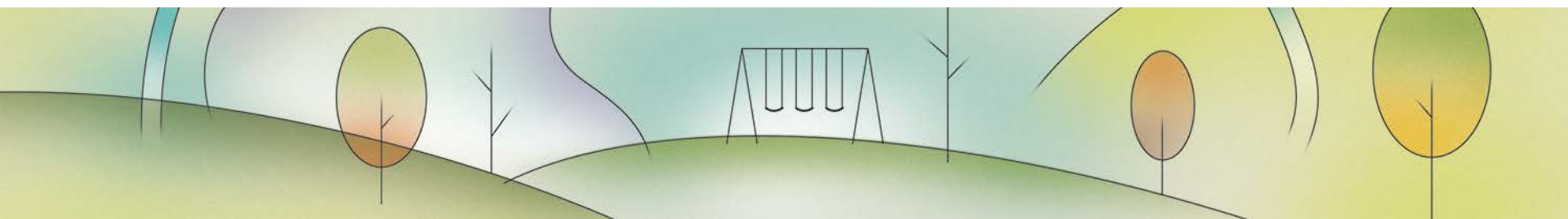




Planning for Climate-Smart Cities

GREEN INFRASTRUCTURE FOR COASTAL PROTECTION

THE
TRUST
for
PUBLIC
LAND





Overview of Presentation

- TPL Leadership in GIS & Planning Applications
- Overview of Climate-Smart Cities
- Green Infrastructure for Coastal Resilience Pilot

TPL Leadership in GIS & Planning Applications

- TPL has developed custom JavaScript to build decision support tools on the Esri platform
- 2006 Esri *Special Achievement in GIS Award*
- 2012 Esri *Making a Difference Award*



TPL's Integrated Services

Climate-Smart Cities Can Lead Global Carbon Diet



NYC vs. Suburbs
13,448 Lbs. Less
CO2 Per Capita

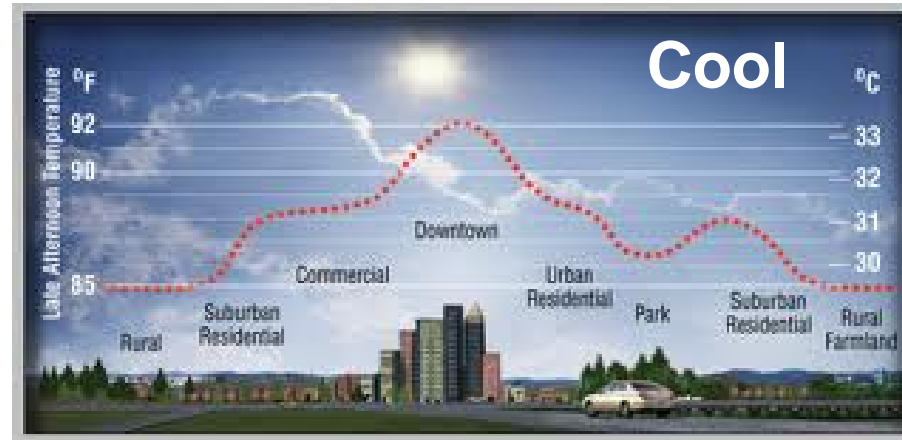
The Greenness of Cities: Carbon Dioxide Emissions and Urban Development,
Glaser and Kahn, 2008

THE TRUST *for* PUBLIC LAND
CONSERVING LAND FOR PEOPLE



Climate-Smart Cities = Safety & Environmental Justice

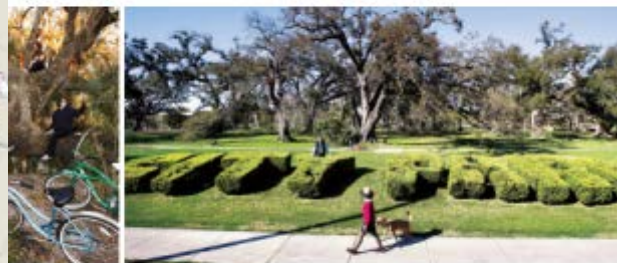
Green Infrastructure for Climate-Smart Cities



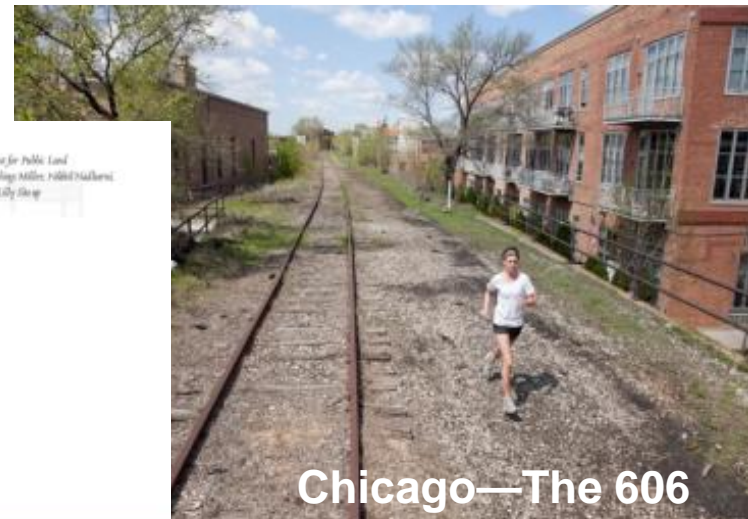
Connect—To Save ½ Lb. CO₂ & 1.3 Cents in Health Care Costs Per Mile Diverted from Auto



