

Nature Positive

Recovering Ecological Function and
Multiple Benefits in the Built Environment.

NCER 2024, Albuquerque NM

Rapid Urbanization

- More than half of the global population lives in cities, and more than 70 percent are expected to do so by 2050
- In these areas exposure and vulnerability to climate impacts and other hazards are exacerbated
- Old or poorly planned infrastructure, such as drainage systems and impervious surfaces, can increase the magnitude of natural hazards, such as flooding and urban heat island effects. (No.1 environmental cause of death)

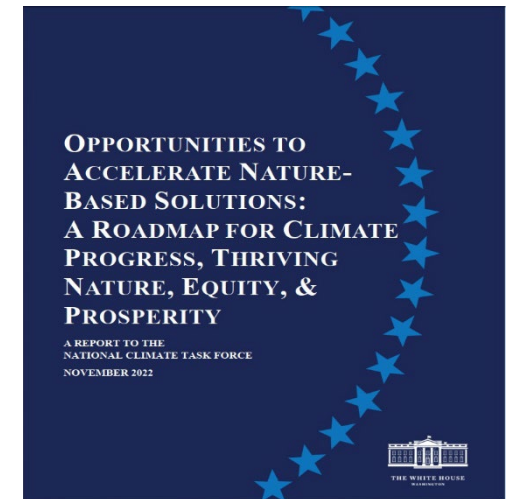
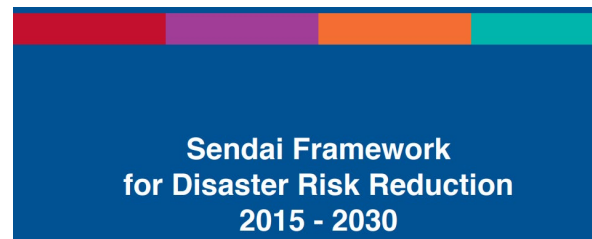
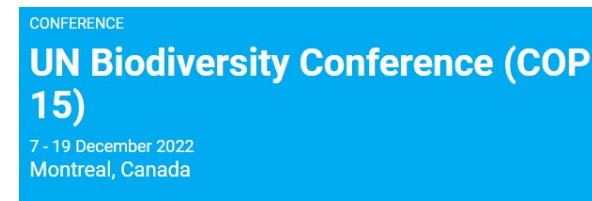


Global and National Agreements

- Gray infrastructure will not always be suitable for cost-effectiveness, resiliency, or sustainability. **Nature-based solutions are recognized to have a critical role in addressing resilience challenges in urban areas**
- These agreements support an alignment of NbS and risk management goals
 - managing climate risk,
 - environmental degradation,
 - adaptive capacities of vulnerable communities,
 - advance public and private investment in disaster risk prevention and reduction



Nature-based Solutions to address global societal challenges



Dependency on nature

- Over **half the world's total GDP**—\$44 trillion of economic value generation—is moderately or highly **dependent on nature** and potentially at risk due to business dependence on nature and its services.
- Most industries depend on natural capital assets and ecosystem services either directly or through the supply chain
- There is no future for business as usual

Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy



Drivers of Nature Loss

- Land- and sea-use change
- Climate change
- Natural resources and exploitation
- Pollution
- Invasive species



Human Activity is eroding the world's ecological foundations

WEF Nature Economy Report Series



- 15 transitions in the three socio-economic systems
 - Food land and Ocean Use
 - Infrastructure and the built environment
 - Energy and extractives

Could deliver:

- \$10.1 trillion of annual business opportunities and
- 395 million of jobs by 2030

WEF Nature Economy Report Series– Infrastructure and Built Environment



- A compactly built environment – protecting ecosystems from conversion
- Nature-positive infrastructure design. Engineered solutions that leverage nature’s emerging properties
- Planet-compatible urban utilities. Provide cleaner air, safer water, efficient sanitation, modern energy, comprehensive waste and recycling services
- Complementing human-engineered solutions for resilience and infrastructure
- Nature-positive connecting infrastructure for transport

