Bioregional Urbanism:
Connecting Scientific Metrics to Design

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The BACKGROUND we bring to BIOREGIONALISM...

Sarah Howard
- Urban & Regional Planning
- Policy Design
- Educational Theory
- Social Justice Studies
- ...

Phil Loheed
- Cultural Evolution Studies
- Terrain Analysis
- Urban and Land Planning
- Architecture
- ...

Other BIOREGIONAL Creators:
- Community Partnerships
- Entrepreneurship
- Land Use Law
- Environmental Science
- Anthropology / Archeology
- Landscape Architecture
- ...

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I. The Process of BIOREGIONAL URBANISM

1. Define the Bioregion
   - A distinct human population in the territory it occupies.
   - (Boundaries adjusted to ecoregional realities.)

2. Map Primary Resources
   - Key Resources: Renewable Fresh Water; Energy Potentials; Food Production; Demographics of People; Waste Management; Land Morphology; and Biodiversity

3. Evaluate and Map Hazard Risks
   - Establish Risk Levels and Locations: Climate Change; Rising Sea Level; Flood; Earthquake; Wildfire; Severe Storms; War; and so on.

4. Evaluate Index of Self Sufficiency
   - Percentage of Locally Mobilized: Water; Energy; Food; People; Waste Management; Land; and Biodiversity

5. Establish Budgets and Design Goals
   - Establish Targets for: Local Consumption of Resources; Trade Relationships; Biodiversity and Habitats; Social Equity; Waste Management; and Innovation.

6. Design Urban and Habitat Patterns
   - Establish Precise relationships between Design Solutions, Resource Availability, and Habitat Restoration.

7. Implement Revised Patterns
   - Physical Action to: Balance Consumption; Limit Imports; Restore Habitats; Increase Social Empowerment; Eliminate Pollution; Innovate to improve performance.

8. Implement Feedback Systems
   - Evaluate Progress in Self Sufficiency, and other metrics of the Budgeted Consumption Economy; and in effectiveness of Bioremediation projects.
Other Related Efforts
The System of BIOREGIONAL URBANISM includes ITERATIONS of...

### ANALYSIS...

1. Define Bioregions
2. Map Resources
3. Map Constraints and Opportunities
4. Evaluate Index of Self-Sufficiency

### APPLIED TO DESIGN...

5. Establish Budgets and Design Goals
6. Design Urban and Habitat Patterns
7. Implement Revised Patterns
8. Implement Feedback Systems

※ Repeat Systemic Cycles
OUR HUMAN CHALLENGE:
LIVING ON A FINITE PLANET
Total WATER on Earth
(a Limited Resource)

Total Amount of H2O on the Planet
(volume = 1/4400 of Earth)

Total Fresh Water
(±3% of total H2O)
The Planet is composed of INHABITED BIOREGIONS supporting COMMUNITIES.

The Nested Scales of Nature:
The Basic Math of Bioregional Urbanism:

the sum of all tiled components equals one world—and not more.

The Planet is composed of INHABITED BIOREGIONS supporting COMMUNITIES.
Defining BIOREGIONS: Analytical Tiles of Populations in Resource Zones
BIOREGIONAL URBANISM is a special form of GeoDesign...
The “Bioregional Lens”

Neighborhoods and COMMUNITIES are analyzed as Components of a BIOREGION
A special form of GeoDesign...

Components of the SELF SUFFICIENCY INDEX create a “Snapshot”

The ratio of LOCAL RESOURCES divided by IMPORTS

RESOURCE BUDGETS—from the global to the local
WATER in Boston Bioregion:

Population = 11,200,840 (2007 estimate)
Land Area = 166,115 Km² (64,137.4 sq.mi)
Density = 67.43 people/Km²

Renewable Water:
Human Share (5%) = 9,966,900,000 m³ (9.97 Km³)
Per Capita Available = 889.84 m³
Total WATER SSindex = 890/2400 = 37%
(based on US average consumption including virtual water)
Local WATER SSindex = 890/1600 = 56%

WATER in New York Bioregion:

Population = 28,175,647 (2007 estimate)
Land Area = 130,595 Km² (50,423 sq.mi)
Density = 215.75 people/Km²

