

Soil Survey Activities in New York City

Richard K. Shaw, NRCS-NY



US Population (US Census 2000)

- **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)



	<u>Cropland</u>	<u>Developed land</u>
1982	13.7%	10.3%
2003	11.4%	15.2%

“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%**
- **US** **6% (2003)**

Land in Farms in the Northeast

(Farmland Information Center website)

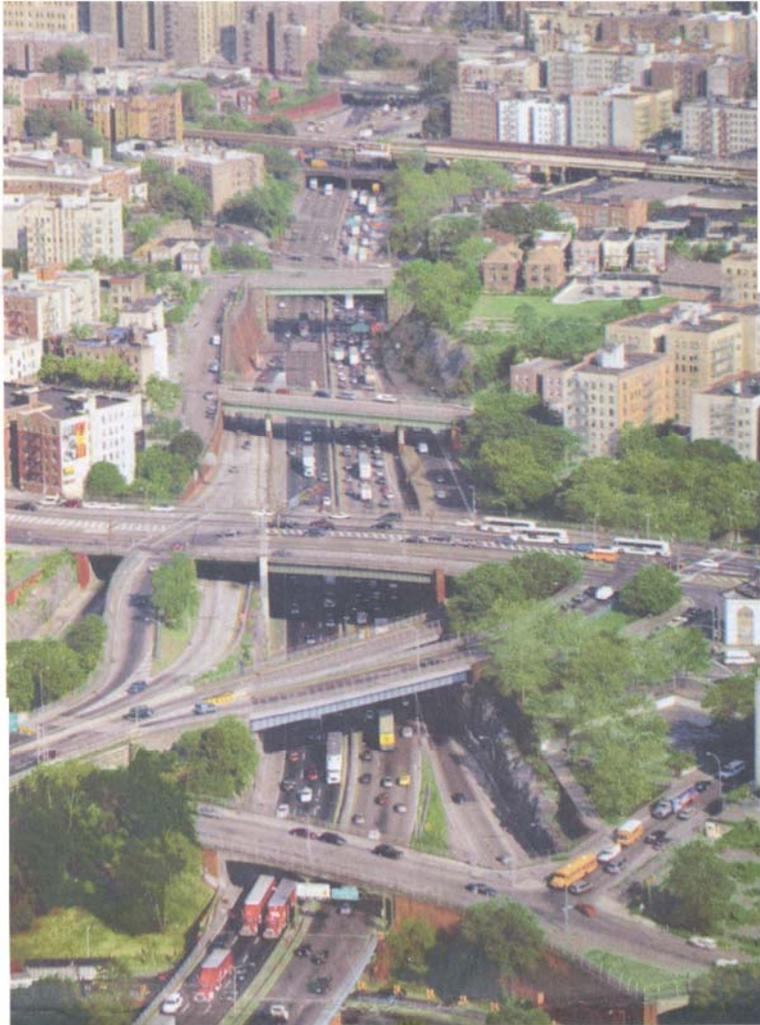
% land in farms (2002)

- 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

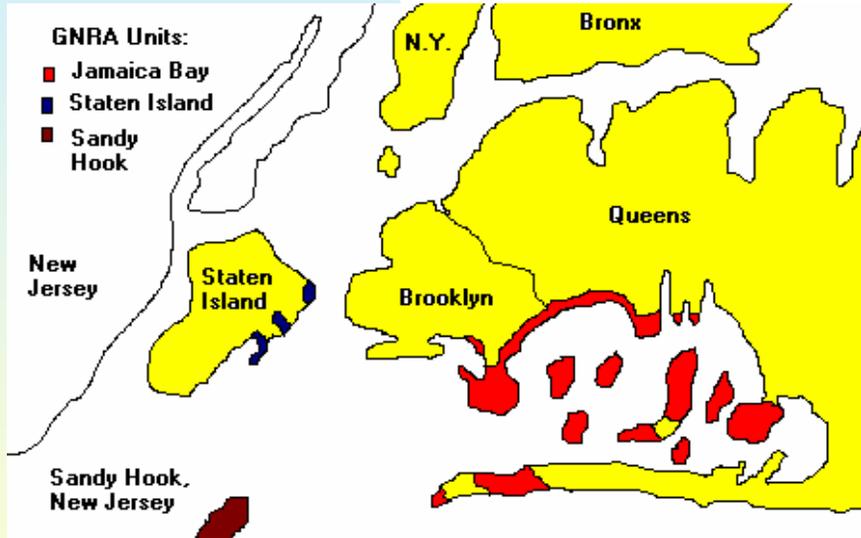
Soil Survey of Gateway National Recreation Area

Completed

1:4800 scale – 8300 acres

Final product – CD:

- Soil maps (shape files & jpg)
- Manuscript (pdf)
- NASIS Access datafiles



GNRA Soil Survey

“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**

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)

