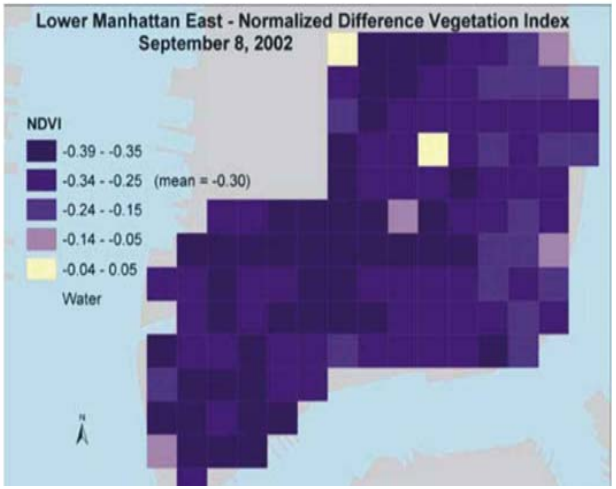
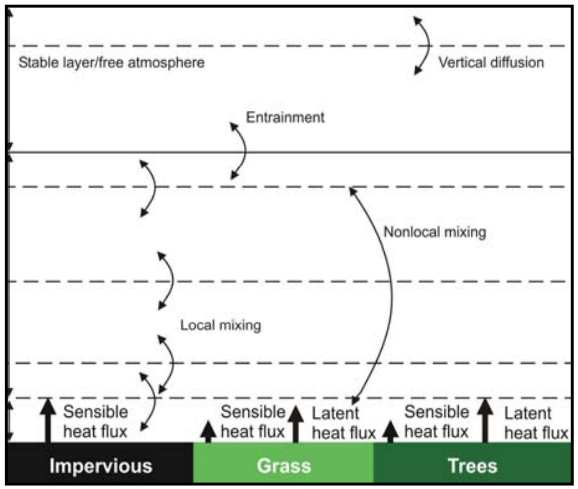
Greening Lower Manhattan East

New York City Urban Modeling Consortium





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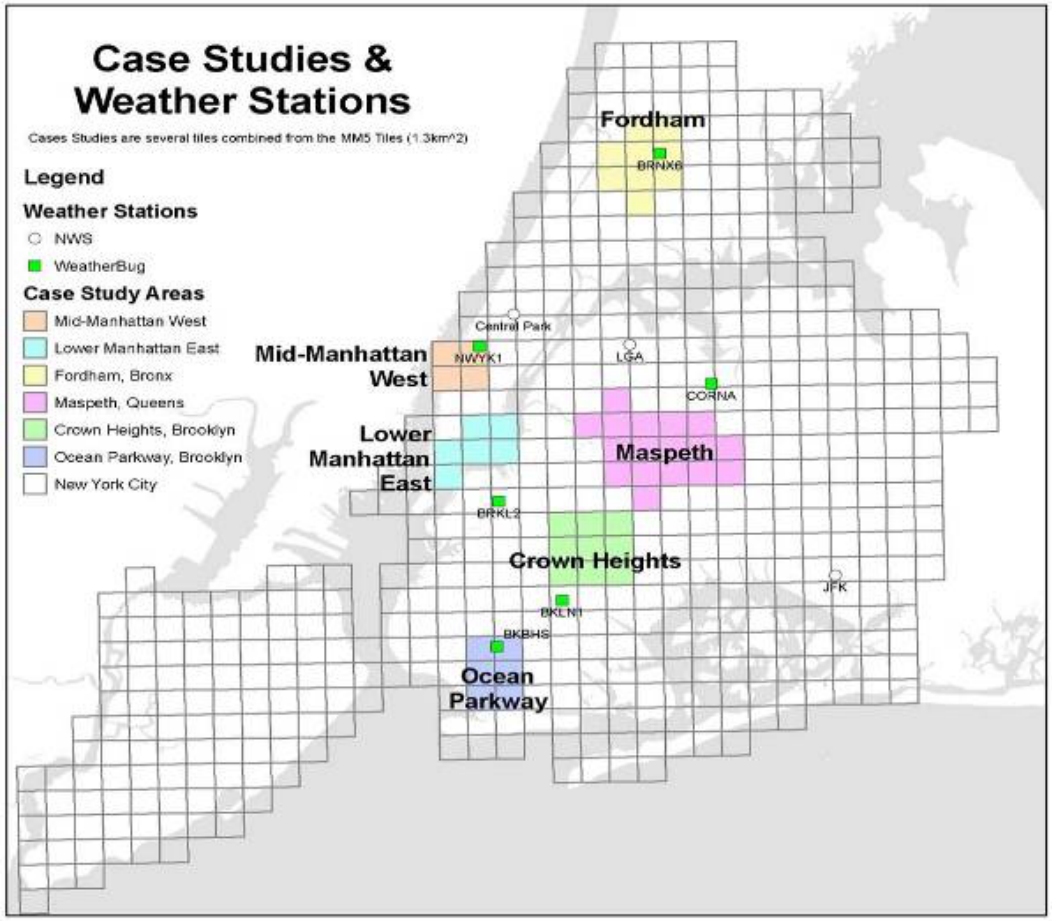
Urban Heat Island Case Studies



