CENTRAL PARK CONSERVANCY

INSTITUTE FOR URBAN PARKS

Urban Park Management Seminar Series

Conserving the Natural Areas of New York City

May 19, 2016

Seminar Presenters

Helen Forgione is the Natural Areas Conservancy's Senior Project Manager for Ecological Assessment. Helen has over 25 years of experience working in ecology in the NYC metropolitan region for NYC DEP and NYC Parks Department's Natural Resources Group. She has an undergraduate degree in biology from the University of Connecticut and a master's degree in ecology and evolutionary biology from Rutgers University.

John-Paul Catusco joined the Conservancy in February 2005. As Woodlands Manager, Mr. Catusco manages the long-term restoration and daily maintenance work in Central Park's three official natural areas: the 40-acre North Woods, the 36-acre Ramble, and the 4-acre Hallett Nature Sanctuary. Prior to joining the Conservancy, Mr. Catusco spent five years working for the New York State Office of Parks, Recreation, and Historic Preservation and the Walt Whitman Birthplace Association helping to manage the Walt Whitman Birthplace State Historic Site on Long Island. He holds a Bachelors of Arts from Hunter College CUNY and a certificate in horticulture from the Brooklyn Botanic Garden, and has been a certified arborist with the International Society of Arboriculture since 2006.

Central Park's Natural Areas

Central Park contains three official natural areas. Often referred to as Woodlands the sites offer a diverse range of habitats including: upland and lowland forests, shrublands, meadows, wetlands, streams, and even some lawns. Designated as part of New York City's Forever Wild program the sites comprise roughly 10% of Central Park's 843 acres:

The North Woods (40 acres)

The Ramble (36 acres)

The Hallett Nature Sanctuary (4 acres)

The North Woods and Ramble are historical woodlands incorporated into the original design of the park. Hallett was originally named the Promontory and was a landscaped site fenced off as a bird sanctuary in 1934 by Robert Moses.

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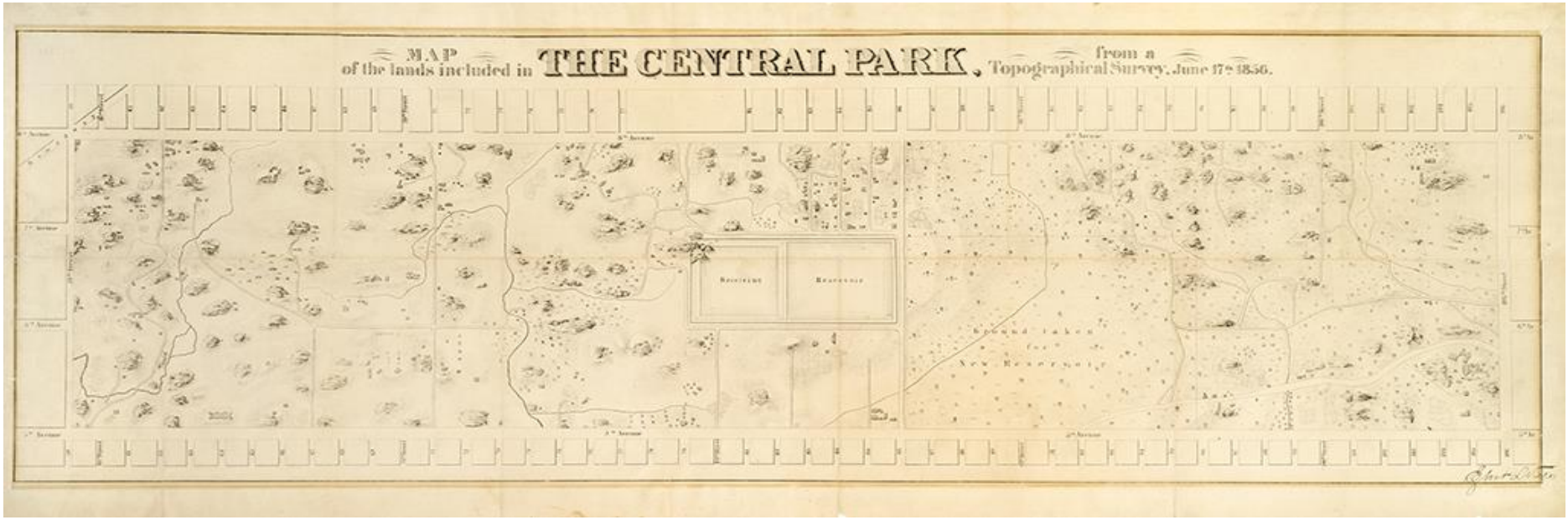
1856 and 1857 — The Lay of the Land



“The Park’s designers, Olmsted and Vaux, sculpted the Ramble out of a wooded hillside that lay immediately south of the old Croton Reservoir. It was, in their estimation, the richest and most interesting part of the pre-Park landscape, both topographically and horticulturally.” RCP

“The present growth, consisting of sweet-gum, spice-bush, tulip-tree, sassafras, red-maple, black-oak, azalea, andromeda, &c., is exceedingly intricate and interesting….” Greensward Plan.

1857 Rawolle and Pilat parkwide plant survey. Pre-construction survey of all flora found growing on the land that was to become Central Park.

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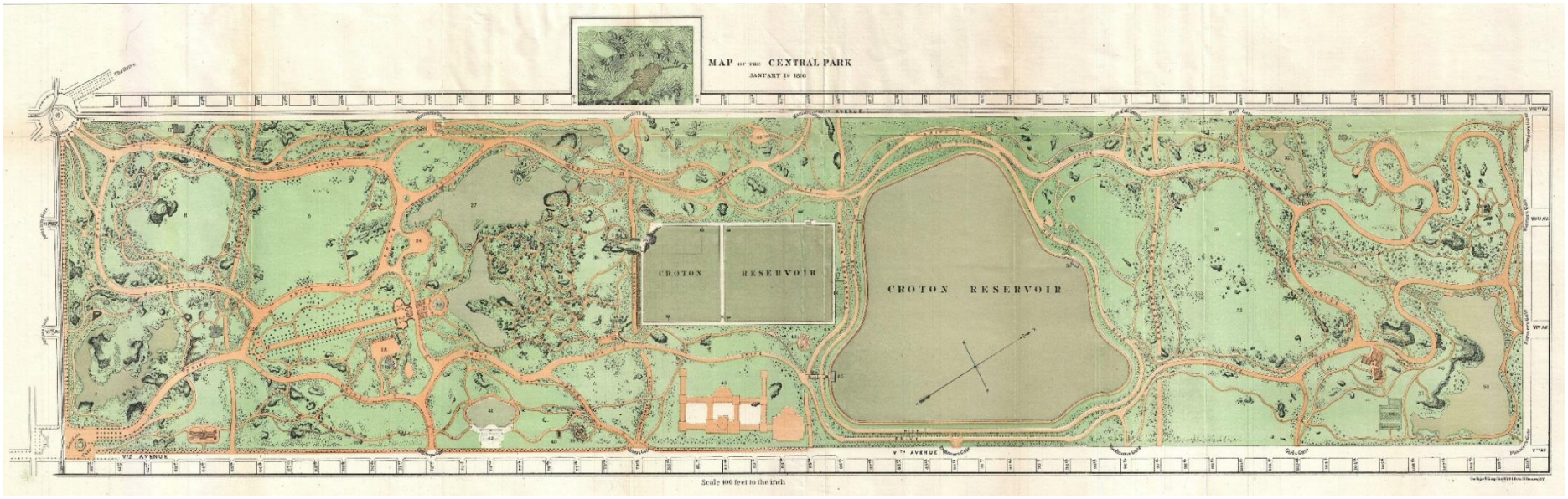
1873 — The Built Woodlands



