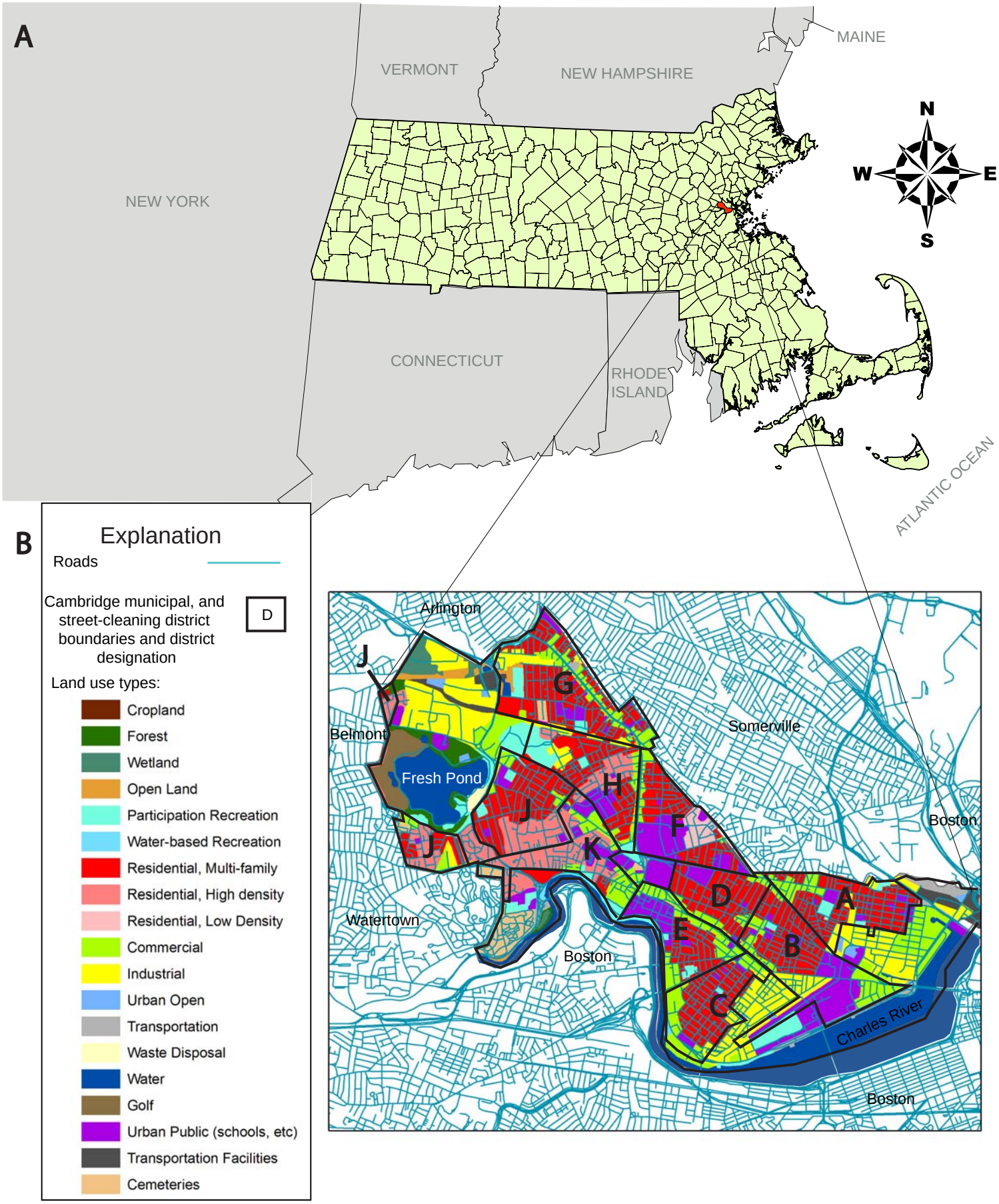

Figure 1. A. Location map of the City of Cambridge, Massachusetts, and B. its land-use distribution and municipal street-cleaning districts

Figure 2. Aerial photo with detail showing the boundary between municipal street-cleaning districts D and E, approximate location of multifamily residential and commercial study street sections, and location of the predominantly commercial land-use subcatchment used in the SLAMM model, Cambridge, Massachusetts.

Figure 3. Photo of curb-to-curb street-dirt composite sampling equipment and municipal police detail to ensure personnel safety, Cambridge, Massachusetts.

Figure 4. Photos of (**A)** two cleaned vacuumed paths typical of street-dirt composite sampling, and examples of the curb-and-gutter drainage system, a rough street-surface and a poor street condition, (photo courtesy of Tom Maguire, MassDEP), and (**B)** a smooth street-surface with good street condition, curb-and-gutter drainage system, and an example of unusual street-dirt loading avoided during sampling, Cambridge, Massachusetts

Figure 5. Photo of a street-dirt composite sample contained within a 0.1 micron paper filter bag being extracted from the vacuum, folded, and placed into a labeled clear plastic zip-lock bag, Cambridge, Massachusetts (photo courtesy of Tom Maguire, MassDEP).

Figure 6. Photo of a a TYMCO Dustless Sweeping Technology-6 (DST-6) regenerative-air street cleaner in Cambridge, Massachusetts (photo courtesy of Tom Maguire, MassDEP).

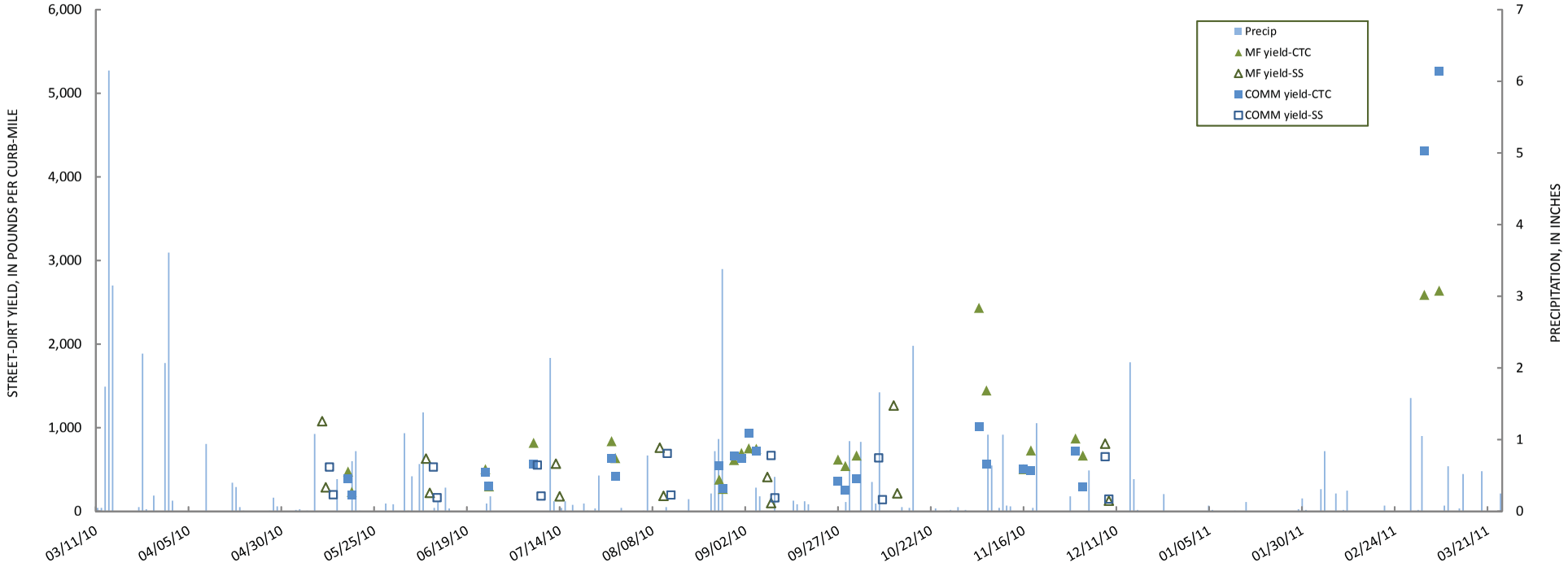

Figure 7. Daily precipitation and average street-dirt sample yields observed within multifamily/high-density residential (MF) and commercial (COMM) land-use types during periods of dry weather and bracketed precipitation events (curb-to-curb, CTC), and estimated yields during removal-efficiency experiments (single side, SS) between May 2010 and March 2011. Precipitation data courtesy ofthe Cambridge Department of Public Works.

