

An aerial photograph of a coastal region, likely Seattle, with a semi-transparent map overlay. The map features red and green areas, possibly indicating different land use or environmental zones. The city of Seattle is visible on the right side, with its characteristic hills and waterfront. The text "Resilient Design: The Regional & Urban Scale" is centered over the map.

Resilient Design: The Regional & Urban Scale

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....4 takeaways

1. What does Resilient Design **mean** and why is it important to my practice of architecture and regional and urban design?
2. What is the **relevance** of resilient design in solving for climate change challenges such as drought, flooding and sea level rise?
3. How do I **adapt** my practice to include Resilient Design?
4. What are some **examples** of Resilient Design at the larger scale?



1) What does Resilient Design **mean** and why is it important to my practice of architecture and urban and regional design?

...resilient design means your design solutions can

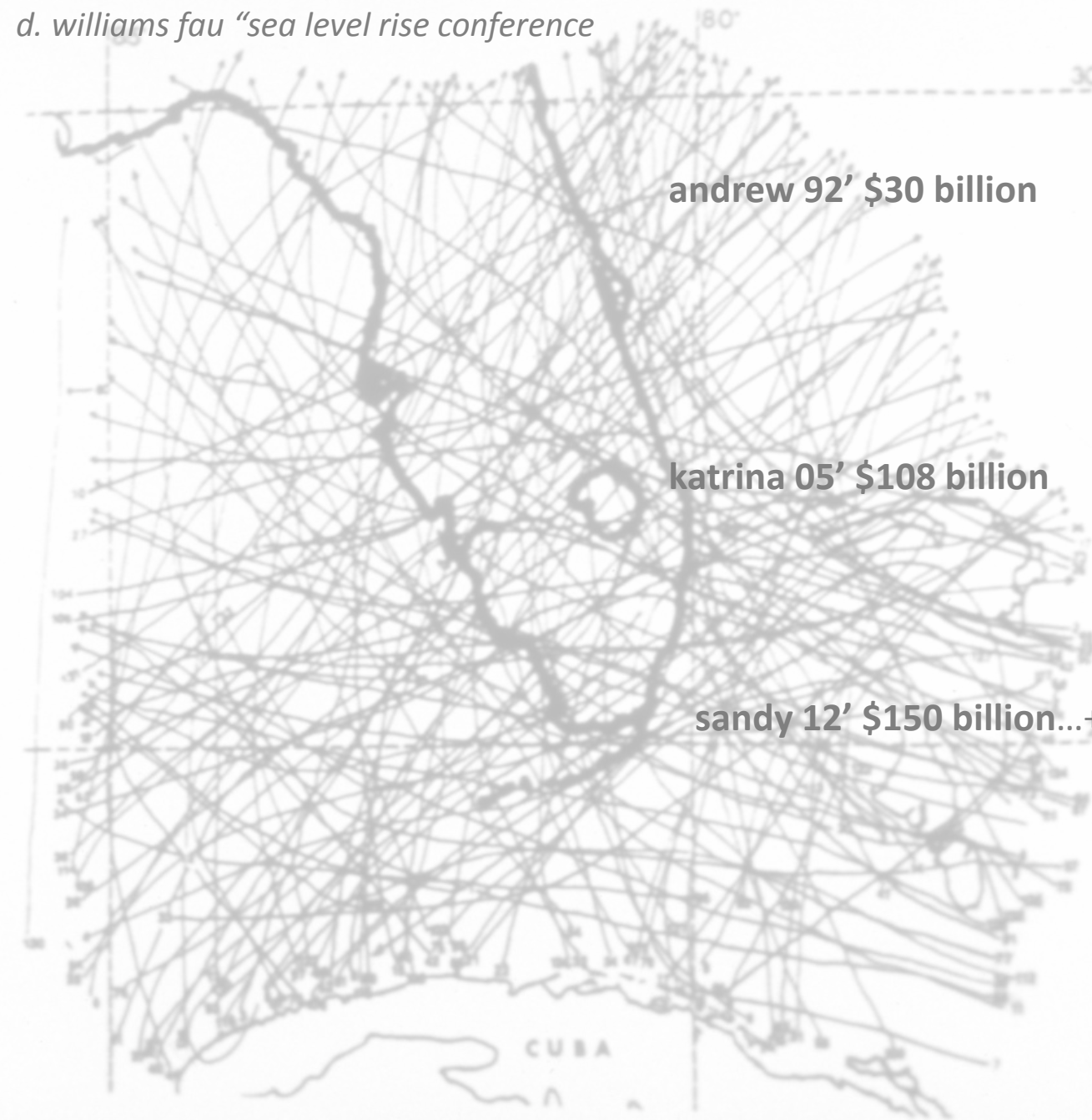
adopt and adapt to changing

conditions. *change is the only* **constant.**



*“natural disasters are **snapshots** of expected long term changes.”*

d. williams fau “sea level rise conference

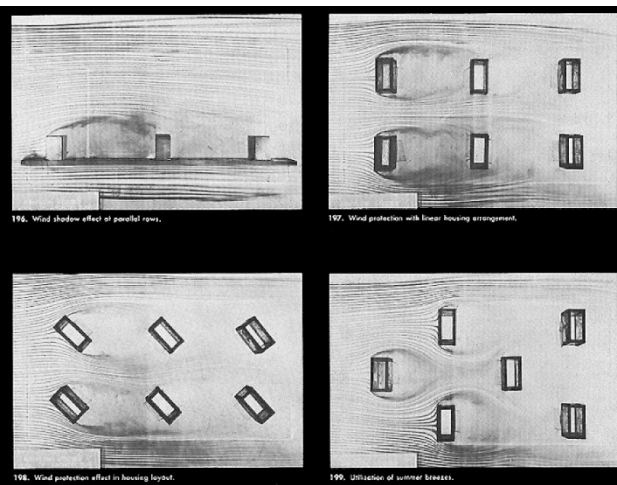


andrew 92' \$30 billion

katrina 05' \$108 billion

sandy 12' \$150 billion...+

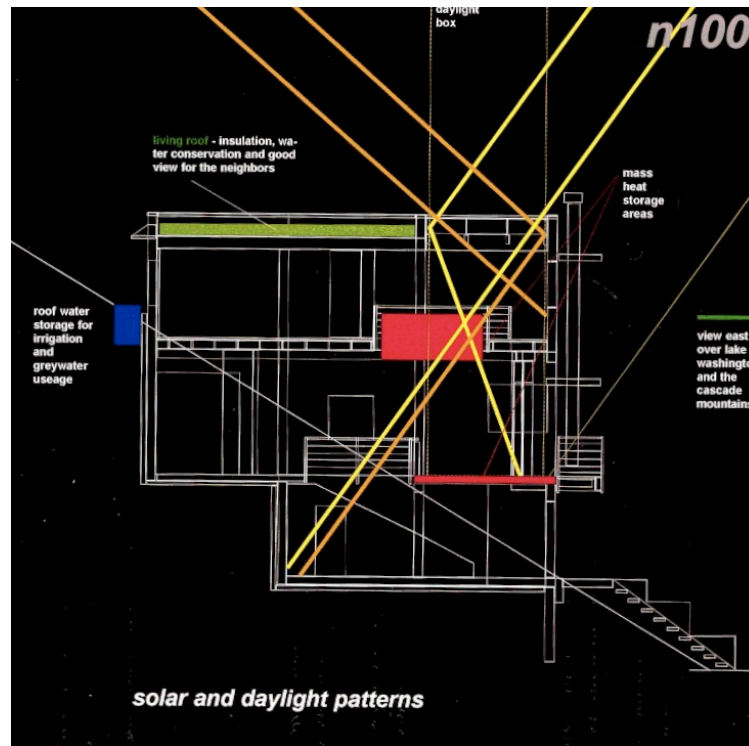




wind & form

too much water and not enough water. **CHALLENGE:** design solutions that *increase storages* while providing walkable, sustainable communities that are resilient to sea-level rise and mitigate wind damage.