Quantifying the Greenhouse Gas Benefits of Urban Parks



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CONSERVING LAND FOR PEOPLE



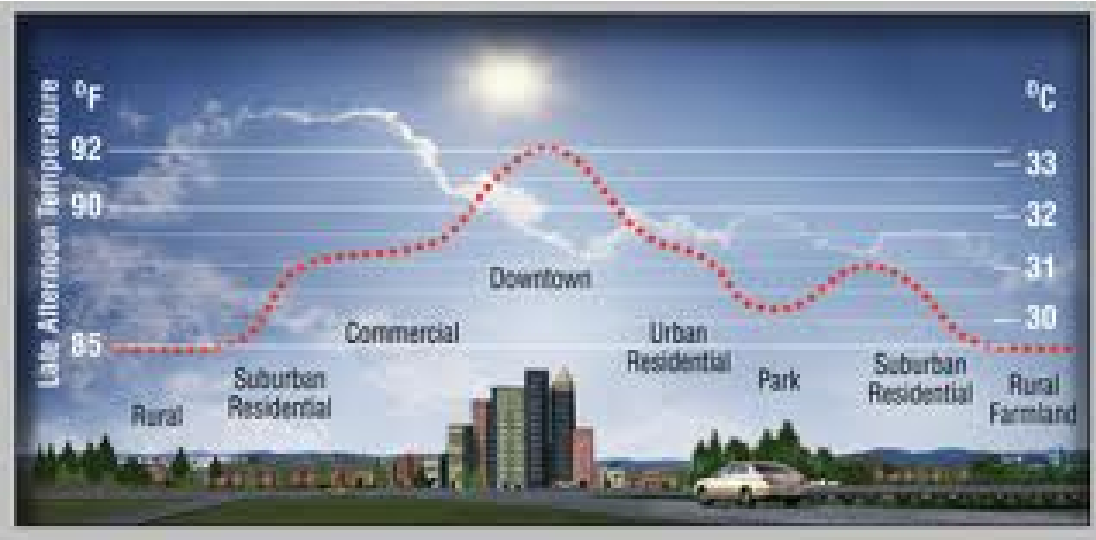
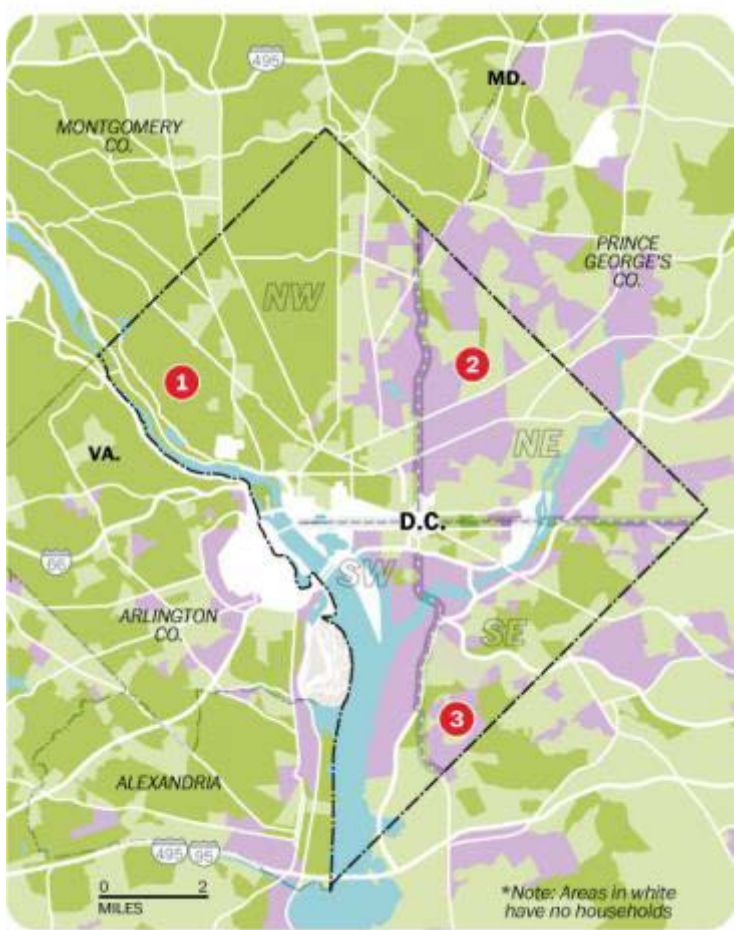
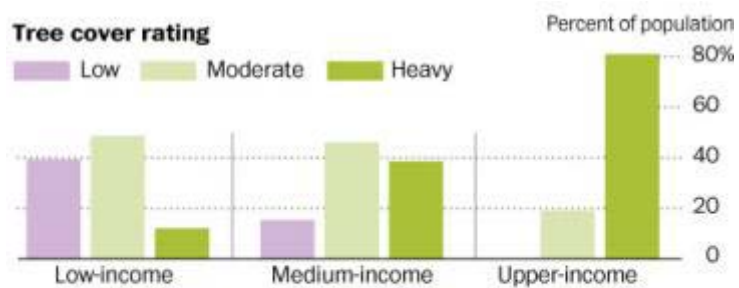
Chicago—The 606



