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

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
National Parks: “for the benefit and enjoyment of the people.”

- Public Health
- Recreation
- Aesthetics
- Ecology
- Economy

1850 1900 1950 2000

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
The parks movement: Central Park, NYC

Public Health
Recreation
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1850 -- 1900 -- 1950 -- 2000

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
The parks movement: The Emerald Necklace, Boston

1850 1900 1950 2000

Public Health
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Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
The parks movement: The Muddy River

- Public Health
- Recreation
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- Ecology
- Economy

1850 1900 1950 2000

under construction
10 years later

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
Industry on the Charles River

Public Health
Recreation
Aesthetics
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1850 1900 1950 2000

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
Filling tidelands in Boston

1850
1900
1950
2000

Public Health
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Rediscovering Nature    Site    Neighborhood    City    Region    Conclusion
The Environmental Movement

- Public Health
- Recreation
- Aesthetics
- Ecology
- Economy

1850 - 1900 - 1950 - 2000

Rediscovering Nature | Site | Neighborhood | City | Region | Conclusion

- love canal
- Denver floods
Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion

Boston Natural Valley Storage Areas

1850  1900  1950  2000

Public Health
Recreation
Aesthetics
Ecology
Economy
Historical objectives for reintroducing natural systems into the urban landscape:

- Public health
- Recreation
- Aesthetics
- Ecology
- Economy

…and today, an increasing synergy of all five.
Analysis:

- Synergy of objectives
- Systems integration
- Level of cooperation
- Impact on form
Mont Cenis Training Center

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

Rediscovering Nature
Site
Neighborhood
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Region
Conclusion
Oberlin College, OH.

• Water Conservation Education
  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

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
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.
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

Rediscovering Nature    Site    Neighborhood    City    Region    Conclusion
Village Homes – Davis, California

Village Homes: water
Village Homes: solar energy
Village Homes: land
Village Homes: air

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
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
• Prairie Crossing, Illinois
• Santa Lucia Community Preserve, California
• Spring Island, South Carolina
• Haymount, Virginia
### Greenspace Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Area</th>
<th>Factor</th>
<th>Score for a site</th>
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</thead>
<tbody>
<tr>
<td>a garden plot</td>
<td>951</td>
<td>0.5</td>
<td>476</td>
</tr>
<tr>
<td>green on the ground</td>
<td>129</td>
<td>1.0</td>
<td>127</td>
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<tr>
<td>green on the wall</td>
<td>112</td>
<td>0.7</td>
<td>78</td>
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<tr>
<td>green roof</td>
<td>330</td>
<td>0.8</td>
<td>264</td>
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<tr>
<td>open water</td>
<td>23</td>
<td>1.0</td>
<td>23</td>
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<tr>
<td>climbing plants</td>
<td>72</td>
<td>0.2</td>
<td>14</td>
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</table>
Synergy of objectives
Level of cooperation
Systems integration
Impact on form
West Philadelphia Landscape Project | Vacancies

Synergy of objectives
Level of cooperation
Systems integration
Impact on form

Neighborhood Mapping with Middle School Students

Evaluating Vacant Parcels and Mill Creek

Corner Lots
Missing Teeth
Connectors
Swiss Cheese
Vacant Blocks
Multiple Contiguous Vacant Blocks

Rediscovering Nature Site Neighborhood City Region Conclusion

All Photos Source: WPLP
West Philadelphia Landscape Project | Floodplains & Subsidence

Synergy of objectives
Level of cooperation
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Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
West Philadelphia Landscape Project | Uncovering Mill Creek

Synergy of objectives
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Gardens

West Philadelphia Landscape Project | Gardens

Rediscovering Nature  Site  Neighborhood  City  Region  Conclusion
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
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
## Summary

<table>
<thead>
<tr>
<th></th>
<th>Number of Systems</th>
<th>Number of Objectives</th>
<th>Influence on Design</th>
<th>Degree of Cooperation Needed</th>
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<tbody>
<tr>
<td>Site</td>
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<tr>
<td>New Suburban Neighborhood</td>
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<td>Retrofit Urban Neighborhood</td>
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<tr>
<td>City</td>
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<tr>
<td>Region</td>
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</tbody>
</table>

- Influence on Design is the same across all categories.
- Degree of Cooperation Needed shows a variation, with Site having the least and Region having the most.
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.
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.
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?