



REDISCOVERING NATURE: Natural Systems in the City

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What is a natural system?

Water

Air

Land

Living

Energy

Rediscovering Nature

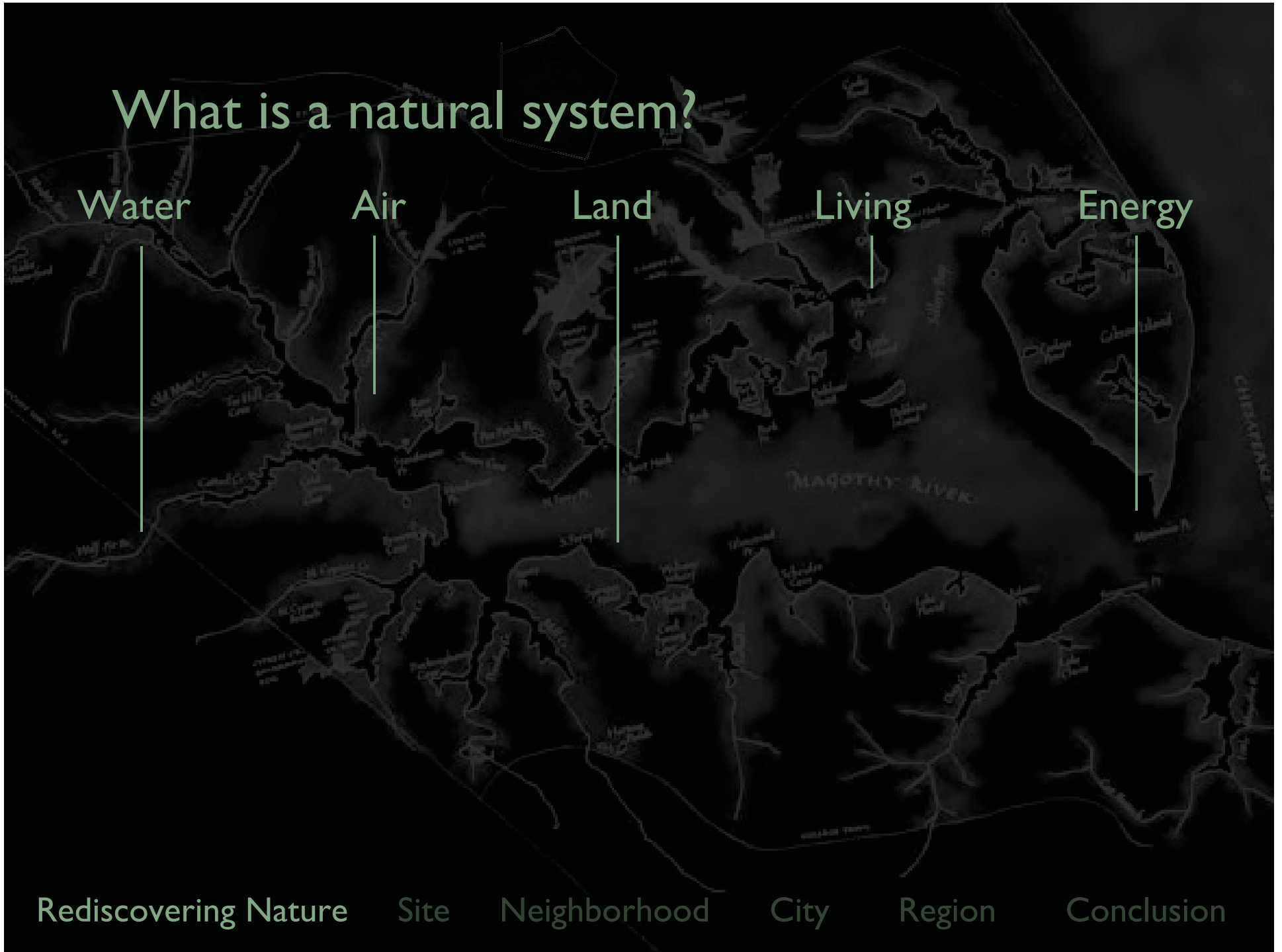
Site

Neighborhood

City

Region

Conclusion



Poor conditions in cities - late 1800s

Public Health

Recreation

Aesthetics

Ecology

Economy



1850

1900

1950

2000

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National Parks: “for the benefit and enjoyment of the people.”

