beyond the building:

Sustainable Design: Ecology, Architecture and Planning

Sustainability at the Regional Scale

air /

light /

water /

soil /

gravity /

orientation /

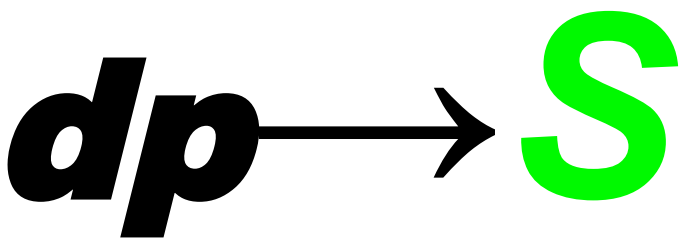
capacity /

LivingFutures 08
Vancouver, BC

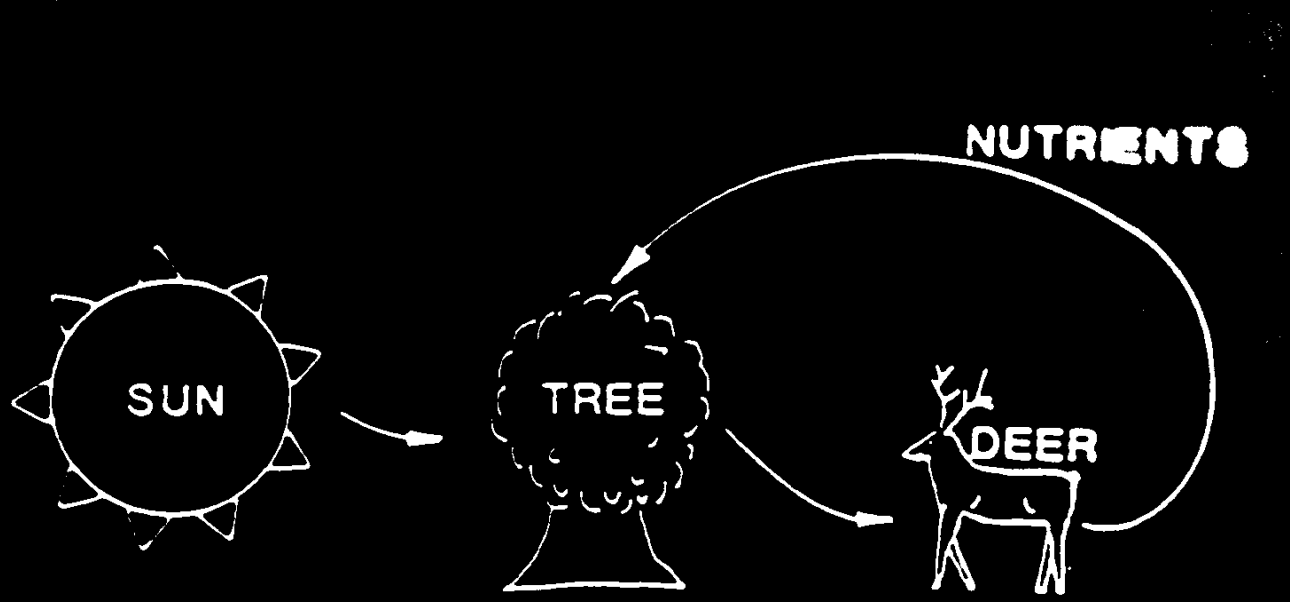
daniel williams, faia
daniel williams architect
architecture, urban & regional design
seattle, washington

"Sustainability is the [emerging] doctrine that economic growth and development must take place, and be maintained over time, within the limits set by ecology in the broadest sense -- by the interrelations of human beings and their works, and the biosphere...It follows that environmental protection and economic development are complementary rather than antagonistic processes."

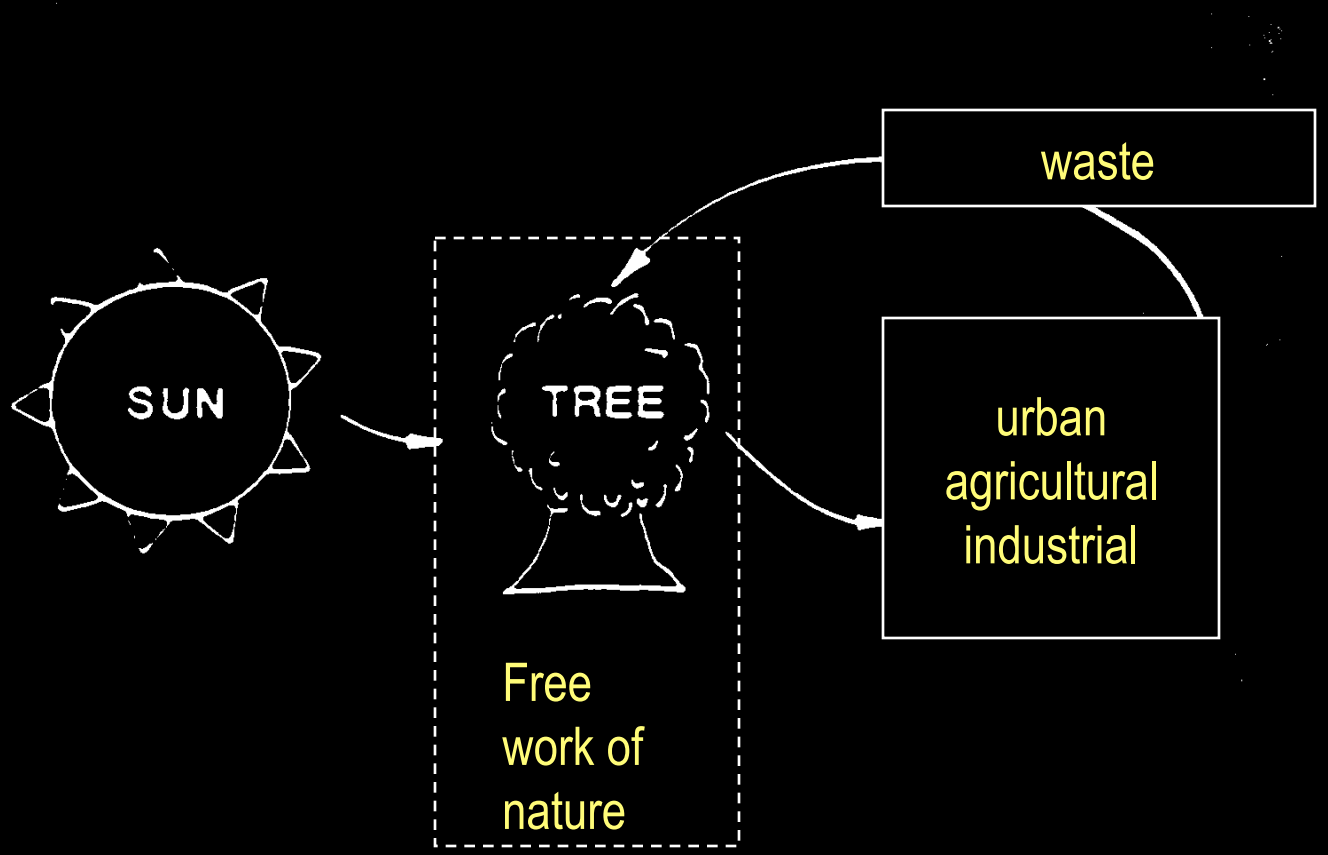
William D. Ruckelshaus
Scientific American
September 1989


dp
S

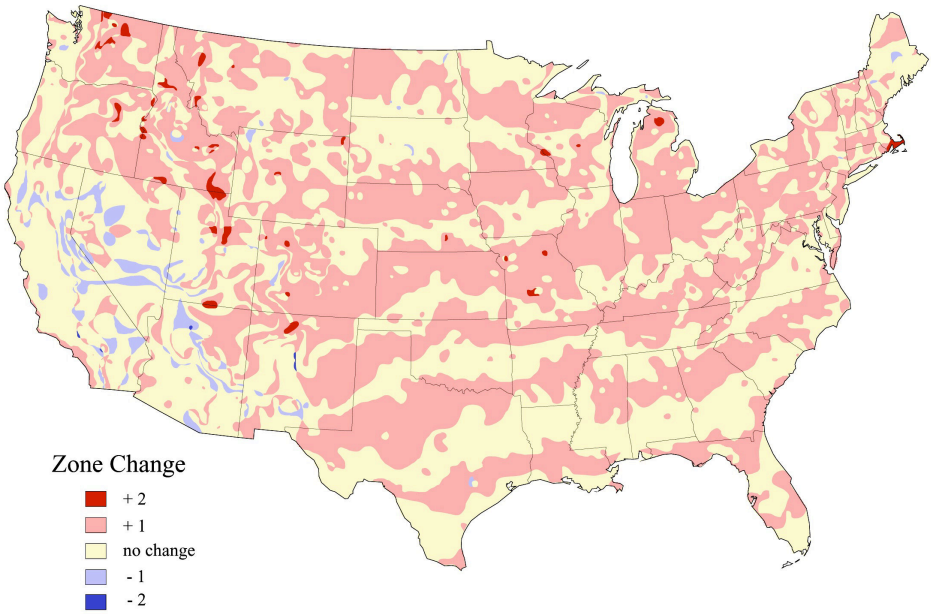
Sustainable Model

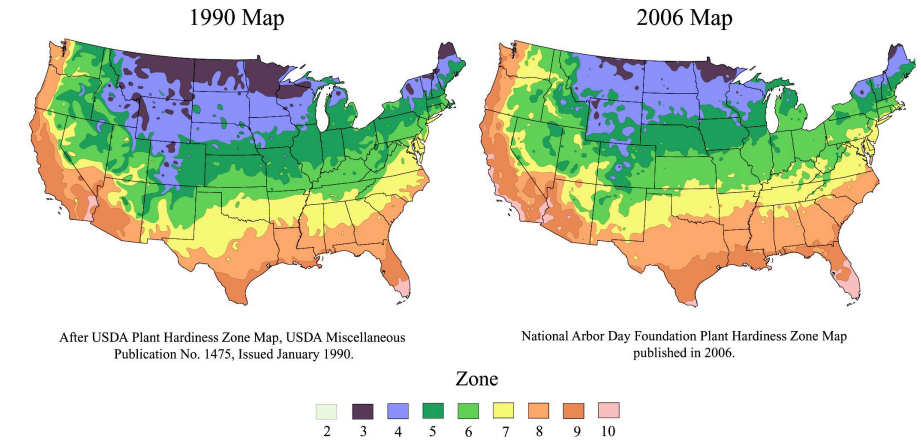


Sustainable Model



Differences between 1990 USDA hardiness zones and 2006 arborday.org hardiness zones reflect warmer climate





1) At what point do the apparent changes in the climate radically change our design approach and 2) is this approach appropriate to the scale of the challenge?