NYC—The Queensway

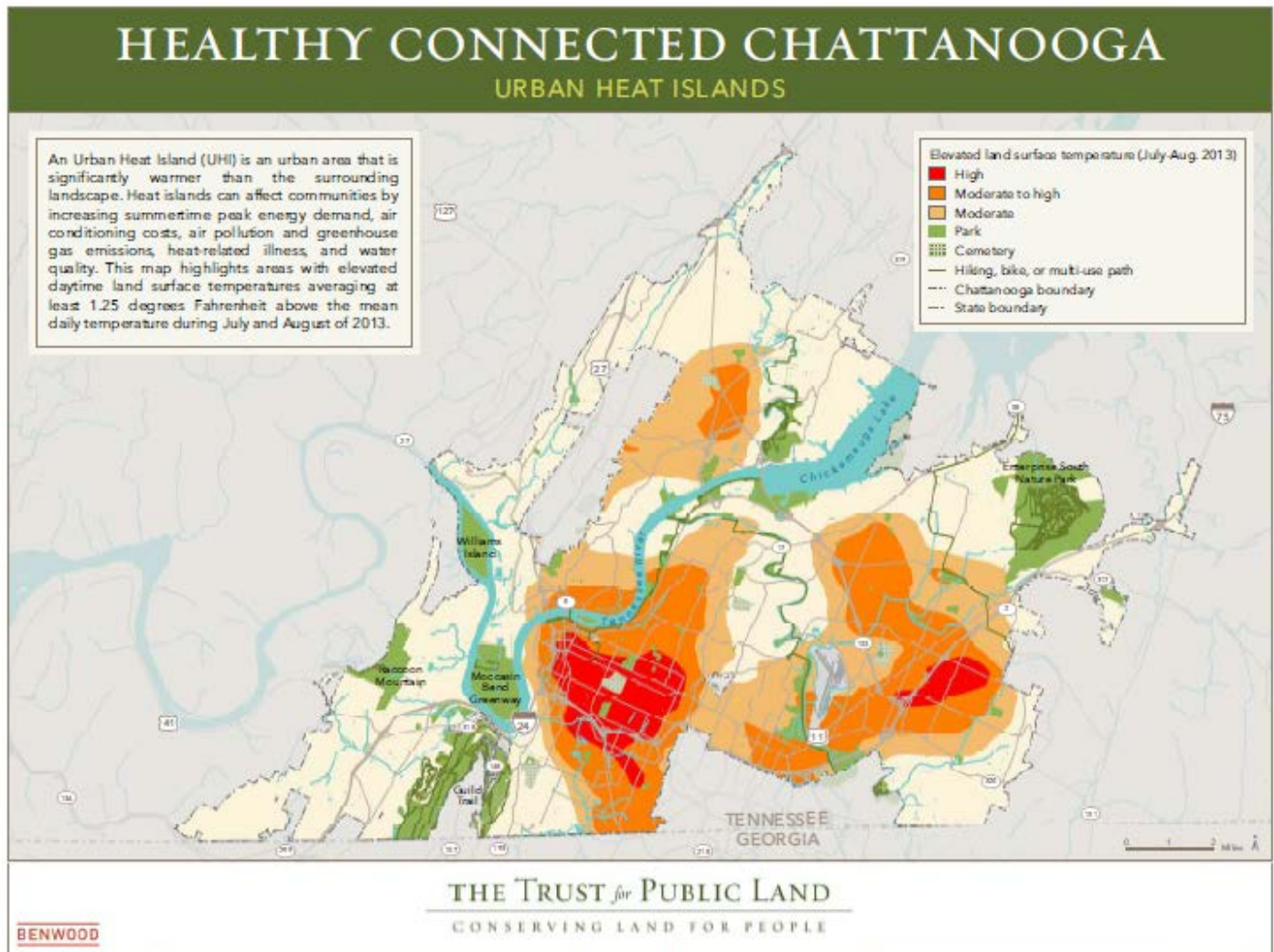
Seattle—Eastside Rail Corridor

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Cool—Add Green to Cool Air by 5-22 Degrees

Creating Climate Data to Fill Gaps— Chattanooga Heat Islands Example



Absorb—To Save Energy and Recharge Aquifers

Ballona Wetlands



Los Angeles Green Alleys



LA River Restoration



Protect—Green Shorelines to Buffer Cities



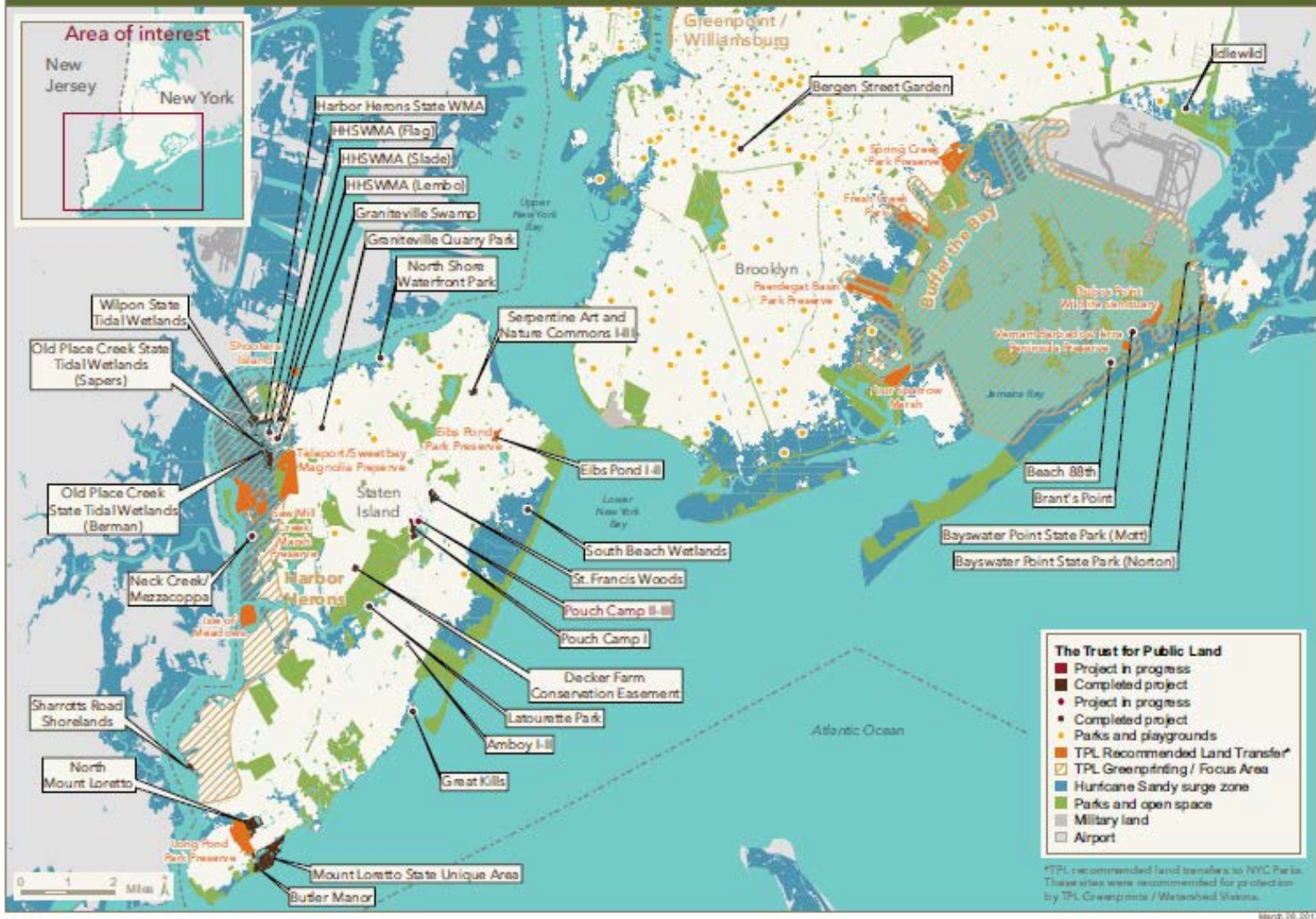
***TPL Project:
North Shore Park,
Staten Island***