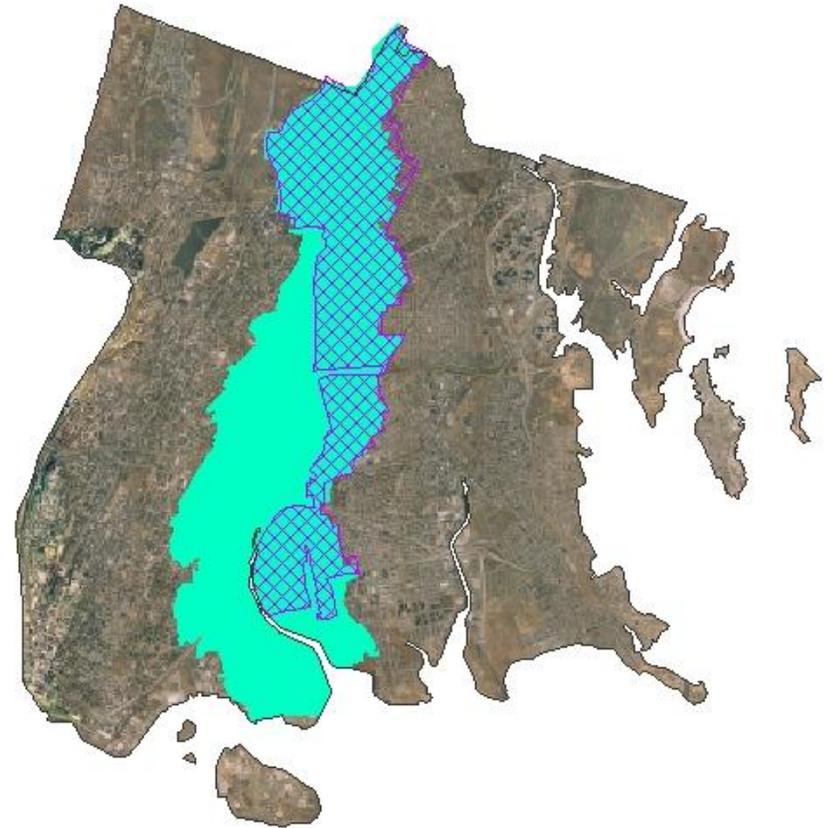
Available at NYCSWCD website



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 $\text{pH} \geq 8.0$
- BaP: 70 - 30,000 $\mu\text{g}/\text{kg}$
- Pb: 34 - 13,200 mg/kg
- Black C: 5 - 100% of TOC



Subaqueous Soil Project, Jamaica Bay, NY

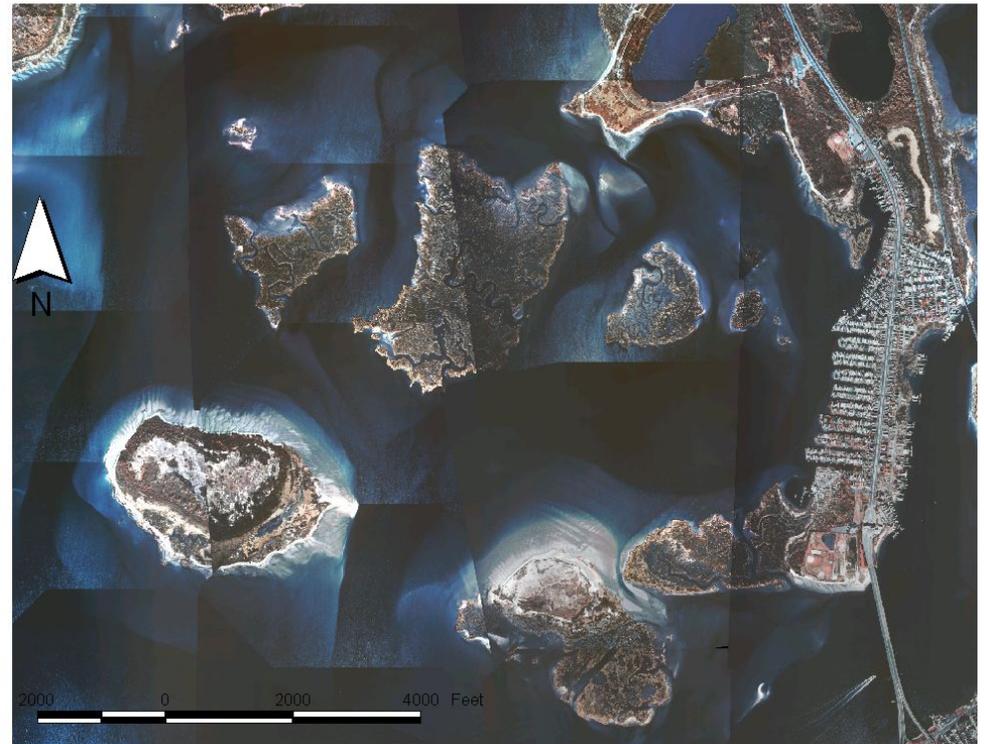


Eelgrass restoration potential

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**

NYC Soil Survey Site Inspections

NPS Marsh Restoration

- Big Egg
- Elders Point

NYCDPR Revegetation

- Pralls Island
- Pugsley Creek
- Eib's Pond Park



NYC Soil Survey Site Inspections

Center for Urban Restoration Ecology

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