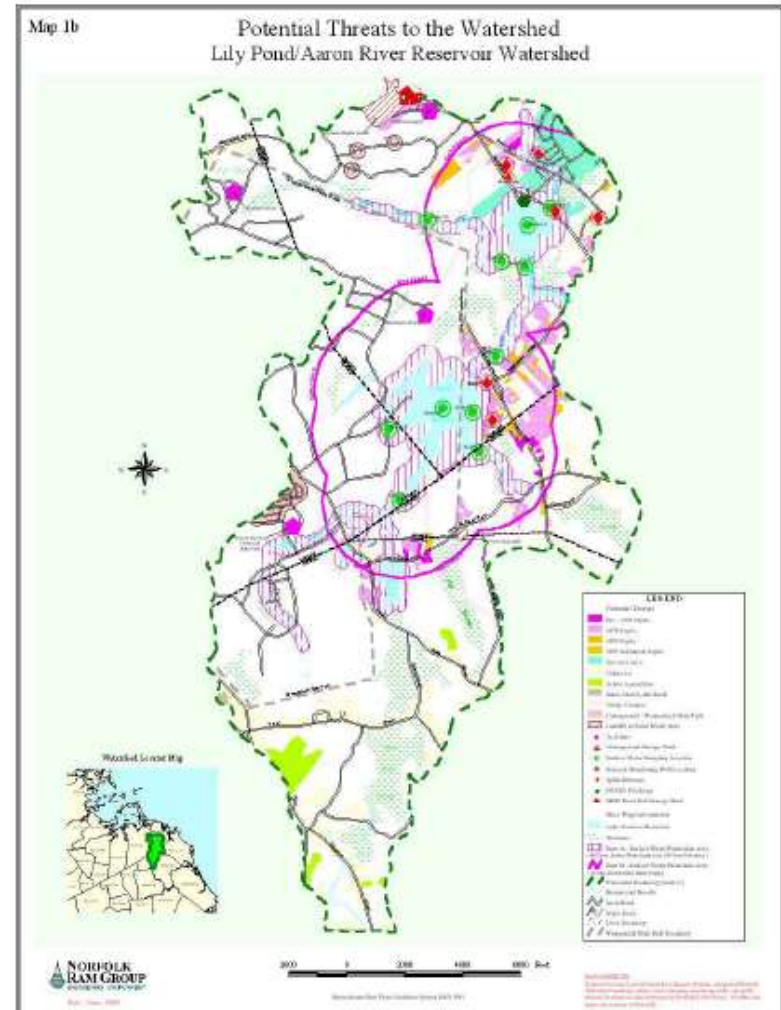
Water Source Areas

- Lily Pond and Reservoir have a combined “Zone C” watershed area of about 9 square miles
- Ellms Meadow Wellfield has a Zone III area of about ____ sq. miles.
- Both included in town Water Resource District
- Only 38% of the Zone C is within Cohasset



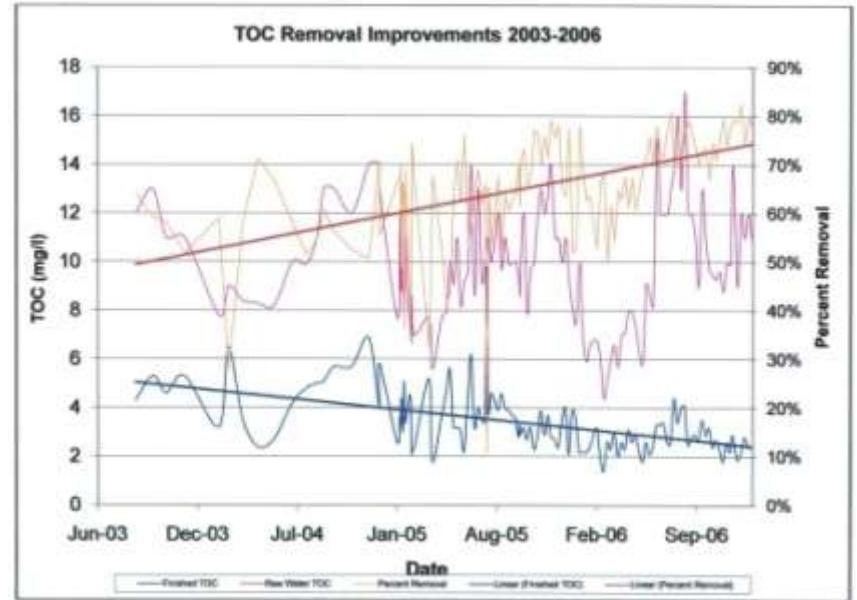
Source Protection History

- 1986 town board on watershed protection
- 1986 Water Resource District Zoning Bylaw & Haz. Materials Bylaw
- 1998 CHL Study
- 2002 Surface Water Supply Protection Plan
- 2003 ENSR Limnology Report