***TPL Project:
Old Place Creek,
Staten Island***

THE TRUST FOR PUBLIC LAND - NEW YORK

HARBOR PROGRAM



Leveraging TPL's Strong History in NYC Resilience

Pilot: Green Shorelines to Protect NYC Waterfront



Climate Smart Cities Pilot:
New York City

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CONSERVING LAND FOR PEOPLE

Zoom In Zoom Out Pan Full Extent Process Exhibit Measure Length Measure Area Identify Reset Map

To view parcel details and create reports, click on the map to select parcels or define search conditions below.

Find Parcels Where ...

Borough
Staten Island

AND +
Acres
> 25

AND +
Overall Priorities for Green Infrastructure
Very High

AND +
>>Subway Entrance Buffer Zone
Yes

Add Query Condition Remove Condition
RUN QUERY

Parcel Details:
Protect Critical Infrastructure
Overall Priority: Very High
Emergency Services Buffer Zone: No
Health Care Facilities Buffer Zone: Yes
Subway Entrance Buffer Zone: Yes
Transportation Structures Buffer Zone: Yes
Railline Buffer Zone: Yes
School Buffer Zone: Yes

esri

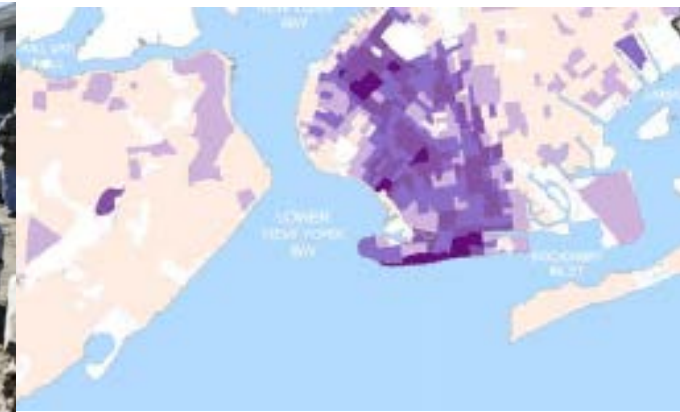
HELP Copyright © 2014 The Trust for Public Land | Questions About This Site | NYC Office of Emergency Management

RESEARCH: Assess Past GI Performance

GIS: Target Highest Value Sites

DEMONSTRATE: Resilient Designs on Priority Sites

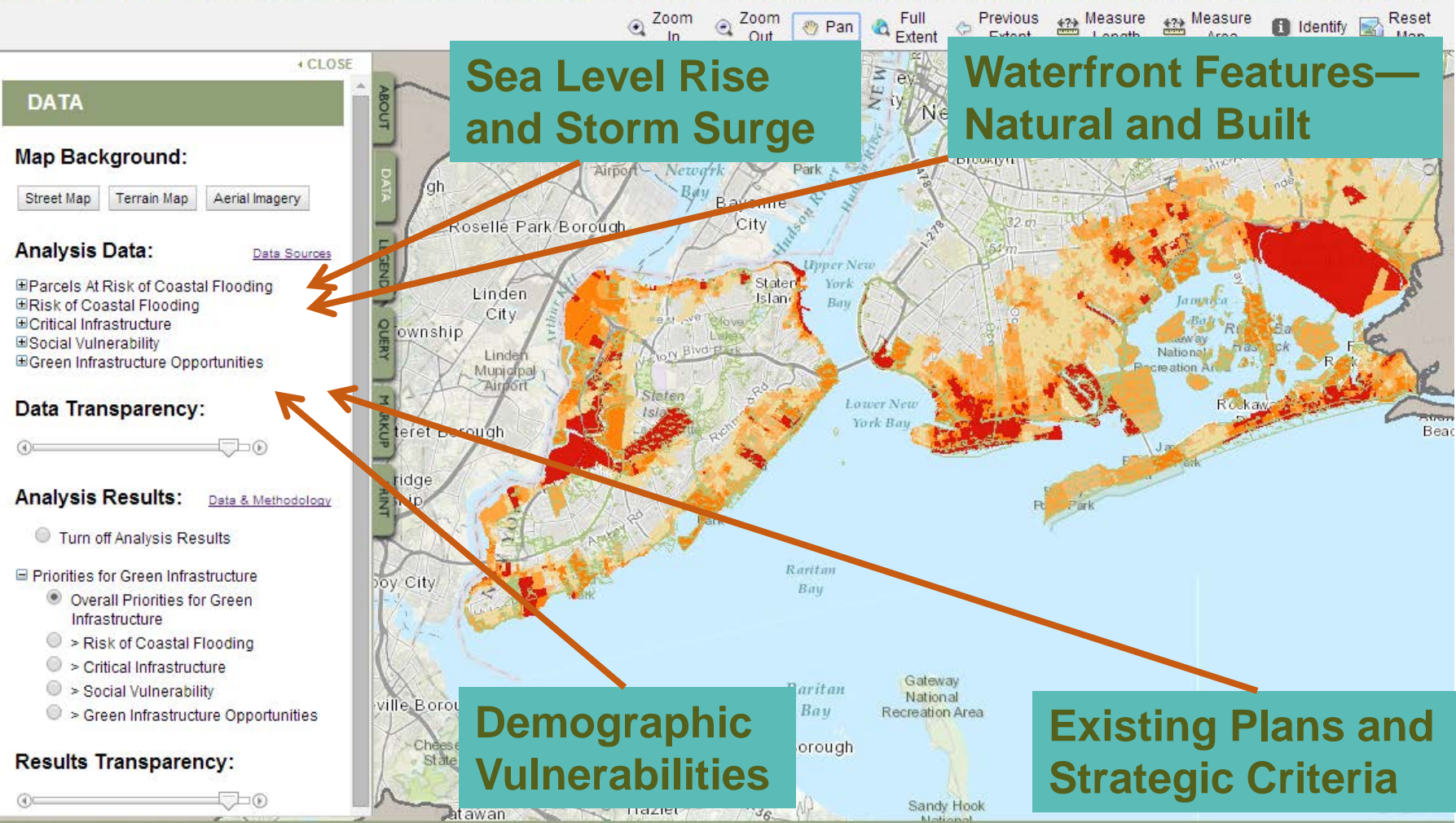
Research: How Did GI and Social Networks Function to Mitigate Damage from Sandy?



