



Urban Forestry and Soils in New York City

**Rich Hallett
USDA Forest Service
Northern Research Station**

NYC Urban Field Station



- Partnership between NYC Parks and USDA Forest Service Northern Research Station
- Modeled after Forest Service Experimental Forests and NSF LTER program
- Based in Fort Totten, Queens
 - shared lab and offices
 - short-term residential space
 - long term monitoring and research programs
 - encourage collaborations / networks



Current Collaborations

30+ projects

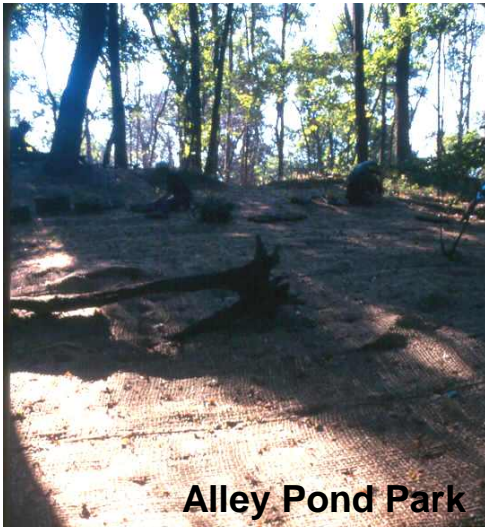
24 researchers

13 different institutions

New York City Parks



Forests



Alley Pond Park



Riverdale Park

Salt marsh



Sawmill Creek



4 Sparrow Marsh

Freshwater wetlands



Bronx River

Grassland



Marine Park

Estuaries



Estuaries

Urban Environment



662,939 street trees



Urban Environment



2,383 greenstreets

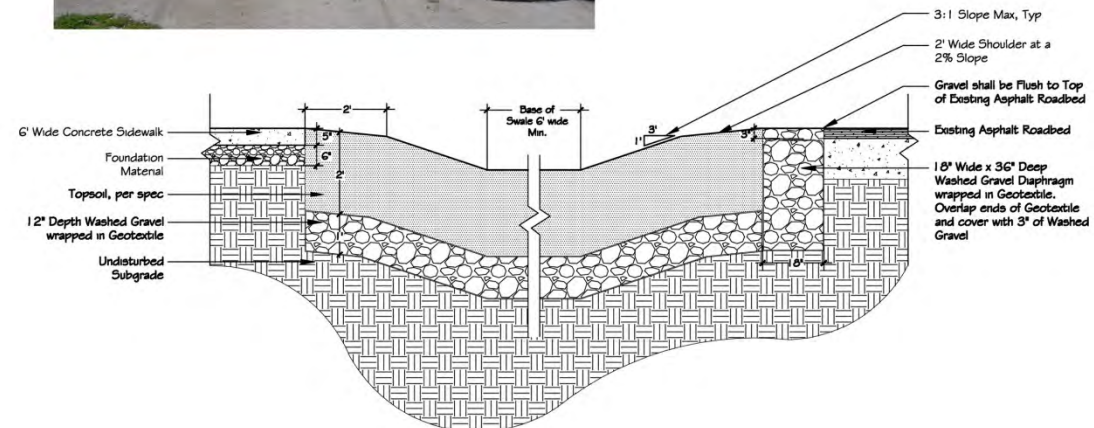


Stormwater Capture



Greenstreets

- bioswales
- curb cuts
- trench drains



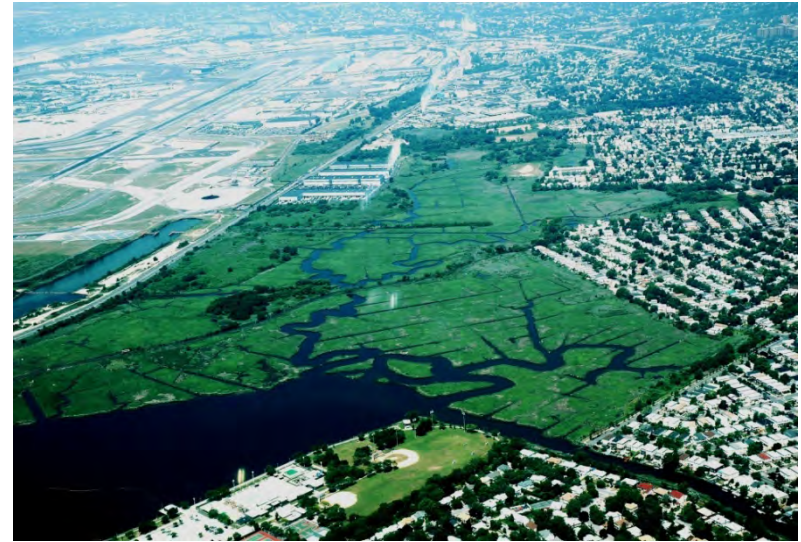
Green Environment



1,651 acres of freshwater wetland



1,498 acres of salt marsh



1,444 acres of meadow/grassland



5,136 acres of forest



Improving Ecosystem Health & Functioning At Freshkills Park Through Phytotechnologies



Current project partners in the US Forest Service Northern Research Station include:

- Ron Zalesny of NRS-13 in Rhinelander, WI;
- Richard Hallett of NRS-07 in Durham, NH;
- Nancy Falxa-Raymond of NRS-09 in New York, NY;
- Mary Beth Adams of NRS-01 in Parsons, WV.