If We Don't Like Sprawl, Why Do We Go On Sprawling?

Between 1970 and 1990 the population of Chicago grew by **four percent**;
its developed land area grew by
46 percent.
Over the same period Los Angeles swelled
45 percent in population, 300 percent in settled area.

In Redmond, Washington, single-family houses pay **21 percent** of property tax but account for **29 percent** of the city budget. A study in California's Central Valley calculated that more compact development could save municipalities 500,000 acres of farmland and $1.2 billion in taxes.

Donella Meadows' The Global Citizen, March 4, 1999

sustainable development

1. Design on a Human Scale
Compact, pedestrian-friendly communities allow residents to walk to shops, services, cultural resources, and jobs and can reduce traffic congestion and benefit people's health.

2. Provide Choices
People want variety in housing, shopping, recreation, transportation, and employment. Variety creates lively neighborhoods and accommodates residents in different stages of their lives.

3. Encourage Mixed-Use Development
Integrating different land uses and varied building types creates vibrant, pedestrian-friendly and diverse communities.

4. Preserve Urban Centers
Restoring, revitalizing, and infilling urban centers takes advantage of existing streets, services and buildings and avoids the need for new infrastructure. This helps to curb sprawl and promote stability for city neighborhoods.

5. Vary Transportation Options
Giving people the option of walking, biking and using public transit, in addition to driving, reduces traffic congestion, protects the environment and encourages physical activity.

6. Build Vibrant Public Spaces
Citizens need welcoming, well-defined public places to stimulate face-to-face interaction, collectively celebrate and mourn, encourage civic participation, admire public art, and gather for public events.

7. Create a Neighborhood Identity
A "sense of place" gives neighborhoods a unique character, enhances the walking environment, and creates pride in the community.

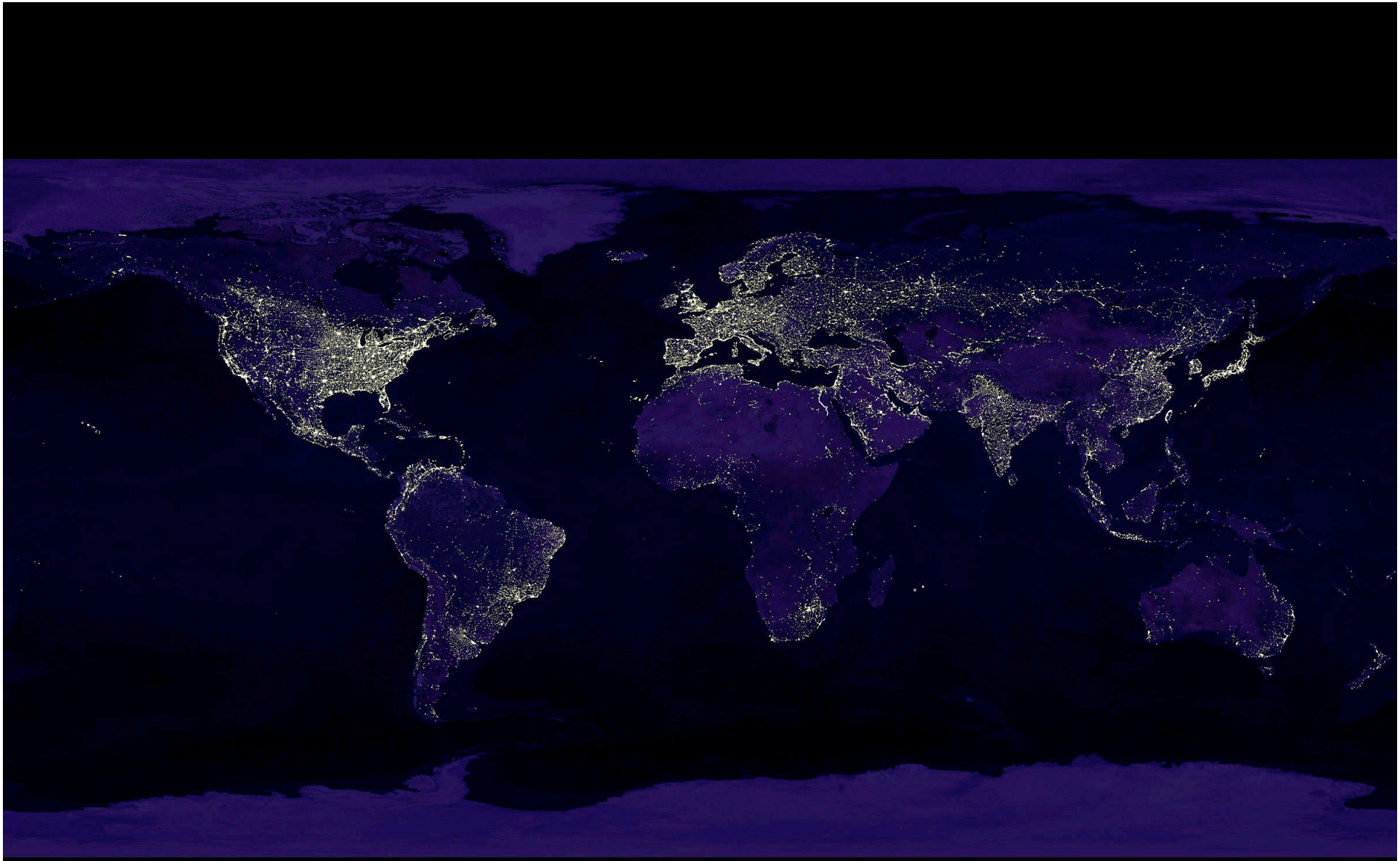
8. Protect Environmental Resources
A well-designed balance of nature and development preserves natural systems, protects waterways from pollution, reduces air pollution, and protects property values.

9. Conserve Landscapes
Open space, farms, and wildlife habitat are essential for environmental, recreational, and cultural reasons.

10. Design Matters
Design excellence is the foundation of successful and healthy communities.

(from AIA Livable Communities)

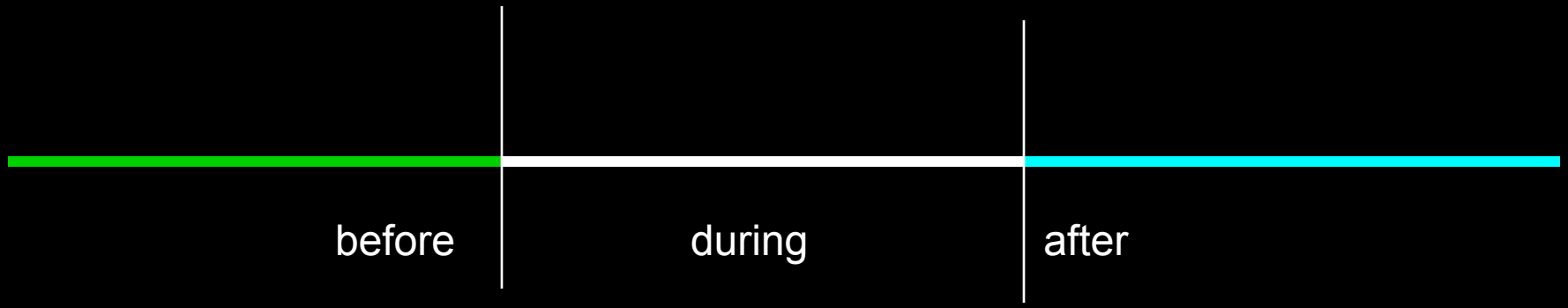
The grandest of cultures have missed the message - the question is how “advanced” is our culture and how good is our crystal ball?