flooding & drought





2) What is the **relevance** of resilient design in solving

for climate change challenges such as drought, flooding and sea level rise?

*...climate change challenges fall into 2 headings:
the first is how does your design*

reduce/eliminate carbon *pollution -
therefore slowing the acceleration of global warming;*

secondly, the design must ***solve for those
impacts*** *that are occurring or will occur?*



change in weather
patterns – flooding
& drought

change in
productivity zones

reduction of
terrestrial land
mass

loss of arable lands
for food.

changes to biomes

exponential
increase in carbon
loading

increases to
carbon footprint in
developing
countries

exponential
population growth



...

educate – *adopting, adapting, and resilience.*

reality check.....

6,366.0 = Radius of Planet (km)

509,264,182.6 = Surface Area of Planet (km²)

[71% Water]

29% = 147,686,613.0 (available land in km²)

7,000,000,000.0 = Number of People

21,098.1 = Square Meters Per Person

[227,097.9 = Square Feet Per Person]

5.2 = Acres Per Person

[33% desert / 24% mountains]

so...13,805,153.0 = Earth Arable Land (km²)

so...21,228.2 = Arable Land per Person (ft²)

~0.5acre = Arable Land/Person

carrying capacity ~ average **water** consumption / person / day = 80 gallons = 10cuft or
.00025 acre-feet x 365 x 4 = 1/3 acre of storage for family of 4.

urban design that:

>mitigates flooding and drought.

>is walkable and incorporates micro-climates.

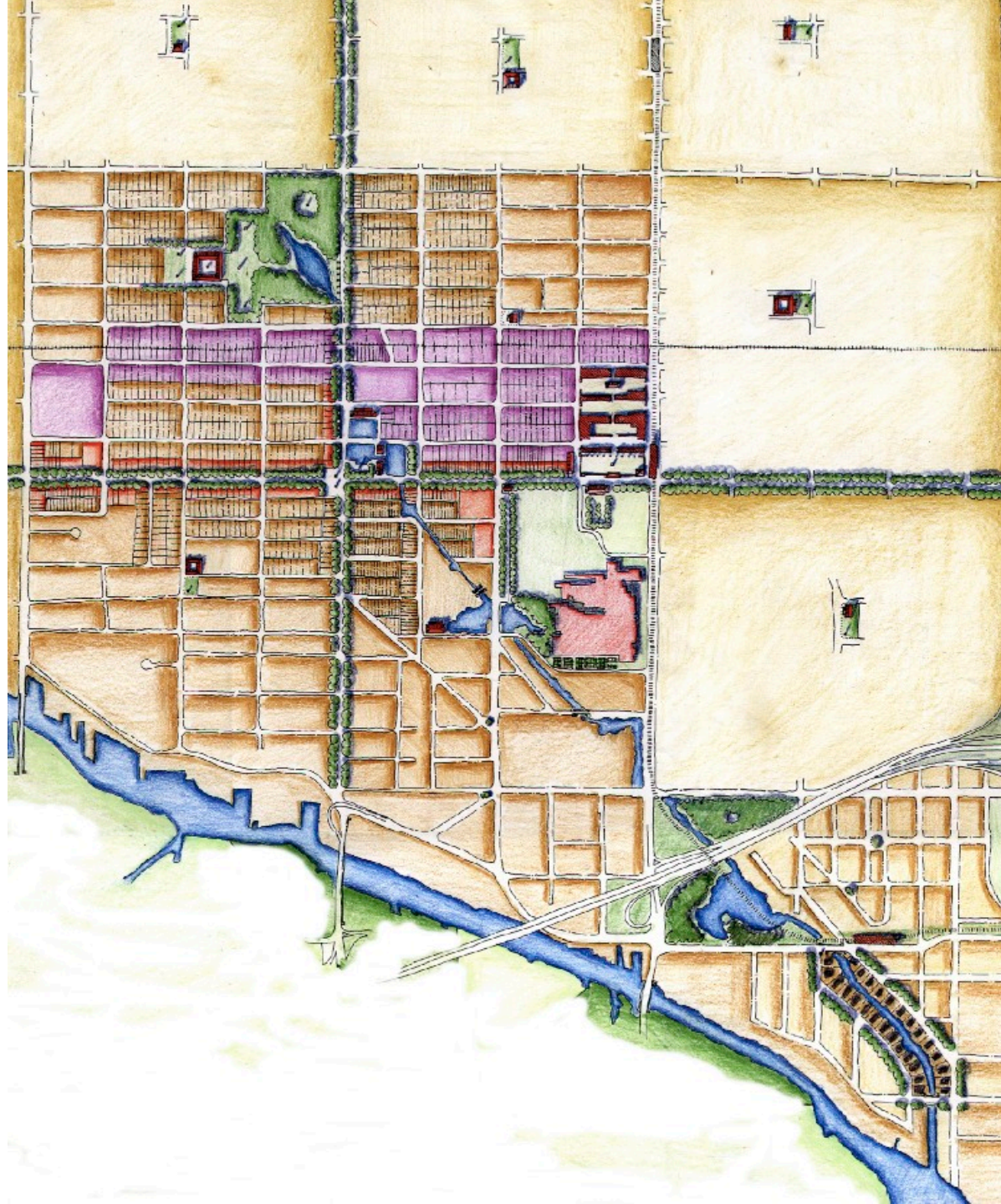
>plans transitional infrastructure and buildable zones to adapt to sea-level rise.