Public Health

Recreation

Aesthetics

Ecology

Economy



1850 ----- 1900 ----- 1950 ----- 2000 ----->

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The parks movement: Central Park, NYC



Public Health

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1850 ----- 1900 ----- 1950 ----- 2000 ----->

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The parks movement: The Emerald Necklace, Boston

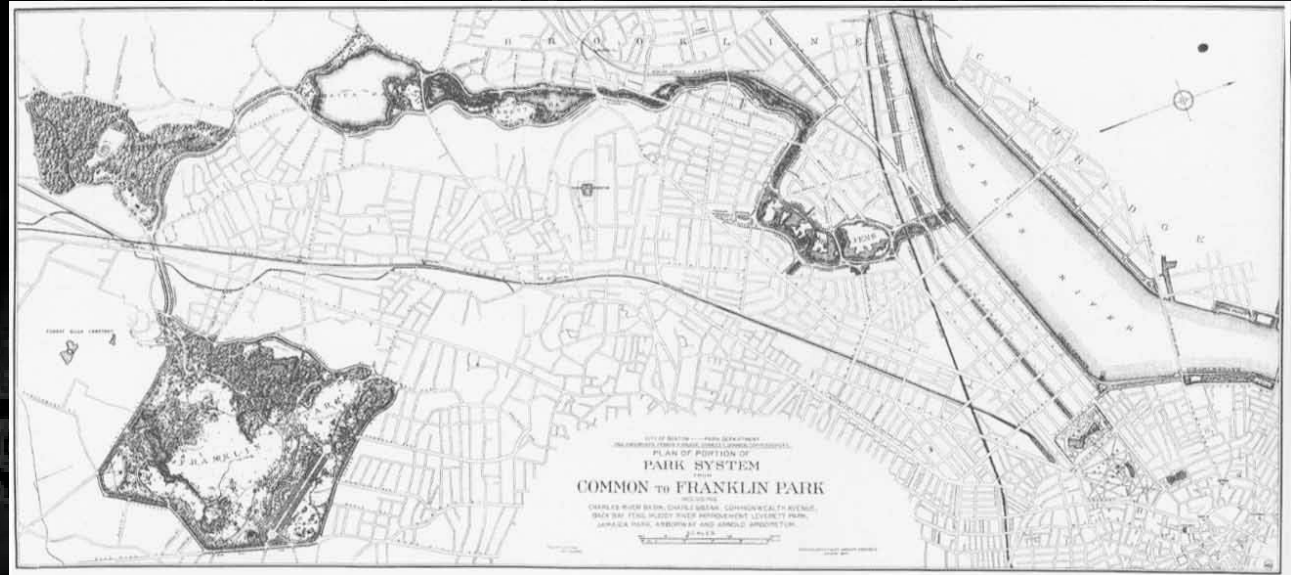
Public Health

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1850 ----- 1900 ----- 1950 ----- 2000 ----->

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The parks movement: The Muddy River



under construction
10 years later



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1850 ----- 1900 ----- 1950 ----- 2000 ----->

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Industry on the Charles River

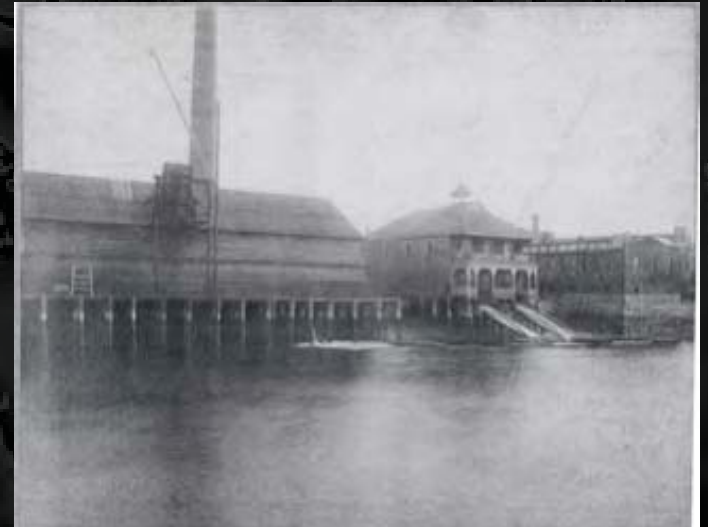
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Filling tidelands in Boston