“…civilization is always a race between learning and disaster” h. g. wells

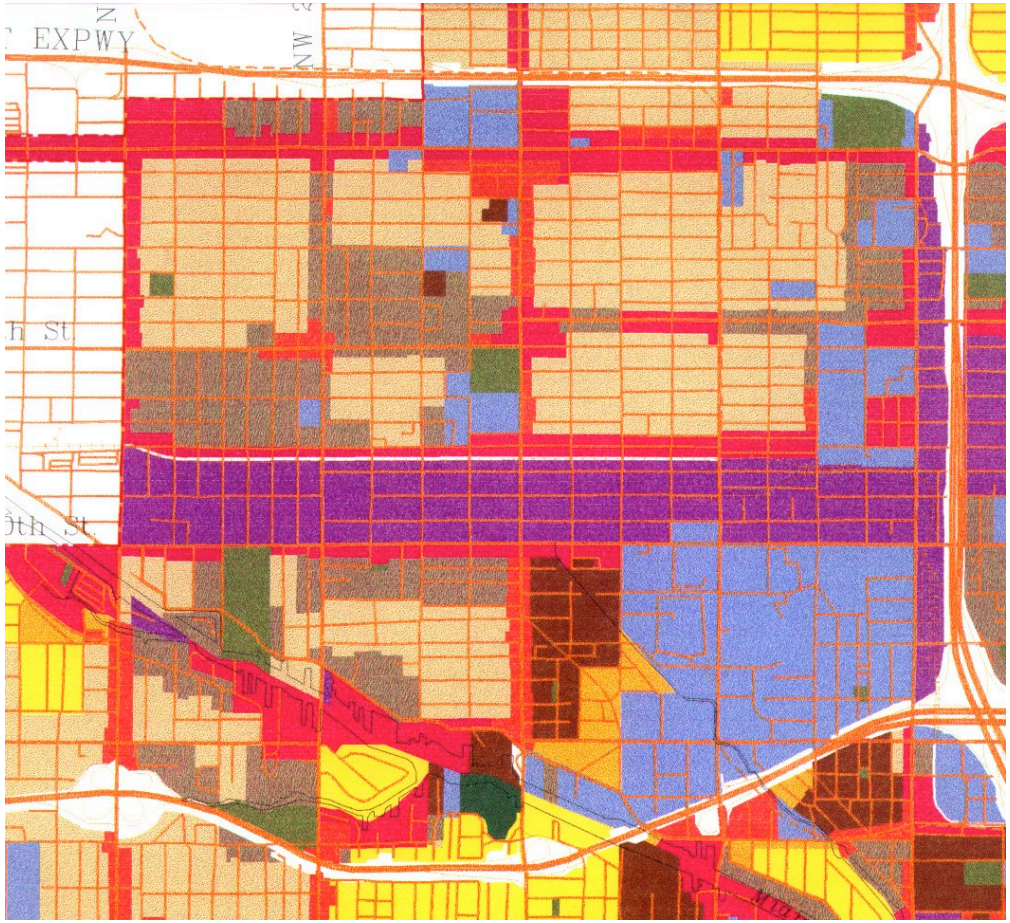

The New York Times Magazine
OCTOBER 21, 2007 / SECTION 6
The Perfect Drought
Will population growth and climate change leave the West without water? By Jon Gertner

s e v e n g e n e r a t i o n s



landuse:

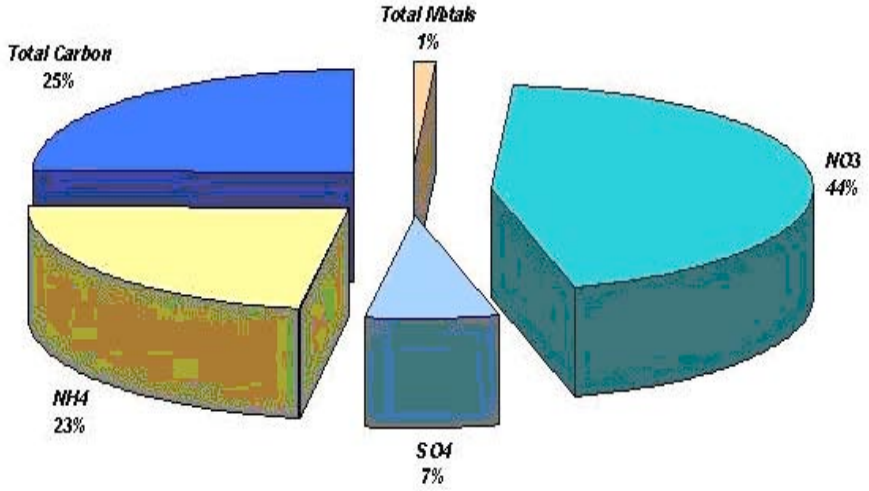
- **more than zoning**
- **relate uses**
- **create buffers as ecotones/connect**
- **mix uses**



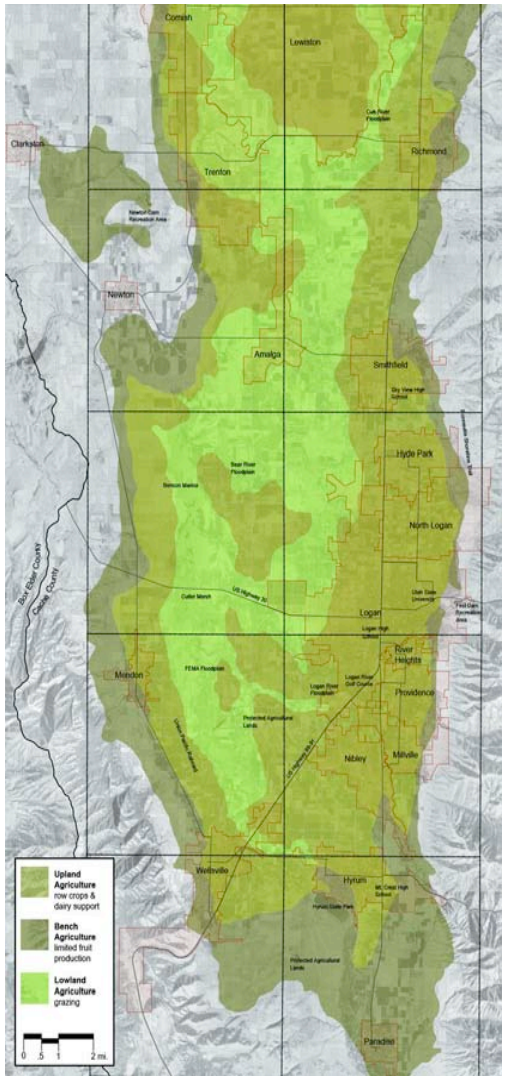
Air Quality

Cache Valley, Utah

AIA SDAT



Ecological Zones



- Bench Agriculture encircles valley at the base of sloping valley walls. Until 1970 supported limited fruit production, now favored for housing. Bench land is an important groundwater recharge zone.
- Upland Agriculture, supporting irrigated row crops and dairy, occupies roughly two-thirds of valley agricultural land. Soils are generally deep and fertile with little need for fertilizer.
- Lowland agriculture, centered on the valley floor, consists largely of grazing beef and dairy cattle. A high water table and cold air drainage are limiting factors of the lowland area. Reliance on grazing has decreased over the last 30 years.

Agricultural Strengths

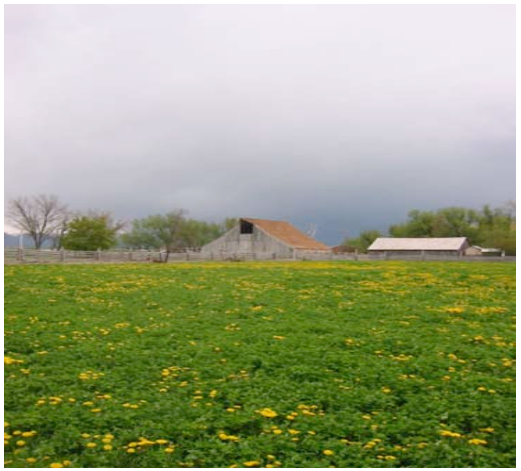
- The diversity of ecological zones and growing conditions is one of the strengths of the Cache Valley “foodshed”. The excellent soil and water resources and limited reliance on genetically modified crops (corn, soy, canola) supports a “clean and green” image.

Preserving the green “quilt”
Views and Vistas

- Three of the four entrances into Cache Valley open to a view of an agricultural landscape.
- Identify key points along the corridor and create a hierarchy of places/ nodes to preserve view points.

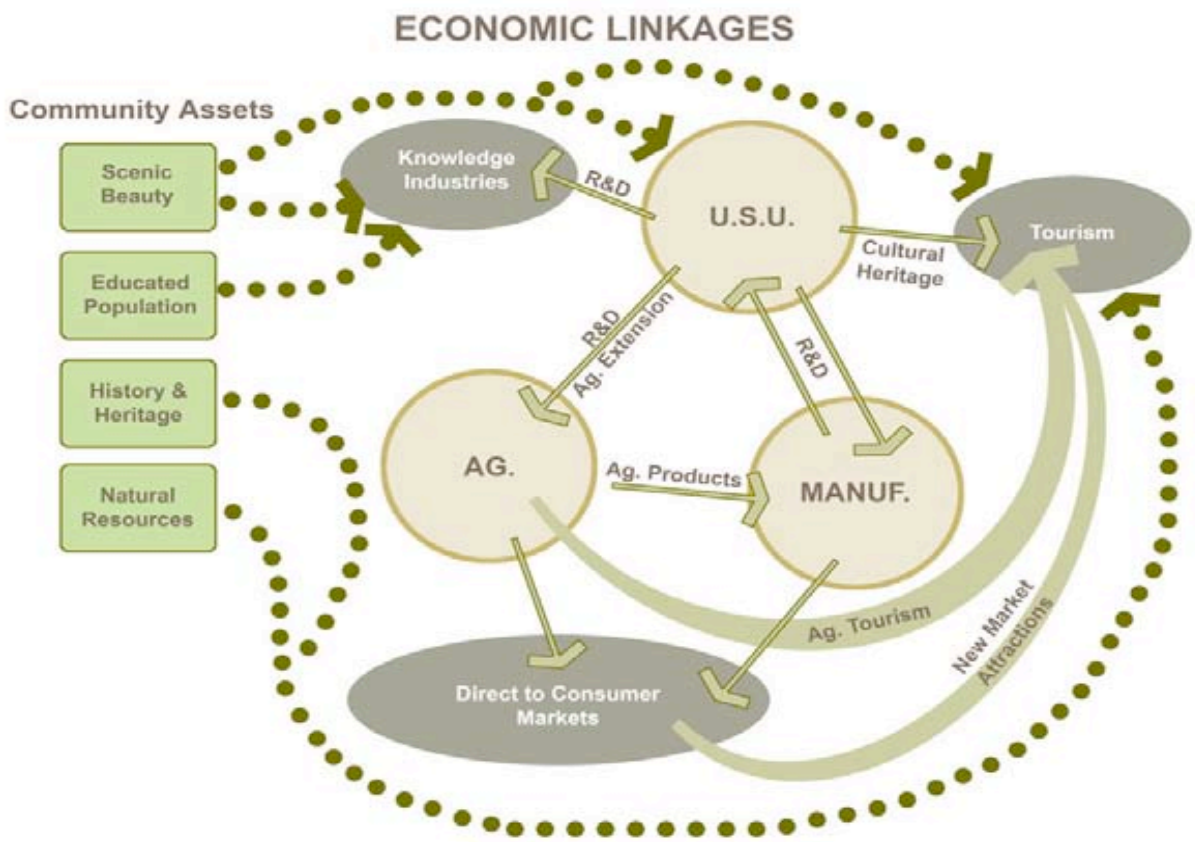
Recommendations
for preserving a sense of place