>stores and cleanups stormwater in bio-uptake parks.

>reduces heat-island effect.

>improves public transit.

>establishes regional greenbelt connections.





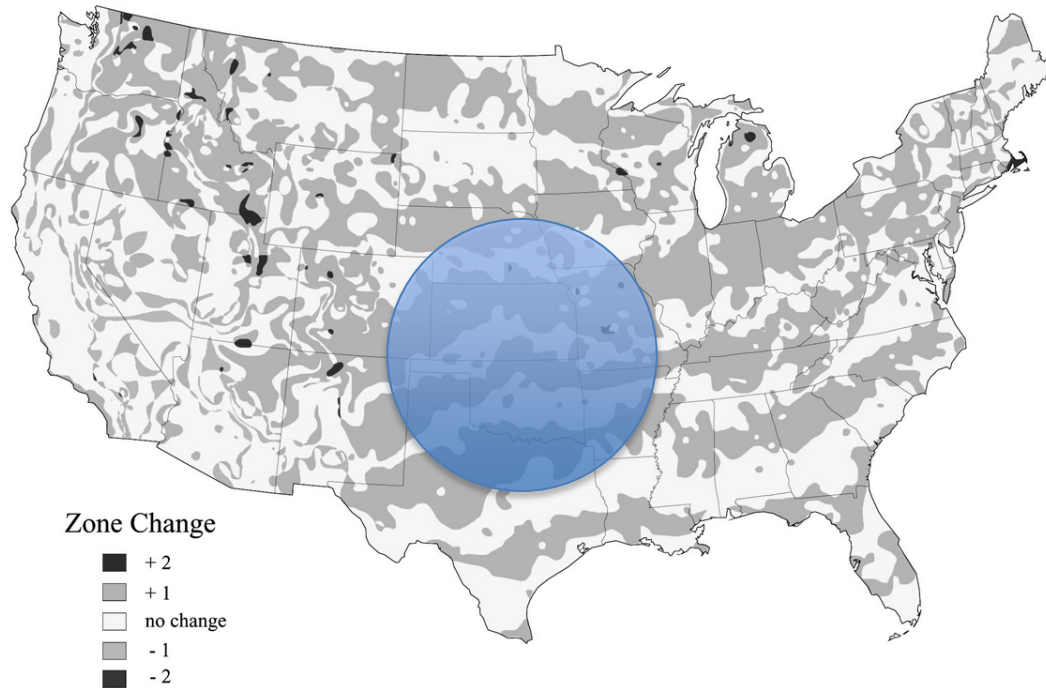
3) How do I **adapt** my practice to include Resilient Design?

to do list...

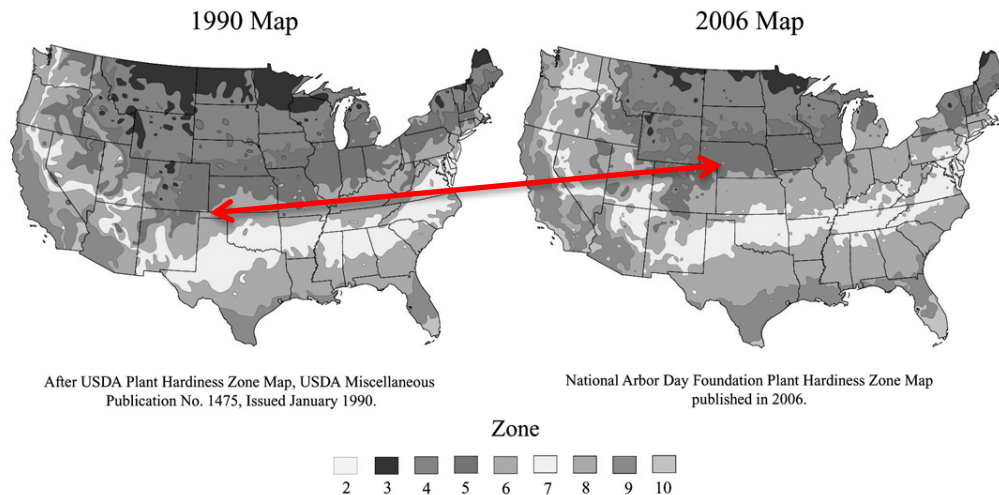
- a) *learn the **climatic-ecological history** of your region(s) of practice.*
- b) *connect with groups that are studying and doing **applied research** that can inform your design and planning work (ipcc, universities, aia/kc).*
- c) *establish inner-office links to government and civic officials (long view planning groups, climate change study groups, post-disaster recovery groups) – **lead, get involved.***



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

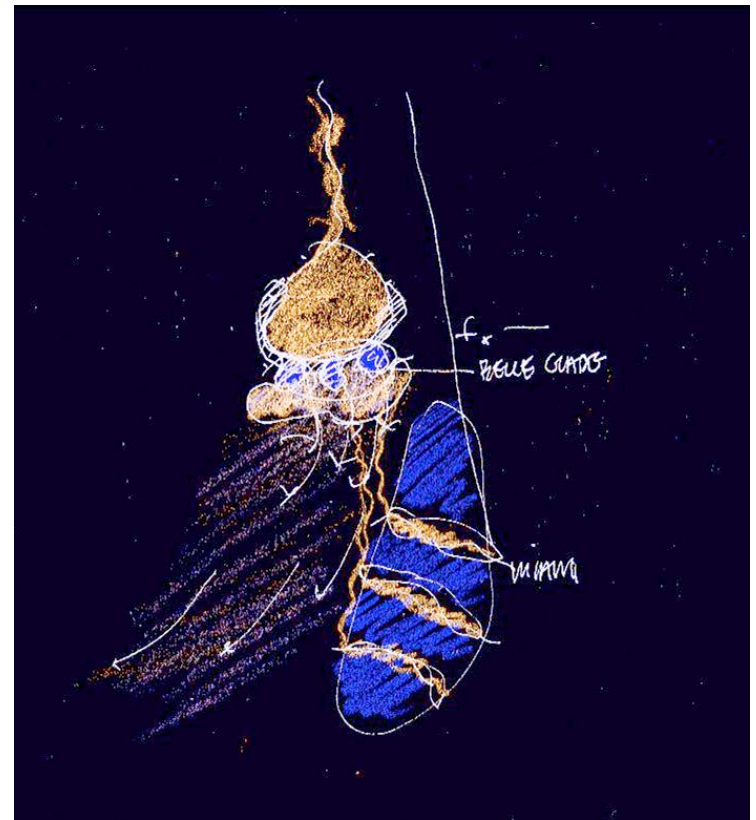


...at what point do the
apparent changes in
climate radically
**change our design
approach?**

