

Lead Contamination in NYC Garden Soils

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The Context

Heavy metal contamination in urban soils is not a new problem, it is an old problem that has been somewhat forgotten ...

Green Movement
Sustainable Urban Environment

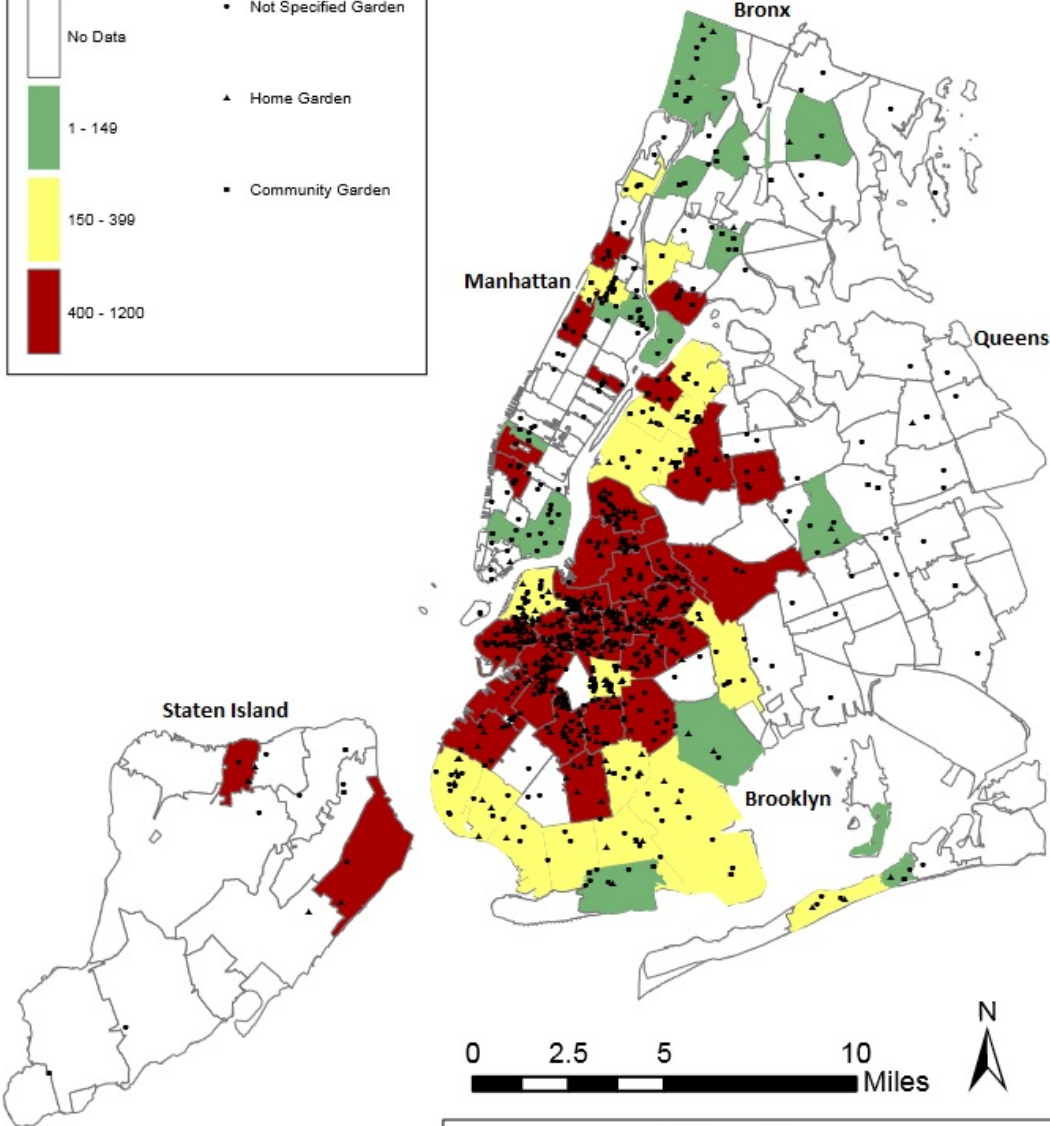
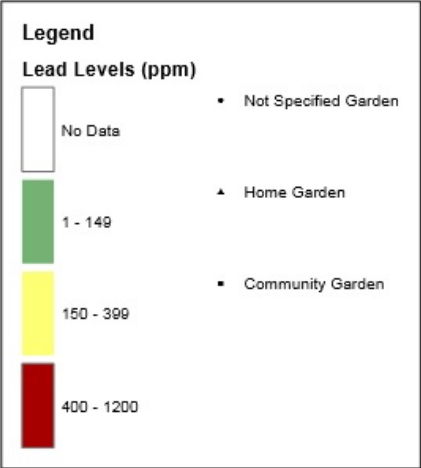
Locally grown organic food
Revitalize precious open space
Increased gardening activities