Project Partners: NYSERDA, NYSDEC

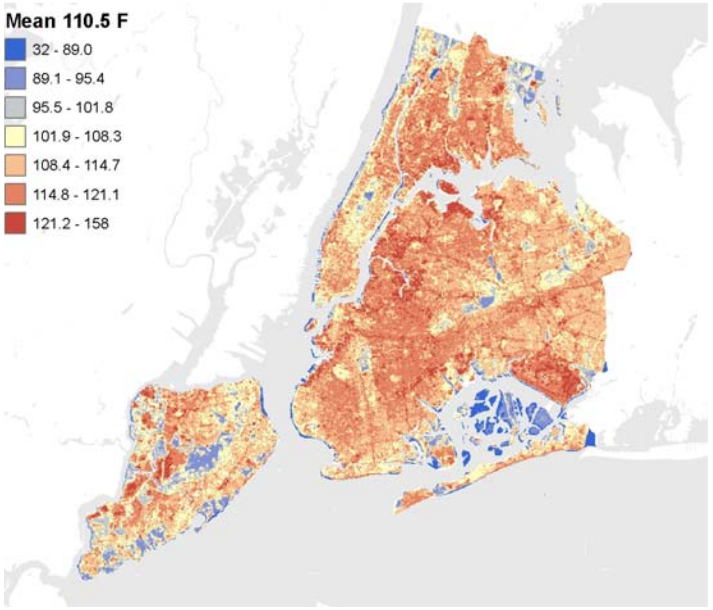
Investigate community-scale options for reducing the heat island through:

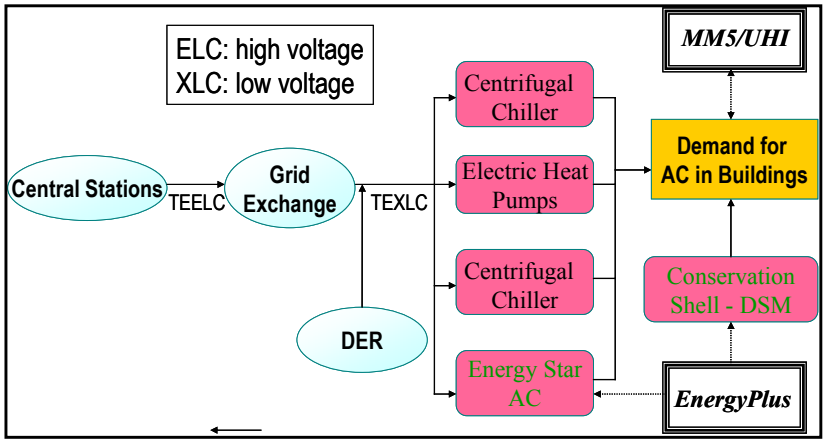
- urban forestry
- living (i.e. green, vegetated) roofs
- light (i.e. reflective) surfaces

Link mitigation to impacts on:

- energy demand
- air quality
- health
- environmental justice

Linking data and models





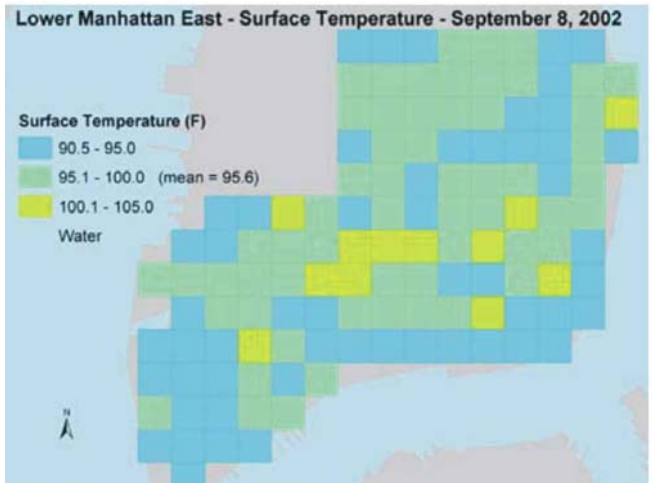
Data:

- Satellite images and climate data
- Land use and land surface cover
- Open space, street trees, flat roofs
- Energy demand data

Models:

- GIS system
- MM5 regional climate model
- MARKAL
- EnergyPlus

Case Study: Lower Manhattan East



A validation of concept for the full set of linked models was carried out in Lower Manhattan.

- Lower Manhattan's temperature could be reduced by planting trees, increasing the reflectivity of roads and sidewalks, and putting vegetation on roofs

- Heat island mitigation could reduce peak energy demand at the neighborhood scale

- Building-level impacts of heat island mitigation strategies can be characterized with EnergyPlus

Applications for Modeling System

- Zero Thermal Footprint zoning ordinance

- 15 year strategy for transforming blocks of real estate tied to the weak substation on Lower Manhattan East

- Population studies of residents vulnerable to heat island expansion and increases in the frequency and intensity of extreme heat events

Next Steps: Proof of Concept

- Analyze community and building-scale data in a small neighborhood using the linked models

- Develop collaboration with key stakeholders from this neighborhood

- Design green community and green building strategies to reduce the heat island and its impacts on energy demand and health

- Implement and monitor the selected strategies

Green Design and Urban Sustainability

- Green Design will play an increasingly important role in adaptation to climate change

- Integrating a range of green design elements into a community is more effective than adopting a single-building or single-strategy approach

- New York City has an opportunity to take a lead role in community-scale green design