- Public Health
- Recreation
- Aesthetics
- Ecology
- Economy



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The Environmental Movement

Public Health

Recreation

Aesthetics

Ecology

Economy

love canal

Denver floods

1850 ----- 1900 ----- 1950 ----- 2000 ----->

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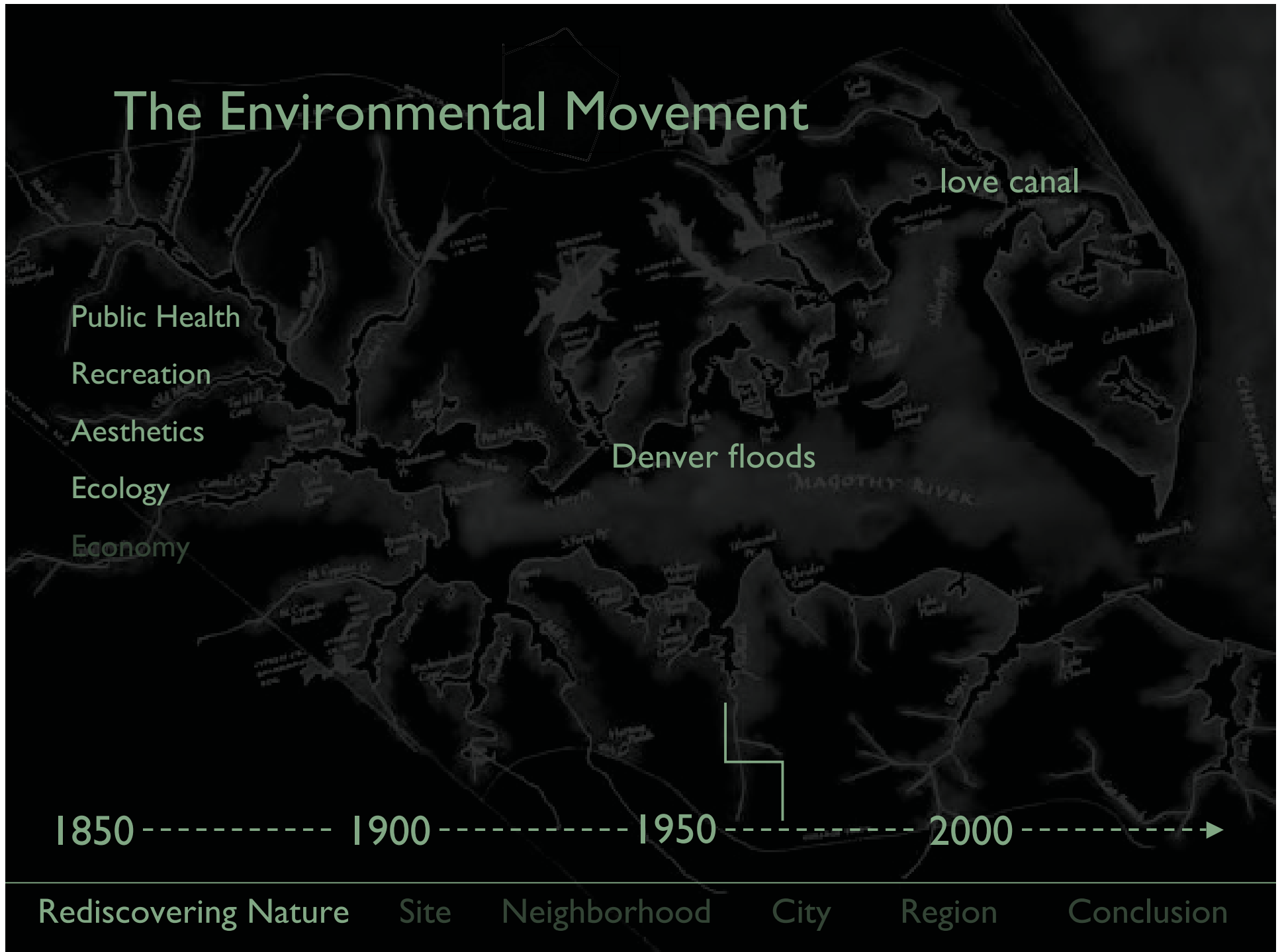
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Boston Natural Valley Storage Areas