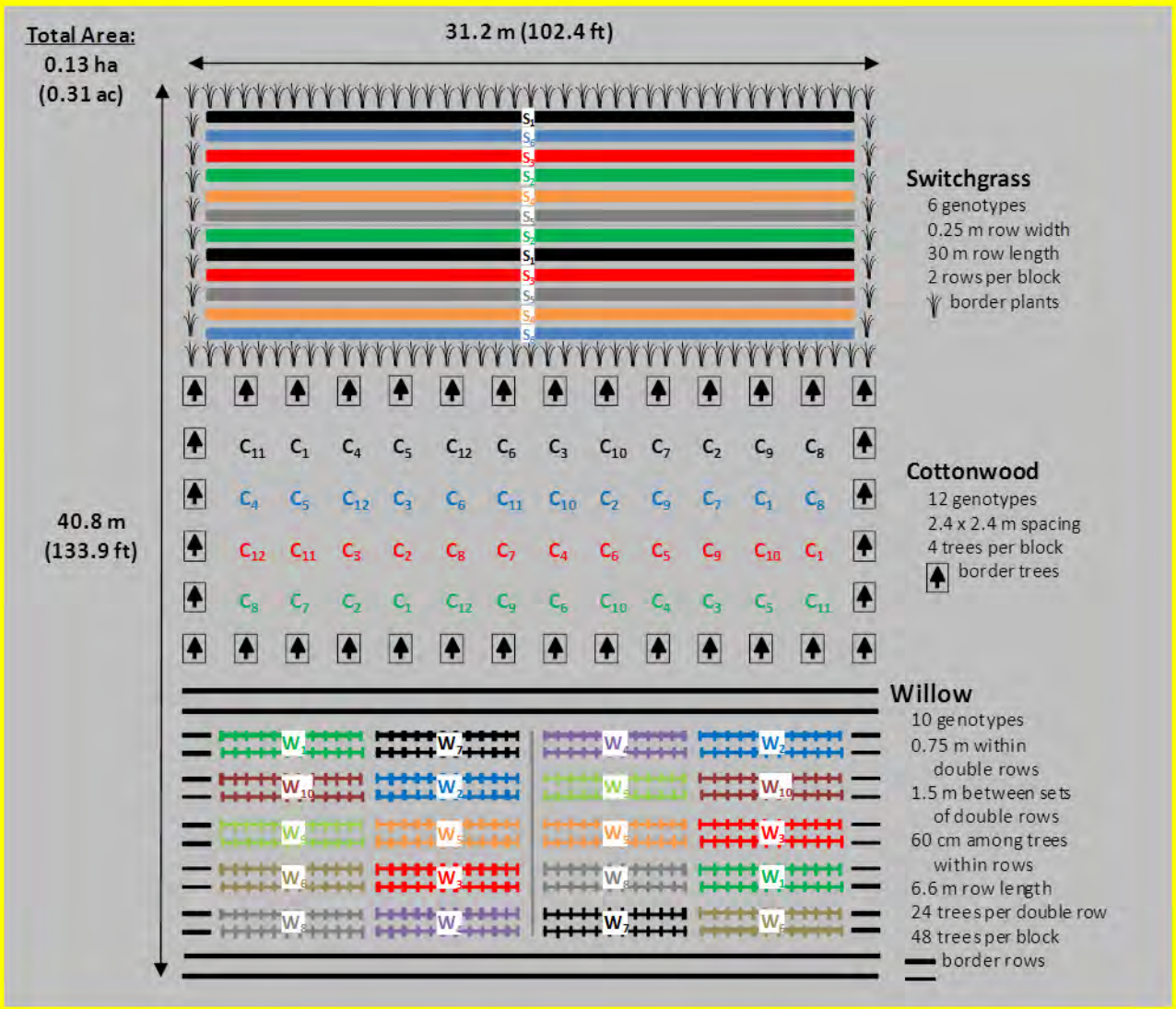
NYC agency partners include the

- Department of Parks & Recreation
- Department of Sanitation

Positive Ecosystem Function
(i.e. sustainable native
vegetation and ecologically
healthy soils)