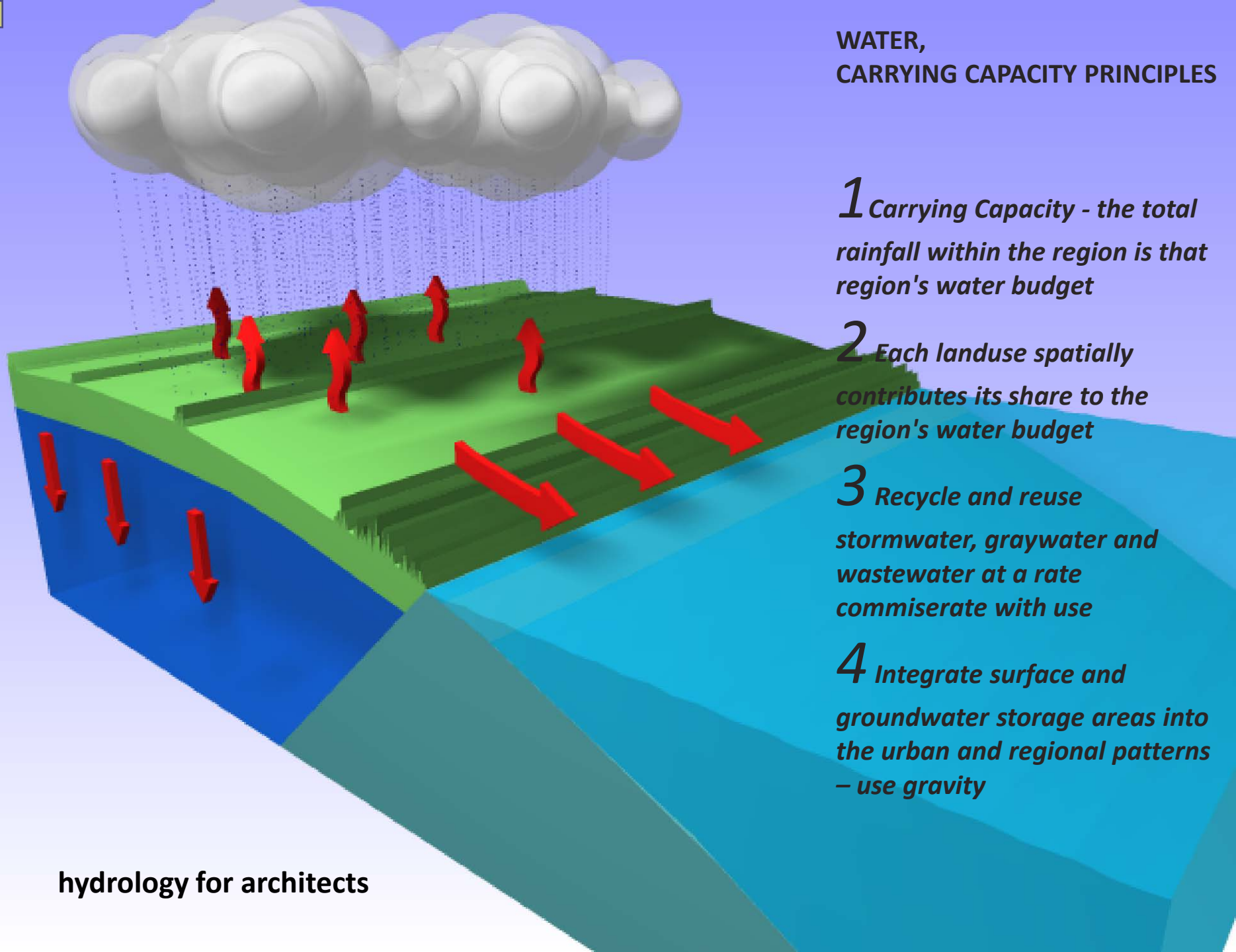


...is this new approach
appropriate to the
**scale of the
challenge?**

[**arrow** shows 300 mile
change in 16 years]



*since natural processes
created the present pattern
what does it “want to be”
when it is informed by
changing processes?*