"A tree survey (of the North Woods) made in 1873 shows that Olmsted and Vaux enhanced but did little to alter the character of the existing forest. They encouraged native tree species such as hickory, basswood, American linden and beech. They planted English ivy, honeysuckle, clematis and other vines that tumbled over the rocks."

"The hilly and heavily wooded north end of Central Park is more than merely a preserve of trees and wildlife. With its cliffs and bluffs and steep ravines, it is a topographical time warp of Manhattan." -- Rebuilding Central Park

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Periods of Decline and Reinvestment along with Plans to Reinvent the Ramble

A variety of projects, ‘improvements,’ and restorations to the three sites over the last 125 years often involved the addition of species of non-native plants some of which would become invasive dominating the sites and reducing biodiversity and habitat. Many were added for aesthetics or for their ability to thrive without maintenance in urban sites.

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Central Park Conservancy and Modern Woodland Management

- In 2011 the Ramble Section was created. The first crew dedicated to natural areas management. In 2015 the North Woods and Hallett Nature Sanctuary were added to unite the park's woodlands into one section
- The woodlands have been divided into eight management zones each with a dedicated Woodland Zone Gardener. Groundskeepers provide support.
- Staff perform all general horticulture and maintenance duties as well as specialized restoration work.
- Manager, coordinator, and foreperson work with and train staff and organize crew, intern, and volunteer projects.
- Woodland education program provides a variety of tours to the public and staff.
- Full-time staff presence in the Ramble and North Woods 7 days a week.

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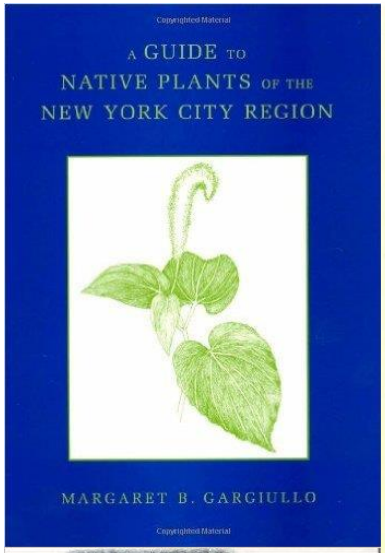
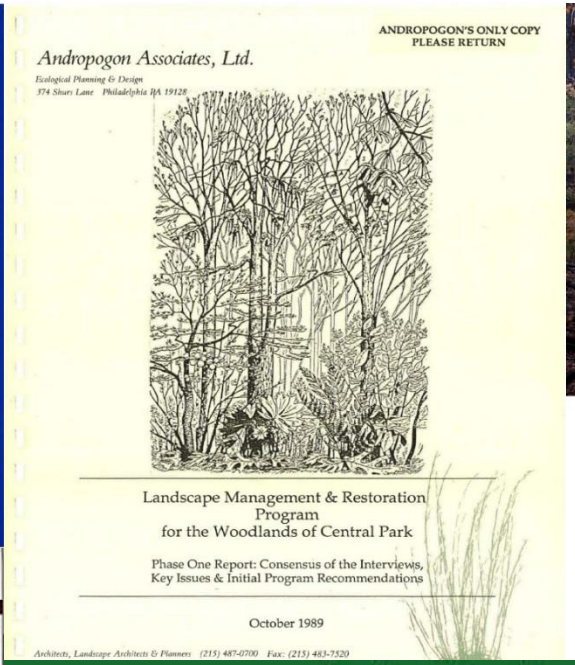
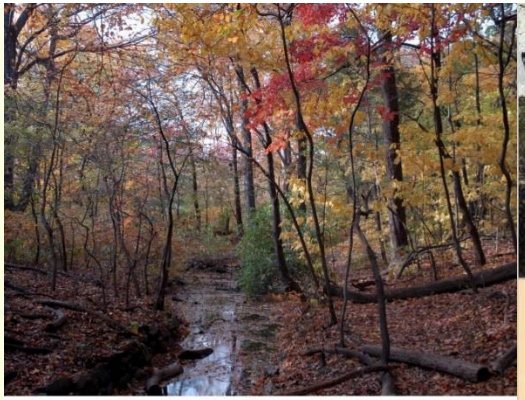
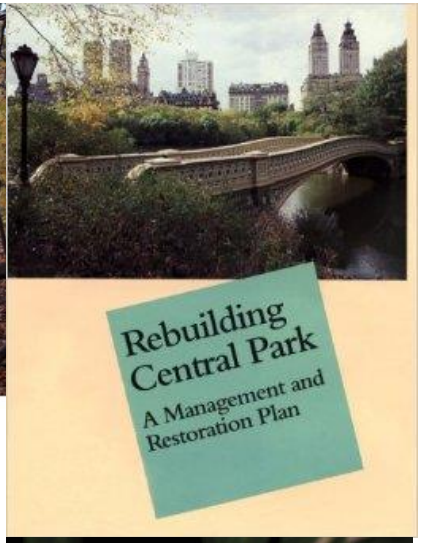
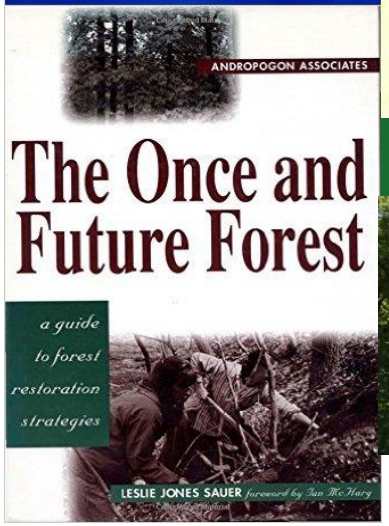
Research Based Restoration Work