Lead by example

(New York Times)

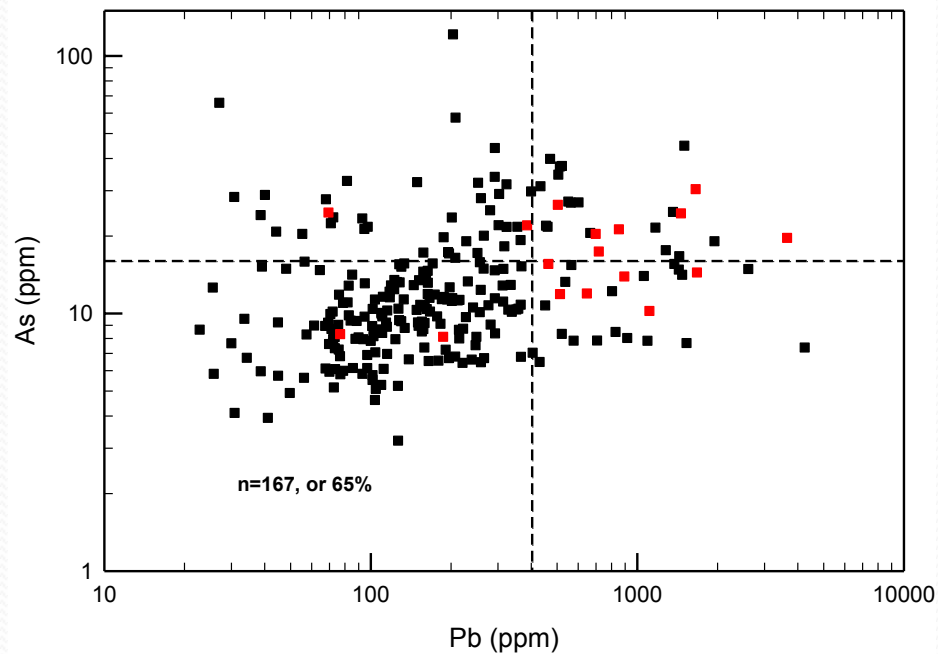
NYC Lead Map



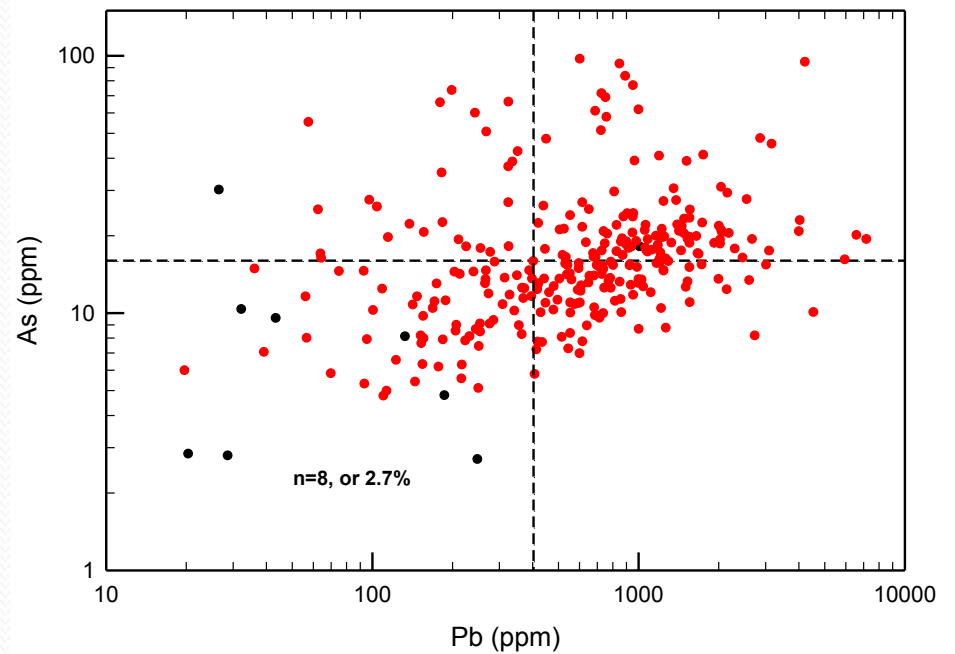
Reference Layer:
United States Census Bureau, 2010, Zip Code Tabulation Areas (ZCTAs): <https://www.census.gov/geo/maps-data/data/tiger-data.html> (accessed June 2014)