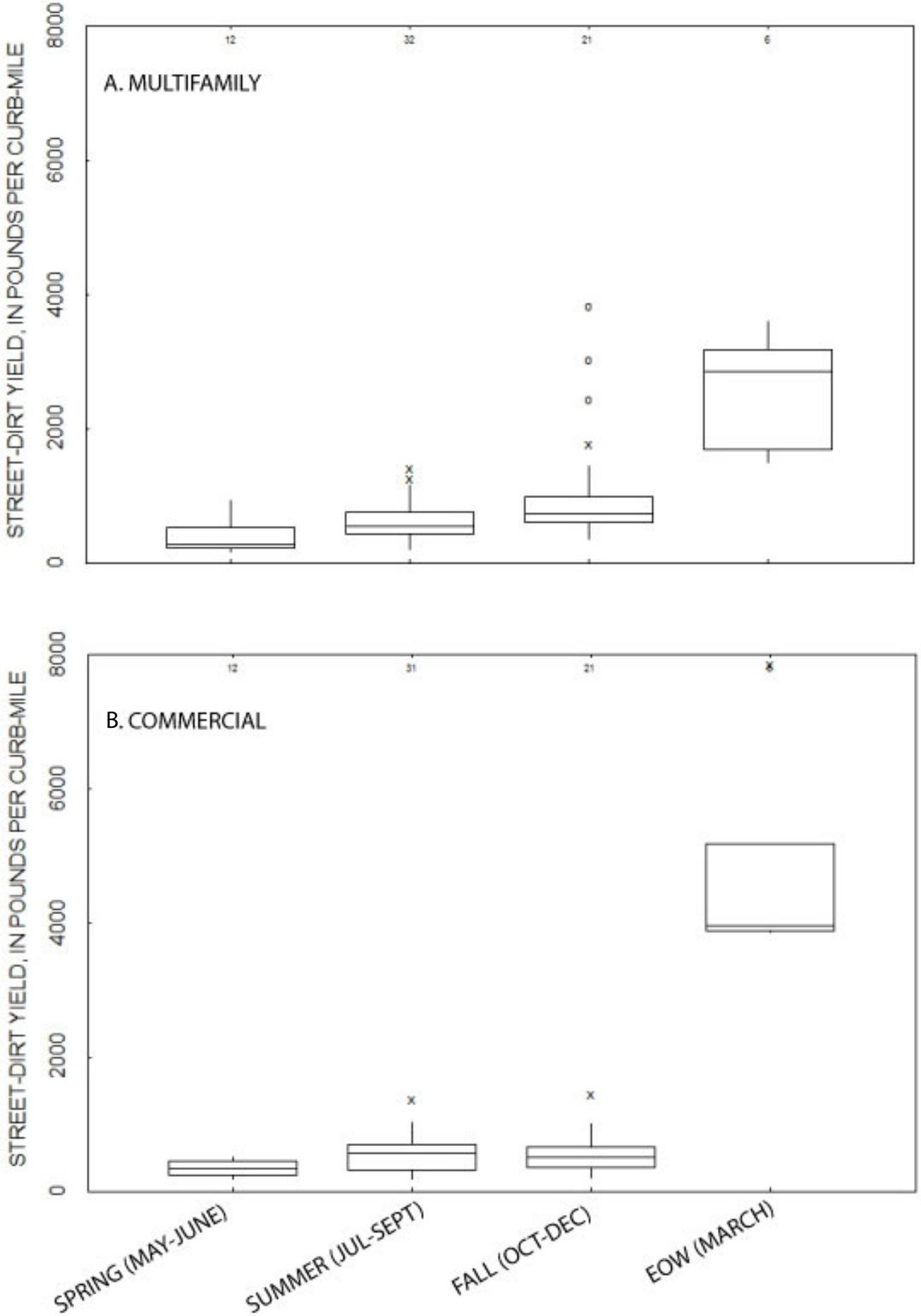

Figure 8. Seasonal and end-of-winter street-dirt yields, in pounds per curb-mile from streets in predominantly A. multifamily residential, and B. commercial land-use types, Cambridge, Massachusetts

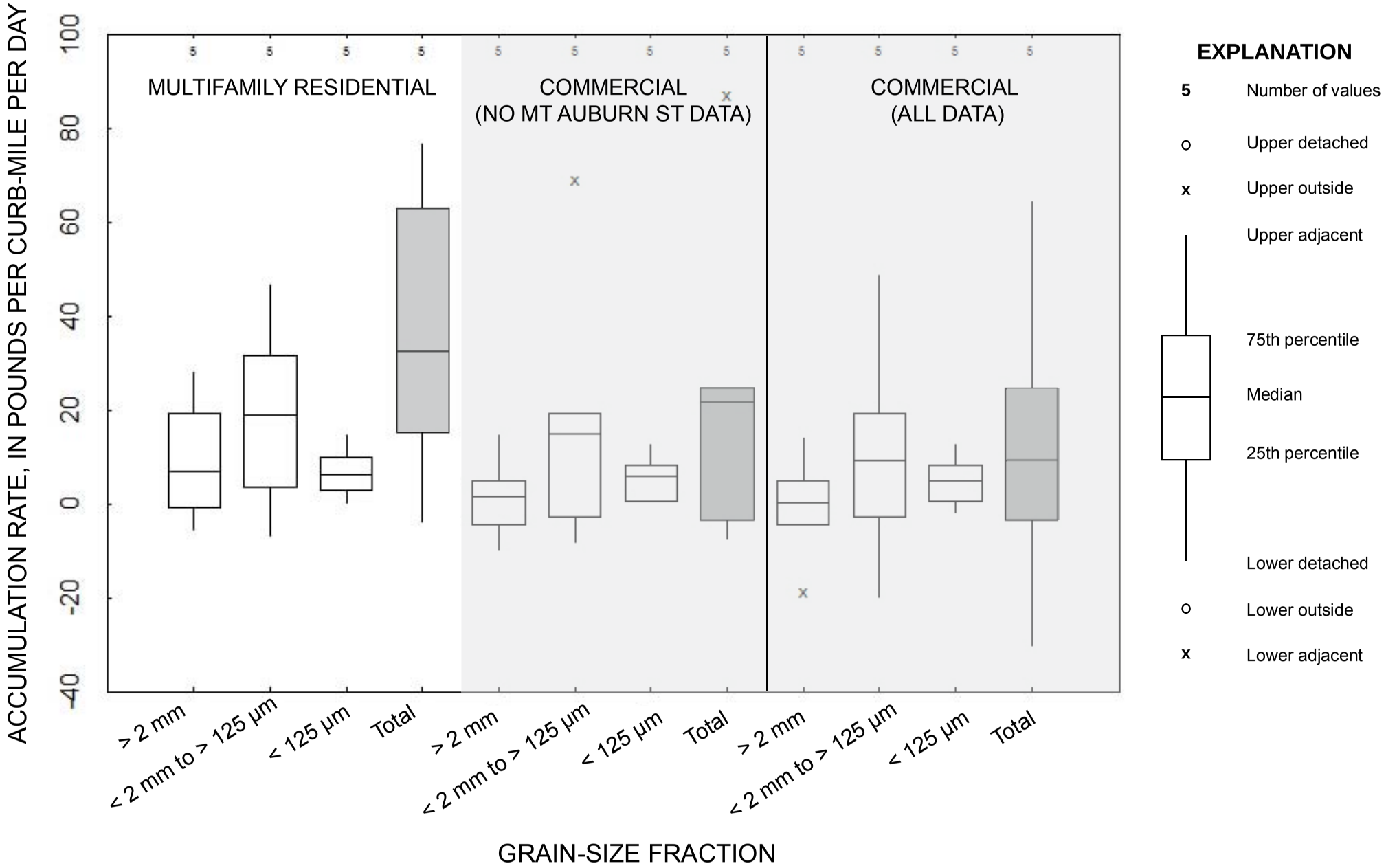

Figure 9. Boxplots of accumulation rates by grain-size fraction and total yield, in pounds per curb-mile per day from streets in predominantly multifamily residential and commercial land-use types, Cambridge, Massachusetts