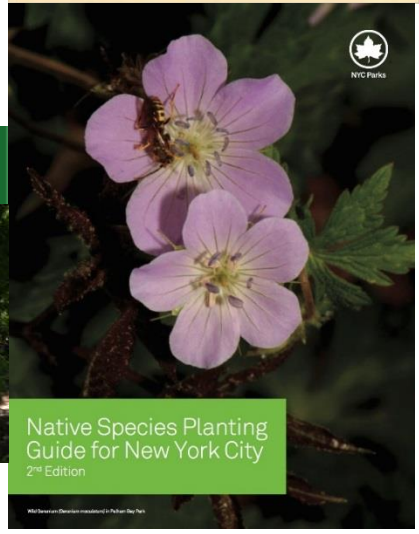












Central Park Flora Project

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Major Investment in Staffing, Infrastructure, and Restoration Work

Between 2006 and 2012 the Central Park Conservancy completed the comprehensive restoration of the Lake and its surrounding landscapes including areas of the Ramble.

The Woodlands Initiative is a $45 million undertaking, and to date the Conservancy has raised $33 million towards this goal.

In 2013 the Conservancy completed site analysis and a natural resources study of the Woodlands, developed restoration concepts and scope of work for the project, and completed the Restoration and Management Planning Framework for the initiative. Work has since begun in phases to limit site disturbance in all three woodlands.

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What We Do and How We Do It

- Initial stages involve a site assessment.
- Teamwork involving staff, volunteers, and interns to clear selected sites of invasive plants. Reduce seed source where possible. Fence sites if needed.
- Herbicide is used only for those invasive plants which cannot be removed manually.
- Initial planting of primary restoration plants able to compete with any remaining or recurring invasive plants.
- Regular maintenance of restoration site by WZG including irrigation if possible.
- If a success continue increasing plant diversity with secondary and rare plants.

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Respect for Place, Flora, Fauna, and People

• One of the biggest challenges was how to increase staff, improve maintenance, move forward with restoration projects without having a negative impact on the Woodlands and their value to wildlife, birds and the bird watching public, along with other park patrons who use the sites to experience a bit of nature in New York City.
• The answer: find staff who love nature and can relate to the various needs and issues unique to the sites. Educate those staff so they can respond to public concerns and speak to the work being done.
• Time major restoration efforts to avoid peak bird Spring and Fall migrations.
• Work with the public and the bird watching community so they are informed of plans and upcoming projects.

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In Small Natural Areas Each Square Foot of Potential Habitat Counts

Staff, interns, and volunteers removing chronically wet turf to expand wet meadow.

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Planting: Focus on Species Native to within 150 Miles of NYC

Over 275 species added since 2007. Plantings techniques and types include: seed, cuttings, bare-root, aquatics, plugs, container, Million Tree saplings, and large caliper B&B shrubs and trees. We have increasingly used Greenbelt Native Plant Center for plants grown from locally sourced seed.

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New Techniques in Invasive Removal

Japanese Knotweed site in North Woods. A before and after. Project begun by ROOTS high school students and staff.

Finding ways to reduce herbicide use. Ongoing experiments in solarization. Based on successful removal of Phragmites in 72nd Street Rowboat Lake.

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New Challenges and Old Foes

- **Turned the corner…**
- Garlic Mustard
- Norway Maple
- Sycamore Maple
- Multiflora Rose
- Japanese Wisteria
- White Mulberry
- Bamboo
- Ailanthus

- **Holding ground…**
- Japanese Knotweed
- Lesser Celendine
- Mugwort
- Phragmites
- Goutweed
- Asiatic Bittersweet
- English Elm
- **New foes…**
- Indian Strawberry
- Porcelain Berry
- Aralia elata
- Mile-a-minute vine
- Canada Thistle
- Scholar Tree
- Amur Cork Tree
- Christmas Berry
- Tea Crabapple
- Winter-Creeper Euonymus

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Nature's Progress

Natural regeneration in the shrub layer was a rarity in the Ramble. With compacted soil, dense layers of invasive plants, and trampling there was poor survivability of seedlings. The serviceberry, witch-hazel, elderberry, and American holly pictured here are a small sampling of native species which are now reproducing in restored landscapes.

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Location, Location, Location

While 80 acres may not seem like a large area the woodlands of Central Park have inherent value as important habitat and their location in Manhattan provides the opportunity for a unique visitor experience. It gives us a chance to reach and educate millions on the value of natural areas.

Annual Visitors:
Ramble 3,129,000
North Woods 938,000
Hallett limited but expanding.

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Long-Term Forest Management Plan for NYC

Helen Forgione

May 19, 2016

Agenda

- Vision and Goals
- What we learned – landscape level
- What we learned – site level
- Developing a Citywide model
- The Plan
- Discussion