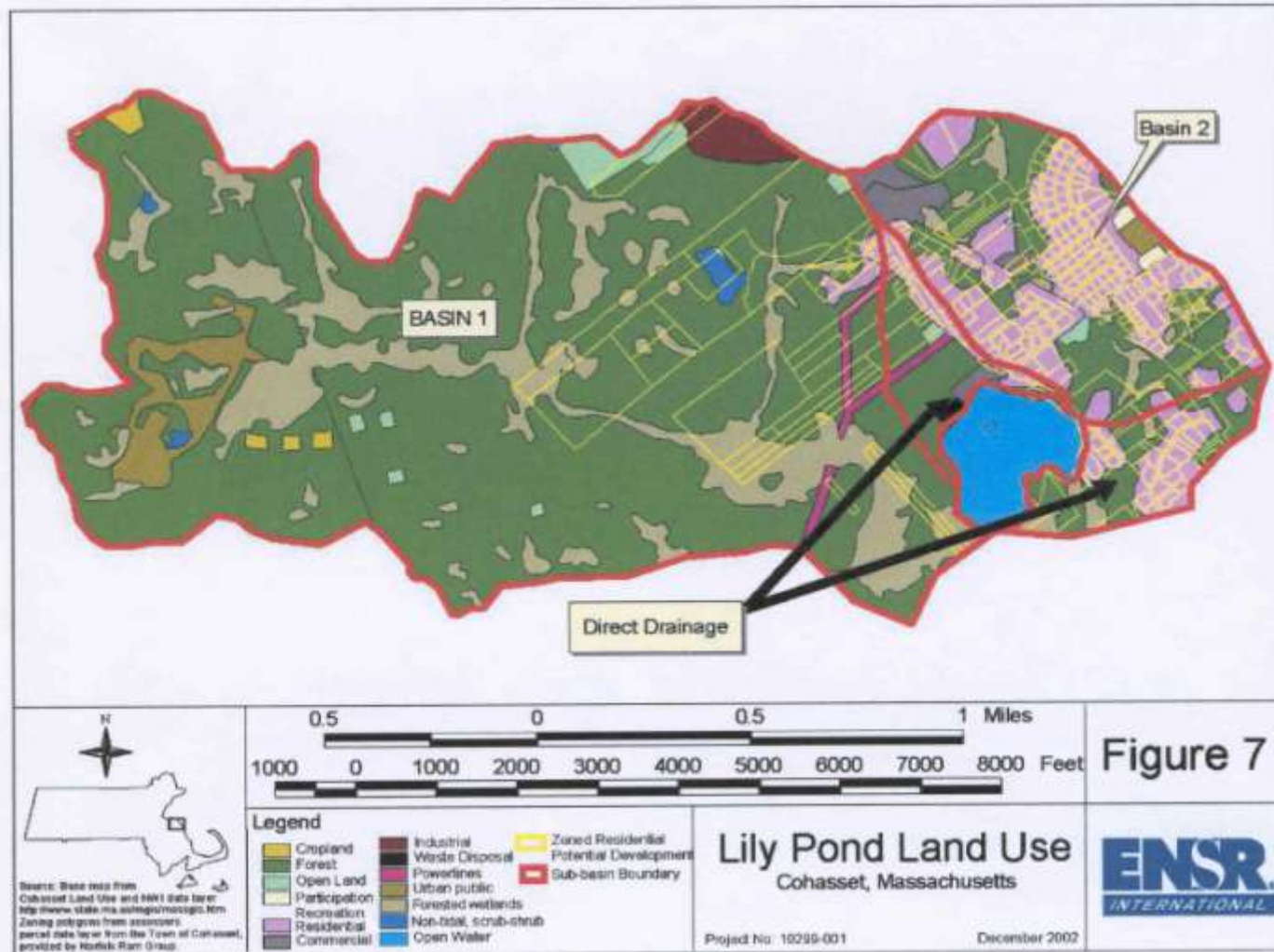
DBPs – our TTHM Problem

- In Q4 of 2004 and Q1 of 2005 we exceeded the TTHM standard of 80ppm, with 100 ppm.
- This is a **Public Health** issue, since TTHM is a potential carcinogen.
- The immediate remedy was to optimize plant operations, replace filter media, and run the plant 24 hours a day for a year. We came into compliance Q2 of 2005 and have been since.
- However, since the source of the problem was high TOC in the source water, we also looked for a way to reduce TOC and nutrients in Lily Pond.
- We also have a recurring Taste & Odor issue, from organic content in the source water.