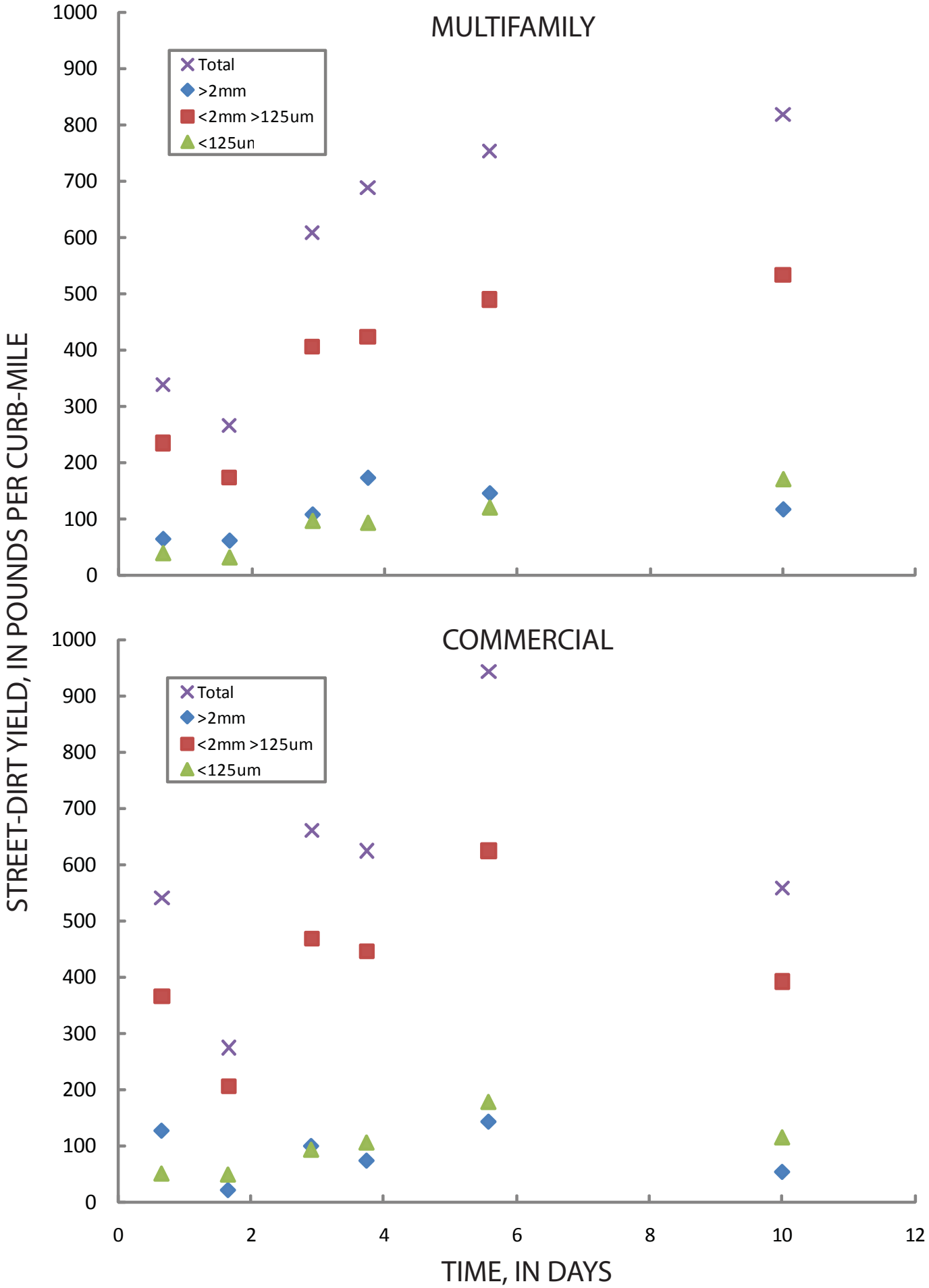

Figure 10. Average total street-dirt yield and yield separated by grain-size fraction, in pounds per curb-mile as a function of time in days from streets in predominantly multifamily residential and commercial land-use types, Cambridge, Massachusetts.

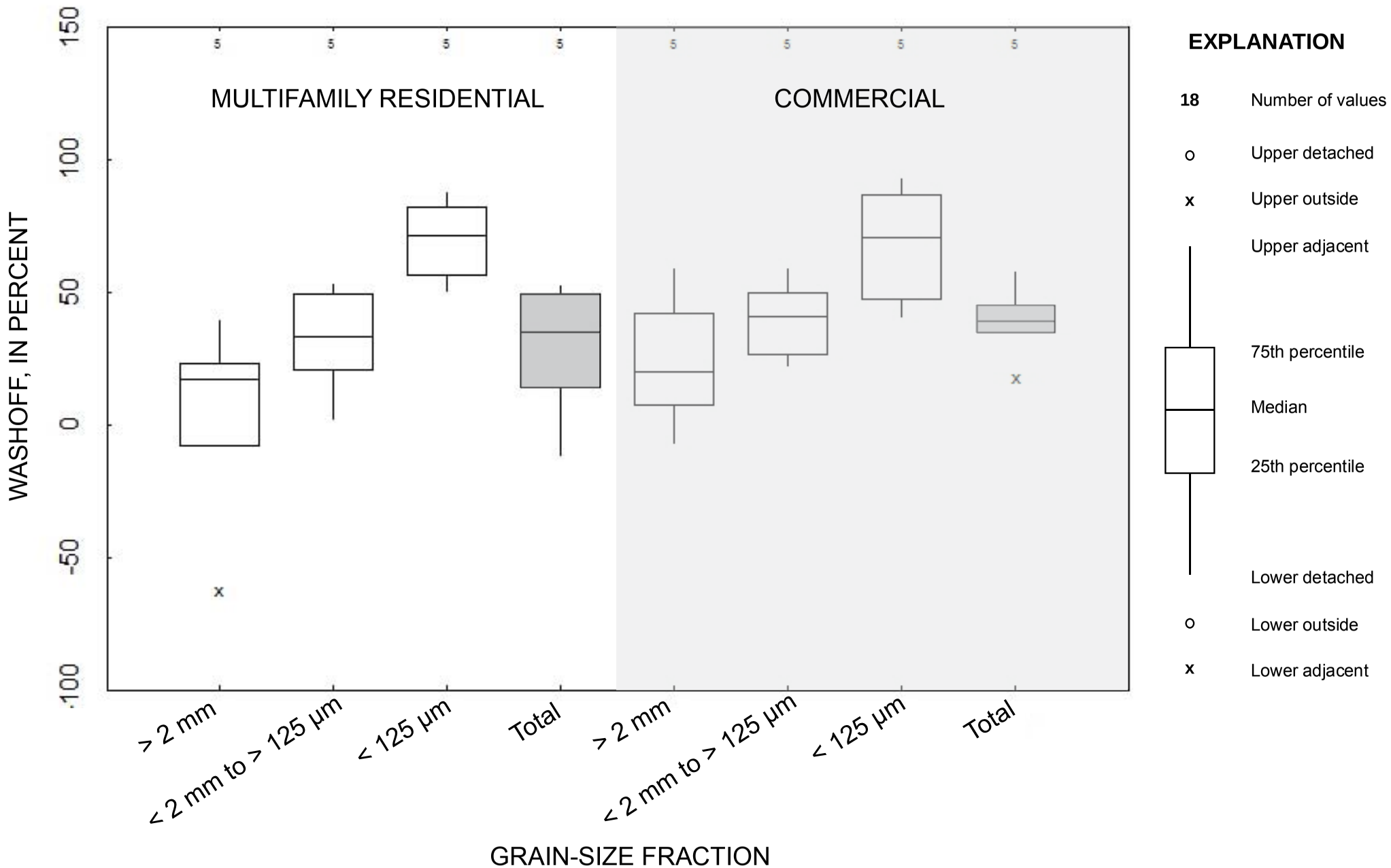

Figure 11. Boxplots of percent washoff due to precipitation by grain-size fraction, from streets in predominantly multifamily residential and commercial land-use types, Cambridge, Massachusetts.