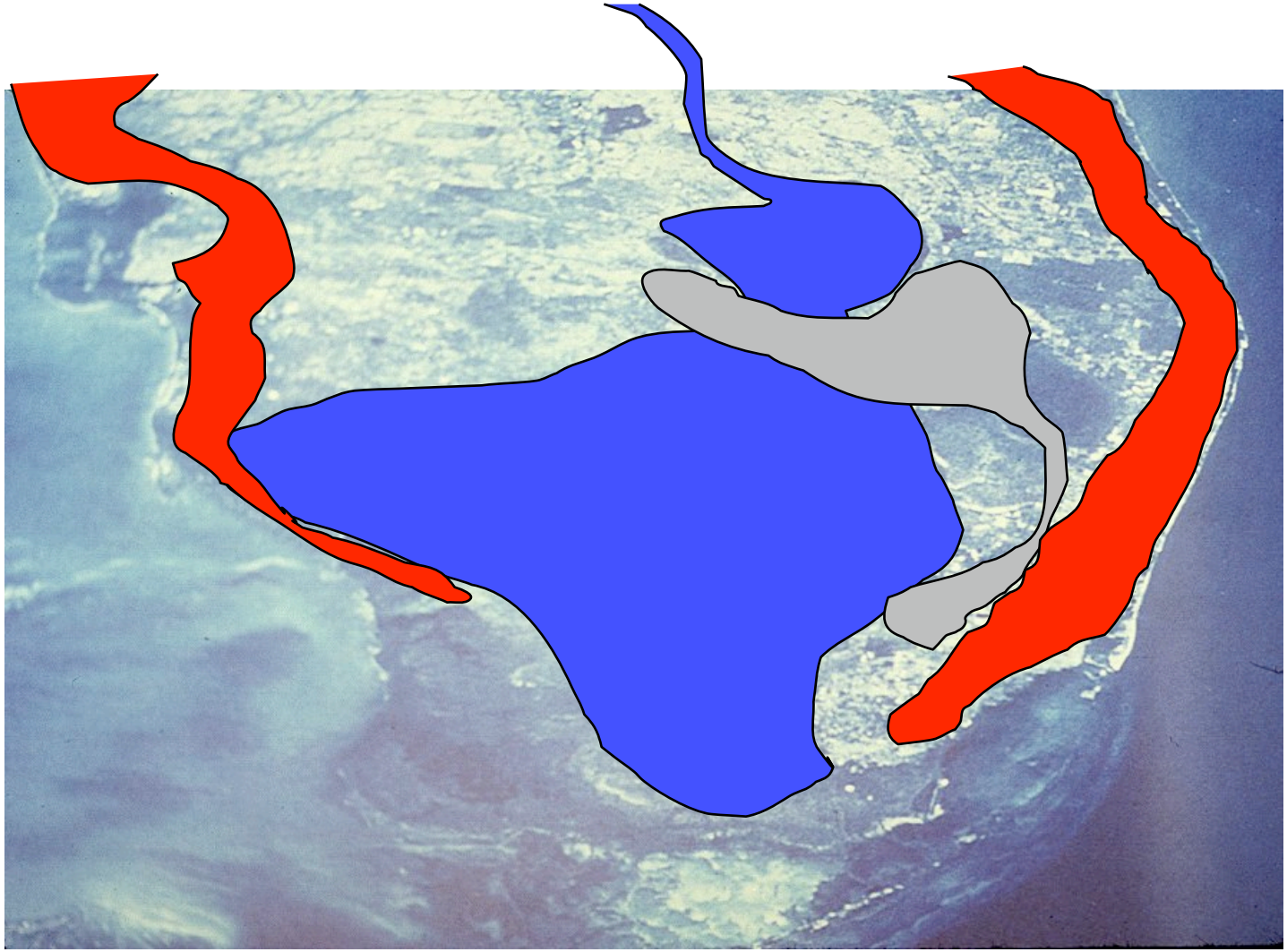


- Provide incentives to build and develop within existing towns and cities.
- Preserve and visually enhance the canal system.
- Preserve distinguishable architectural elements and the original setting of villages set six to eight miles apart.
- Preserve at a smaller scale individual farmsteads and barns.
- Identify, preserve, and enhance views at Logan & Little Bear rivers.

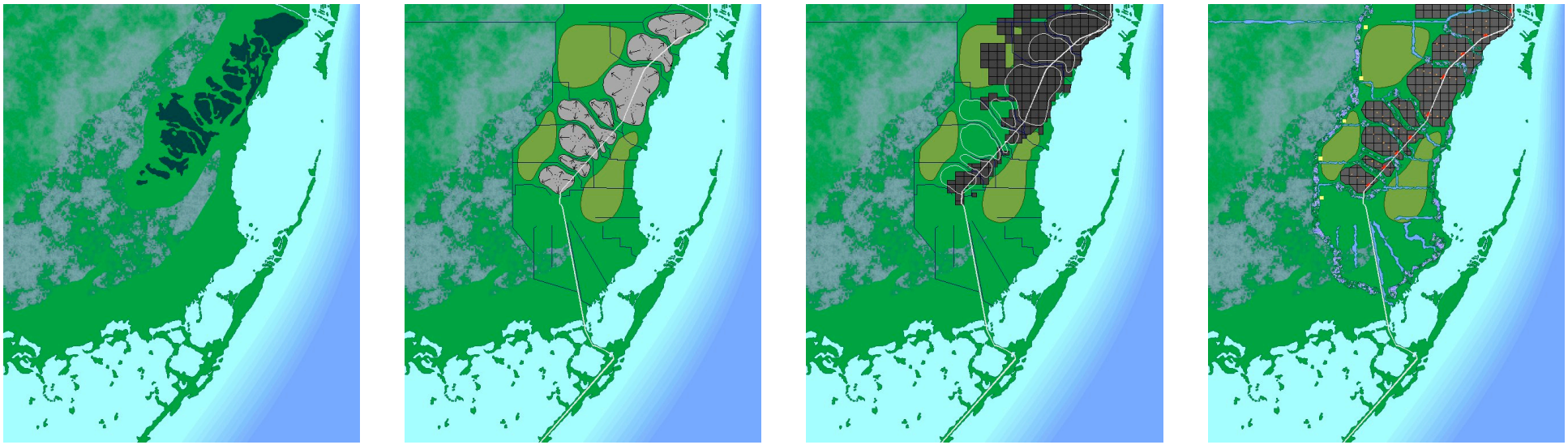
Ecologic / Economic Linkages



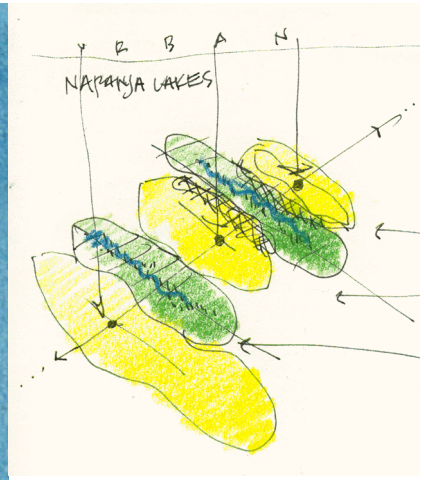
region: a case study | **FLORIDA**



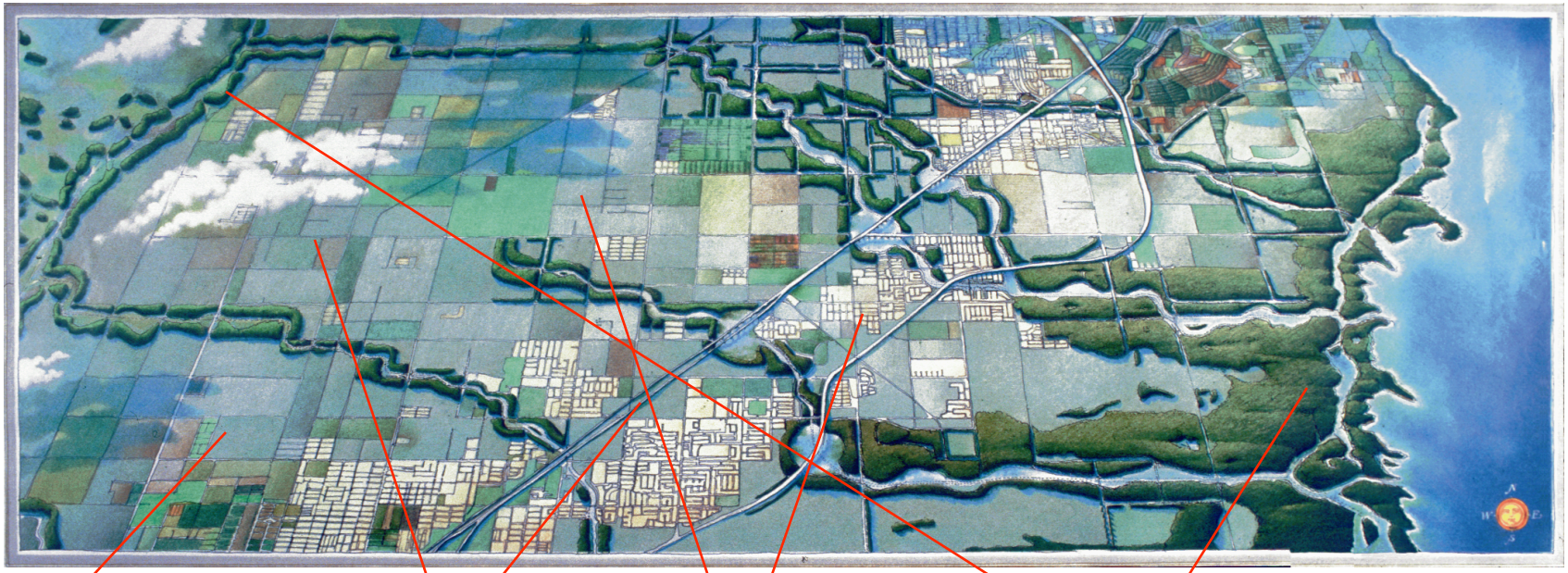
landuse has a carrying capacity at all scales



design the transition in large, incremental steps – water!