Renewable Water:
Human Share (5%) = 6,529,750,000 m³ (6.53 Km³)
Per Capita Available = 231.75 m³
Total WATER SSindex = 232/2400 = 10%
(based on US average consumption including virtual water)
Local WATER SSindex = 232/1600 = 14.5%
**Renewable ENERGY Self Sufficiency Indexes [Partial Data]**

**ENERGY in Boston Bioregion:**

Renewable Energy Sources (energy.gov 2013)

- Maine 139,654 billion BTUs (100%)
- New Hampshire 39,969 billion BTUs (30%) (133,230 = 100%)
- Vermont 26,524 billion BTUs (32%) (82,888 = 100%)
- Massachusetts 42,103 billion BTUs (43%) (97,914 = 100%)
- Rhode Island 2,652 billion BTUs (100%)
- Connecticut 26,087 billion BTUs (13%) (200,669 = 100%)

Total Bioregion = 252,000 billion BTUs
Total Requirement = 466,338 billion BTUs needed

SSindexENERGY = 54% local
(energy.gov 2013, not including imports)

**ENERGY in New York Bioregion:**

Renewable Energy Sources (energy.gov 2013)

Total Bioregion = 407,678 billion BTUs
Total Requirement = 905,951 billion BTUs needed

SSindexENERGY = 45%
(energy.gov 2013, not including imports)
Bioregional WASTE Self Sufficiency Indexes

**WASTE in Boston Bioregion:**

- Maine Generated = 2,495 tons (2,524 managed)
- New Hampshire = 3,950 tons (3,950 managed)
- Vermont = 2,813 tons (366,785 managed)
- Massachusetts = 36,915 tons (45,341 managed)
- Rhode Island = 8,597 tons (26,279 managed)

Total Produced = 51,957 tons
Total Managed = 444,879 tons

MA: 39% waste to energy; 31% landfill; 22% recycling; 7% composting
(2011 EPA data)

**WASTE in New York Bioregion:**

- New York = 186,486 tons produced
- New York = 269,685 managed

(2011 EPA data)
Bioregional Urbanism: Connecting Scientific Metrics to Design

II. Case Study…
THE GROVE HALL COMMUNITY
Boston, Massachusetts
II. Case Study…
GROVE HALL

We applied the BIOREGIONAL URBANISM method...

**SCIENCE**

- Mapped regional resources
- Mapped community resources

Greater Grove Hall ±55,000 People
II. Case Study…
GROVE HALL

We applied the BIOREGIONAL URBANISM method…

SCIENCE

- SCORED
  Regional Index

- ESTABLISHED
  Priorities+budgets:
  - Community scale
  - Regional scale

REGIONAL INDEX COMPONENTS
II. Case Study…

GROVE HALL

Ongoing application of the BIOREGIONAL URBANISM method…

DESIGN—STRATEGIES

TYPOLOGIES
- Bioregional building typologies
- “green” corridors
- Bioregional economics

OTHER
- Heritage Projects
- STEM+ incubation/education

Bioregional Economic Strategy

STEM+ education + Green incubation

Bioregional Building Typologies + Green Corridors
II. Case Study…

GROVE HALL

Ongoing application of the BIOREGIONAL URBANISM method…

DESIGN IMPLEMENTATION

ROXBURY HERITAGE MEMORY TRAIL—Creating a community+regional cultural asset
II. Case Study…
GROVE HALL

Ongoing application of the BIOREGIONAL URBANISM method...

DESIGN IMPLEMENTATION

S.T.E.A.M.
School for Resiliency (Science, Technology, Engineering, Arts, Mathematics)

creating a community + regional education hub
II. Case Study…
GROVE HALL

Ongoing application of the BIOREGIONAL URBANISM method…

TOOLS NEEDED!!!!

Online mapping system with:

• Regional and Local GIS
• Crowd-sourced Inputs
• Continuous Community Activity Updates
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III. Ongoing Knowledge Building…
Existing and Desired Collaborations
Earthos Institute  www.earthos-institute.us
III. Bioregional Urbanism is based collaboration leading to a BUDGETED CONSUMPTION ECONOMY—and success for self-sufficient & resilient BIOREGIONS...
Some desired Collaborations for Knowledge Building & Applications
Bioregional Urbanism:
Connecting Scientific Metrics to Design

Thank You for Your Interest!

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BIOREGIONS: Analytical Tiles of Populations in their Influence Zones
A special form of GeoDesign…

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