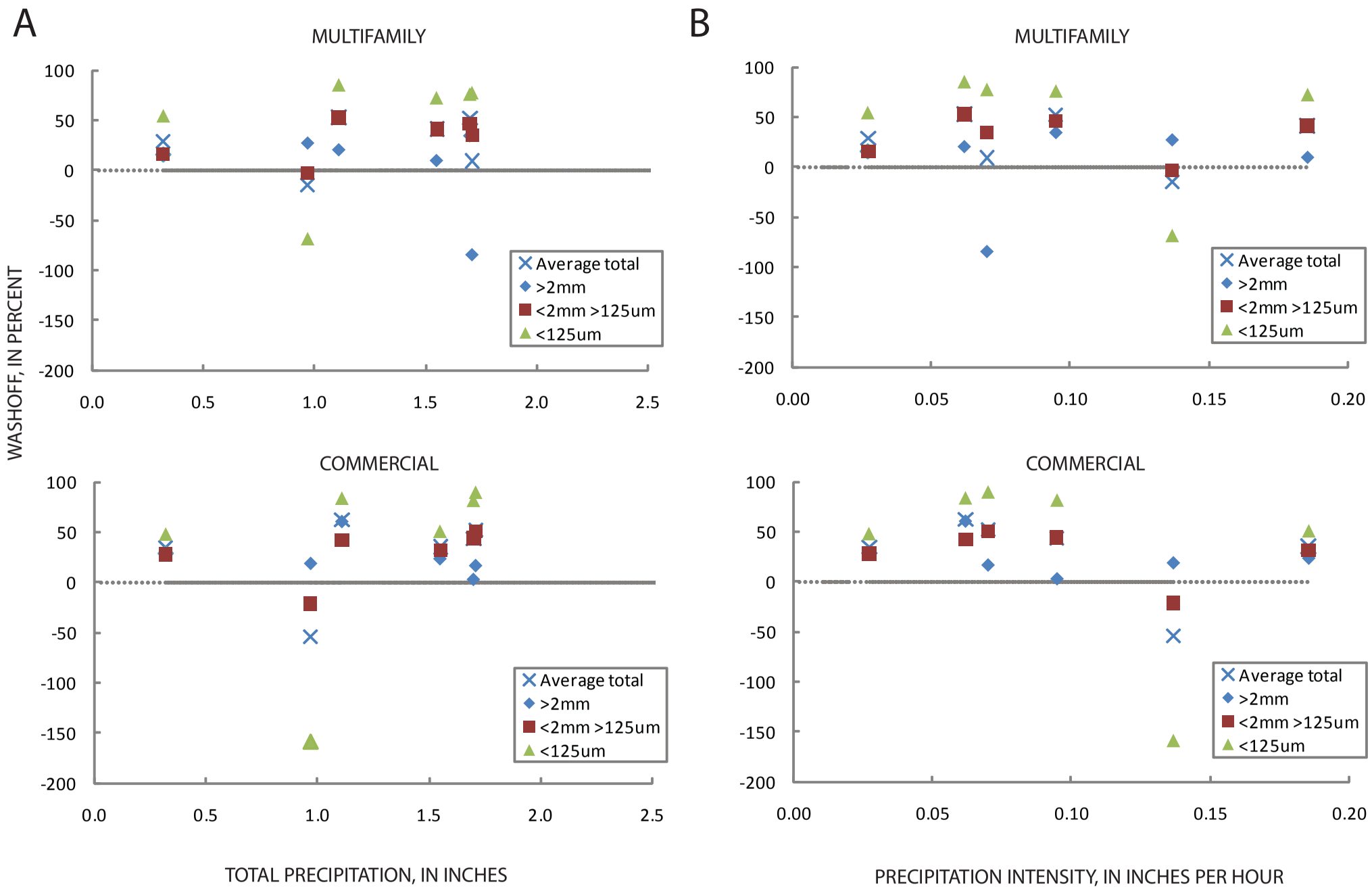

Figure 12. Average total washoff and washoff by grain-size fraction, in percent, as a function of A total precipitation depth, in inches, and B precipitation intensity, in inches per hour from streets in predominantly multifamily residential and commercial land-use types, Cambridge, Massachusetts

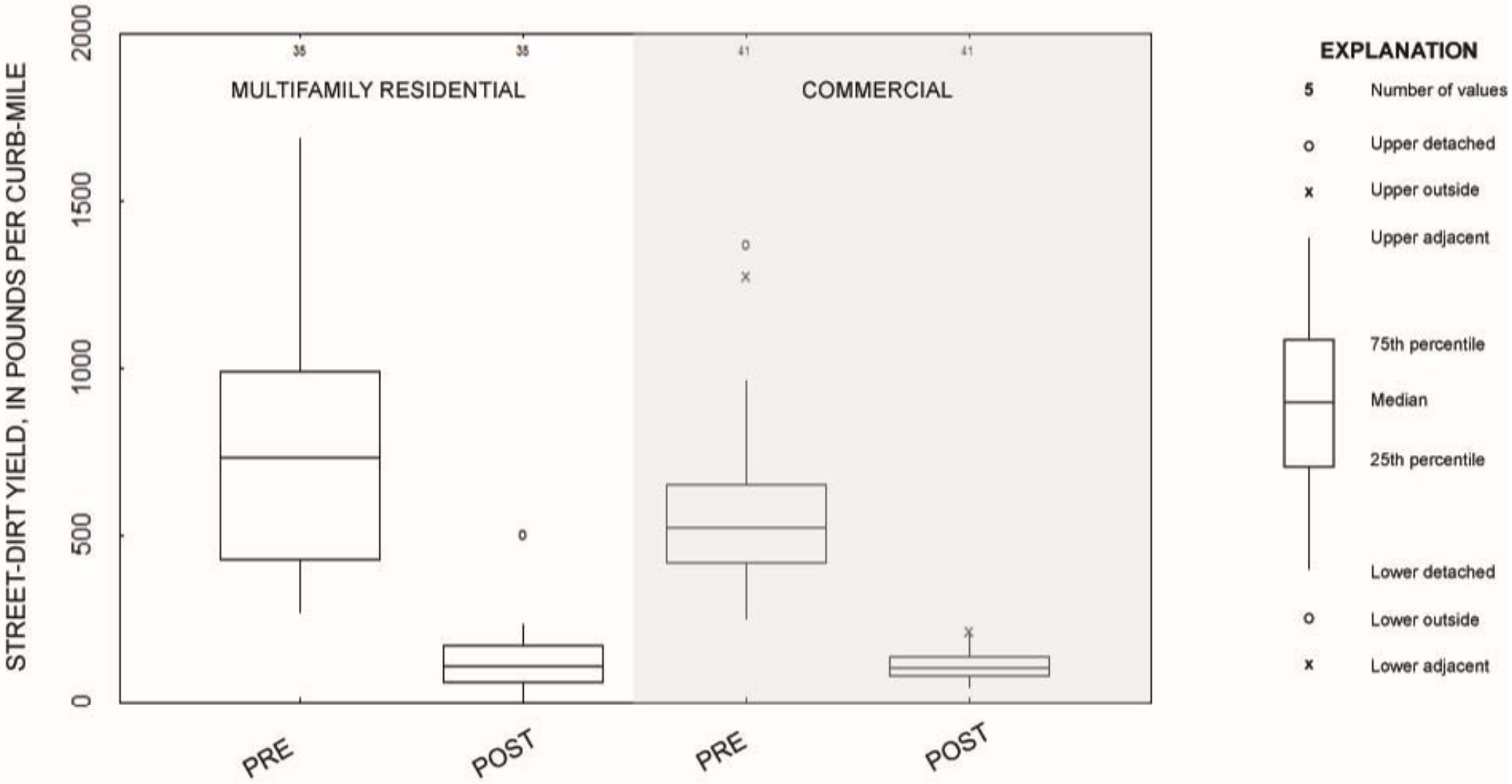

Figure 13. Boxplots of street-dirt yields before (PRE) and after (POST) a single pass of a regenerative-air street cleaner, Cambridge, Massachusetts.

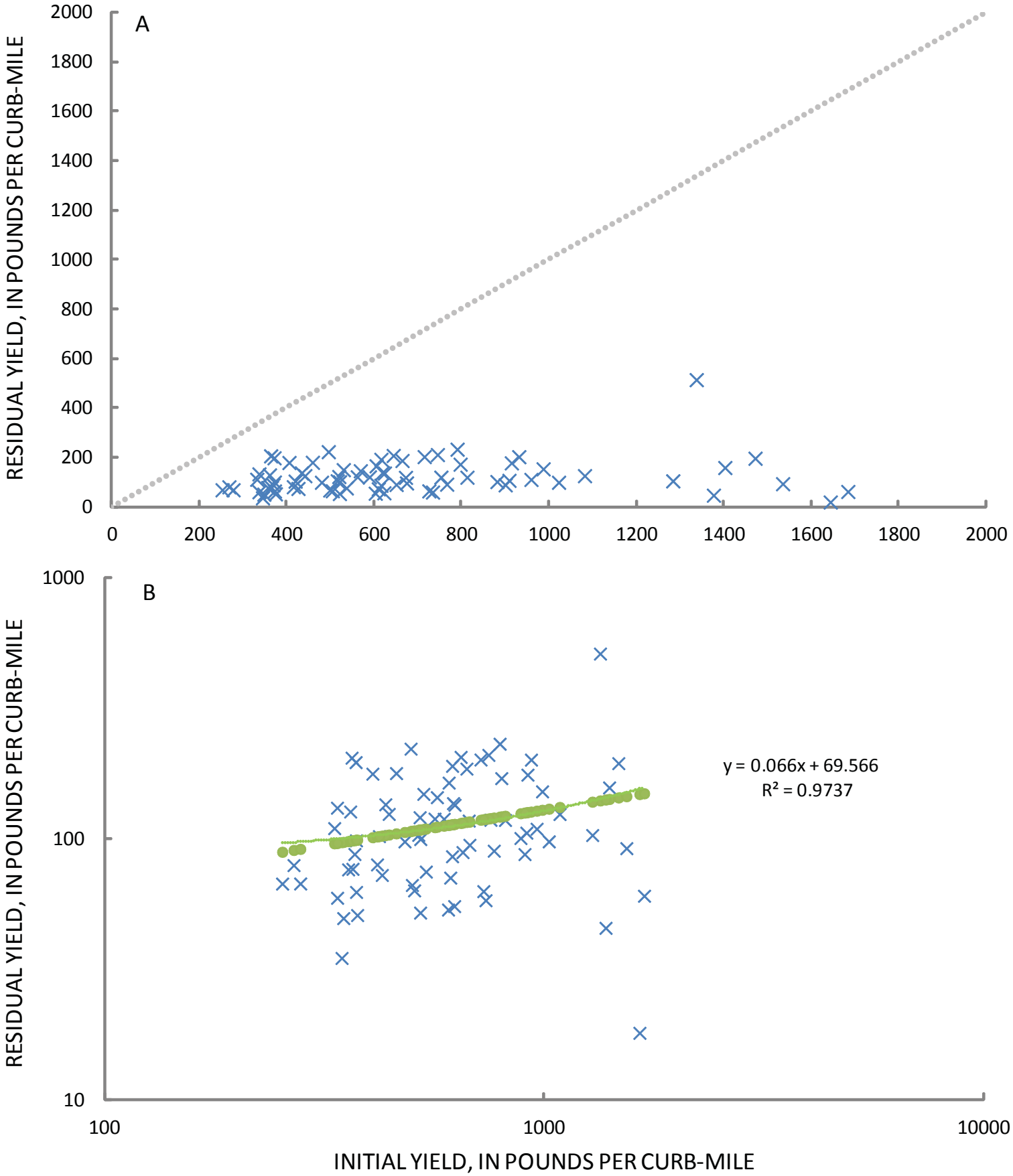

Figure 14. A. Removal efficiency plot of a regenerative-air street cleaner making single passes on streets with smooth to rough street-surface conditions, with heavy on-street parking and monthly parking controls within mostly high-density multifamily residential and commercial land use, Cambridge Massachusetts B. Productivity function of the regenerative-air street cleaner using the Kendall-Theil Robust Line (KTRLine version 1.0).