Based on the NYS DEC Standard, how many of the garden soil samples were “safe” for growing food?

(black=OK; red=not OK)



Community Garden



Home Garden



Cr Co Ni Cu Zn As Cd Pb

Overall New York City (n = 1652 for Pb; n=475 for other metals)

| | | | | | | | | |
|--------------------------|--------|----|------|------|-------|-----|-----|------|
| Median | 49 | 9 | 28 | 77 | 248 | 10 | 1.2 | 355 |
| Mean | 55 | 9 | 32 | 110 | 327 | 12 | 1.6 | 600 |
| S.D. | 29 | 4 | 24 | 123 | 258 | 7.5 | 1.5 | 767 |
| Max | 262 | 28 | 333 | 1286 | 2352 | 76 | 11 | 8912 |
| Min | 4 | 2 | 2 | 5 | 35 | 0.9 | 0.1 | 3 |
| Unrestricted use std | 30 | - | 30 | 50 | 109 | 13 | 2.5 | 63 |
| <i>% exceeding limit</i> | 85 | - | 44 | 75 | 88 | 32 | 24 | 92 |
| US EPA SSLs | 120000 | - | 1600 | - | 23000 | 0.4 | 70 | 400 |
| NYS Background* | 14 | - | 17 | 14 | 65 | 5 | 0.5 | 19 |

Home garden samples (n = 197)

| | | | | | | | | |
|--------------------------|----|---|-----|-----|--------|----|-----|-----|
| Median | 53 | 9 | 30 | 89 | 300 | 12 | 1.8 | 632 |
| Residential std | 36 | - | 310 | 270 | 10,000 | 16 | 2.5 | 400 |
| <i>% exceeding limit</i> | 86 | - | 0 | 8 | 0 | 28 | 36 | 68 |

Community garden samples (n =106)

| | | | | | | | | |
|--------------------------|-----|---|-----|-----|--------|-----|-----|-----|
| Median | 39 | 8 | 21 | 55 | 169 | 7.6 | 1.1 | 140 |
| Restricted Res. std | 180 | - | 310 | 270 | 10,000 | 16 | 4.3 | 400 |
| <i>% exceeding limit</i> | 0 | - | 1 | 0 | 0 | 9 | 2 | 10 |


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Welcome

The Environmental Science Analytical Center at Brooklyn College, located on the 5th floor of Ingersoll Hall, is equipped with state-of-the-art instrumentation for environmental research and education, and provides analytical services to a wide range of customers. Currently core facilities include a Perkin-Elmer Dynamic Reaction Cell Inductively Coupled Plasma Mass Spectrometer, an Analytical JEOL 2000 Transmission Electron Microscope, and a Philips Multiurpose X-Ray Diffractometer. An environmental geochemistry laboratory is available for both research and teaching activities.

The facilities at ESAC can provide structural and compositional information for a wide range of samples, especially at very high resolutions (nanometer scale) or ultra-low elemental concentrations (parts per trillion ranges).

- The ICP-MS can rapidly analyze most elements in the periodic table in many different environmental, geological, and biological matrices. The low blank trace metal lab processes a type of samples into aqueous solution that ICP-MS can analyze. The instrument provides parts per billion (ppb) to parts per trillion (ppt) detection limits for most elements. For toxic

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