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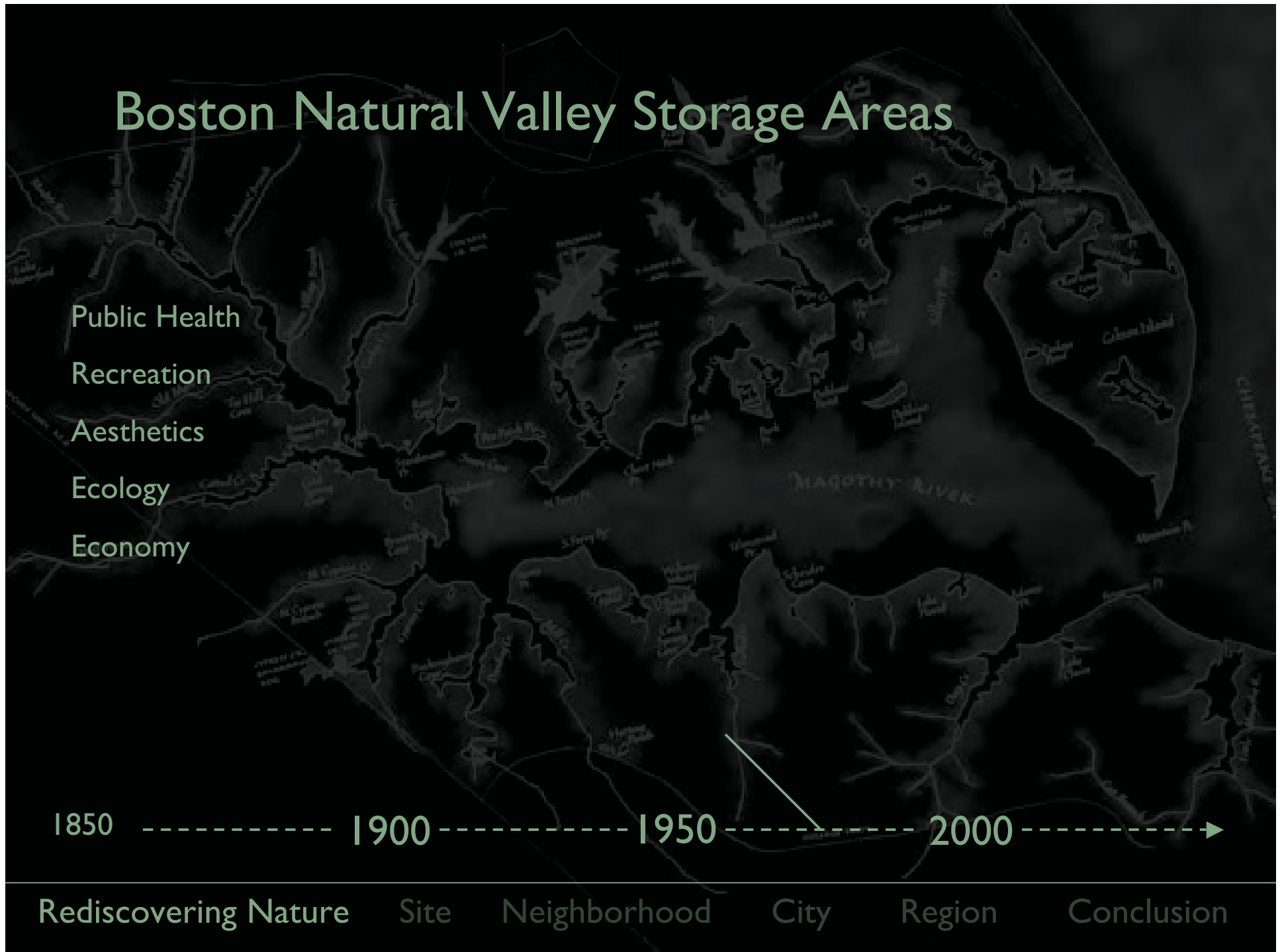
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Historical objectives for reintroducing
natural systems into the urban landscape:

Public health

Recreation

Aesthetics

Ecology

Economy

...and today, an increasing synergy of all five.

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Analysis:

Synergy of objectives

Systems integration

Level of cooperation

Impact on form

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Mont Cenis Training Center



Conventional mixed use and
federal spaces
Combined into one building that
provides an energy efficient,
comfortable climate year round

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Beddington Zero Energy Development



- Bill Dunster Architects
- London, UK 2002

Project aimed to prove market viability of sustainable, high-density development with high quality of life

Dollar value placed on reduced CO2 emissions in the bidding process allowed project to move forward

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Oberlin College, OH.