Starting Point

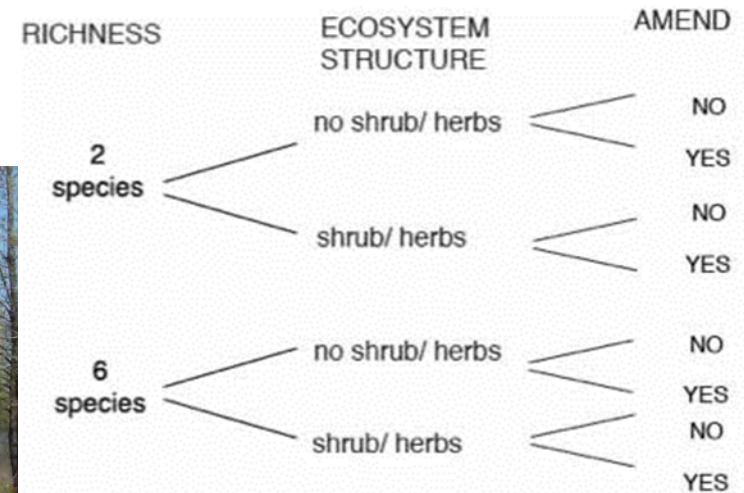
Time



Reforestation (Afforestation?) Experiments



- Alex Felson and Mark Bradford, Yale University
- Rich Hallett, Northern Research Station



Each of the 28 low diversity plots includes 52 trees:
26 *Tilia americana* and 26 *Quercus rubra*.

Each of the 28 high diversity plots also have 52 trees:
6 *T. americana*, 8 *Q. rubra*, 9 *Q. alba*, 9 *Celtis occidentalis*, 10 *Carya* spp., and 10 *Prunus serotina*

Research questions include:



1. What role will environmental stressors such as pollution, drought, vandalism, pests and disease play in the health and survival of the planted species, and do treatments mitigate or exacerbate the impact of these stressors?
2. Does planted species diversity:
 - a. Impact the level to which exotic invasive plant species proliferate?
 - b. Impact local species richness including recruitment of native vegetation?
3. What impact do organic amendments have on soil fertility, planted species health, and/or invasive species proliferation?



Wood Stake Decomposition



Using Wood Stake Decomposition in the Forest Floor and Mineral Soil to Evaluate Soil productivity in the Northern Research Station

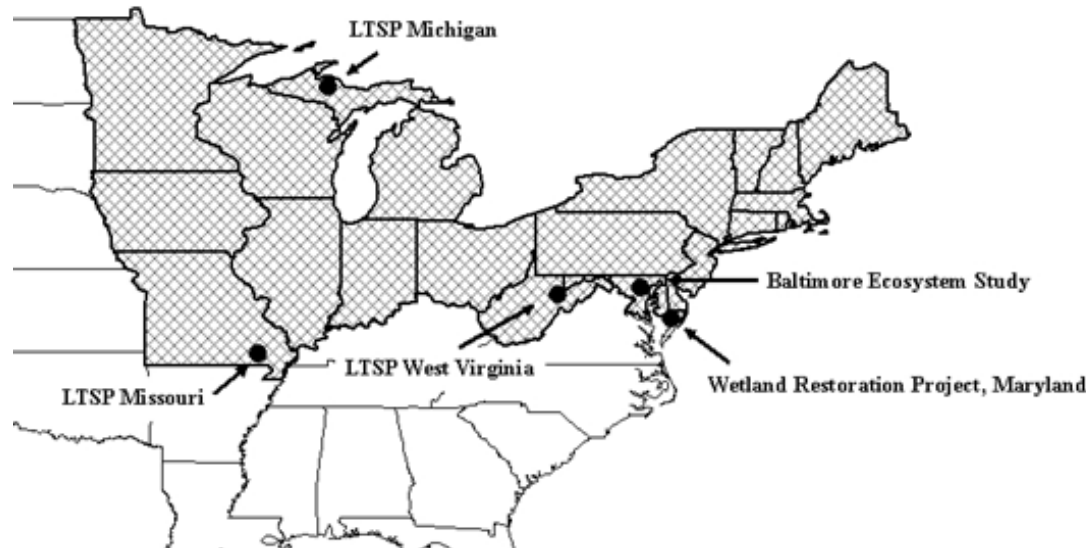
A proposal to evaluate soil organic matter decomposition related to soil productivity

Investigators: Mary Beth Adams¹, Deb Dumroese¹, Marty Jurgensen², Megan Lang³, Ian Yeselonis¹, Brian Palik¹, John Kabrick¹, Daniel Lindner¹

