

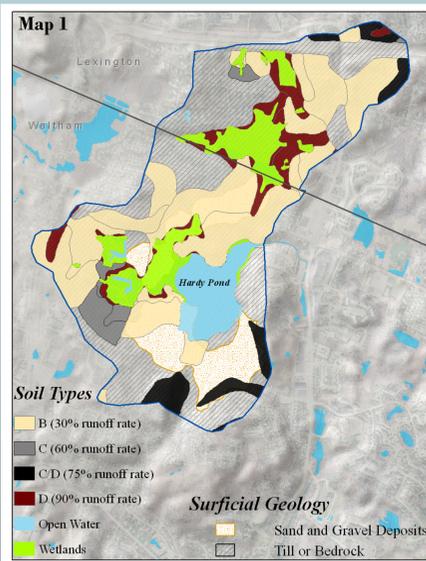
Watershed Management Plan for the Hardy Pond Watershed in Waltham & Lexington, MA

I. Assessment of Present Conditions

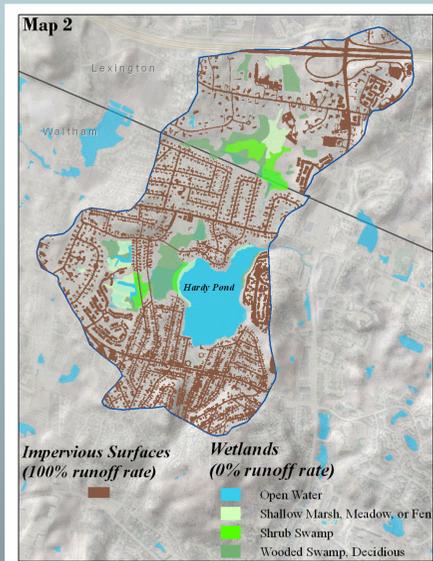
A. Hydrologic Budget by Soil Types

Ground Permeability in Natural Conditions

Ground Permeability After Development

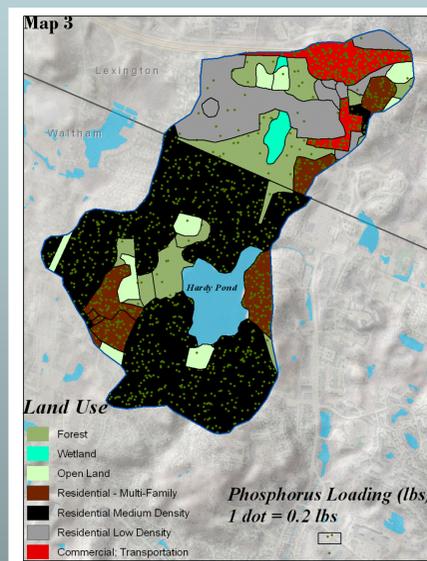


Result:
Runoff rate is 62%
of available precipitation.

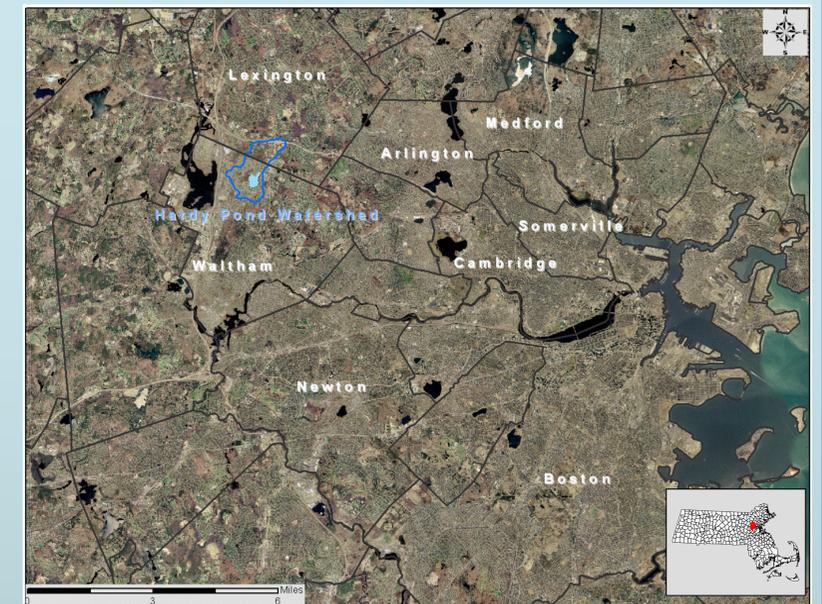


Result:
Runoff rate is 71%
of available precipitation,
an increase from natural conditions
because currently 30% of the
watershed is impervious.