NAIVASHA LAKES

growth boundaries and conservation zones – a utility



establish water supply and land use criteria - carrying capacity

protect / preserve agriculture - develop transit

additional 700,000 by 2025

preserve / protect / re-establish ecological system integrity

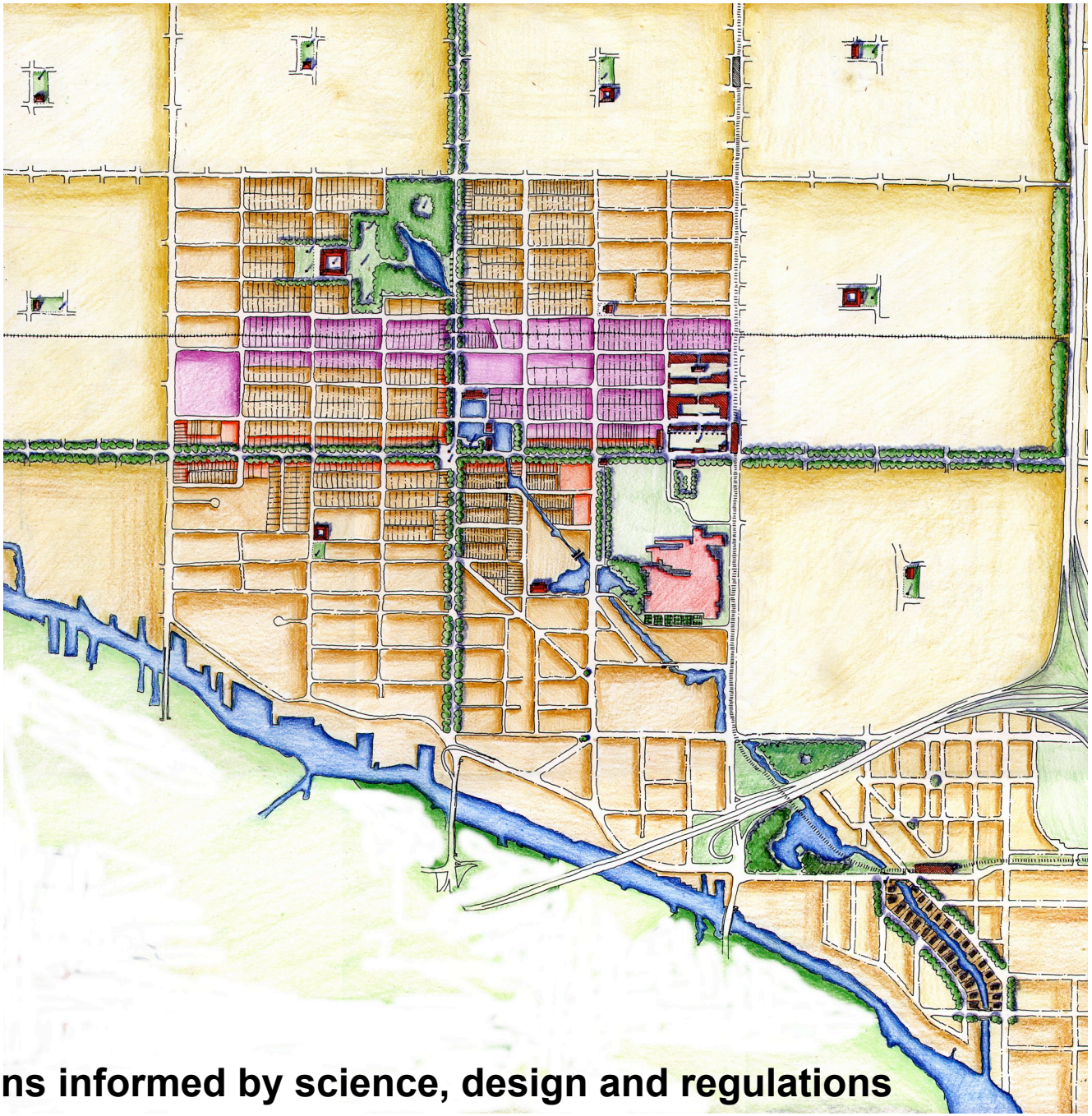
sustainable design and planning reduces taxes

The economic, environmental and social choice is clear - The Eastward Ho: Alternative Development Vision **SAVES**

→ 67,725 acres of developable land
→ 13,887 acres of fragile environmental lands
→ 52,856 acres of prime farmland
→ $62,000,000 in state road costs
→ 108 lane miles of state roads
→ $1,540,000 billion in local road costs
→ 4,221 lane-miles of local roads
→ $157,000,000 in water capital costs
→ $135,600,000 in sewer capital costs

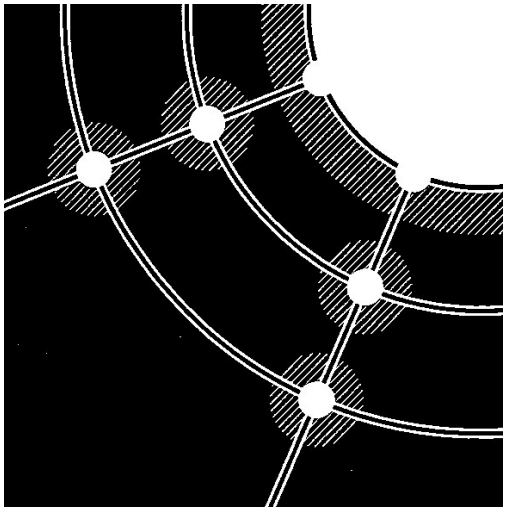
? - reduction in asthma, obesity, diabetes, road-rage
? – increase in quality of life, fishing industry, tourism…

(Rutgers University, Center for Urban Policy Research)