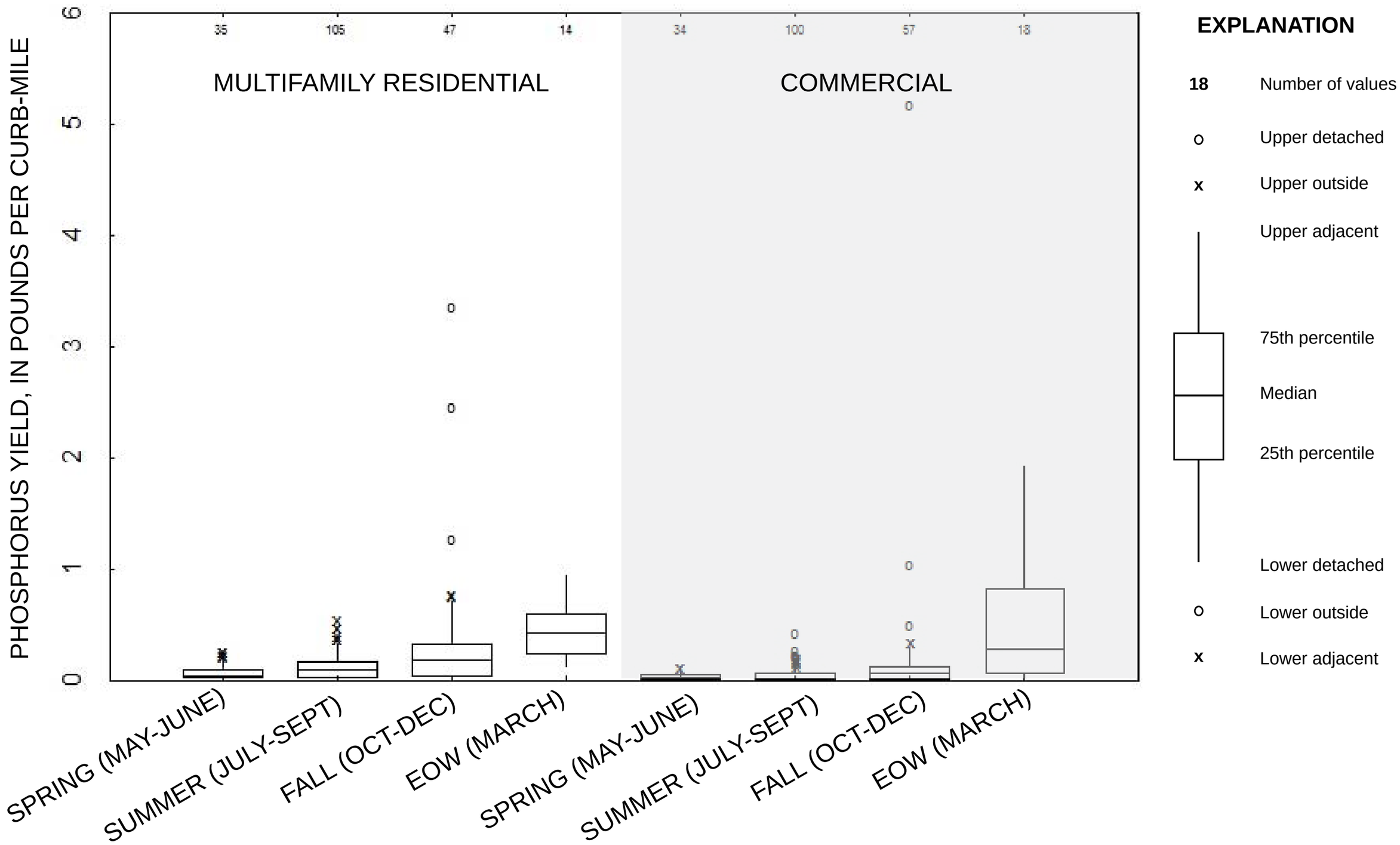

Figure 15. Boxplots of phosphorus yield, in pounds per curb-mile, by season (where EOW represents end-of-winter), from streets in predominantly multifamily residential and commercial land-use types, Cambridge, Massachusetts.

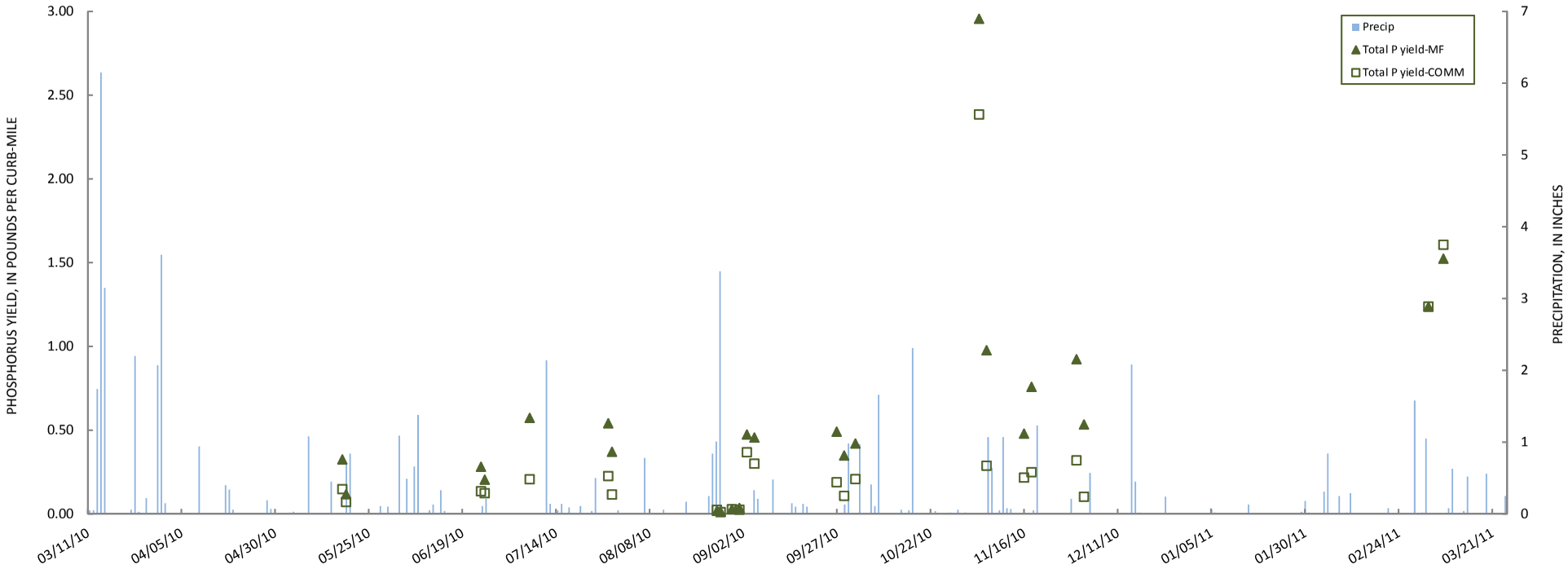

Figure 16. Daily precipitation and average phosphorus yields observed within multifamily/high-density residential (MF) and commercial (COMM) land-use types between May 2010 and March 2011. Precipitation data courtesy of the Cambridge Department of Public Works.

Figure 17. Predominantly commercial land-use subcatchment in Cambridge, Massachusetts and USGS flow and water-quality monitoring station (USGS ID: 01104677), over a 0.5-m color orthophoto obtained from MassGIS.