GIS: Online Portal for Decision Support from Project Selection to Policy Measures

Climate Smart Cities Pilot:
New York City

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CONSERVING LAND FOR PEOPLE



Sea Level Rise and Storm Surge

Waterfront Features—
Natural and Built

Demographic Vulnerabilities

Existing Plans and Strategic Criteria

DATA

Map Background:

- Street Map
- Terrain Map
- Aerial Imagery

Analysis Data:

[Data Sources](#)

- Parcels At Risk of Coastal Flooding
- Risk of Coastal Flooding
- Critical Infrastructure
- Social Vulnerability
- Green Infrastructure Opportunities

Data Transparency:

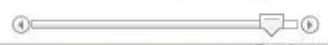


Analysis Results:

[Data & Methodology](#)

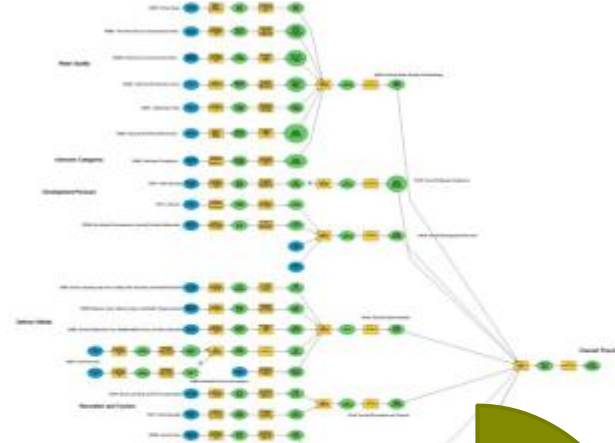
- Turn off Analysis Results
- Priorities for Green Infrastructure
 - Overall Priorities for Green Infrastructure
 - > Risk of Coastal Flooding
 - > Critical Infrastructure
 - > Social Vulnerability
 - > Green Infrastructure Opportunities

Results Transparency:



HELP

Climate Smart Cities Pilot Project: New York City					
Model Criteria February 16, 2014					
Component	Criteria	Scoring (Scale 0-5)	Methodology	Data (Description, Date)	Data Source
Risk of Coastal Flooding	Hurricane Evacuation Zone	Zone 1 = 1 Zone 2 = 4 Zone 3 = 3 Zone 4 = 2 Zone 5 = 1 Zone 6 = 1	Each parcel is tagged with 2013 Hurricane Evacuation Zone designation 1-6. Hurricane evacuation zones are the areas of the city that may need to be evacuated due to the anticipated threat from hurricane storm surge. These areas may be numbered by storm surge or isolated by storm surge walls. There are six zones, ranked by the risk of storm surge impact. ZIP CODE 1 DURING THE HURTS REPLY TO FLOOD. If the result of a hurricane or tropical storm, residents in these zones may be ordered to evacuate.	2013 Hurricane Evacuation Zones	NYC Office of Emergency Management
	2010 Hurricane Sandy Storm Surge	In Surge Zone = 5 Not in Surge Zone = 0	Parcels that were within the 2012 Hurricane Sandy Storm Surge zone are tagged.	2012 Hurricane Sandy Storm Surge	NYC Office of Emergency Management
	2010 Hurricane Irene Storm Surge	In Surge Zone = 5 Not in Surge Zone = 0	Parcels that were within the 2010 Hurricane Irene Storm Surge zone are tagged.	2010 Hurricane Irene Storm Surge	NYC Office of Emergency Management
	2013 Flood Advisory Zones	Zone 1 = 4 Zone 4 = 4 Zone 3 = 3	Each parcel is tagged with its potential flood extent based on current 2013 Flood Advisory Zones. The Flood Advisory Zones take into consideration a combination storm surge, wave setup, and overland wave action. Zone 1 designates areas in the coastal high hazard zone, subject to high velocity wave action with breaking waves over 2 ft in height based on the 1% annual chance flood elevation. Zone A designates areas subject to coastal flood effects based on the 1% annual chance flood elevation. Zone X designates areas with potential for catastrophic effects associated with wind speeds over 100 mph or flood.	2013 Flood Advisory Zones	National Emergency Management Agency (NEMA)



Climate Smart Cities Pilot: New York City



[Zoom In](#) [Zoom Out](#) [Pan](#) [Full Extent](#) [Previous Extent](#) [Measure Length](#) [Measure Area](#) [Identify](#) [Reset Map](#)

+ CLOSE

DATA

Map Background:

Analysis Data: [Data Sources](#)

- Parcels At Risk of Coastal Flooding
- Risk of Coastal Flooding
- Critical Infrastructure
- Social Vulnerability
- Green Infrastructure Opportunities

Data Transparency:

Analysis Results: [Data & Methodology](#)

- Turn off Analysis Results
- Priorities for Green Infrastructure
 - Overall Priorities for Green Infrastructure
 - > Risk of Coastal Flooding
 - > Critical Infrastructure
 - > Social Vulnerability
 - > Green Infrastructure Opportunities

Results Transparency:

[HELP](#)

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POWERED BY

Portal: Use Data to Model Priorities

To view parcel details and create reports, click on the map to select parcels or define search conditions below

Find Parcels Where ...