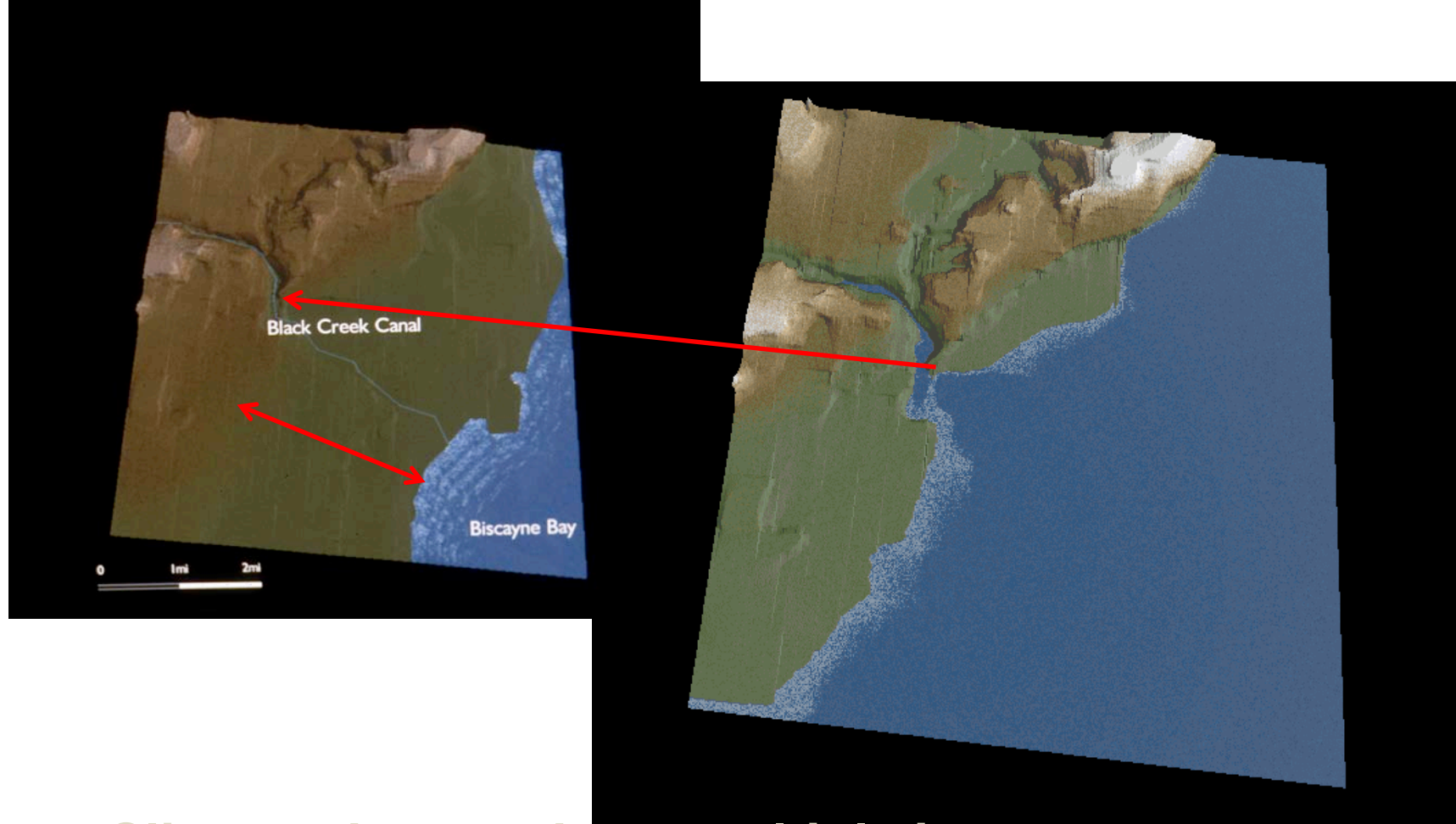
WATER, CARRYING CAPACITY PRINCIPLES

1 *Carrying Capacity - the total rainfall within the region is that region's water budget*

2 *Each landuse spatially contributes its share to the region's water budget*

3 *Recycle and reuse stormwater, graywater and wastewater at a rate commiserate with use*

4 *Integrate surface and groundwater storage areas into the urban and regional patterns – use gravity*



Climate changes have multiple impacts...

The impacts from the loss of terrestrial land will cost trillions of dollars with no net benefit... and the loss of aquifer storage (loss of potable water) to every coastal city in the world.



4) What are some **examples** of Resilient Design at the larger scale?

case studies:

Southeastern Florida Coastal Zone – sea level rise adaption, Transit, Agricultural Preservation, Sustainable Potable water Storage, Flood Mitigation, Post-Disaster Planning.

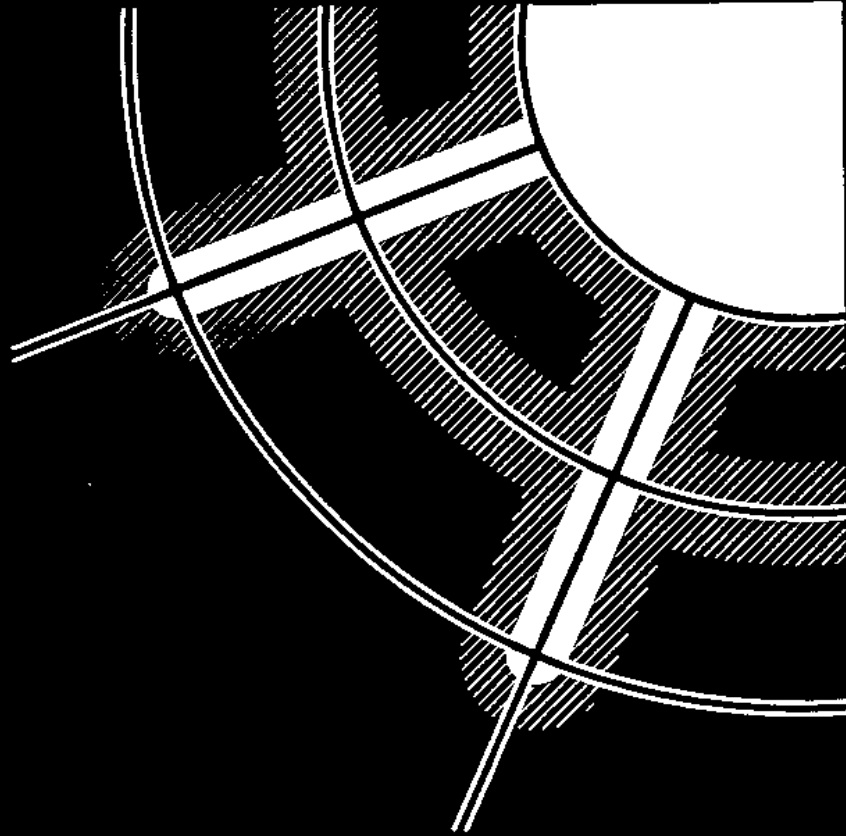
Mississippi River: Ecosystem Services

Adaption - a gravity powered flood protection, aquifer recharge, agricultural soil rehabilitation and improved navigation system plan.