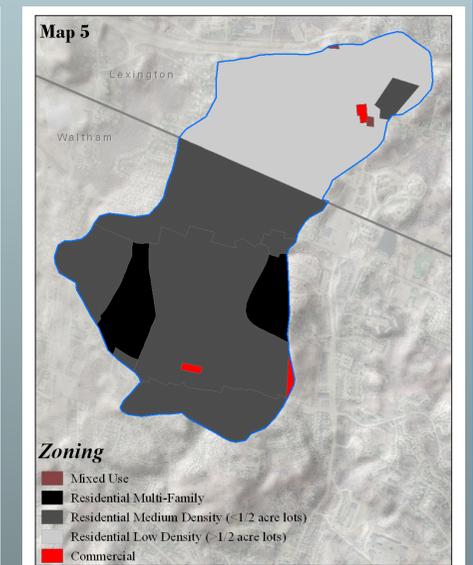
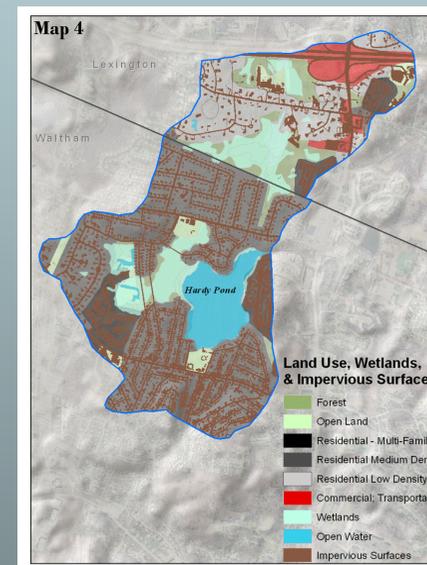
B. Phosphorus Loading by Land Use Type



Result:
Current phosphorus loading is
287 lbs/year,
2.5 times lake's assimilation
capacity of 116 lbs/year.



II. Assessment of Future Conditions: Build-Out Analysis



Result:
Map 4 shows the Hardy Pond watershed, environmentally constrained land (open water and wetlands), and developed lands (using impervious surface as a proxy). Map 5 shows current zoning allowed for the area within watershed. Visual inspection shows that the watershed is built out already, with current residential areas zoned for residential use and no available land left to build on.

Hardy Pond has a rich cultural history and is the largest natural lake in Waltham, MA. Hardy Pond's area is 42 acres and its watershed's area is 645 acres. While naturally oligotrophic, it is currently in the state of *cultural eutrophication* caused by increased *phosphorus loading* as a result of human land use activity such as lawn fertilizers, leaking sewage and storm water pipes, the use of the detergents when washing cars, and more. Eutrophication is a process of excessive growth of plants, decreased amount of oxygen, and subsequent death of most of the life in the pond. Accelerated filling in of the lake as well as noxious smells accompany those changes as well.

The purpose of this watershed management plan was to assess the current condition of Hardy Pond, to predict its condition at the full build-out, and to make recommendation for rehabilitation of the lake based on this information.

Recommendations

The analysis from above had shown that while no more growth is likely to happen in the Hardy Pond watershed, nevertheless the phosphorus loading to the lake is currently still 2.5 times the level that could be safely assimilated by the lake. Therefore, the following recommendations were made to improve the situation:

- ♦ **Building Relationships.** Building a stronger relationship with the City of Waltham, the Hardy Pond Association, and other stakeholder to work together on solving the problem.
- ♦ **Science.** Hiring consultants and involving the neighbors in collecting scientific data about the lake's health with a goal of establishing data baseline. Continuing to monitor lake's condition and improvement over time.
- ♦ **The Plan.** Creating a long-term recovery plan based on the input of residents and other stakeholders and the best scientific evidence available.
- ♦ **Public Education.** Promoting and sustaining public education is the key to curbing non-point source pollution. Public education needs to be multi-faceted, reaching out to all ages, languages, and income levels. It should also be continuous and should utilize different mediums to reach different groups.

Cartographer: Luba Zhaurova

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Introduction to GIS for Urban and Environmental Analysis
Tufts University Department of Urban and Environmental Policy and Planning
Maps Projection: NAD 1983 State Plane, Massachusetts Mainland FIPS 2001 Feet
Data Source: MassGIS, accessed November-December, 2007, and the City of Waltham, 2007