Engineering With Nature®

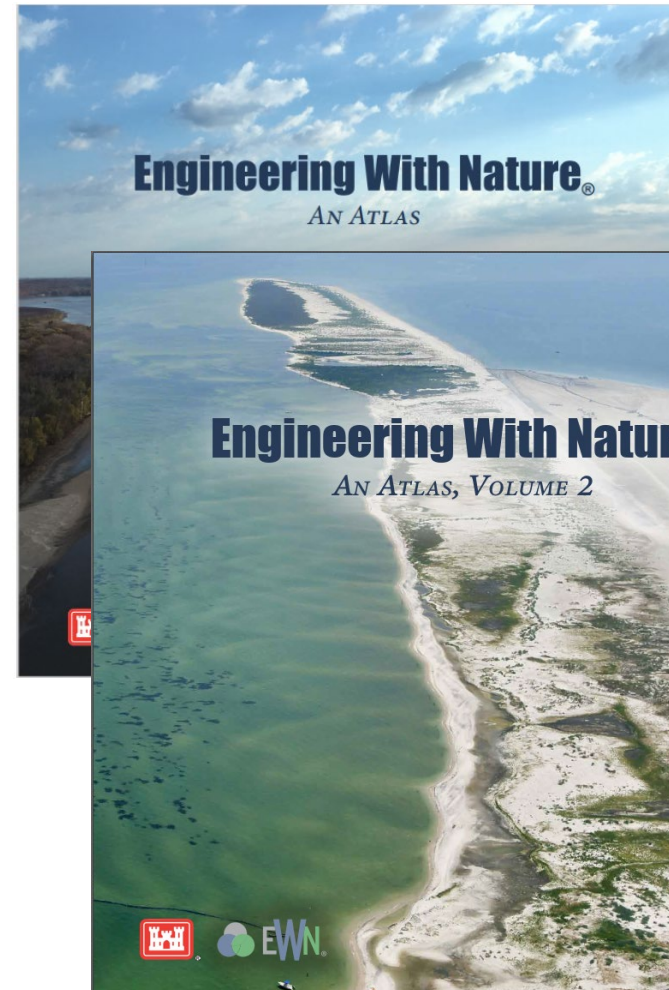
USACE ERDC

<https://ewn.erdcdren.mil/>

...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaboration.

Key Elements:

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Increase and diversify infrastructure value
- Science-based collaboration to organize and focus interests, stakeholders, and partners



Engineering With Nature
AN ATLAS, VOLUME 3

The EWN Atlas Series showcases Engineering With Nature principles in action through images and descriptions of constructed projects around the world.