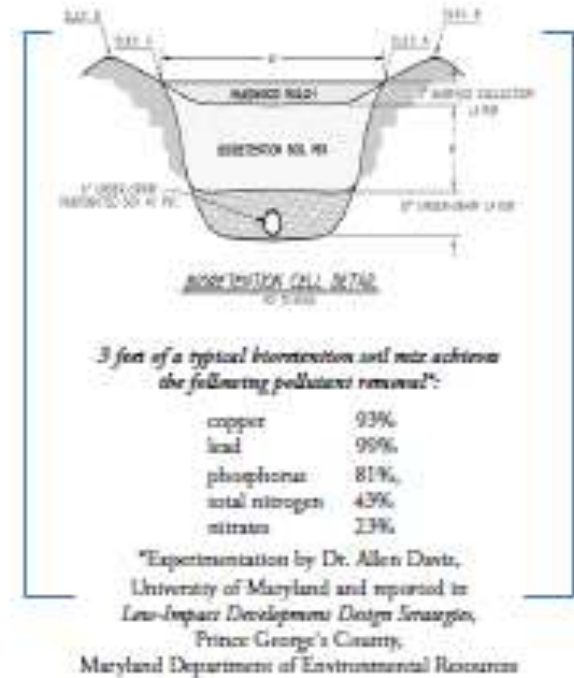
- Total Organic Carbon levels in Lily Pond are high – 12 to 13 ppm, but we can consistently remove 58% or more to meet TOC removal requirements, and have been improving TOC removal.

The Two Basins of Lily Pond: developed & undeveloped



Raingardens

- Why Raingardens? (Also called a “bio-retention cell”)
- A raingarden is a passive method to clean stormwater with soil and plants before entering stormwater drainage system and then the Pond
- The ENSR report found that the Peppermint Brook watershed contributes a disproportionate amount of the excess nutrients entering Lily Pond
- Raingardens were estimated to be able to reduce Nitrogen by 50% and Phosphorus by 80%
- Raingarden Project is funded by \$255,000 c. 319 grant and \$459,000 Clean Water SRF low interest loans
- Total project cost: \$425,000; with \$255,000 from EPA and \$170,000 from the Cohasset Water Department



Raingardens

- Installation began 2004 and is concluding 2009
- Total: 32 raingardens, 2 drainage swales, one oil-gas separator
- Maintenance is a challenge; can't leave it to the underfunded Town DPW. We contract with a local landscaper for maintenance
- Some residents requested one, a few declined, some original locations couldn't be used because of tree roots, gas lines, etc.



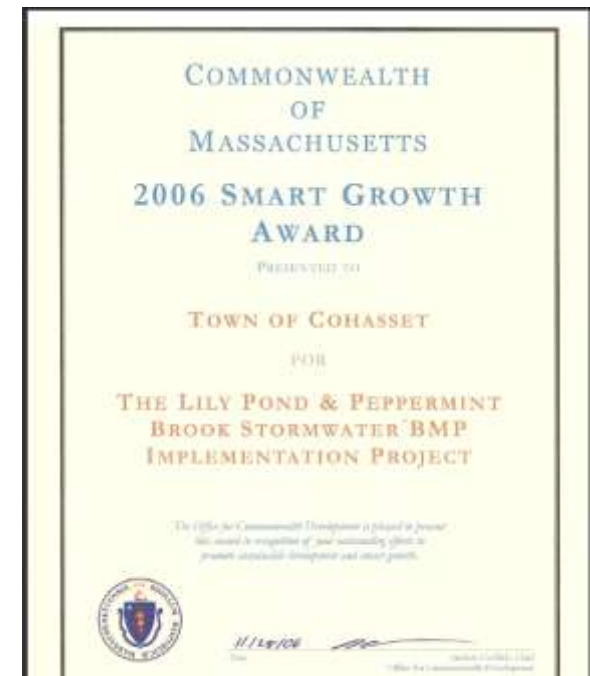
Raingardens

- *Preliminary testing shows great results!*
- Nitrogen reduced by 31% (5.1 to 3.1 ppm)
- Phosphorus reduced by 58% (0.4 to 0.17 ppm)
- Total Petroleum Hydrocarbons (TPH) reduced by 85% (from 1,403 to 207 ppb)