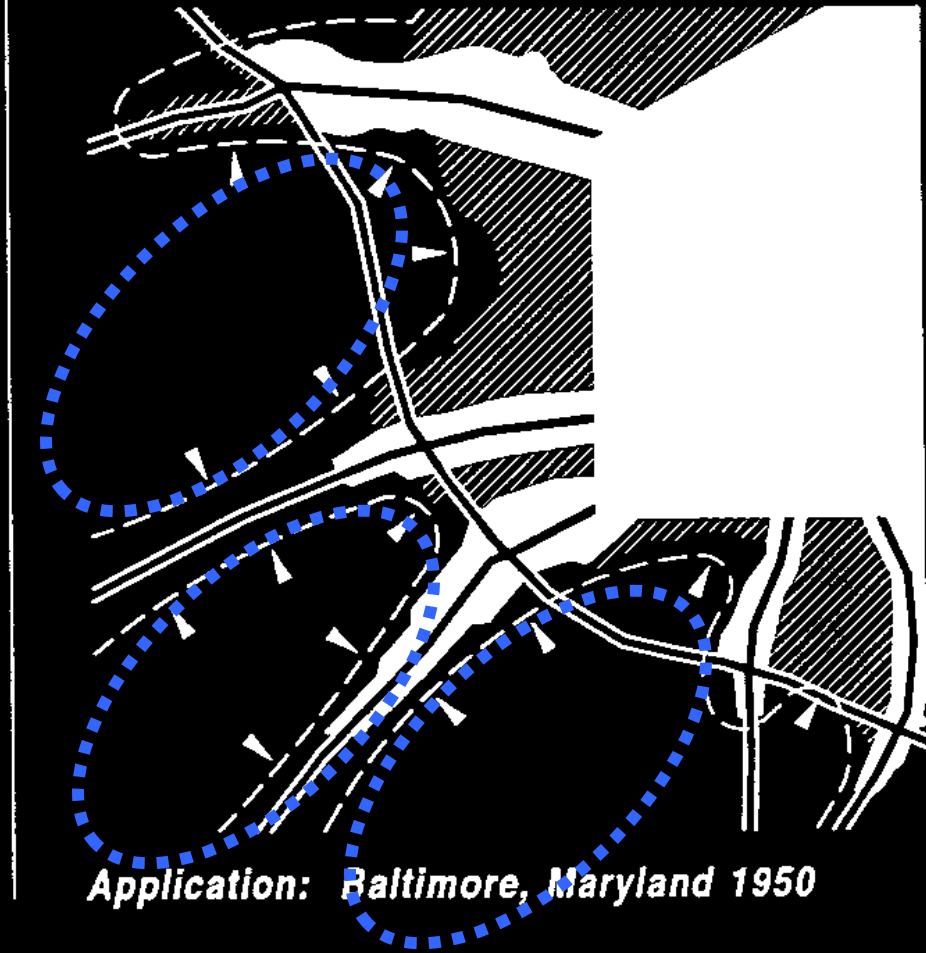
Mini Interventions – small projects illustrating resilient design.



carrying capacity



Pattern



Application: Baltimore, Maryland 1950

Water, Food & Jobs – Conservation Boundaries

.....smart growth, based on natural resources ability to supply needs.....



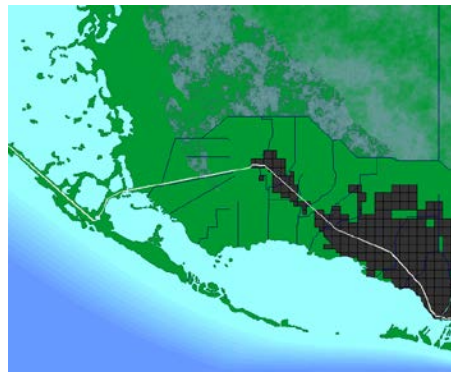
sustainable regional design process & analysis

1999 AIA HONOR AWARD FOR URBAN AND REGIONAL DESIGN



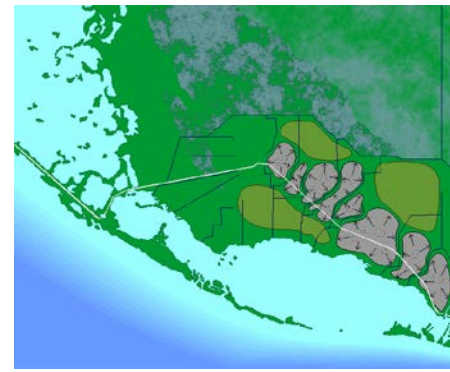
1 pre-settlement 1900

- high-dry elevations
- resilient to storms
- provide flood protection
- prime aquifer recharge



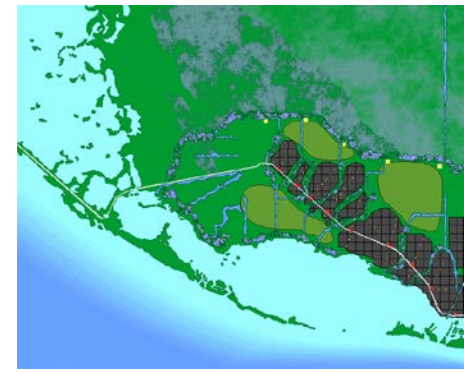
2 existing conditions conflicts

- growth in flooded areas
- sea level rise and hurricanes
- drained- loss of potable water storage, increase salt water intrusion



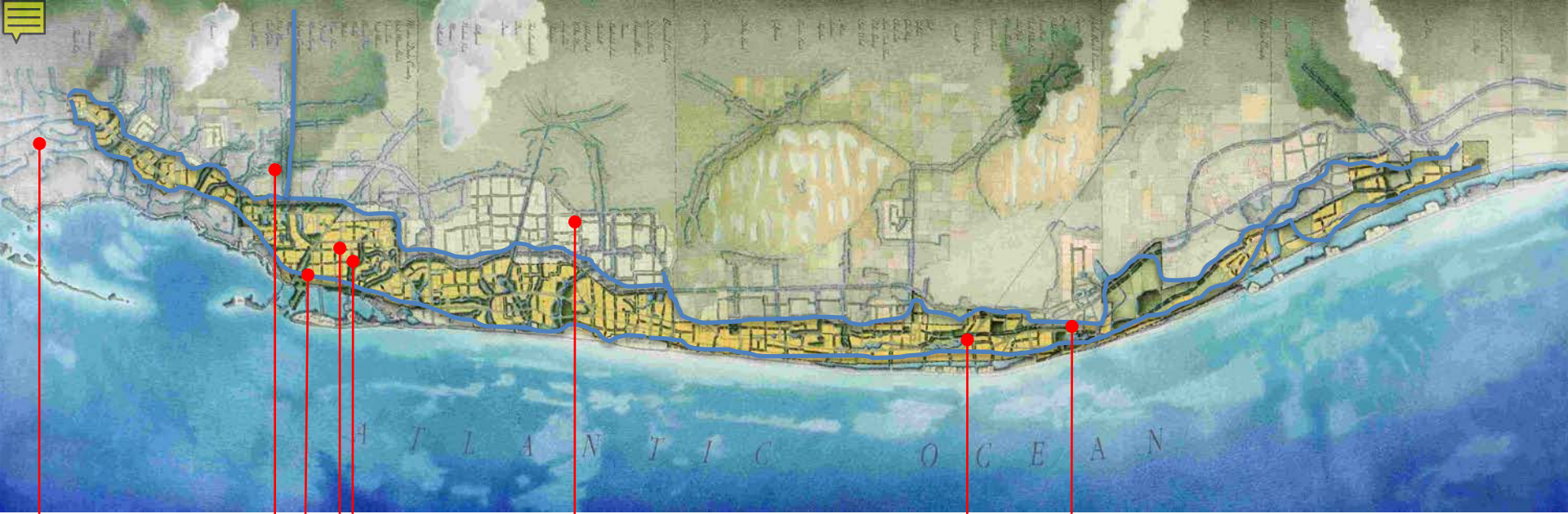
3 sustainable principles

- locate where to develop or move population out of harms way.
- increase water storages & local food supply
- t.o.d. / jobs



4 sustainable development 2050...