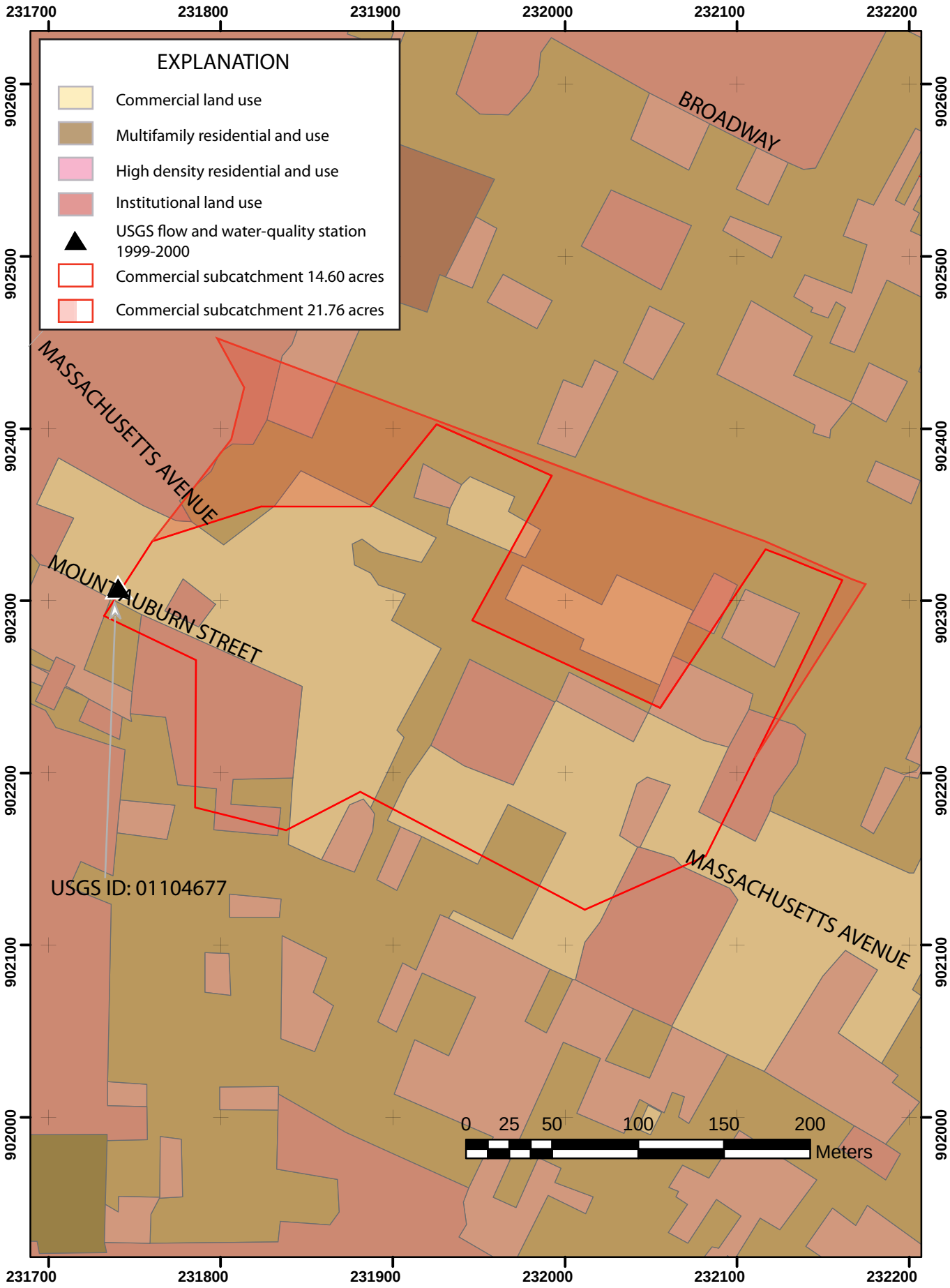

Figure 18. Predominantly commercial land-use subcatchment in Cambridge, Massachusetts and USGS flow and water-quality monitoring station (USGS ID: 01104677), over the 2005 land-use coverage obtained from MassGIS.

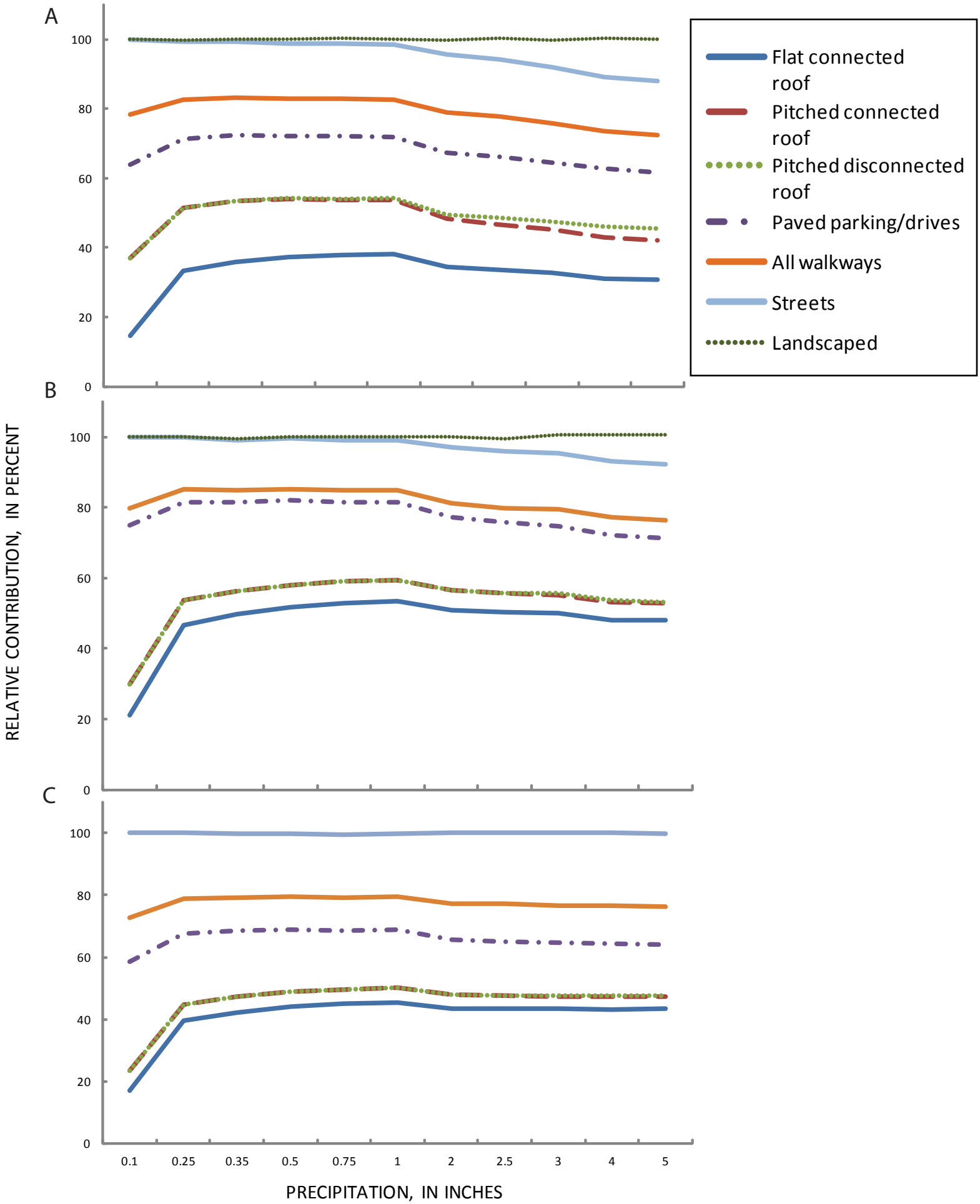

Figure 19. Cumulative relative percent contributions of major source areas within the (A) multifamily and high-density residential, (B) institutional, and (C) commercial land-use types contained in the commercial subcatchment in Cambridge, Massachusetts.