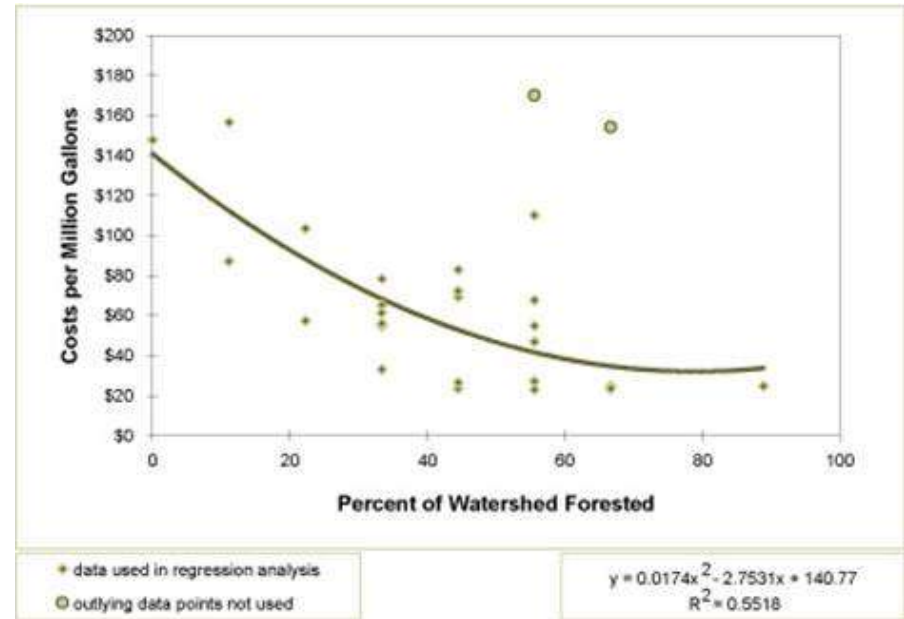
Raingardens

- Raingardens are very popular; “bioretention cells” are not
- The Town is following our example and is building dozens of raingardens in other areas of town to clean stormwater
- Our raingarden program has won recognition from the state and EPA
- Won the Mass. 2006 Smart Growth Award and the national 2008 PISCES Award