- design a system-solution
- transportation, aquifer recharge, flood protection, local food and jobs...make incremental steps toward a regional vision.



reduction
of land area &
aquifer

climate
change - sea
level rising
zone -
transition
from fresh to
salt water
ecology.

loss of
gravity-fed
storm
water
system

salt water
intrusion
zone
new tidal
ecology

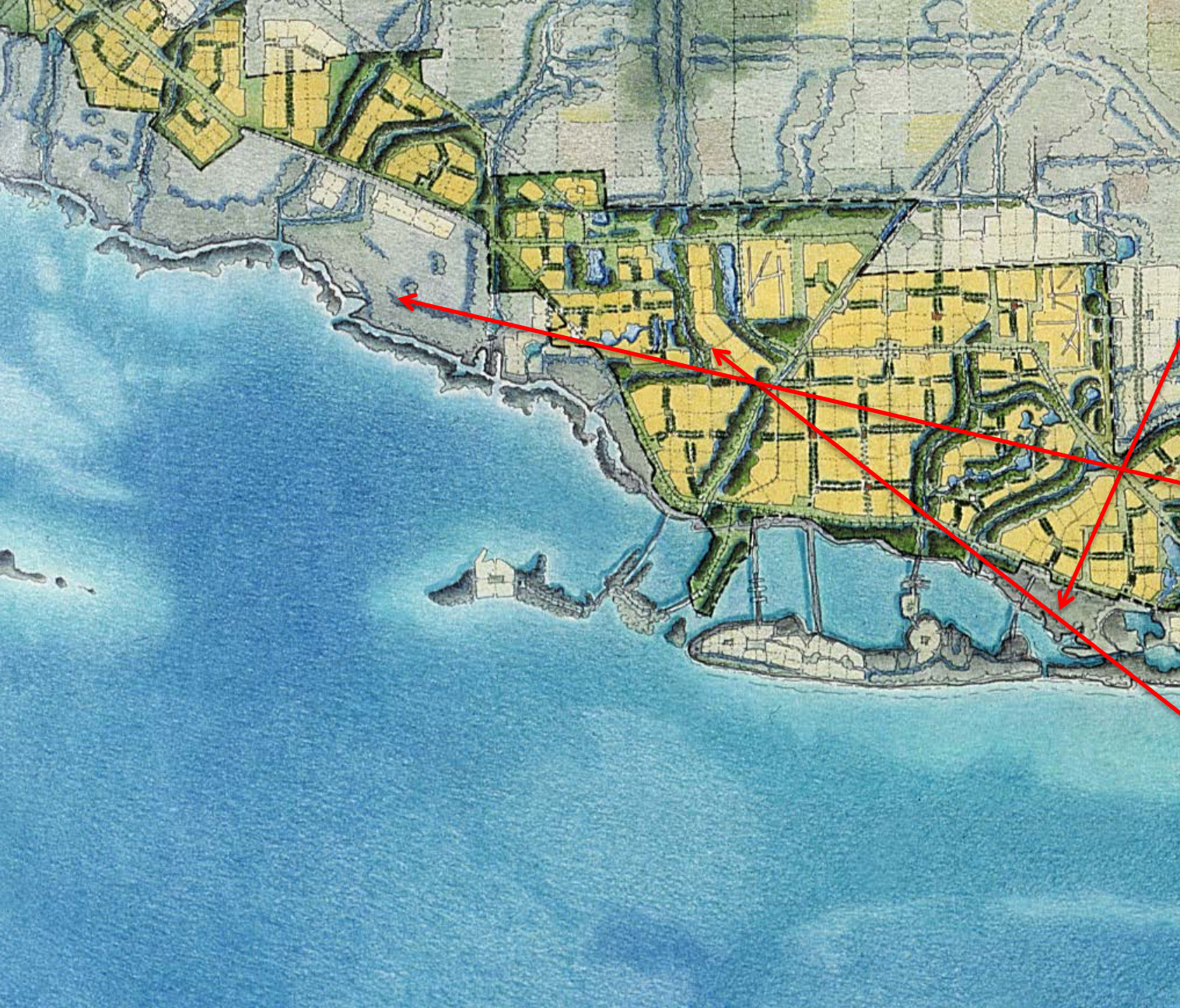
100% flooding of
westward
communities &
agriculture – water /
soil chemistry to
brackish

significant change in
natural system
functioning – changes
to biome?

population
increase but land
area decrease

building foundations,
roadways, fiber optics...
and all drainage systems
impacted

the changing conditions



resilient adaptive land use

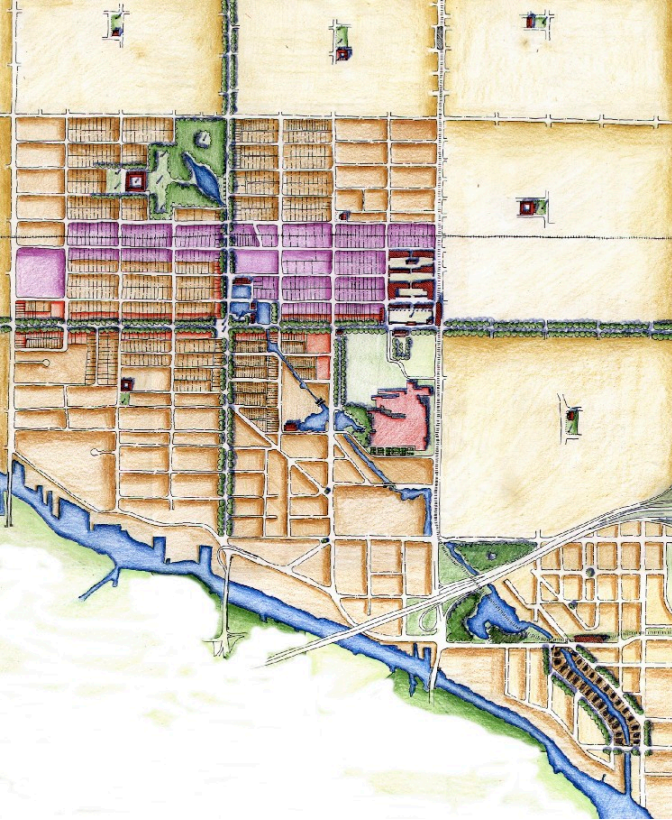
+ ecosystem
health - reclaim
reconstitute
wetlands – no
build zones