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Central Park
Manhattan

840 acres

Central Park Conservancy

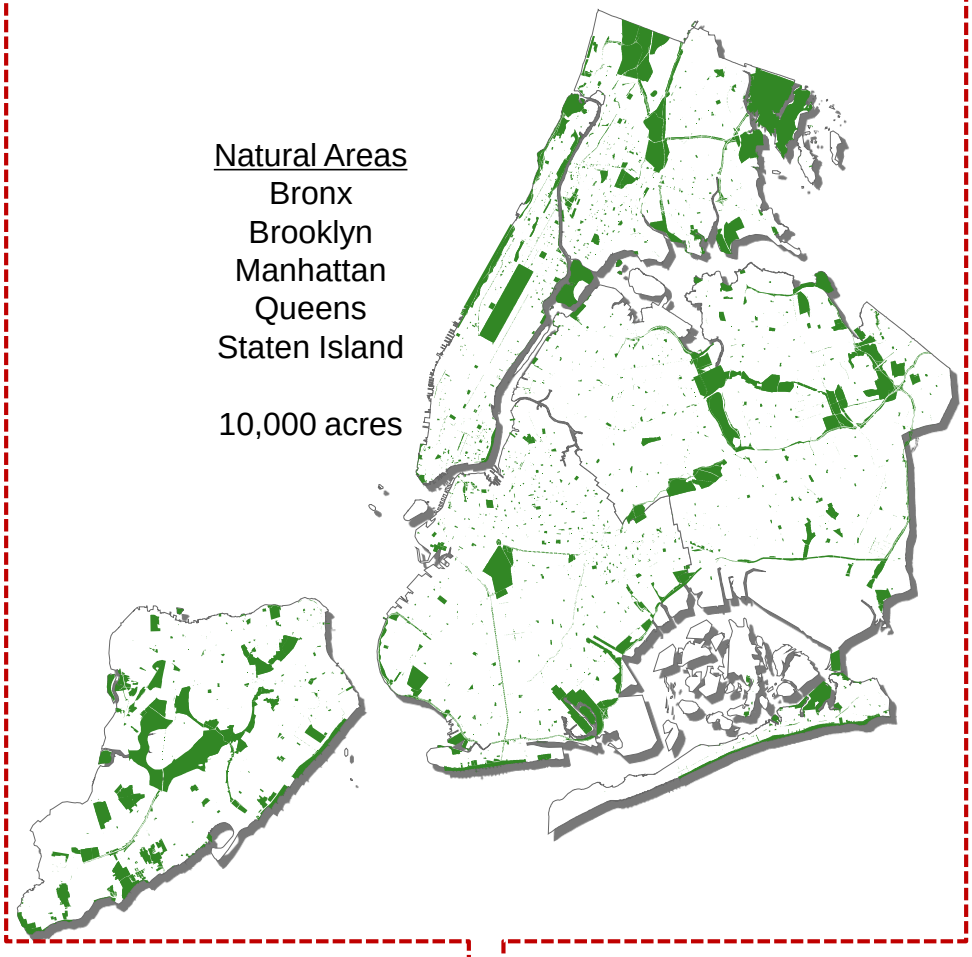
Prospect Park
Brooklyn

585 acres

Prospect Park Alliance

Natural Areas
Bronx
Brooklyn
Manhattan
Queens
Staten Island

10,000 acres



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Why Do Urban Forests Matter?

- 80% of US residents live in urban areas
- More than 5% of NYC is forested
- Urban forests make urban areas livable – mitigate climate change, clean air, stormwater capture
- Urban forests important for human well-being – reduce stress, improve cognition, community cohesion, inspiration, spirituality
- Urban ecology is an emerging field – NYC is on the cutting edge

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Why Does NYC Need A Plan?

- Proactive vs. Reactive
- Serve all residents
- **Set targets and measure progress**

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Vision

Healthy forest that is fully supported socially and financially through:

- Sound science
- Good public policy

Goals

- **100% Active Management** (7,200 acres) – assess, improve, monitor
- Secure a multi-year budget (capital and expense)
- Engage the public at all stages of management
- Ensure high quality user experience

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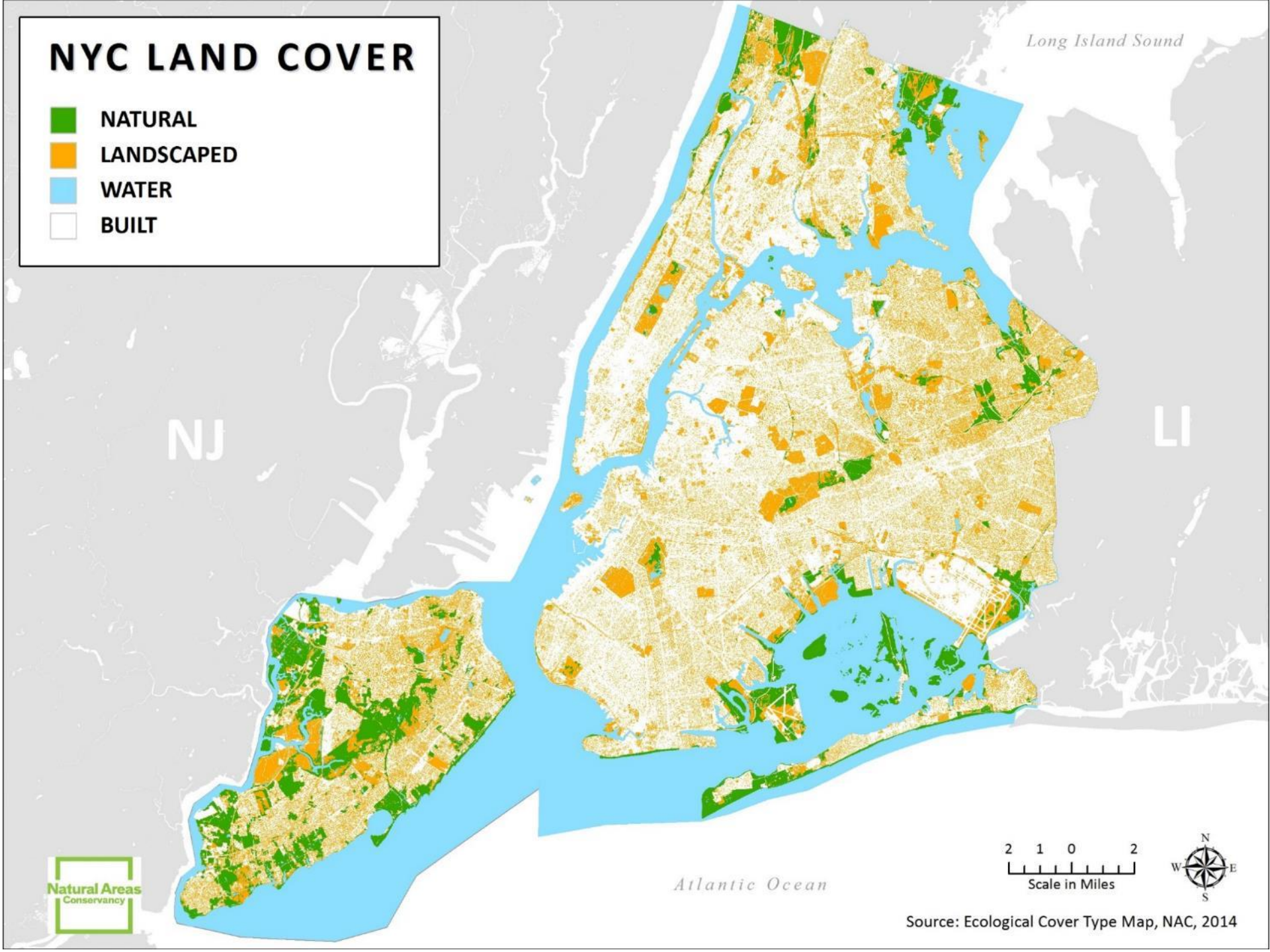
What We Learned – Landscape Level