Borough

Staten Island

AND

Acres

> 25

AND

Overall Priorities for Green Infrastructure

Very High

AND

>> Subway Entrance Buffer Zone

Yes

Add Query Condition Remove Condition

RUN QUERY

Parcel Details:

Protect Critical Infrastructure
Overall Priority: Very High

Emergency Services Buffer Zone: No
Health Care Facilities Buffer Zone: Yes
Subway Entrance Buffer Zone: Yes
Transportation Structures Buffer Zone: Yes
Railline Buffer Zone: Yes
School Buffer Zone: Yes

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Portal: Use Query Function to Find High Value Parcels and Develop Parcel Priority Maps

Climate Smart Cities Pilot: New York City Parcel Report

Parcel ID (BBL): 5052020173

Acres: 1.9

Borough: Staten Island

Priorities for Green Infrastructure

Overall Priority: Medium

Mitigates Risk of Coastal Flooding: Very High

Protects Critical Infrastructure: Low

Protects Areas of Social Vulnerability: Low

Opportunity for Green Infrastructure: High

LEGEND

Reference Data

Outside of Study Area

Green Infrastructure Opportunities

Existing Parks



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Climate Smart Cities Pilot: New York City Parcel Report

Parcel ID (BBL): 5052020173

Acres: 1.9

Borough: Staten Island

Mitigate Risk of Coastal Flooding - Priority: Very High

Hurricane Evacuation Zone: 1

Within Hurricane Sandy Storm Surge: Yes

Within Hurricane Irene Storm Surge: Yes

2013 Flood Advisory: High Hazard Zone

2020 Sea-Level Rise: 100-Year Floodplain

2050 Sea-Level Rise: 100-Year Floodplain

Storm Surge Inundation with Hurricane Category: 1

Protect Critical Infrastructure - Priority: Low

Within Emergency Services Buffer Zone: No

Within Health Care Facilities Buffer Zone: No

Within Subway Entrance Buffer Zone: No

Within Transportation Structures Buffer Zone: Yes

Within Railline Buffer Zone: No

Within School Buffer Zone: No

Protect Areas of Social Vulnerability - Priority: Low

Social Vulnerability Index: Medium Low

Percent Children 19 and Under in Census Blockgroup: 0.0

Percent Adults 65 and Older in Census Blockgroup: 0.0

Percent Low Income Households in Census Blockgroup: 0.0

Population Density (res/sqmi): 0.0

Identify Opportunities for Green Infrastructure - Priority: High

Vacant Parcel: Yes

Parcel Size in Acres: 1.9

Under Public Ownership: No

Existing Park: No

Adjacent to a Park: Yes

Has Playground: No

Has Community Garden: No

Cemetery: No

Park Under Construction or Remediation: No

Other Publicly Accessible Waterfront: No

Contains Wetlands: Yes

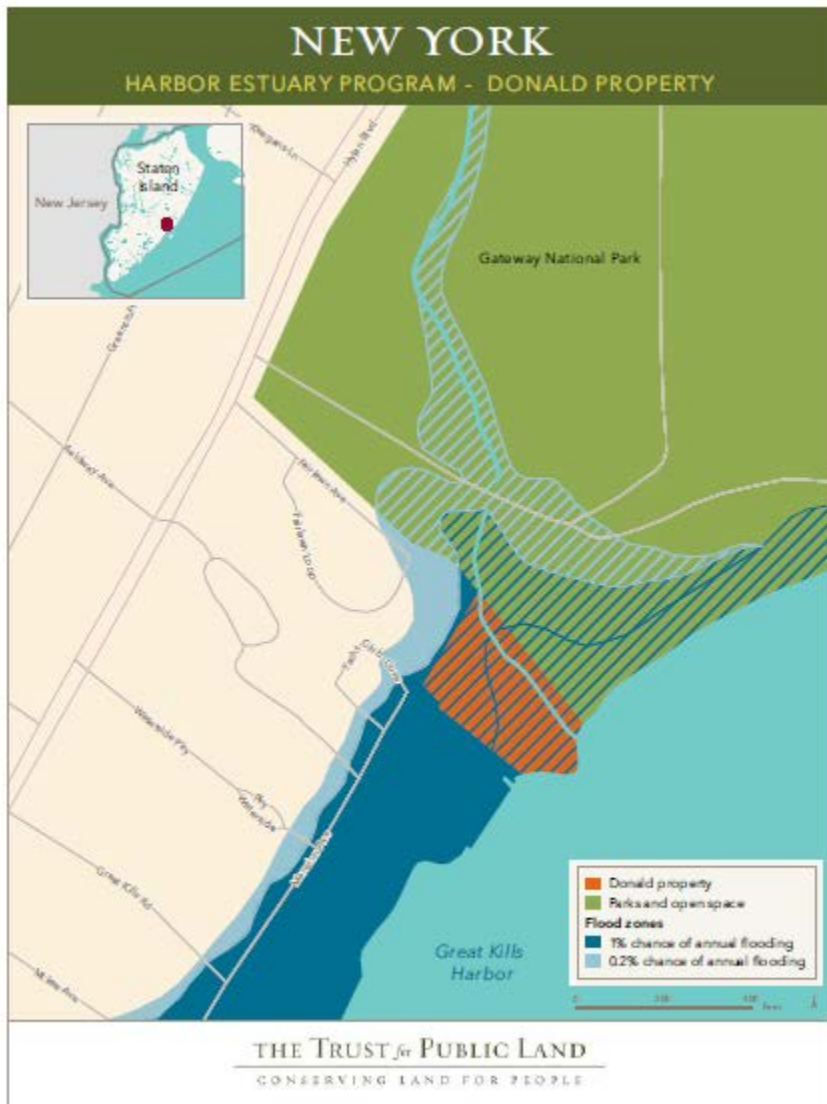
Within Business Improvement District: No

