Soil Survey Activities in New York City

Richard K. Shaw, NRCS-NY

- 80% of US population lived in “Metropolitan” areas (cities with > 50,000 or urbanized areas >100,000 people)

- planners, engineers, hydrologists, landscape architects, environmental professionals, educators & students, homeowners
## Land Use, New England & Midatlantic States (NRI data)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cropland</th>
<th>Developed land</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>13.7%</td>
<td>10.3%</td>
</tr>
<tr>
<td>2003</td>
<td>11.4%</td>
<td>15.2%</td>
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"Keep the survey relevant to ever-changing needs"
Urban land in the Northeast (NRI data)

% urban land (NRI 1997)

• NJ 34%
• MA 26%
• MD 19%
• RI 17% (1995)
• NH 12%
Land in Farms in the Northeast
(Farmland Information Center website)

% land in farms (2002)
- ME 7%
- NH 8%
- RI 9%
- MA 10%
- CT 12%
- NJ 17%
- US 41%

“Expand our efforts to broaden the conservation partnership and build new alliances.” NRCS Strategic Plan
New York City Soil Survey

USDA-NRCS

Soil Survey Team
- Richard K. Shaw
- Philip Smith
- Lindsay Reinhardt

NY State Soil Scientist
- Steve Indrick
Soil Survey of Gateway National Recreation Area

Completed

1:4800 scale – 8300 acres

Final product – CD:
- Soil maps (shape files & jpg)
- Manuscript (pdf)
- NASIS Access datafiles
Our resources are mapped at a scale range of 1:1200 to 1:4800. The fine scale and small minimum mapping unit of these soils maps make them invaluable for our purposes.

A standard 1:12000 or 1:24000 scale mapping with MMU of 3 acres would be too coarse for us to use as a base layer of information. What a loss of knowledge that would be...."

Kathy Mellander, GIS Specialist, GNRA
GNRA Soil Survey

**Uses**

1. Critical layer (using the NASIS database and the maps) for site suitability maps for project, facilities, and resource planning
2. Base layer for natural & cultural resource mapping & assessment
3. Quick & accurate ID and area statistics of water, impervious surfaces, landfill soils
4. Hydric soil ID
5. Examine soil/invasive species relationships
6. Correlation with historic maps for location of buried or hidden cultural resources
7. Substitute for updated land cover map
8. Aid to air photo/satellite image interpretation, historic and current

Kathy Mellander, GIS Specialist, GNRA
GNRA Soil Survey

Uses

1) Wildlife mgmt plan
2) Watershed mgmt plan for Jamaica Bay
3) ID tidal areas for ecosystem restoration

Doug Adamo, Chief
Division of Natural Resources, GNRA
NYC Reconnaissance Soil Survey

Completed

1:62,500 scale

Final product – CD:
- Poster-sized map (pdf)
- Manuscript (pdf)

Available at NYCSWCD website
Soil Survey of Bronx River Watershed

1:6000 scale
- 3200 acres mapped
- Manuscript
  - Urban vs topographic watershed
  - History of Bronx River

Provide information & assistance to encourage and enable locally led, watershed-scale conservation.
NRCS Strategic Plan
BRW Soil Survey Users

Bronx River Alliance
NYCDPR
NYBG
Bronx Zoo
NYC DEP

• Revegetation & restoration potential
• Infiltration rates
• Stormwater capture potential
• Environmental resource inventory
BRW Soil Survey
Infiltration Study

Bronx River Watershed

Infiltration values for variable:
• Land cover/land use types
• Soil types

Lab Data:
• OM content
• Particle size analysis
• Bulk density
BRW Research Projects

Water Mgmt & Conservation in Dense Urban Environments
Earth Institute @ Columbia U

P Transport in the Bronx River
Lehman College
BRW Soil Survey

Ground Penetrating Radar

- Depth to bedrock
- Depth of fill?
Con-Ed, Retec PAH Project

PAHs in Manhattan Soils

- Set urban cleanup standards
- Characterization of “urban core” soils
- Survey data for 1:12000 survey
Con-Ed PAH Project

Lab Analyses (2 horizons):

- 46 PAHs
- 22 Metals
- Total Organic Carbon & “Black” Carbon
Con-Ed PAH Project

Lab Data to date (n=22):

- 20% of samples pH ≥ 8.0
- BaP: 70 - 30,000 ug/kg
- Pb: 34 - 13,200 mg/kg
- Black C: 5 - 100% of TOC
Subaqueous Soil Project, Jamaica Bay, NY

Eelgrass restoration potential
NYC Soil Survey

Subaqueous Soil Survey

Jamaica Bay

- 75 cores described
- Incomplete bathymetry
Subaqueous Soil Survey
Jamaica Bay

• 4 landforms identified
• No SAV (except Ulva)
• SOC = 0.2 to 1.2%
• 70% Haplic sulfaquents
Subaqueous Soil Survey

Locating Potential Restoration Sites for *Zostera marina* L. (eelgrass) Using a Subaqueous Soil Survey of Jamaica Bay, NY

Yiyi Wong
Department of Soil Science,
North Carolina State University
NPS Marsh Restoration
- Big Egg
- Elders Point

NYCDPR Revegetation
- Pralls Island
- Pugsley Creek
- Eib’s Pond Park
Native plant test sites

- Fresh Kills Landfill, Staten Island
- Dreier-Offerman Park, Brooklyn
- Mariners Marsh Park, Staten Island
- Duke Farms, Raritan, NJ
- EPA Office, Edison, NJ
NYC Soil Survey
Training / Outreach

- NYC Envirothon
- NYCSWCD Science Teacher Workshops
- NYRP
- Bronx River Alliance
- Sustainable South Bronx
International Committee on Anthropogenic Soils (ICOMANTH)

- New nomenclature
  Standard terminology for “anthropogenic” soils
NRCS, NYCSWCD, & Queens College Partnership

Soils Faculty Position

- Training in Soil Science
- Research Collaboration
- Potential Employees
Soil Survey of New York City

Next Mapping Project:
City-Wide Soil Survey

1:12000 scale
Summary
NYC Soil Survey Program

- Multifaceted program
- Close cooperation with NYC-SWCD
- Responsive to customers’ needs
- Use of innovative methods & techniques
- Characterize, classify, map, & interpret disturbed soils