+ protection from
climate change
impacts:
water storage in
hydric parks

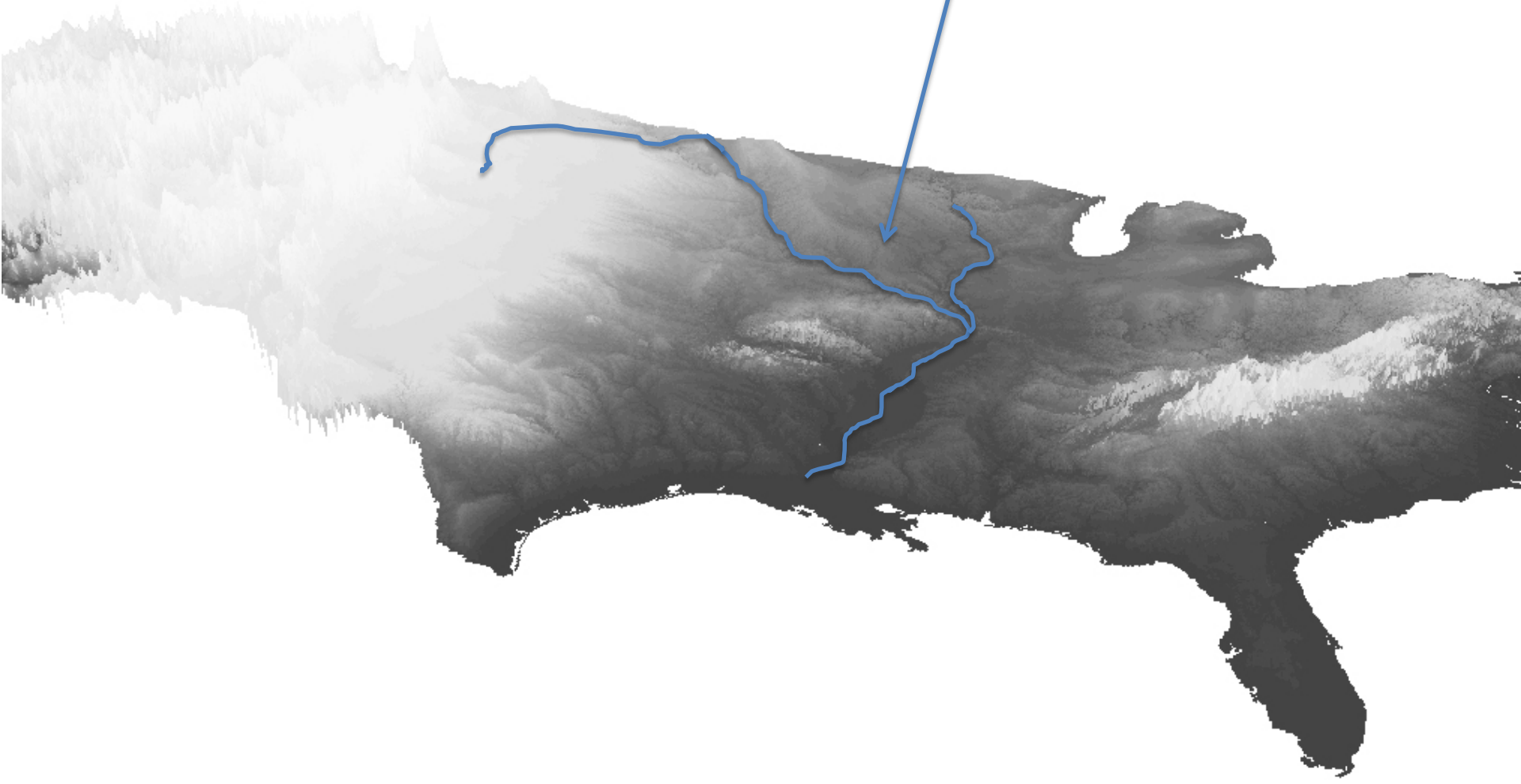
+ increased land
value and
ecological
functioning

evolving this pattern to adapt to climate change





*a million storages, gravity fed
– mitigating flooding and
drought.*





- 1) Define community-based disaster resilience for the built environment. *Learn and tell a story about the place, empower the community with the physics and natural system sciences.*
- 2) Identify consistent performance goals and metrics for buildings and infrastructure and lifeline systems to enhance community resilience. *Function unplugged, net zero +; passive design; 100% walkability.*
- 3) Identify existing standards, codes, guidelines, and tools that can be implemented to enhance resilience. *GIS mapping of fema impact zones; wetlands protection; preservation and protection of additional green/blue national park systems.*
- 4) Identify gaps in current standards, codes, and tools that if successfully addressed, can lead to enhanced resilience. *Create new codes are reactive and should be proactive.*

Meeting the challenge of sustainable design.

"Daniel Williams's *Sustainable Design* is . . . a thoroughly practical call for the design professions to take the next steps toward transformation of the human prospect toward a future that is sustainable and sustaining of the best in human life lived in partnership not domination."

—From the Foreword by David W. Orr, the Paul Sears Distinguished Professor of Environmental Studies and Politics and Chair of the Environmental Studies Program at Oberlin College

"In this pioneering book, Daniel Williams provides the sort of intelligent, thoughtful, experienced insights that—if followed—will ensure that we make the right choices. It should be on the desk of every architect in the world."

—Denis Hayes, president and CEO of the Bullitt Foundation and coordinator of the first Earth Day in 1970

Architects identify "sustainability" as the most important change in the future of their profession. *Sustainable Design: Ecology, Architecture, and Planning* is a practical, comprehensive guide to design and plan a built environment compatible with the region's economic, social, and ecological patterns.

In this book, Daniel Williams challenges professionals to rethink architecture and to see their projects not as objects but as critical, connected pieces of the whole, essential to human health as well as to regional economy and ecology. Comprehensive in scope, *Sustainable Design* answers key questions such as:

- How do I begin thinking and designing ecologically?
- What is the difference between "green design" and "sustainable design"?
- What are some examples of effective change I can make that will have the most impact for the least cost?

Written for architects, planners, landscape architects, engineers, public officials, and change agent professionals, this important resource defines the issues of sustainable design, illustrates conceptual and case studies, and provides support for continued learning in this increasingly central focus of architects' and urban planners' work.

Williams's book features winning projects from the first decade of the AIA's Committee on the Environment (COTE) Top Ten award program.