¹ USDA Forest Service

² Michigan Technological University

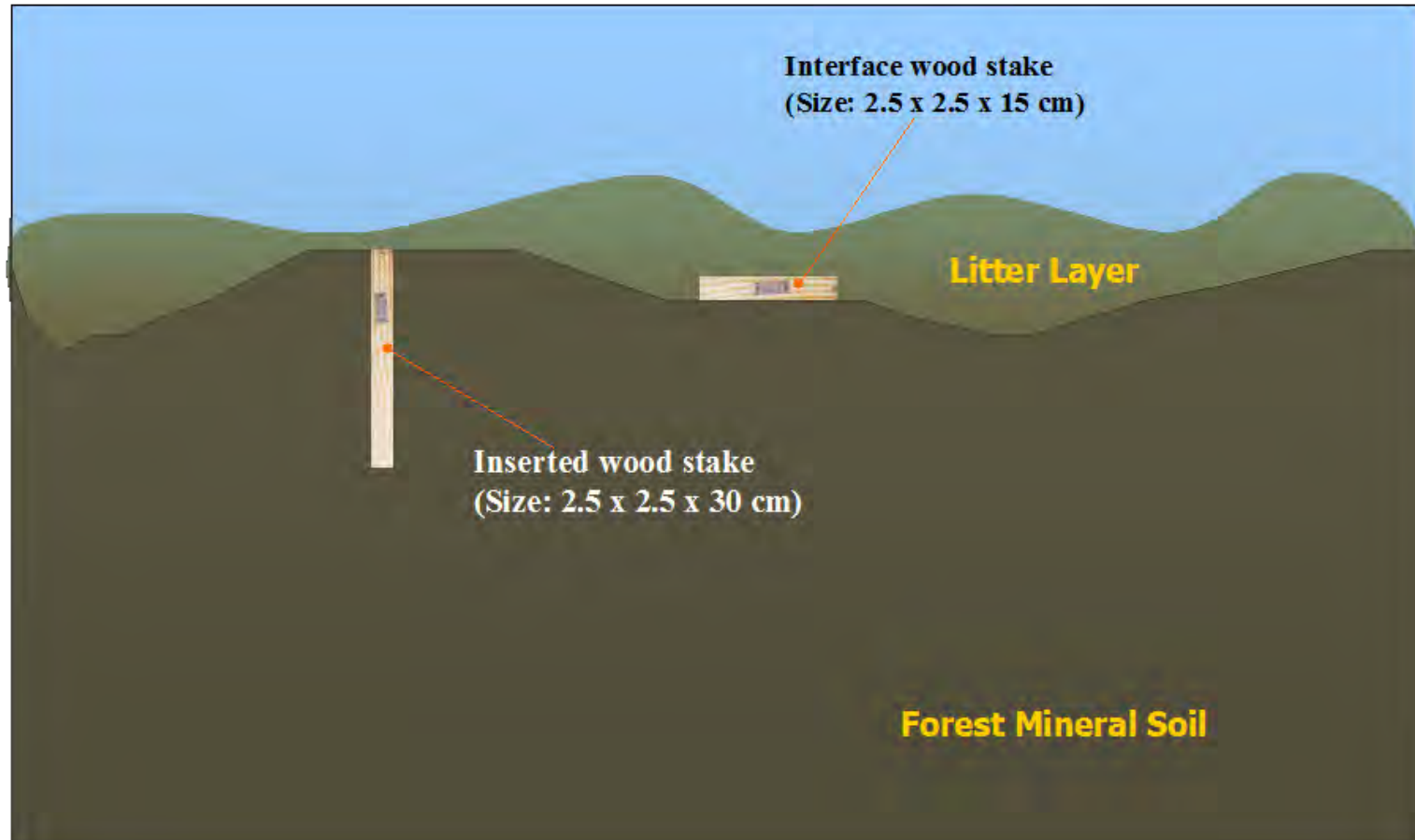
³ USDA Agriculture Research Service, USDA Forest Service



Study objectives



1. Evaluate the effects of soil chemical, physical, and biological properties on wood decomposition rates and microbial decay patterns across a range of soil types and climatic regimes within the Northern Research Station.
2. Estimate the impacts of a variety of land management practices (e.g. timber harvesting, site preparation, urbanization, and wetland restoration) on wood decomposition in the forest floor and mineral soil within the Northern Research Station.
3. Assess the relationship of microbial diversity to the rate and degree of wood decomposition under varying soil moisture, temperature, and nutrient conditions within the Northern Research Station.
4. Provide input to carbon sequestration and cycling model of the Northern Research Station, and Forest Service Research and Development.



At each location, two types of wood stakes will be used to contrast the different lignin and cellulose contents of softwood and hardwood trees on decomposition: loblolly pine (*Pinus taeda*), and aspen (*Populus tremuloides*).

Thank you!