Land Acquisition

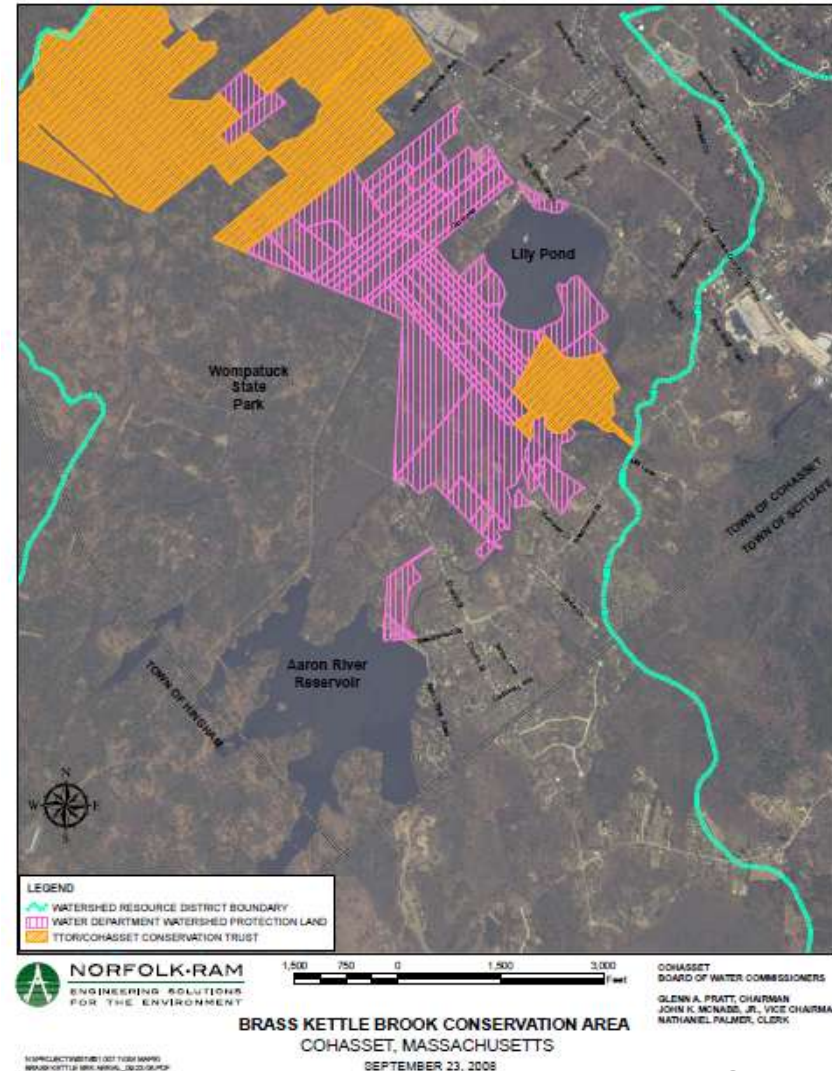
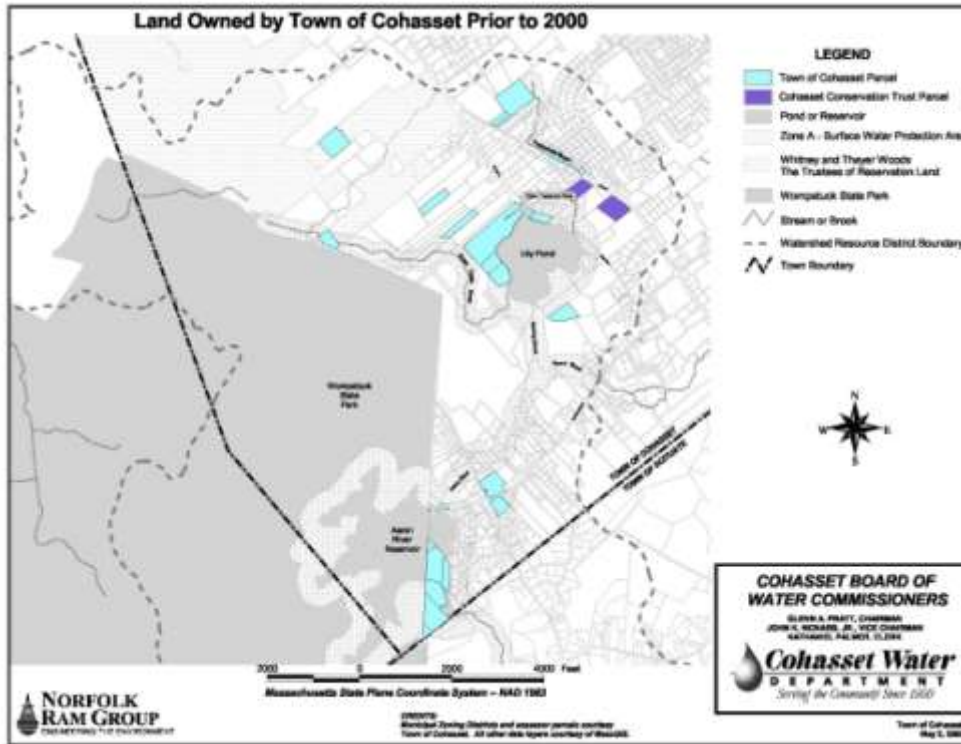
- Why acquire land?
- Acquisition of watershed land to prevent development is a proven means to protect future drinking water quality.
- Study by the Trust for Public Land found a strong correlation between % of watershed that was forested and reduction in treatment plant costs.
- So, acquiring watershed land won't decrease our existing costs, at least not right away, but will help reduce future costs.



Land Acquisition

Year	Acres Purchased	Eminent Domain	Total	EEA Grants & Other \$\$	Cost
2004	23.5	0	53.5 acres		\$1,345,300
2005	53.37	0	23	\$434,000	\$1,356,750
2006	8.00	12.5	32	\$120,000	\$190,000
2007	23.11	57.39	30	\$366,850	\$450,000
2008	5.6	7	12.6		\$296,250
Total	115.38	76.89	192.27	\$920,850	\$3,539,150

Land Acquisition – Before & After



Conservation Restriction

- Final step: conservation restriction
- Town Meeting vote in 2008
- Bill filed at State House
- Get bill passed in 2009-2010 legislative session
- Then formally adopt the restriction