- Oberlin College Lewis Center
- William McDonough Architects
- Oberlin, Ohio 2001
- John Todd / Ocean Arks International
- Living Machine design

“The Center operates on three fundamental principles of nature — waste equals food, use current solar income, and respect diversity. An integrated approach to natural energy flows will allow the Center to evolve into a net-energy exporter.”
(William McDonough)

Outdoor space use:

Interpretive landscape (80%)

Restored landscape (50%)

Garden—productive (35%)

Wildlife habitat (30%)

Patio/hardscape (20%)

Garden—decorative (15%)

Parking (10%)

Pedestrian/non-motorized
vehicle path (5%)

Drives/roadway (5%)

Oberlin College, OH.

Educate building management and employees about water conservation

- **Landscape Plantings**

Landscape with indigenous vegetation

Landscape with edible plants

Minimize turf area

- **Managing Stormwater**

Design a constructed wetland for pollutant removal from stormwater

- **Wastewater and Graywater Recycling**

Plumb building to accommodate graywater separation

- **Solar energy runs the living machine and passively heats and lights the classroom spaces**

Study for Zuid-oost Industrial Terrain



Natural systems as urban infrastructure

Interconnecting habitats; using natural systems to sustain production of energy, industry, recreation and wildlife

The goal is to open up potential and unforeseen inter-relations between economic and environmental interests, especially in the short term.

Connects innercity areas with the landscapes to the southeast of the city.
Provides a network of east-west and north-south green and blue networks.

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Eco-suburbia



- Profit driven – The Woodlands, Houston, Texas

- Ecology driven – Village Homes, Davis, California

- Profit + ecology – Eco-suburbia of the future

Design with Nature - Ian McHarg

Systems integration

Synergy of objectives

Level of cooperation

Impact on form

The Woodlands – Houston, Texas



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Village Homes – Davis, California



Village Homes: water

Village Homes: solar energy

Village Homes: land

Village Homes: air

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The future of eco-suburbia



- Civano, Arizona
- Coffee Creek Center, Indiana
- Dewees Island, South Carolina
- Glenwood Park, Georgia
- Highlands' Garden Village, Colorado
- HomeTown Aurora, Illinois
- Summerset at Frick Park, Pennsylvania
- Praire Crossing, Illinois
- Santa Lucia Community Preserve, California
- Spring Island, South Carolina
- Haymount, Virginia

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Bo01: City of Tomorrow | Malmö, Sweden

Greenspace Factors			
	Area	Factor	Score for a site
a garden plot	951	0.5	476
green on the ground	129	1,0	127
green on the wall	112	0,7	78
green roof	330	0.8	264
open water	23	1.0	23
climbing plants	72	0.2	14

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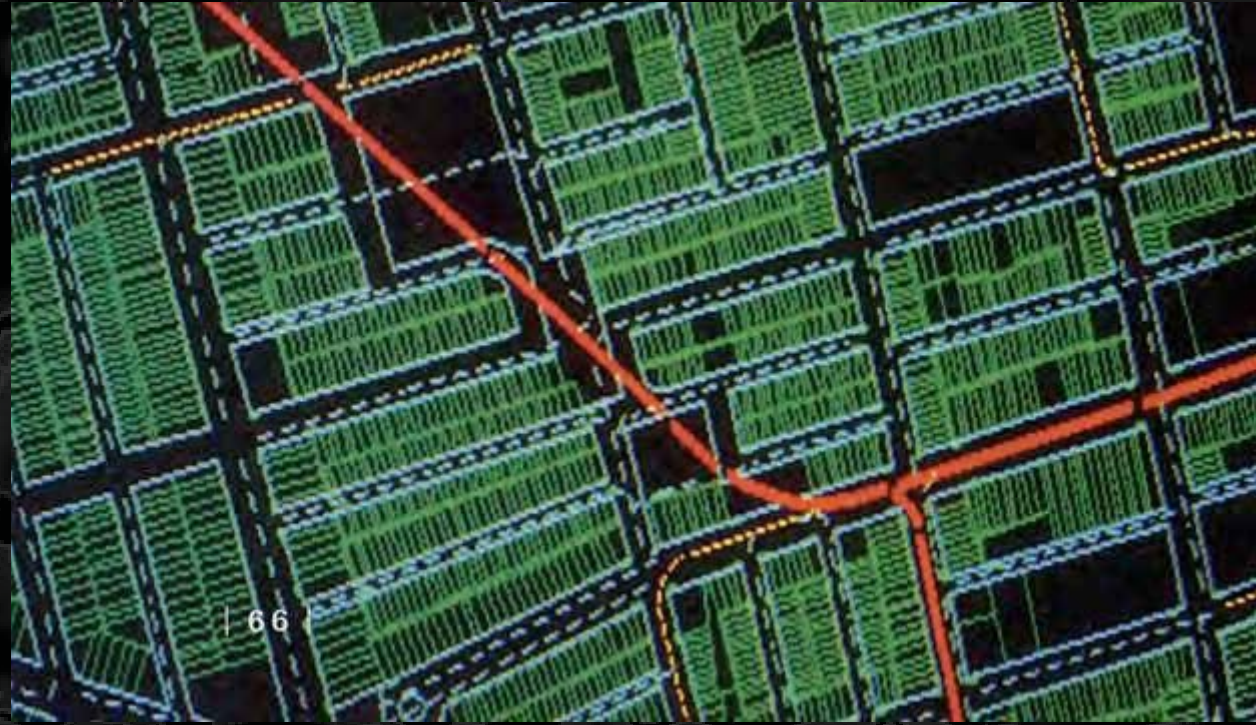
West Philadelphia Landscape Project | Uncovering Mill Creek