ParkScore Park Equity Analysis: High Park Need

School Property: No

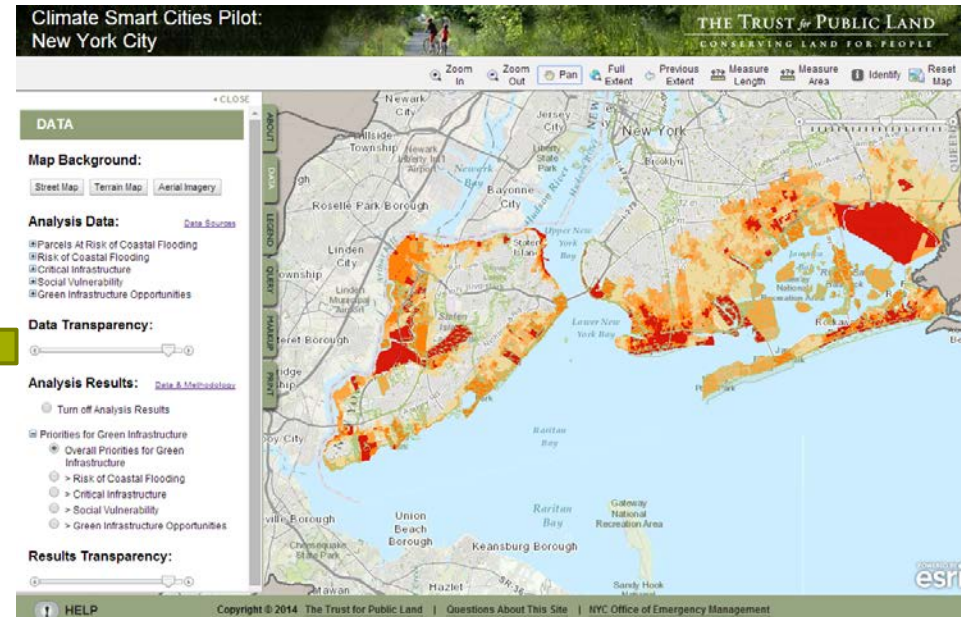
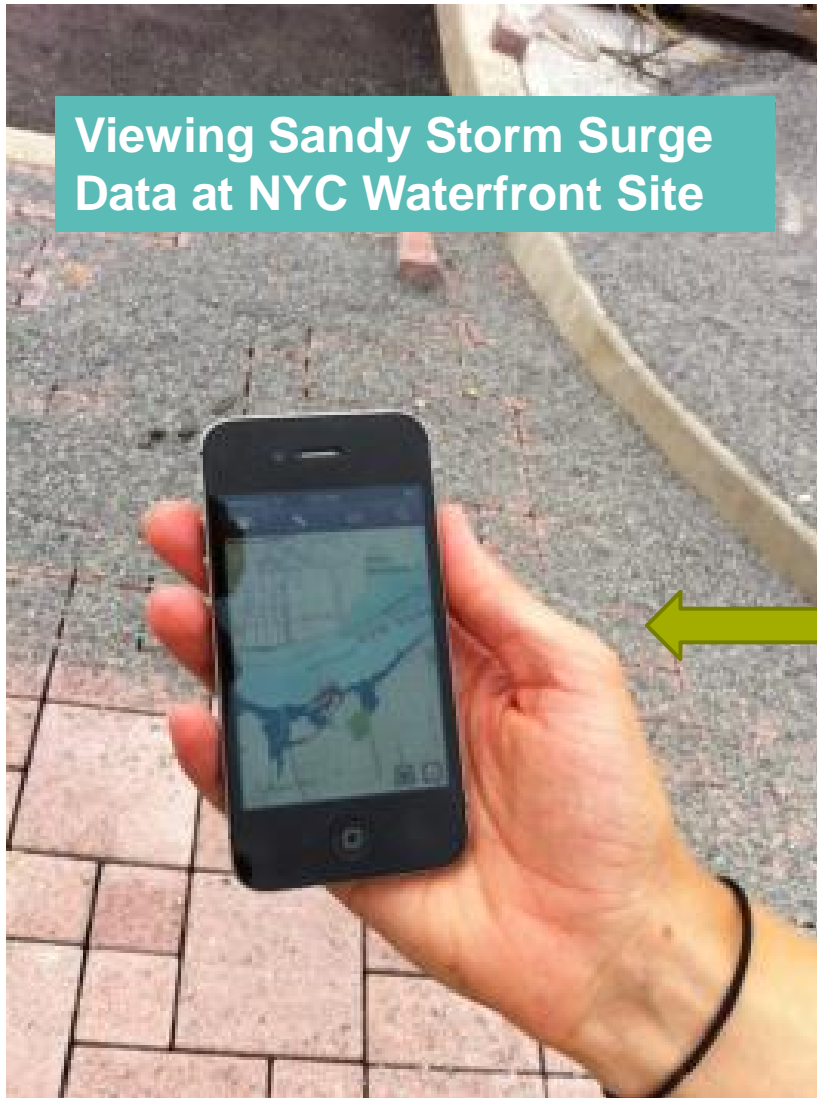
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Portal: Run Data-Driven Parcel Reports



Portal: Use Data to Make Project Maps Showing Climate Relevance

Viewing Sandy Storm Surge Data at NYC Waterfront Site



Portal: Take Data to the Field

Pilot: L.A. Green Alleys to Connect, Cool and Absorb



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SAIT LABORATORY



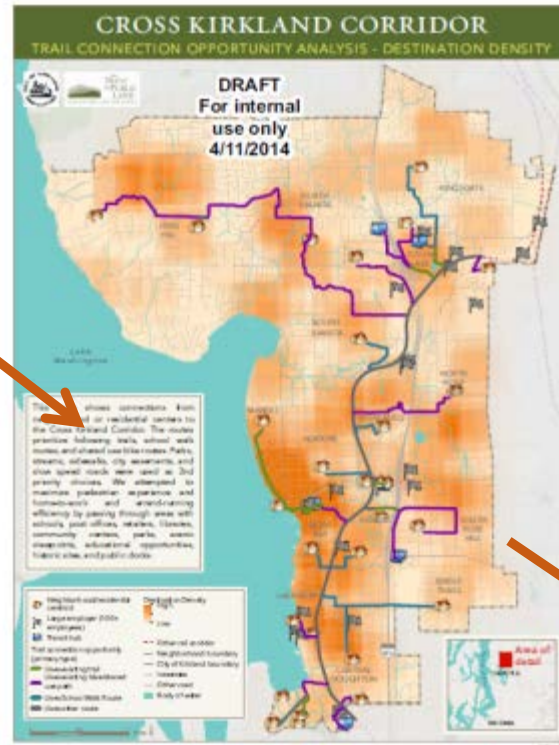
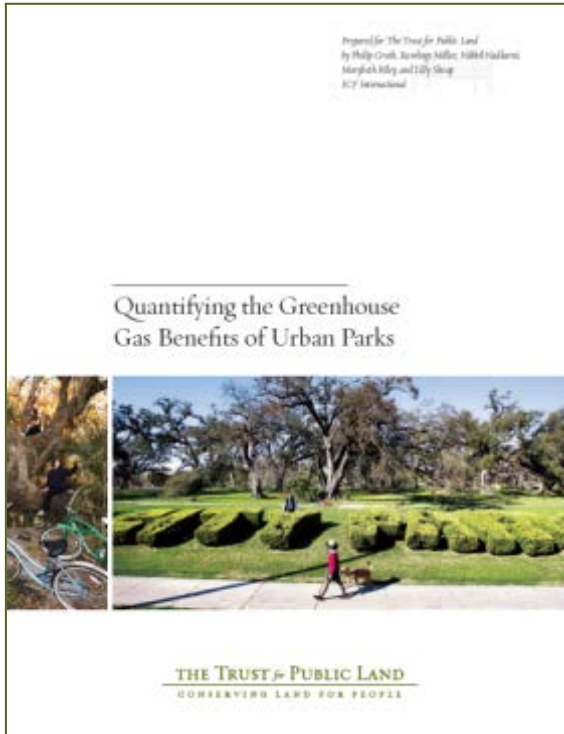
RESEARCH: Cost-Benefit Analysis at City Scale