create designs informed by science, design and regulations

infrastructure



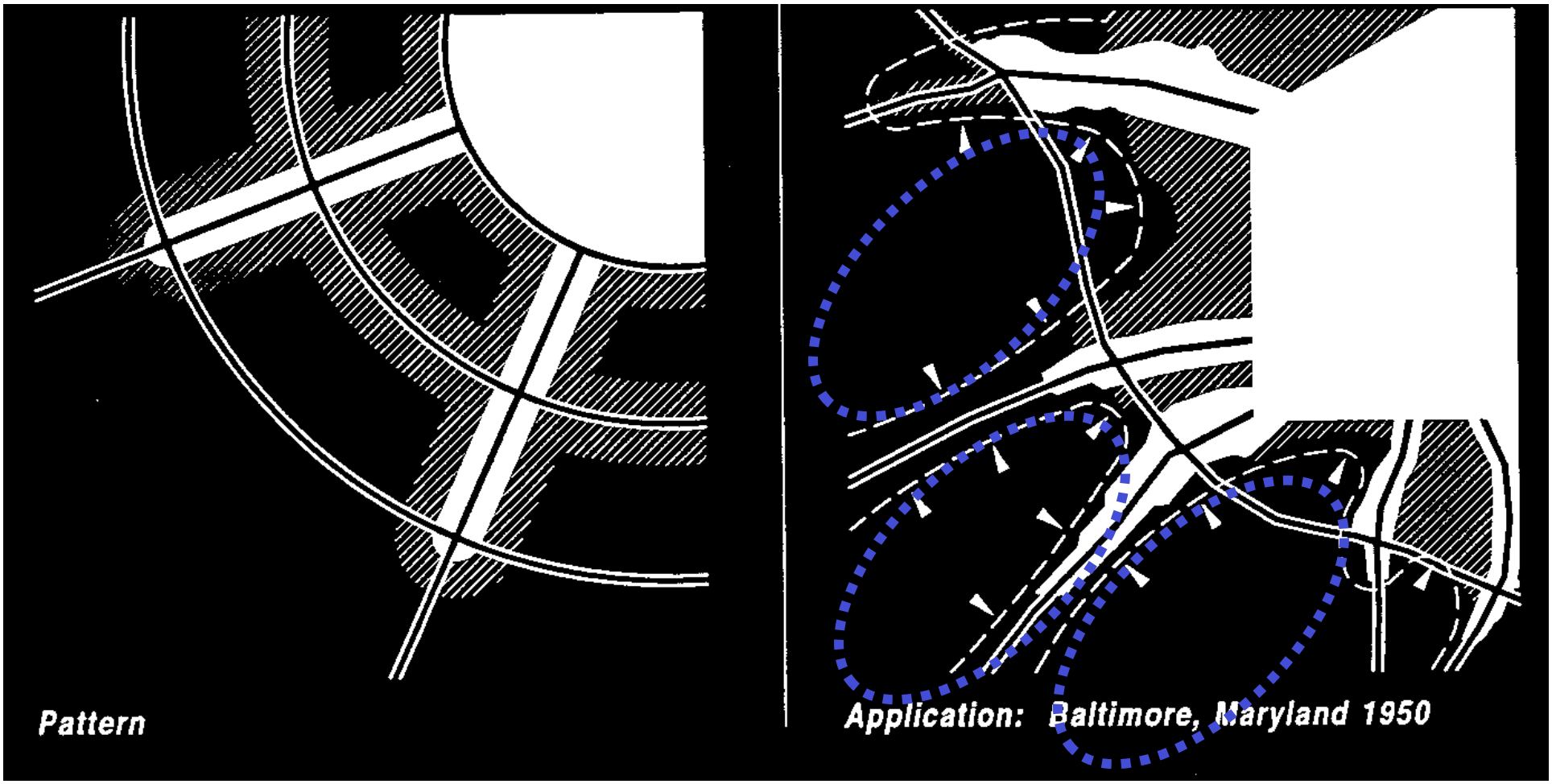
mobility

supplies

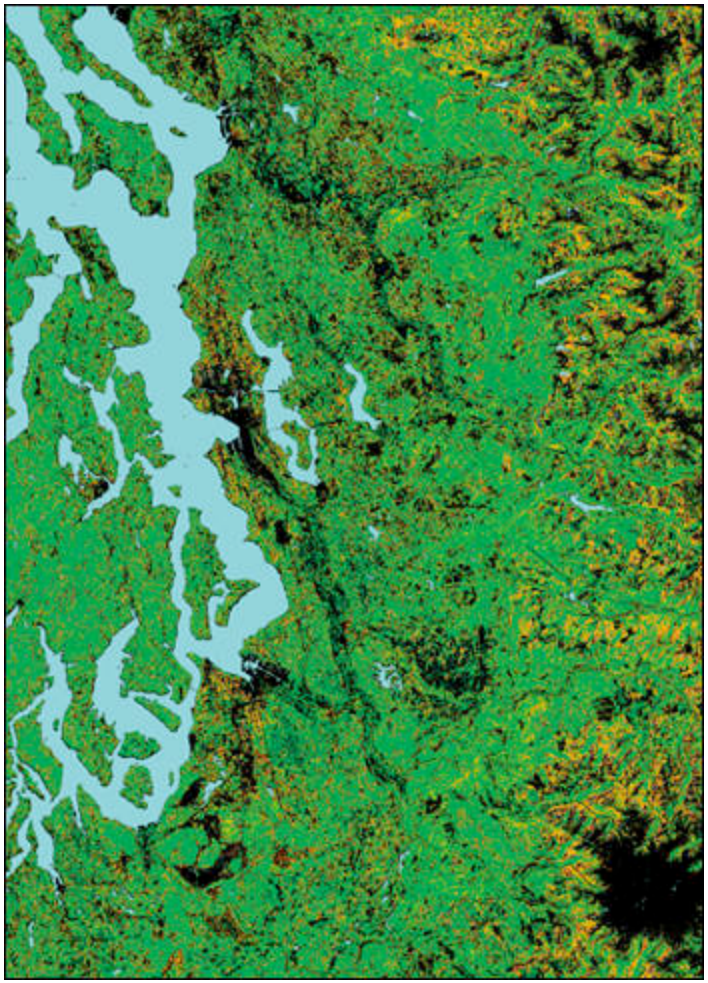
belonging

air

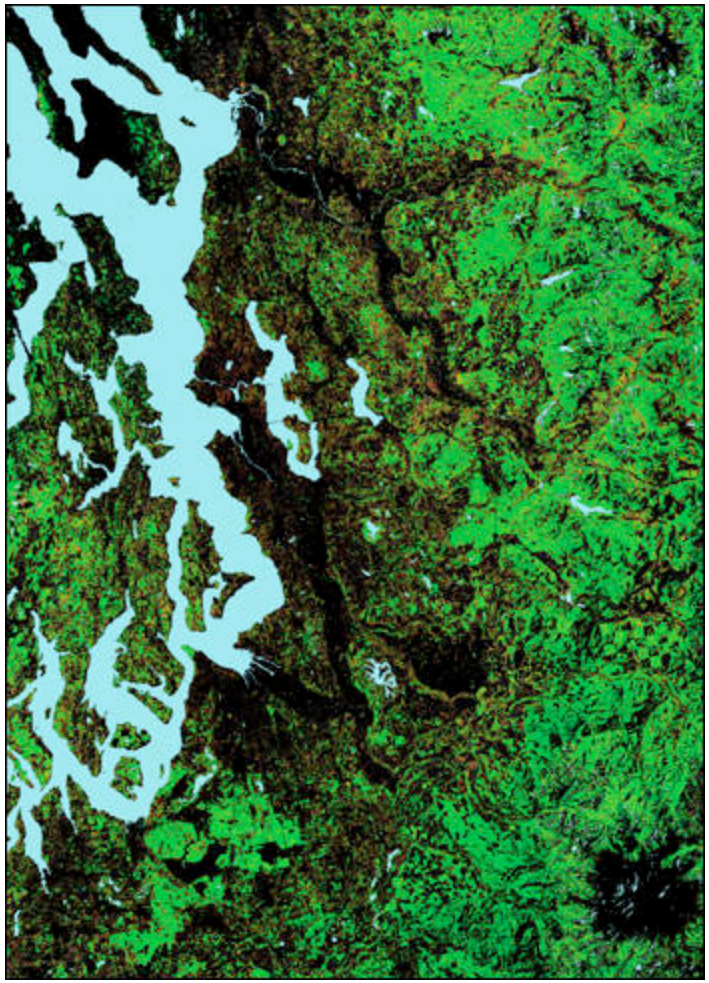
water


Pattern
Application: Baltimore, Maryland 1950

puget sound – the loss of the solar subsidy ~ increase infrastructure taxes



1972



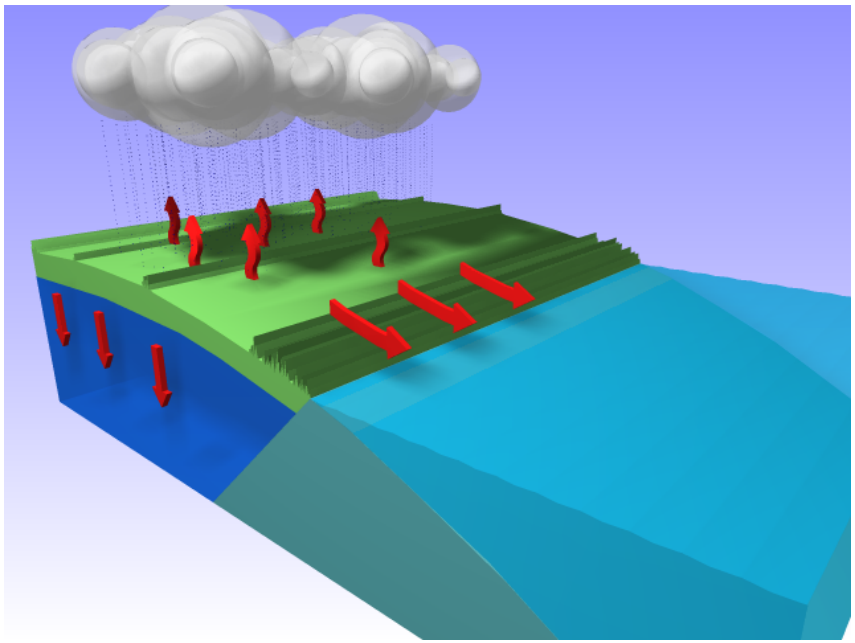
1996

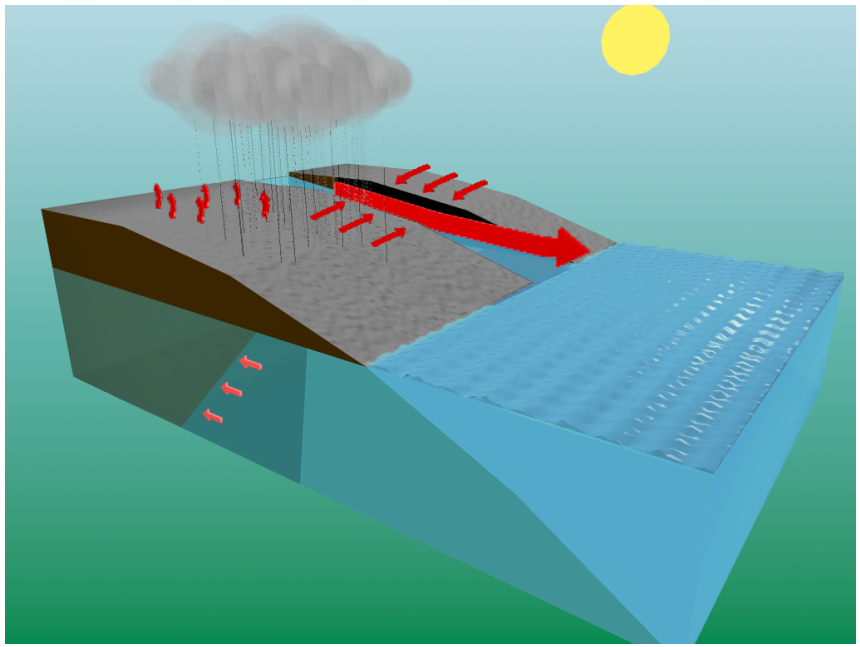
the water budget drives development

et = 75%

gr + s = 24%

budget = 1%





win plan sfwmd 1996 swim figures

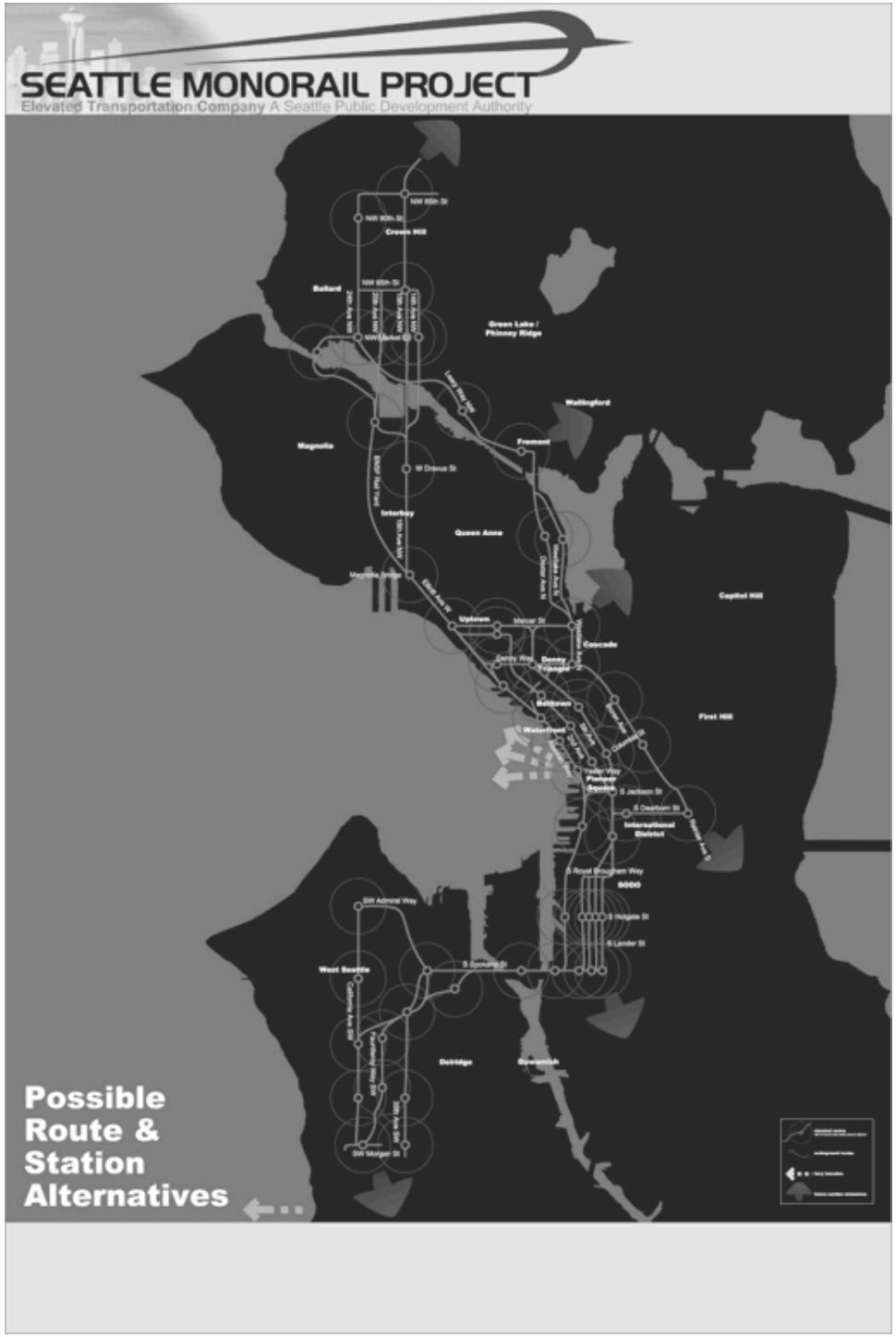