NYC LAND COVER
NATURAL
LANDSCAPED
WATER
BUILT
Long Island Sound
NJ
LI
Atlantic Ocean
2 1 0 2
Scale in Miles
N
W
E
S
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Source: Ecological Cover Type Map, NAC, 2014

NYC Land Cover

41% of New York City is Green (Landscaped + Natural)
11% is Natural Area

Built	Landscaped	Natural
112,950 acres	56,539 acres	21,162 acres
59%	30%	11%

NYC Natural Area Cover

50% Forests
23% Grasslands & Shrublands
27% Wetlands (Tidal & Freshwater)

Forests	Grasslands	Wetlands
10,578 acres	**4,864 acres**	**5,719 acres**

Built	Landscaped	Natural
112,950 acres	56,539 acres	**21,162 acres**
59%	30%	**11%**

NYC Forest and Grassland Cover in NAC Assessment (7200 acres)

Northern Hardwood
2,601 acres

Successional Hardwood
2,530 acres

Maritime Coastal Forest
942 acres

Swamp/Floodplain Forest
769 acres

Grassland
359 acres

Forest & Grassland
8.1%

What We Learned – Site Level


NAC ASSESSMENTS
Freshwater Wetland Assessment Plot
Over 300 acres, 3 Boroughs, 17 Watersheds, 22 wetlands
Forest & Upland Assessment Plot
7000 acres, 53 Parks, 1124 plots
Salt Marsh Assessment Site
1500 acres, 25 Marsh Complexes, 4 Boroughs
Social Assessment Zone
9503 acres, 1,600 Interviews
Long Island Sound
NJ
LI
Upper Bay
Jamaica Bay
Atlantic Ocean
0 1 2 4
Scale in Miles
N
W
E
S
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SOURCES: NYCDPR, 2016
NAC, 2013, 2014

Highlights

- **A dynamic system -** 76% of forest canopy is native, 63% of midstory and 71% of all tree seedlings
- **Invasive vines** were found in 58% of forest stands
- **Regeneration is varied -** 20% of Northern Hardwood stands have no native seedlings and 36% of Successional stands have no native seedlings
- **Biodiversity –** Over 750 plant species and 62 unique vegetation associations
- **Deer browse** observed in 53% of plots citywide and in 81% of all plots in Staten Island
- **Invasive plants -** 80% of our forests have at least one invasive plant
- **Trash –** Estimated 273 acres of trash in our forest
- **Sweetgum and Black Cherry** are among the dominant canopy trees of the over 40,000 trees we measured (~12,000 overstory)

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Developing a Citywide Framework

Threats

- Cover of invasive exotic herbaceous species in the understory
- Invasive woody seedlings, midstory and canopy trees.
- Invasive vines climbing on trees
- Trash & dumping

Health*

- Native trees in the canopy, midstory and seedling layer
- Native species richness
- Coarse woody debris volume
- Leaf litter depth

**health equation is unique to each forest type.*

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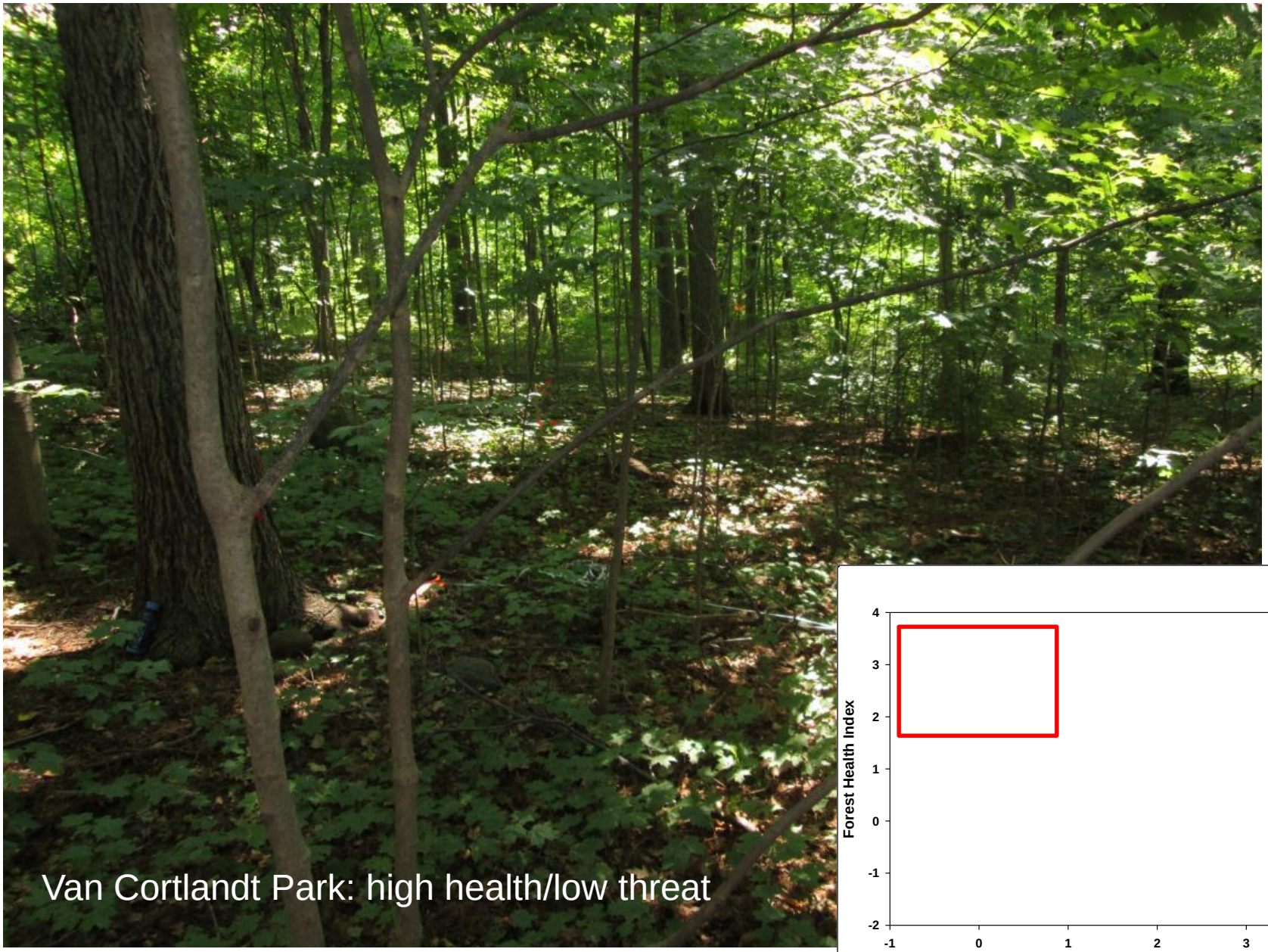
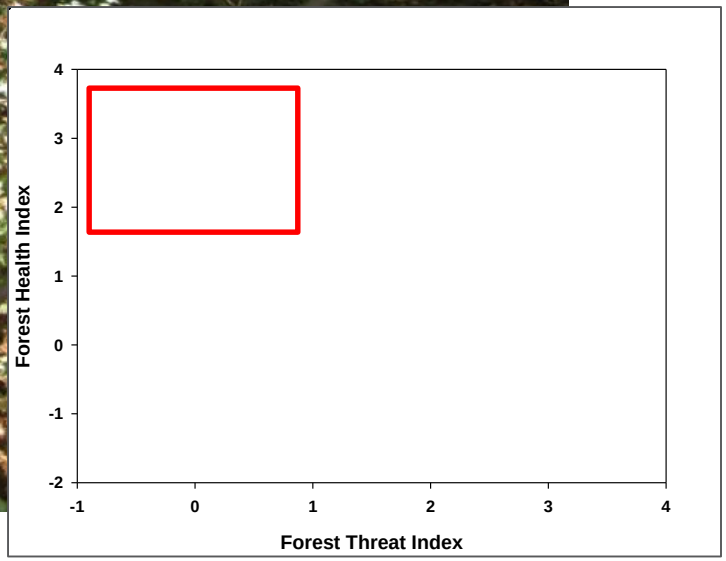

