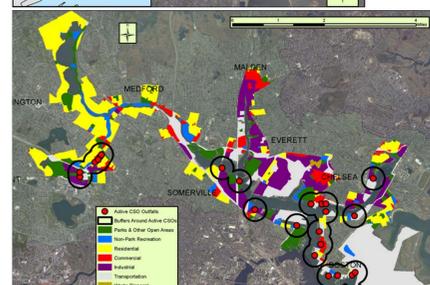
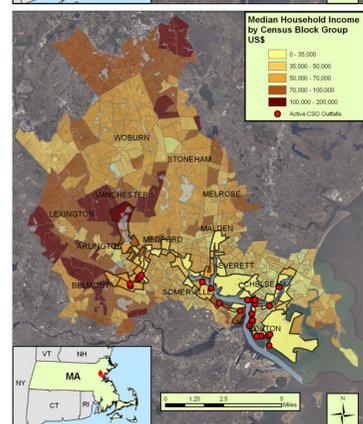
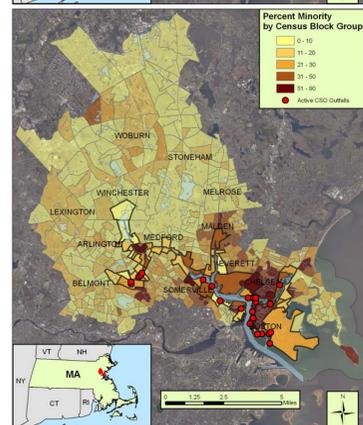
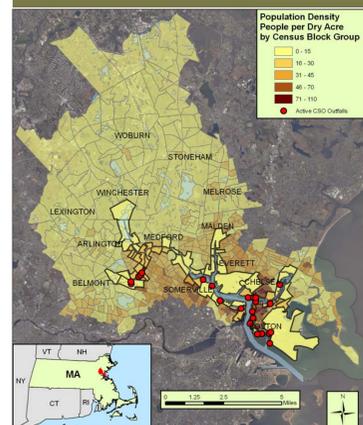


Combined Sewer Overflows in the Mystic River Watershed

An Environmental Equity Analysis

Demographics of the Mystic River Watershed



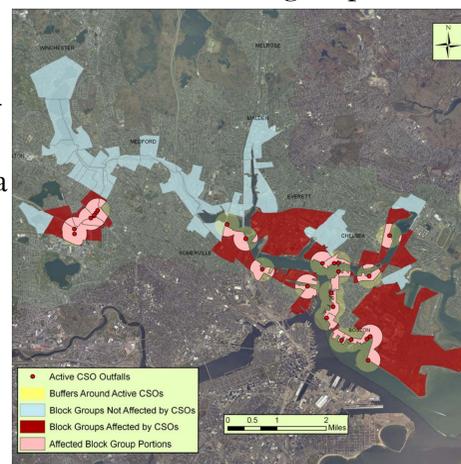
Research Question

Combined sewer overflows (CSOs) are the discharges from combined sewer systems, which during heavy precipitation events discharge wastewater (containing untreated human waste, industrial waste, and toxic materials) directly to surface waters such as rivers, lakes and coastal areas. There are numerous CSOs in the Mystic River Watershed of Eastern Massachusetts. This project attempts to assess the equity of distribution of these CSOs across demographic patterns in the watershed by Census block group.