as high as 60% of urban infrastructure is auto orientated

transit metric

what percentage of the population is serviced by transit?

what incentives are in places to stimulate use?

how are the incentives funded?



community

place

protection

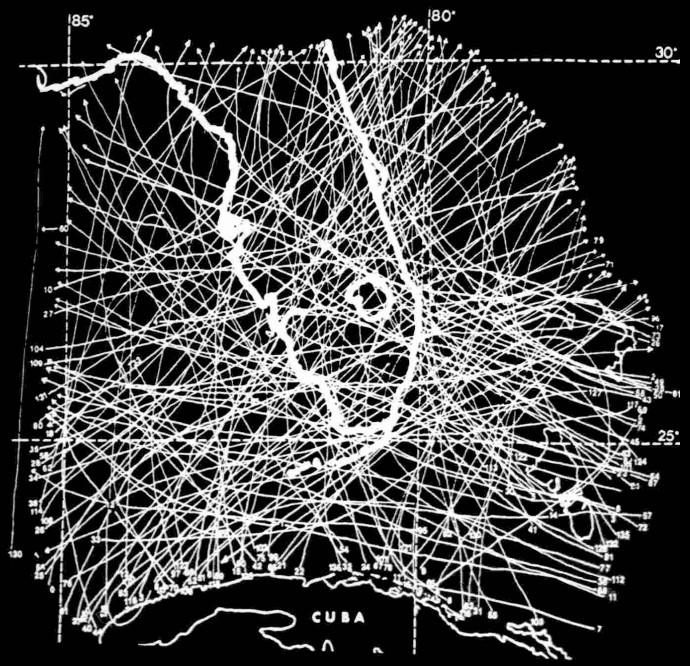
security

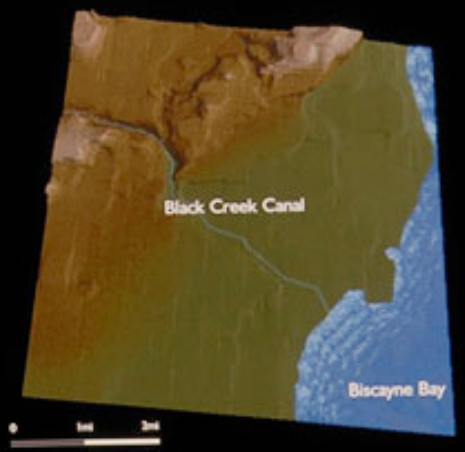
stability

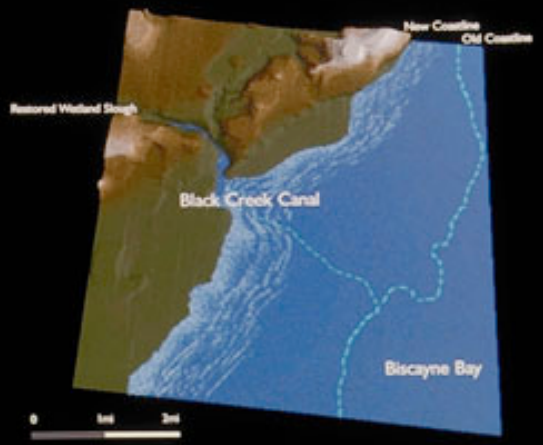
culture

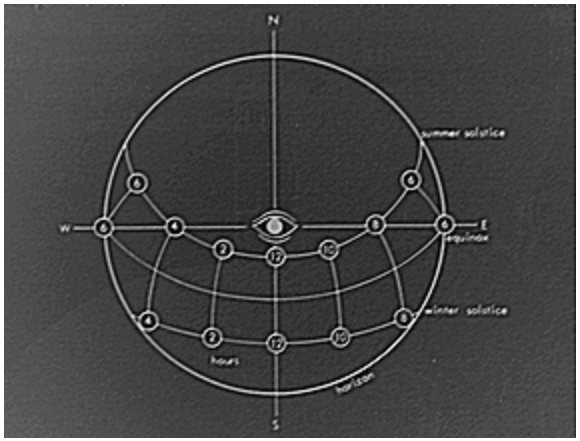
security / protection

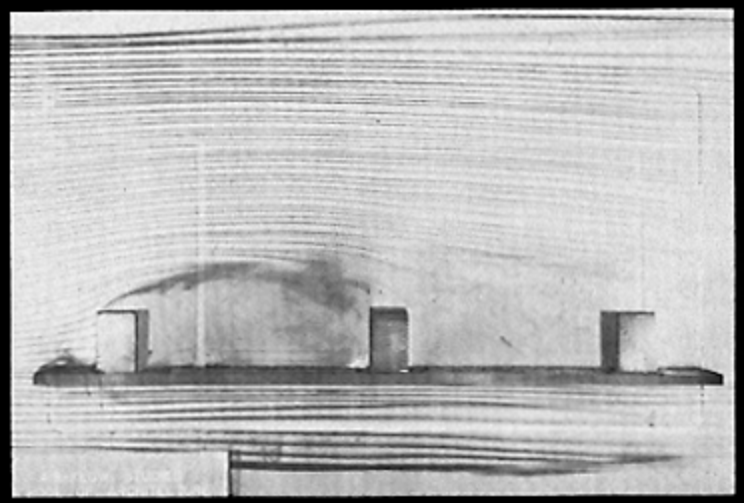
- increase in storm frequency and strength
- sea level rising, 18” - 72” by 2096