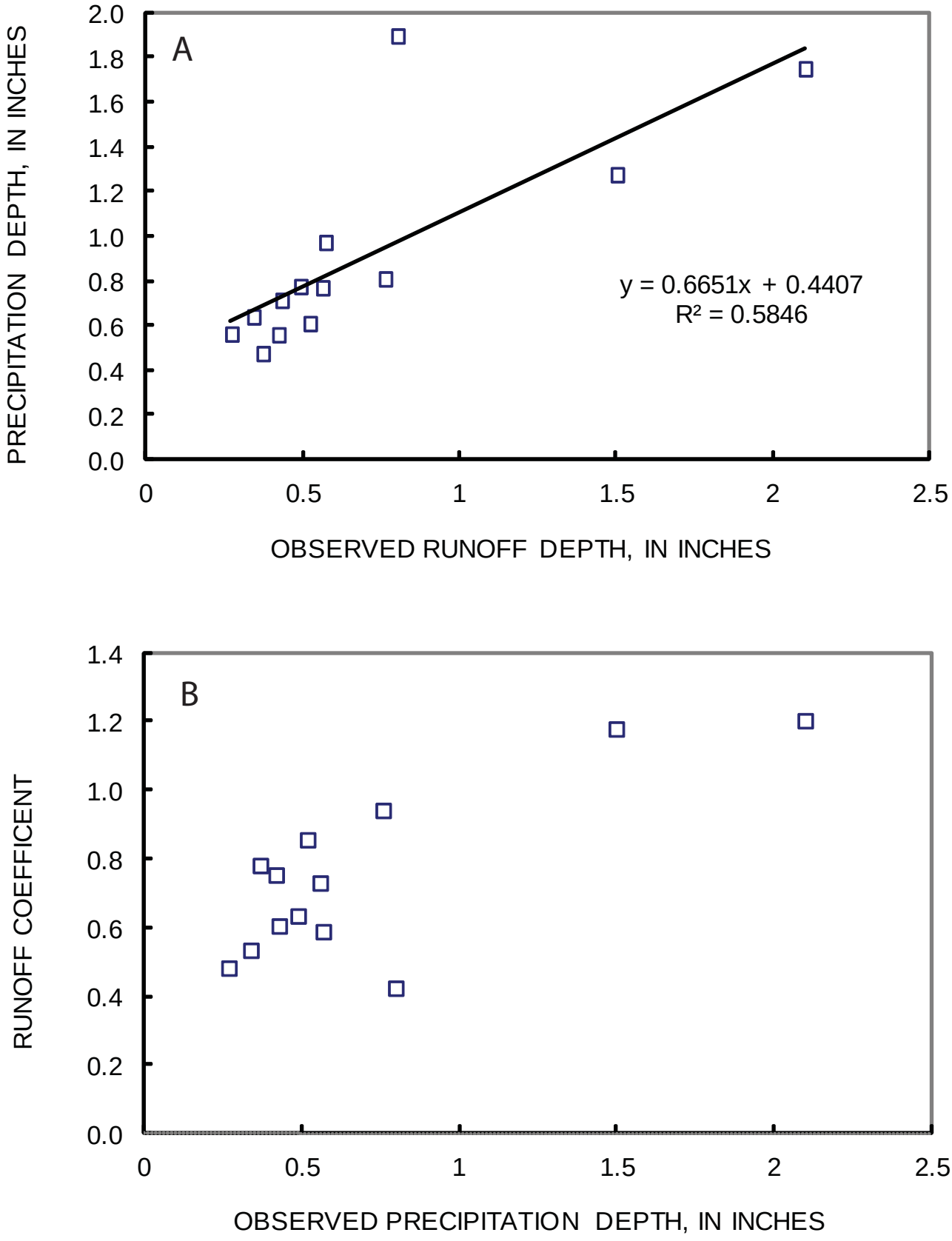

Figure 20. Plots of (A) rainfall depth versus runoff depth, and (B) runoff coefficient versus rainfall depth from the commercial subcatchment outfall observations in 2000, Cambridge, Massachusetts (USGS station ID: 01104677).

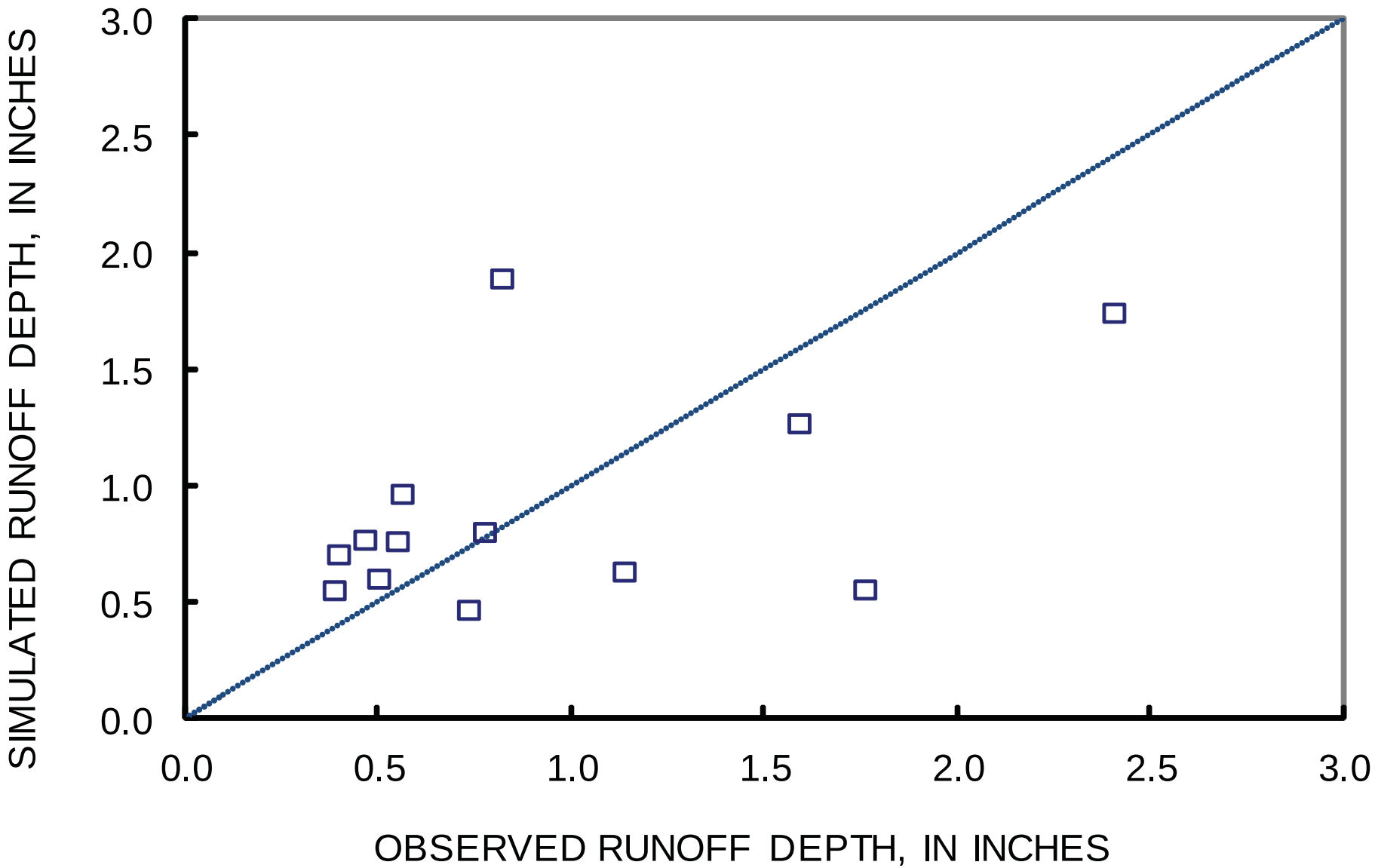

Figure 21. Simulated versus observed runoff depth from the commercial land-use subcatchment, 2000, Cambridge, Massachusetts (USGS ID: 01104677).

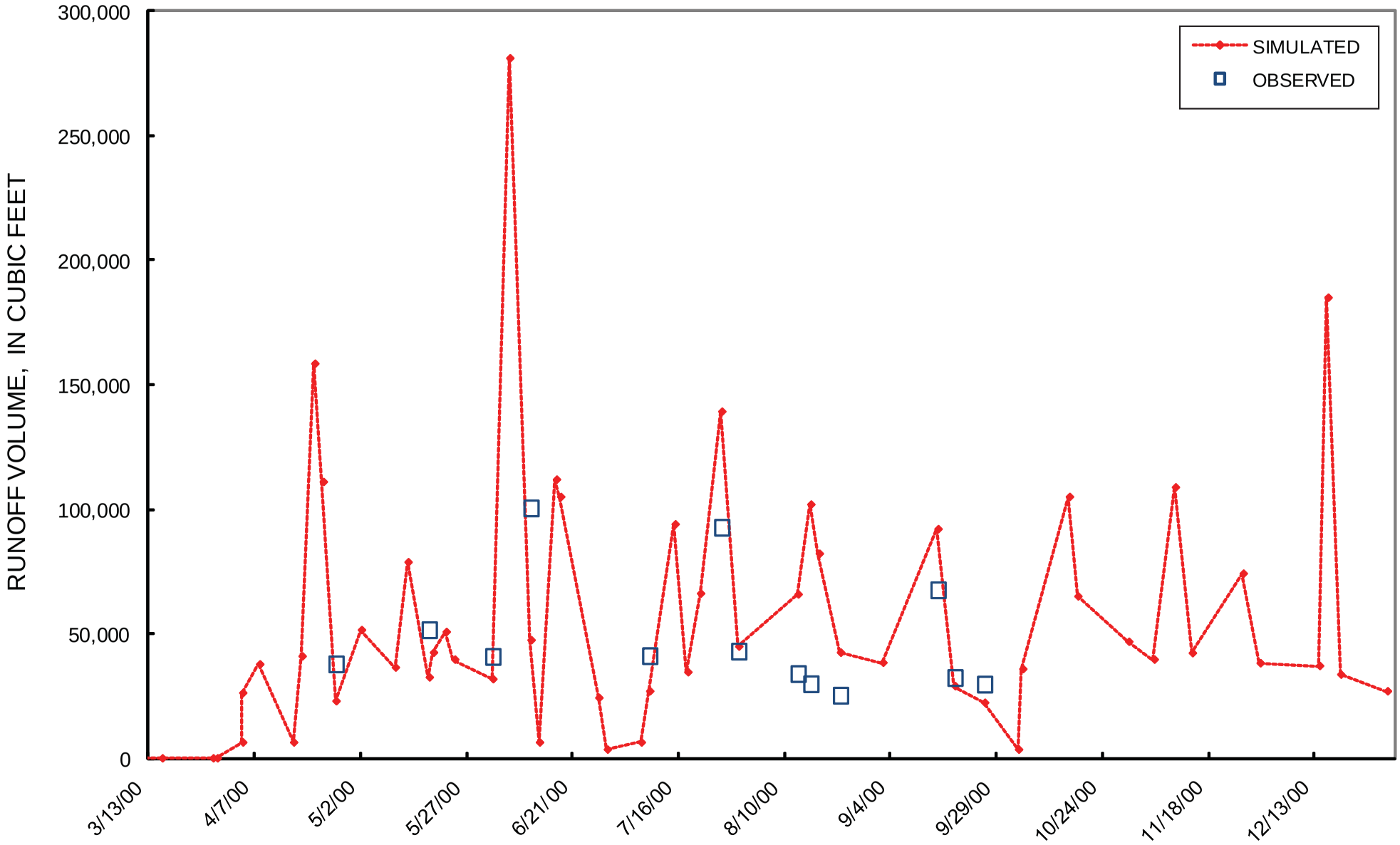

Figure 22. Time series of simulated outfall runoff volume from the commercial land-use subcatchment compared to observed runoff volume, March to December 2000, Cambridge, Massachusetts (USGS ID: 01104677).