Van Cortlandt Park: high health/low threat


Forest Health Index
4
3
2
1
0
-1
-2
-1
0
1
2
3
4
Forest Threat Index

Forest Management Plan

Scaling up to the entire forest

Each plot represents 6.4 acres of NYC Parks forested land.

Assign plots to a management strategy based on severity of site condition:

- Percent invasive cover
- Invasive vines on trees
- Presence of native tree seedlings
- Invasive-dominant forest type

Each management strategy has a different associated cost.

These costs are borne at different rates over time.

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Connecting condition to management strategy

Contractor Restoration OR In-house Crew Restoration → Forest Management → Forest Conservation

1,107 acres	2,419 acres	2,494 acres	896 acres

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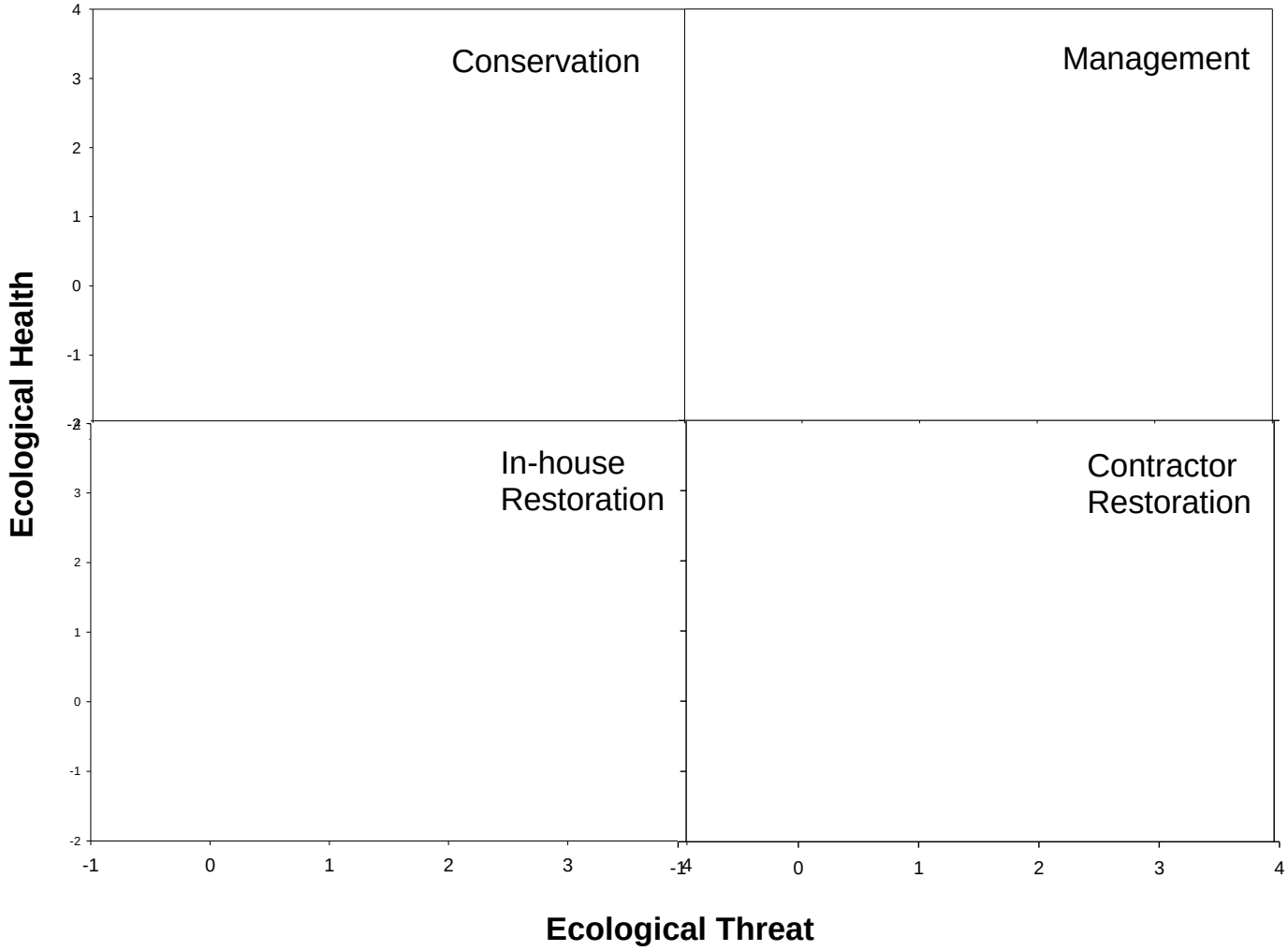
Connecting condition to management strategy