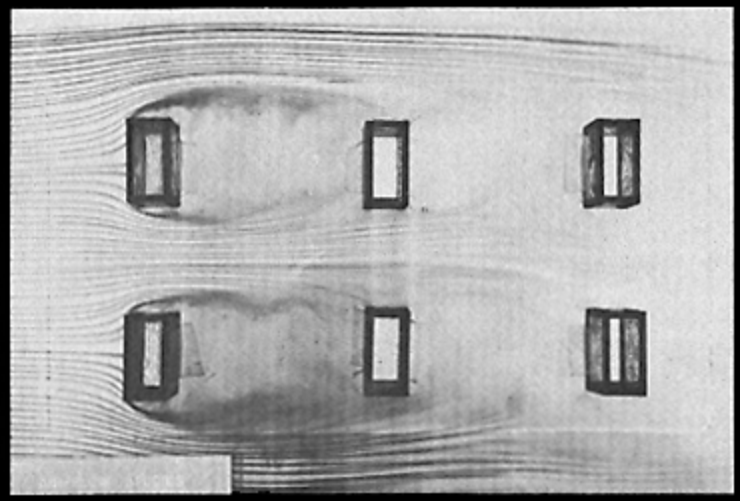




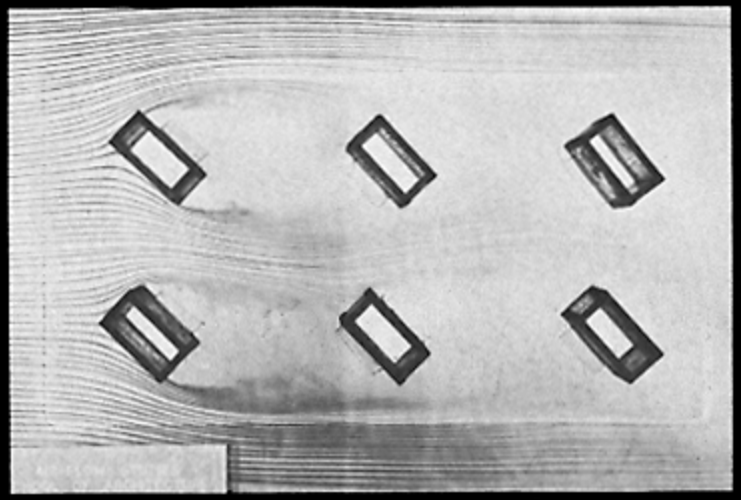

N
summer solstice
W
E
equinox
winter solstice
hours
horizon
S



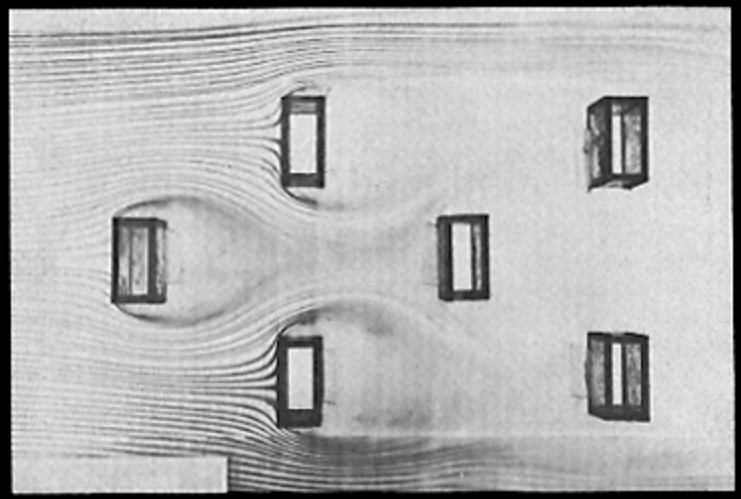
196. Wind shadow effect at parallel rows.



197. Wind protection with linear housing arrangement.

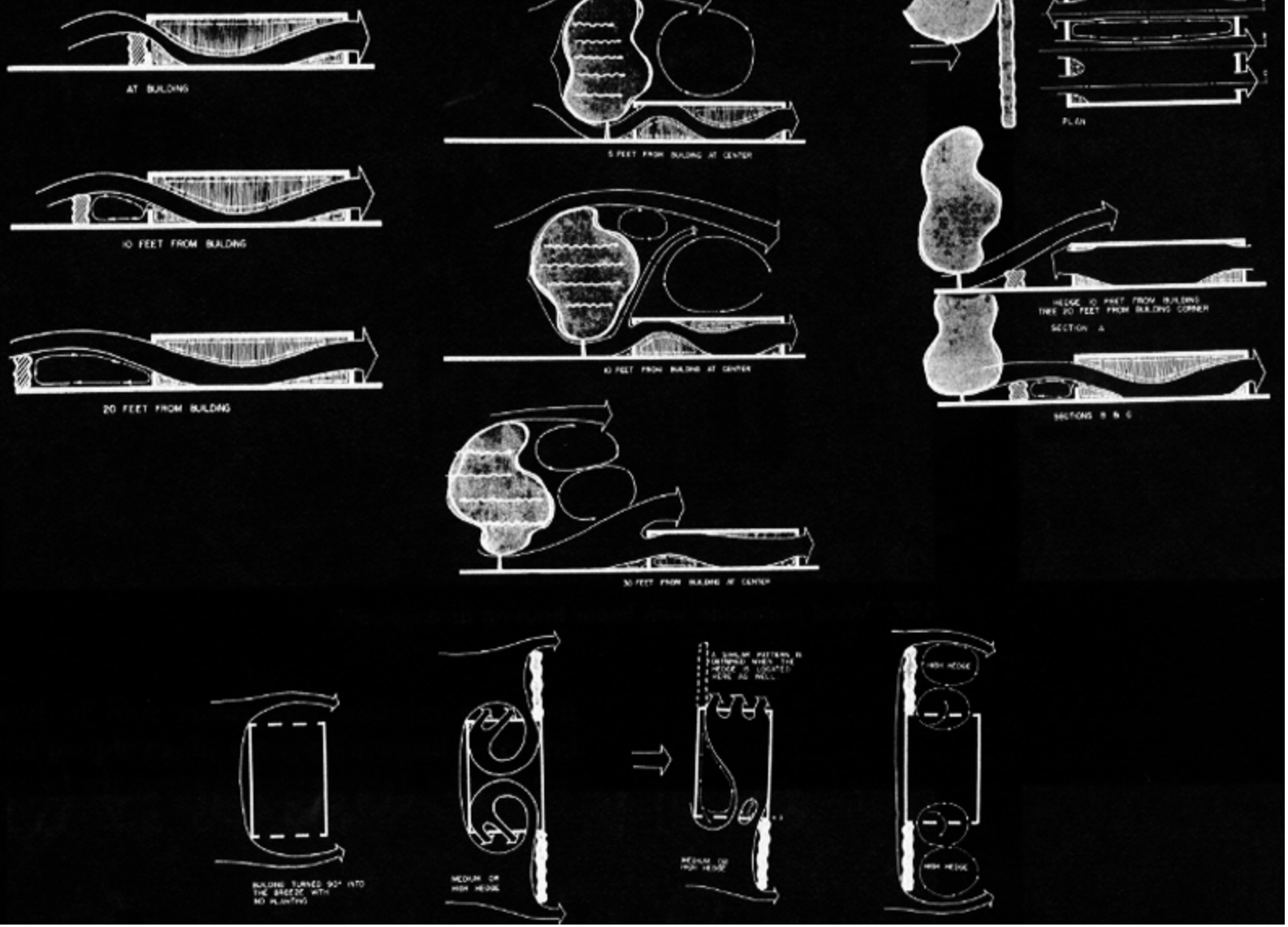


198. Wind protection effect in housing layout.



199. Utilization of summer breezes.

Medium Hedge




RESERVED
VISITOR

urban ecosystems

Designing sustainable landuse patterns provides for the integration and protection of local natural infrastructure enabling communities to have a high quality of life at a lower tax base.

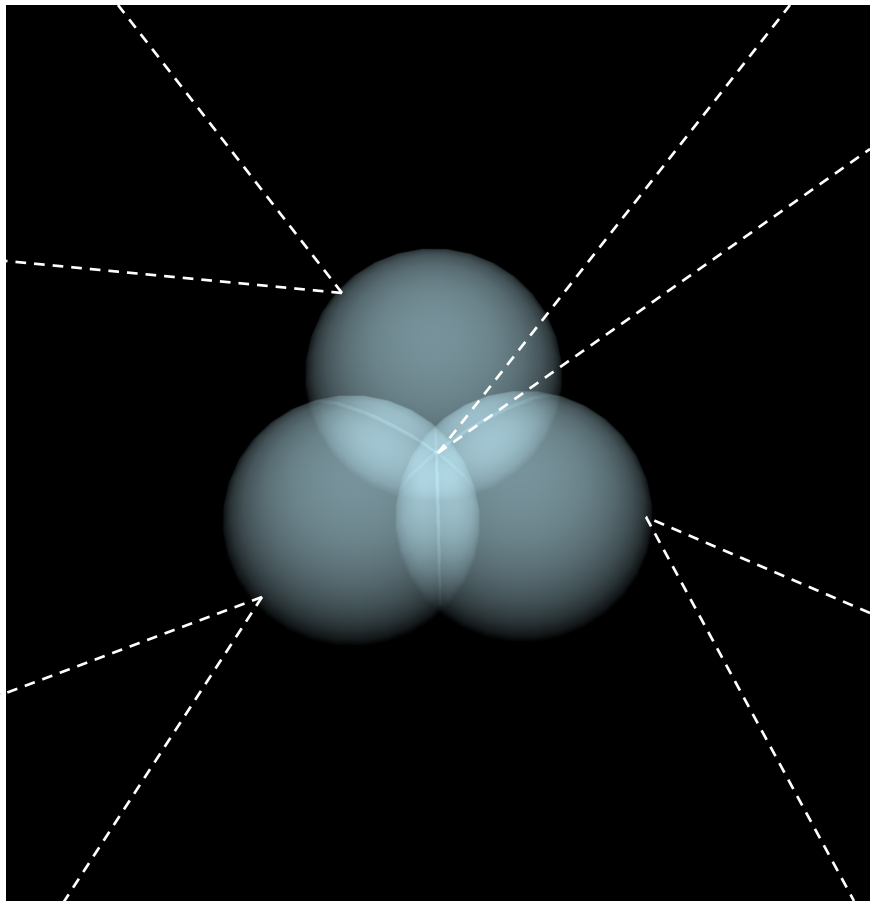
Community

Equity

Social Fabric

Culture

Preservation



Design

the

Connections

Environment

Cycles

Systems

Connections

Economy

Flows

Value

sustainability is a three-dimensional opportunity

"Sustainability is the [emerging] doctrine that economic growth and development must take place, and be maintained over time, within the limits set by ecology in the broadest sense -- by the interrelations of human beings and their works, and the biosphere...It follows that environmental protection and economic development are complementary rather than antagonistic processes."

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