Synergy of objectives

Level of cooperation

Systems integration

Impact on form



Source: WPLP

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West Philadelphia Landscape Project | Vacancies

Synergy of objectives

Level of cooperation

Systems integration

Impact on form

Evaluating Vacant Parcels and Mill Creek



Corner Lots



Missing Teeth



Connectors

Neighborhood Mapping with Middle School Students



Swiss Cheese



Vacant Blocks



**Multiple Contiguous
Vacant Blocks**

All Photos Source: WPLP

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West Philadelphia Landscape Project | Floodplains & Subsidence

Synergy of objectives

Level of cooperation

Systems integration

Impact on form



Source: WPLP

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West Philadelphia Landscape Project | Gardens

Synergy of objectives

Level of cooperation

Systems integration

Impact on form



Source: WPLP

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Street Edge Alternatives | Seattle, Washington

Synergy of objectives

Level of cooperation

Systems integration

Impact on form

SYSTEMIC INTERVENTIONS

- Tree Retention
- Tree Pit Enhancement
- Infiltration / Conveyance Trenches
 - Linear Bioretention
 - Subsurface Linear Bioretention
- Porous Pavement
- Interconnected Vegetated Swales
- Rock and Vegetation Systems

Source: Seattle Public Utilities

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Stockholm, Sweden

Stuttgart, Germany

Chicago, IL.

Dallas, TX. Trinity River Project

Charles River Basin Master Plan

Rail Trails - Nationwide

San Diego Multiple Species Program

Chicago Wilderness

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Summary

	Number of Systems	Number of Objectives	Influence on Design	Degree of Cooperation Needed
Site	Dark Green	Dark Green	Dark Green	Light Cyan
New Suburban Neighborhood	Medium Green	Medium Green	Medium Green	Light Green
Retrofit Urban Neighborhood	Medium Green	Medium Green	Light Green	Light Green
City	Light Green	Light Green	Light Green	Medium Green
Region	Light Cyan	Light Cyan	Light Cyan	Dark Green

Summary

Systems

- Natural systems provide health, recreational, aesthetic, ecological and economic benefits.
- Ecological systems function at a regional scale.

Integration

- The highest number of systems are integrated at the site scale.
- Regional projects result from the synergy of meeting these objectives.

Conclusions

- These projects are changing the relationship between individual people and spaces, but ecological systems function on a much grander geographic scale.
- Therefore, urban design as we know it may not be the best way to address natural systems.

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Conclusion

- In the current cultural and political paradigm of the U.S., regionalism is weak.
- Smaller scale interventions integrate more natural systems.
- Individual projects in isolation might seem ineffective, but the localized effects can accumulate to create a regional impact.

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Questions for Discussion

- Is urban design an appropriate profession to address natural systems?
- What tools do urban designers need to better incorporate their natural systems into their work?
- What is the future for regional design in the US?
- Does the greening of suburbia do more harm than good?

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