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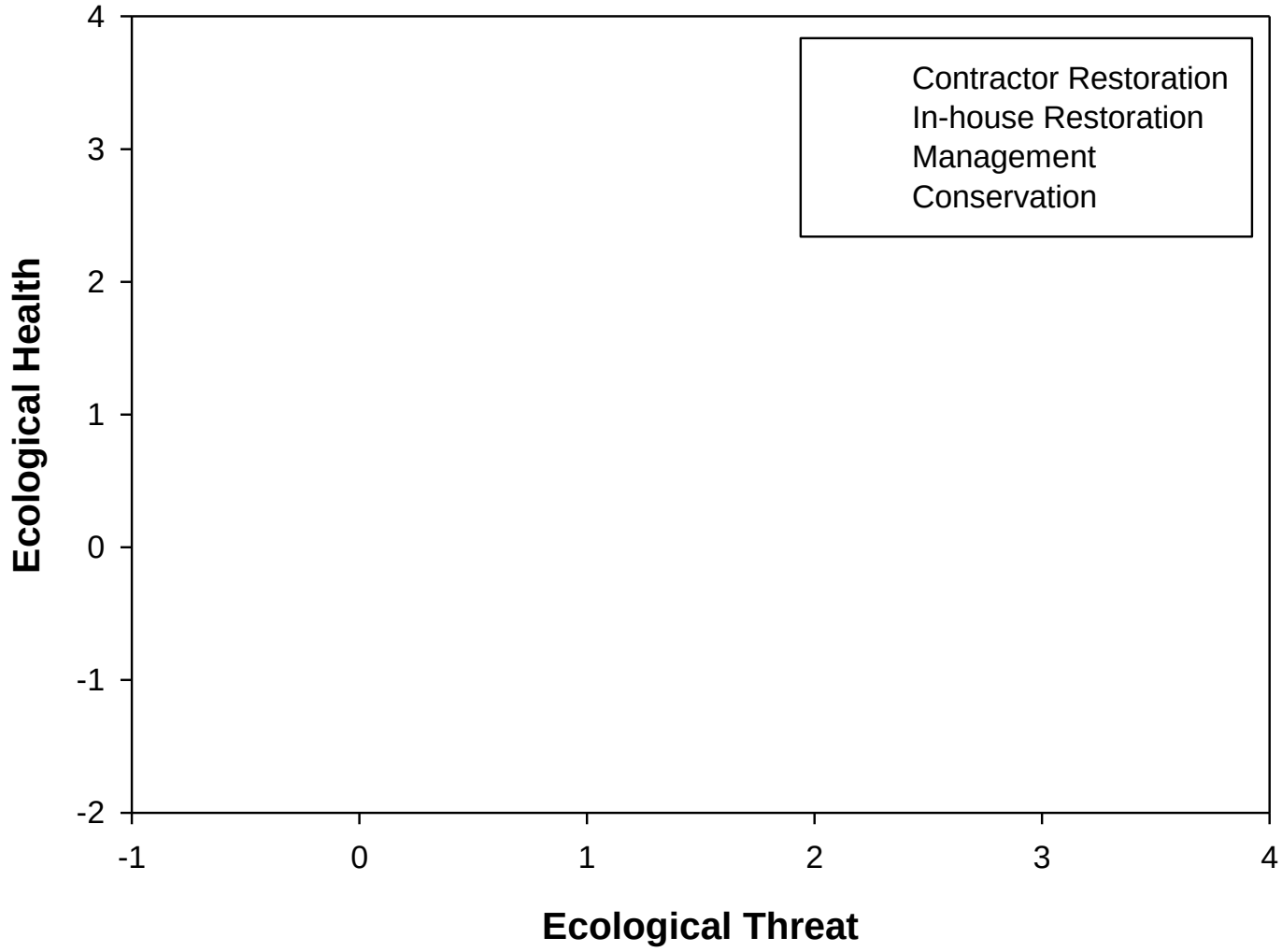
Connecting condition to management strategy



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Management costs

Type of work	Cost/acre
Contractor restoration	$ 42,076
In-house crew restoration	$ 6,078
Forest management: in-house crew	$ 2,075
Forest management: volunteer engagement	$ 28,534
Forest management: job training program	$ 1,236
Forest conservation	$ 1,037
Forest monitoring	$ 35

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Tree planting

The cost of planting is very high due to the high cost of seed and plant material.

Type of planting	Cost per acre
Contractor planting	$ 162,041
Volunteer planting	$ 99,177
In-house planting	$ 75,543

Solution:

- Do not plant forest that is exhibiting natural regeneration
- Plant at densities appropriate to forest type

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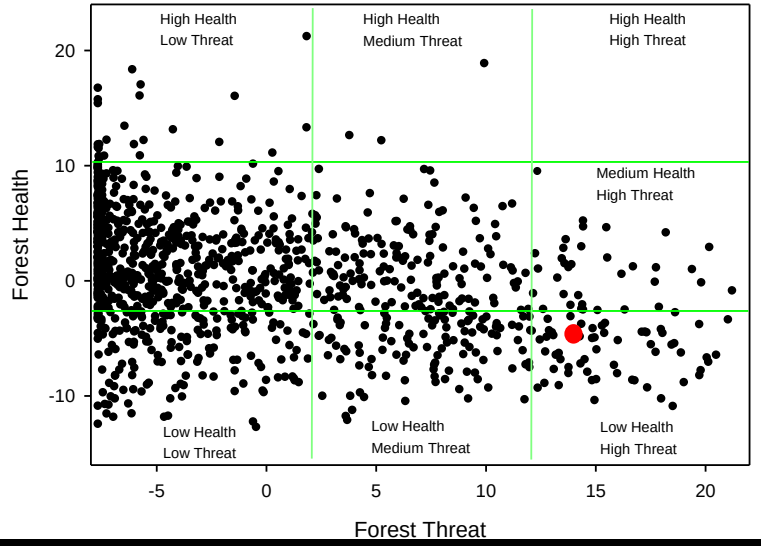
Costs over time: contractor restoration



year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10
restoration		planting	management	conservation	monitoring				
$42,076.12		$41,230.38	$3,355.80	$1,037.37	$34.58	$34.58	$34.58	$34.58	$34.58

Intensive management required via two years of focused work

Large-scale mitigation of existing threats (debris removal, decompaction, soil amendment)

We estimate that 40% of these types of sites will require tree and shrub planting

Public engagement

Management after restoration and planting involves caring for young trees and shrubs.