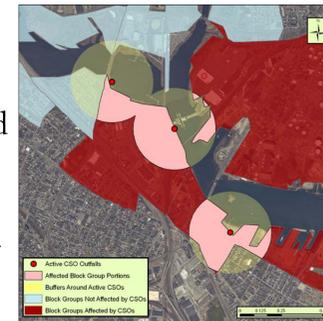


Methods

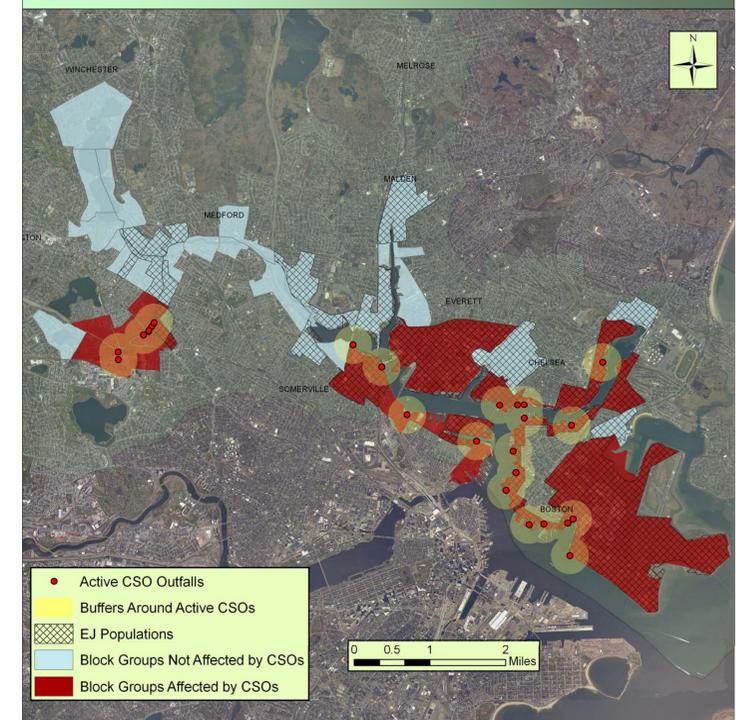
A study area was identified of block groups abutting the river that could host a CSO outfall. After locating CSOs, I set a buffer zone of 0.25 miles (based on known impact zones) surrounding each outfall. These buffers were overlaid on census block groups in order to identify affected downstream block groups. Affected areas were identified at both the gross block group level as well as using an areal interpolation



method (here using areal weighting) whereby selected block groups were separated into sub components of affected and non-affected areas based on buffer zone overlay. Population and demographic characteristics were then allocated proportionally and the demographic variables extracted for analysis. Demographic comparisons between affected and non-affected areas were conducted for both methods.



CSO Distribution Across Block Groups in Watershed Study Area



Findings

While further analysis is needed, preliminary findings indicate the following:

- Areas affected by CSOs are found to host 7-10% higher minority populations than unaffected areas
- CSO-affected areas have median household incomes nearly \$16,000 lower than unaffected areas
- CSO-affected areas have 8% more of their population below the poverty level than do unaffected areas (18-20% vs. 10-12%)

Table 1. Demographic Comparisons	Watershed Wide	Whole Block Group Method		Area Weighted Method	
		Affected Block Groups	Unaffected Block Groups	Area Inside Buffers	All Other Area
Total Population	585,487	23,994	33,240	12,643	11,351
Total Households	235,287	10,570	14,367	5,588	19,349
Total Non-English Speaking Households	63,490	3,095	4,153	1,694	5,553
Percent Non-English Speaking Households	27	29	29	30	29
Total Number of Minority (Non-white) Population	129,394	8,050	8,864	4,669	12,246
Percent Minority (Non-white) Population	22	34	27	37	27
Total Number of People without US Citizenship	75,907	3,422	5,001	2,045	6,378
Percent of Population without US Citizenship	13	14	15	16	14
Average Median Household Income by Block Group (1999 \$)	56,496	40,142	55,998	NA	NA
Total Population Below Poverty Level	54,496	4,361	3,366	2,557	5,170
Percent Population Below Poverty Level*	9	18	10	20	12

*Percent Population Below Poverty Level was calculated by normalizing the Total Population Below Poverty Level by the Total Population for Whom Poverty Status is Determined

While there are methodological limitations to this study, this initial assessment suggests that CSOs disproportionately impact lower-income and minority populations within the Mystic River Watershed.

Joshua Berkowitz
Department of Urban and
Environmental Policy and Planning
December 2007
Data Sources: MassGIS; MWRA;
USGS NHD