GIS: Optimize Green Alley Siting with Climate Data

DEMONSTRATION: Avalon Neighborhood



Pilot: Eastside Rail Conversion to Connect Seattle

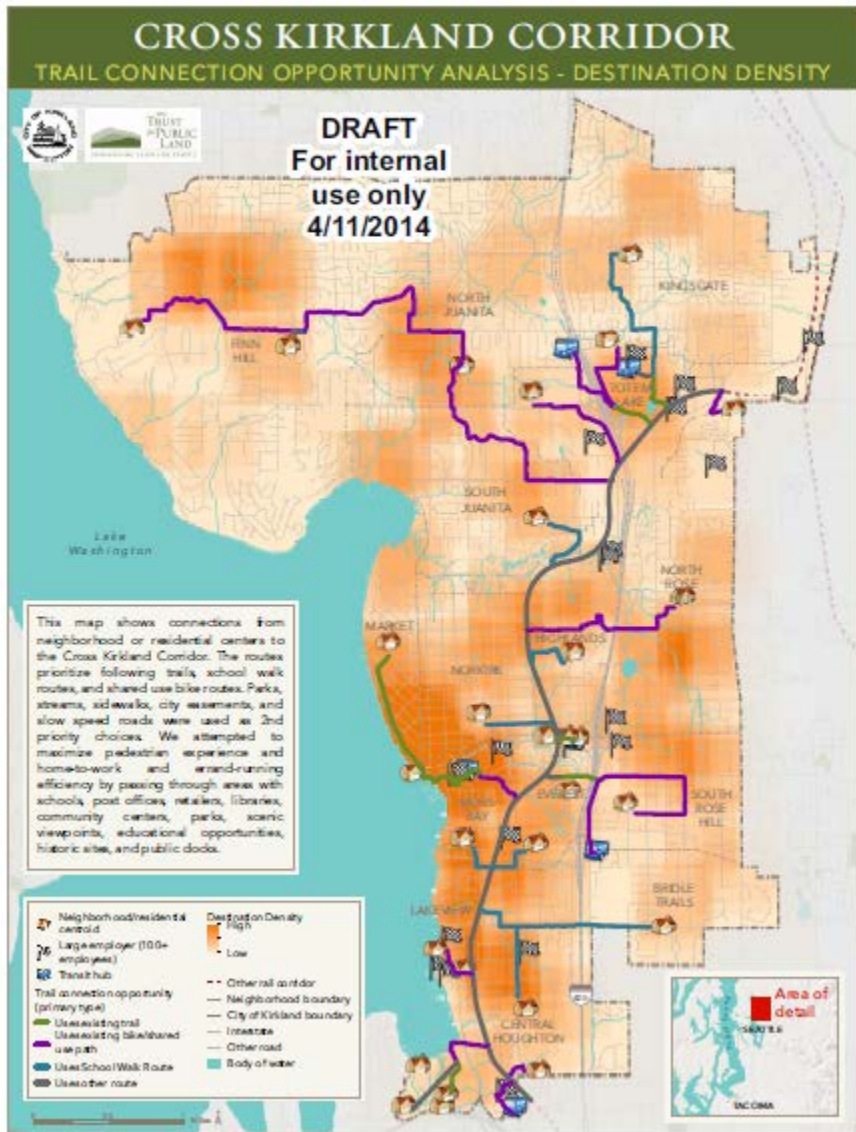


Research: Quantify CO2 Mitigation

GIS: Model for Hyper-Connectivity

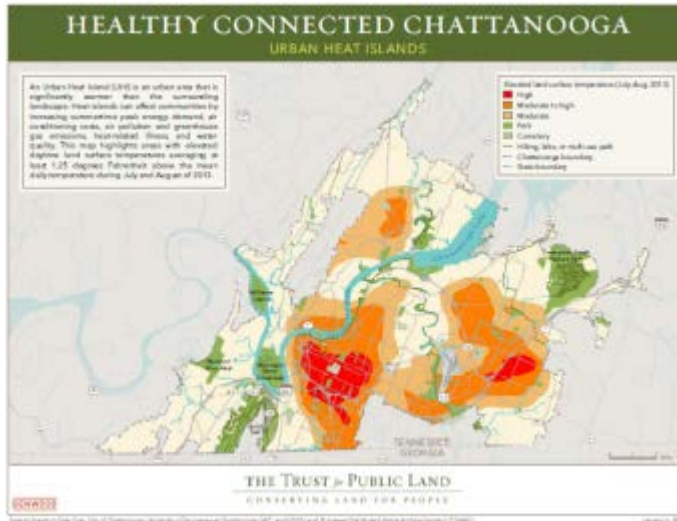


Demonstration: Connect + Absorb



Using Modeling to Design Hyper-Connectivity for Lower CO2 Emissions from Transportation

Other Trust for Public Land Climate-Smart Cities



**Green Line Corridor Connectivity—
Twin Cities**



**Miami-Dade Western Greenway—
SLR and Surge Buffer**