Public engagement

Tasks similar to management but occurring less frequently

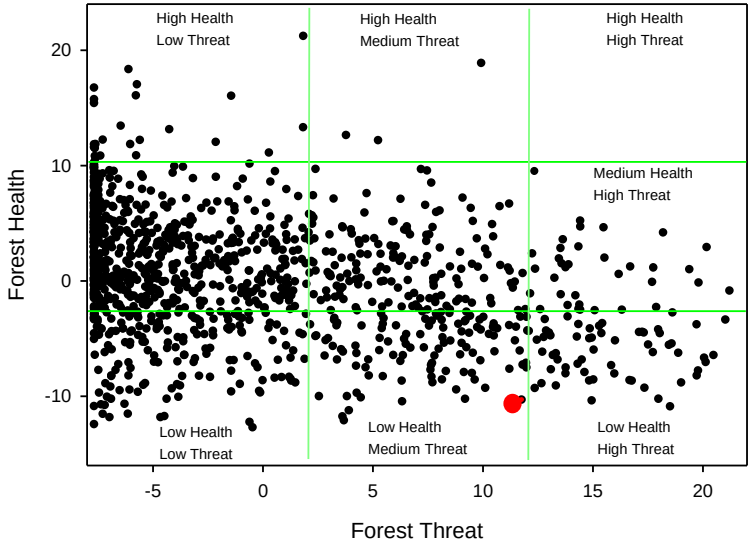
Seed collection

Public engagement

Total cost – 1 acre/10 years: $87,873

1,107 acres begin in this category

Costs over time: forest management



year 1		year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10
management	planting	management		conservation	monitoring					
$3,355.80	$21,645.95	$3,355.80		$1,037.37	$34.58	$34.58	$34.58	$34.58	$34.58	$34.58

One year of invasive management, can be performed by in-house crews or volunteers

We estimate that 21% of these types of sites will require tree and shrub planting

Public engagement

Management after restoration and planting involves caring for young trees and shrubs.

Public engagement

Tasks similar to management but occurring less frequently

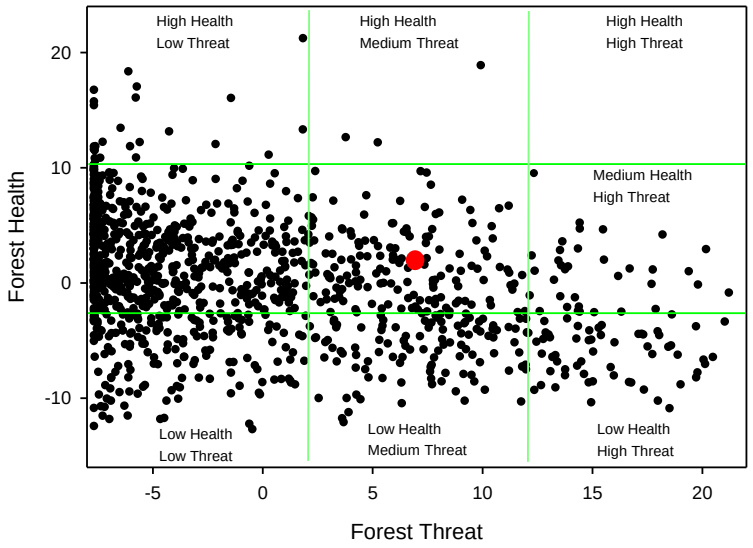
Seed collection

Public engagement

Total cost – 1 acre/10 years: $29,602

2,185 acres begin in this category

Costs over time: in-house crew restoration



year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10
restoration		planting	management	conservation	monitoring				
$6,077.55		$24,738.23	$3,355.80	$1,037.37	$34.58	$34.58	$34.58	$34.58	$34.58

Intensive management required via two years of focused work by in-house forestry crews

We estimate that 24% of these types of sites will require tree and shrub planting

Public engagement

Management after restoration and planting involves caring for young trees and shrubs.

Public engagement

Tasks similar to management but occurring less frequently

Seed collection

Public engagement

Total cost – 1 acres/10 years: $35,382

2,419 acres begin in this category

Costs over time

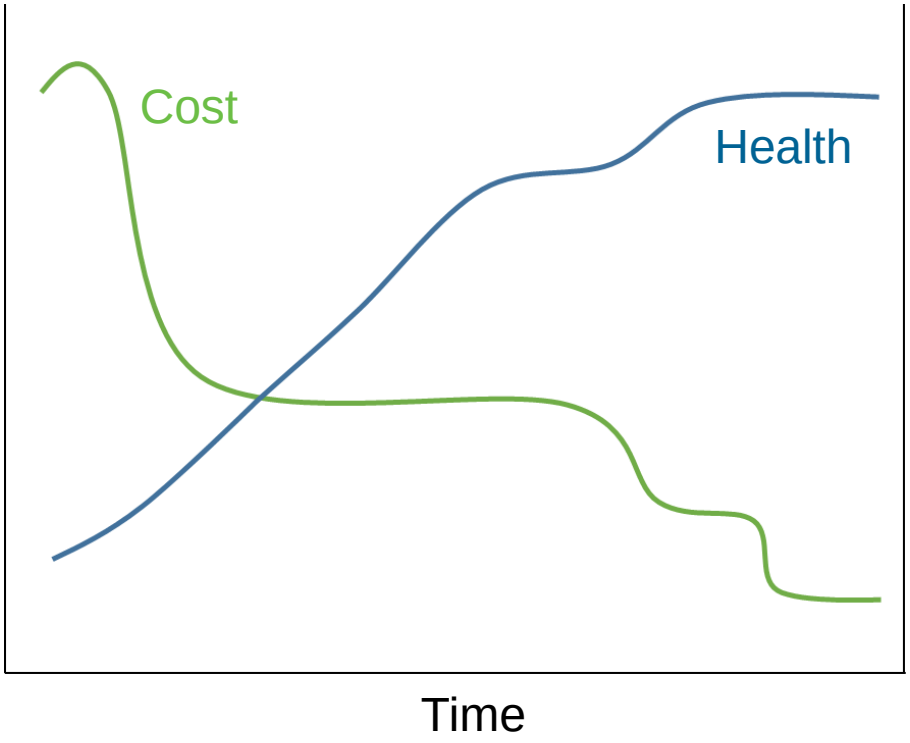
Each site starts in one category, moves through others over time

- Costs change over time
- Number of acres in each category of active management changes over time

Management focuses on mitigation of threats, and health improves as threats are reduced.

Large initial investment to tackle the most degraded areas.

Costs decrease as threats are addressed and health improves.



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Thank you
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For more information about the Seminar Series and other Park-to-Park programs, please contact:

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