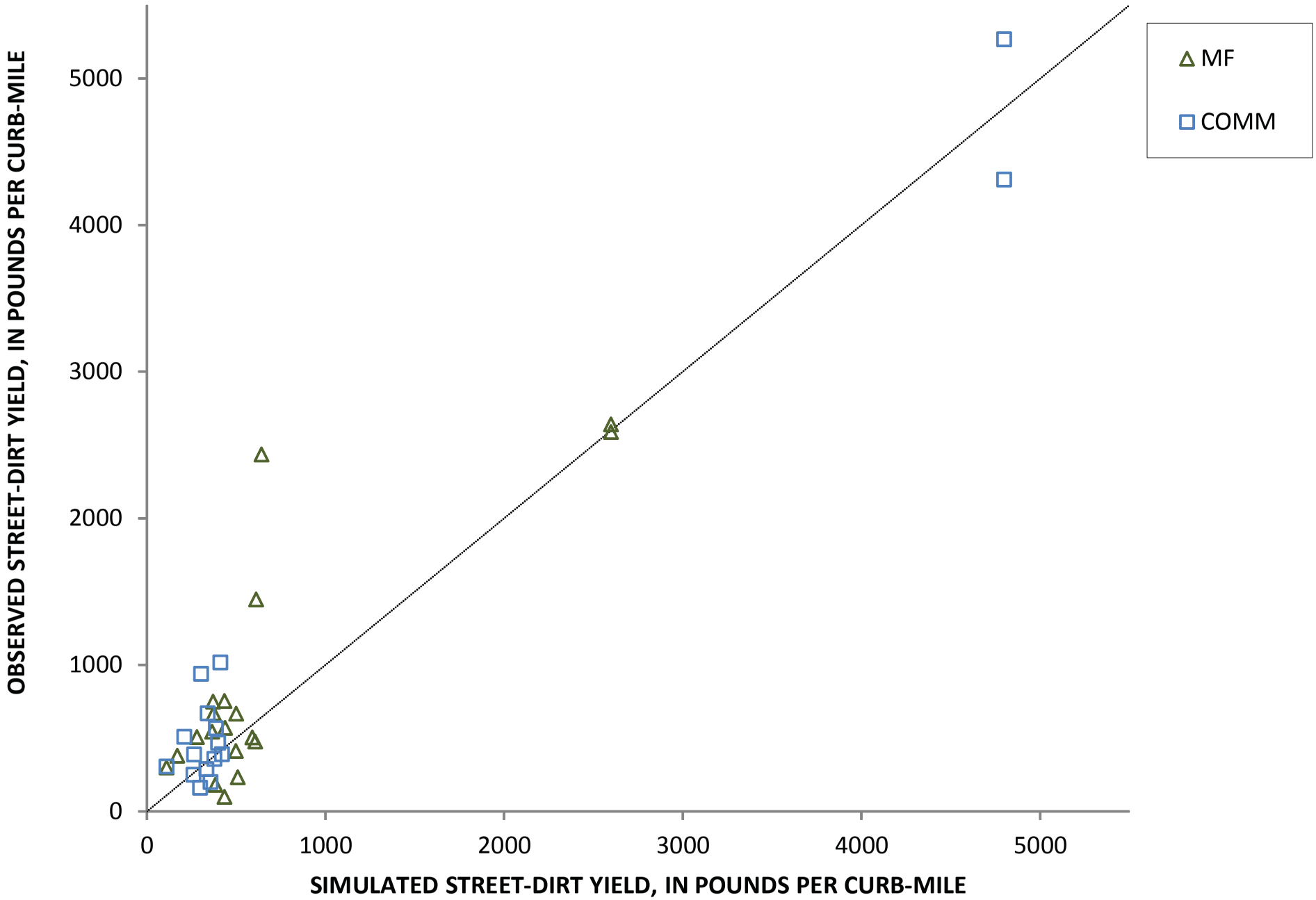

Figure 23. Simulated versus observed street-dirt yields, Cambridge, Massachusetts.

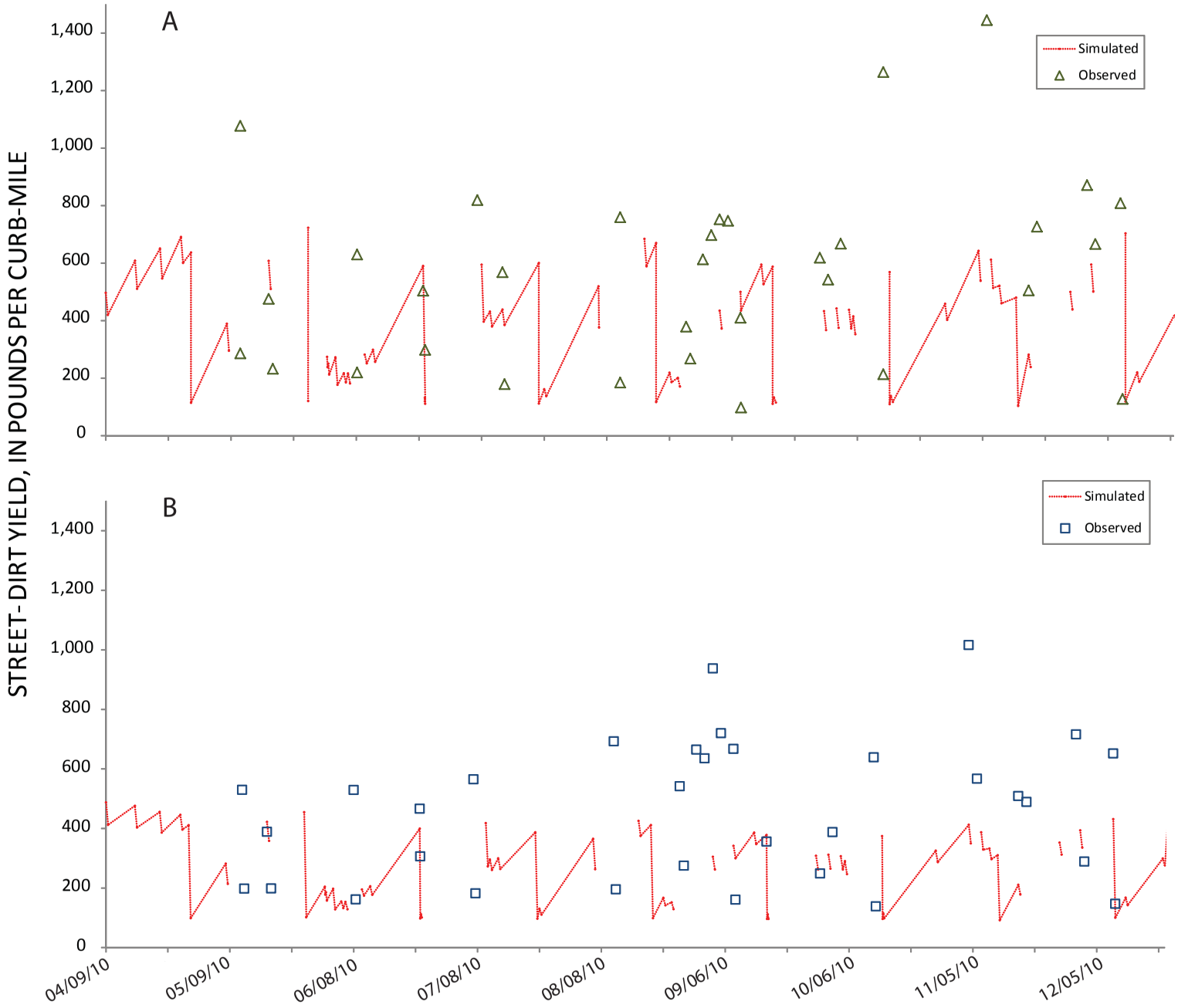

Figure 24. Simulated and observed street-dirt yields, April to December 2010 for A. multifamily and B. commercial land-use types within the predominantly commercial land-use subcatchment ,Cambridge, Massachusetts.