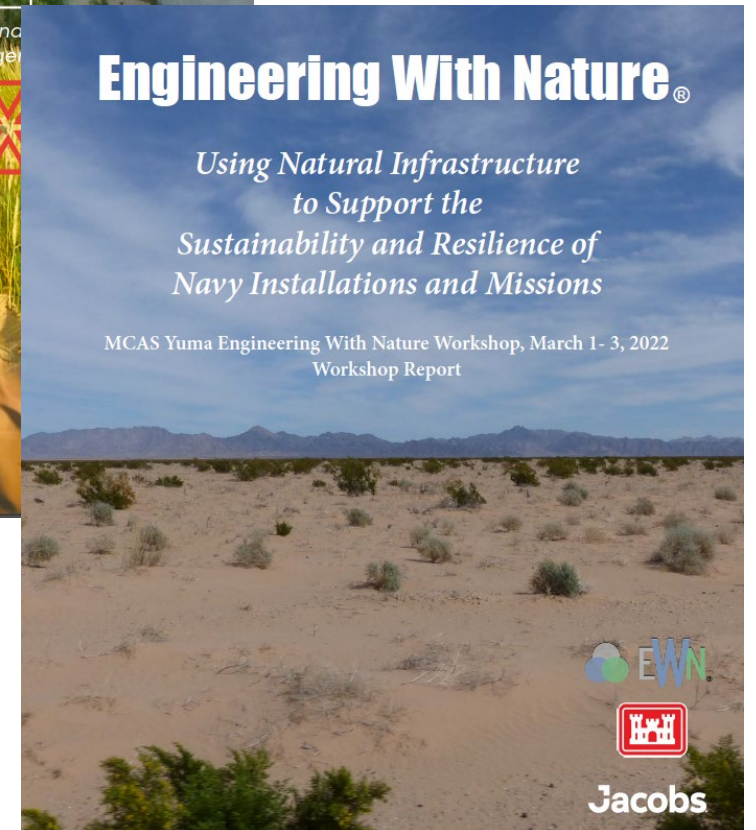
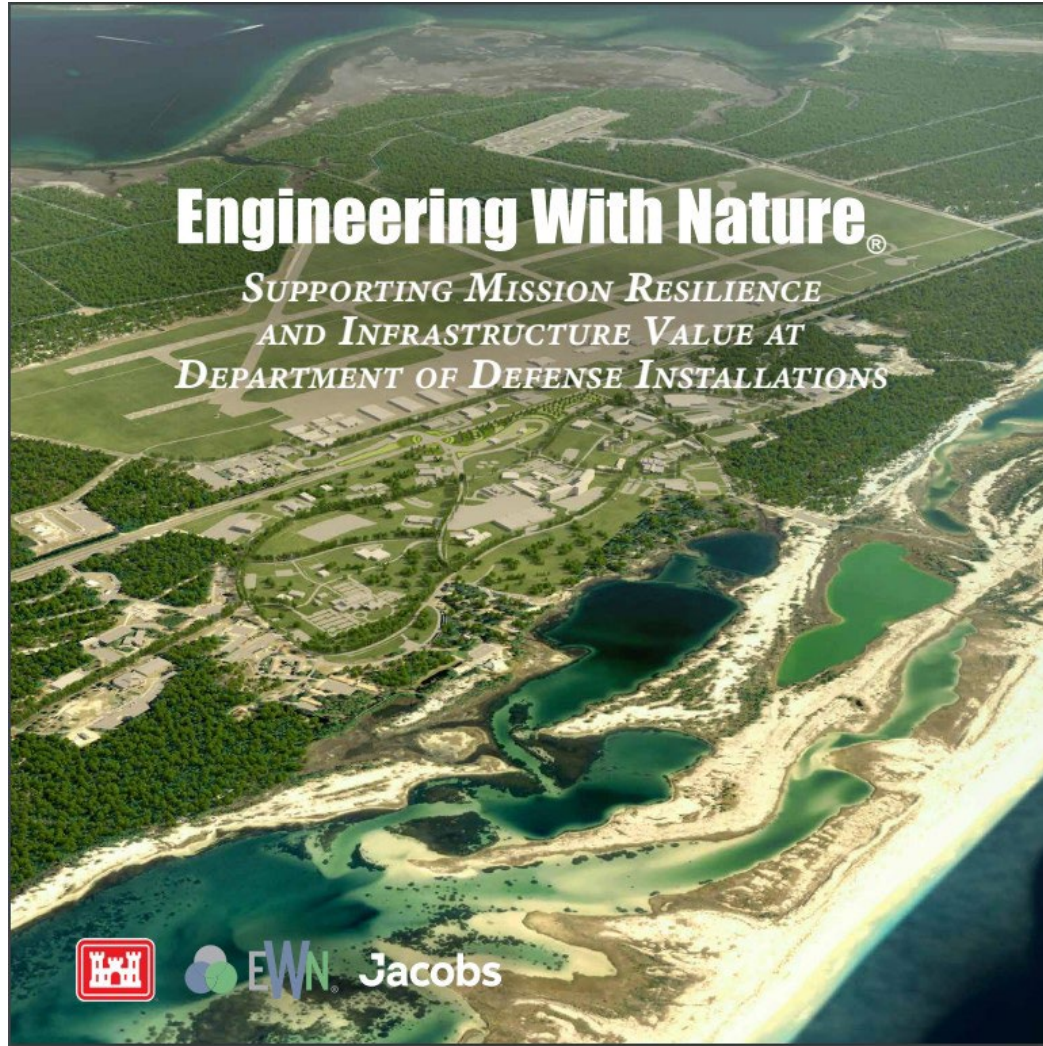
Engineering With Nature
An Atlas, Volume 3

Available May 2024

- 58 PROJECTS
- 37 PARTNER ORGANIZATIONS
- 15 USACE PROJECTS
- 22 PROJECTS IN THE US
- 19 INTERNATIONAL PROJECTS
- 4 CONTINENTS

WWW.ENGINEERINGWITHNATURE.ORG

Engineering With Nature[®]



Living Building Challenge


International Living Future Institute

<https://living-future.org/>

20 Imperatives grouped into seven petals. Some Imperatives are not required for all Typologies.


PETAL	IMPERATIVE	TYPOLOGY			
		New Building	Existing Building	Interior	Landscape + Infrastructure
PLACE	01 Ecology of Place	Imperative	Requirement Dependent	Not Required	Imperative
	02 Urban Agriculture	Imperative	Imperative	Not Required	Not Required
	03 Habitat Exchange	Imperative	Imperative	Imperative	Not Required
WATER	04 Human Scaled Living	Imperative	Requirement Dependent	Requirement Dependent	Not Required
	05 Responsible Water Use	Imperative	Imperative	Requirement Dependent	Imperative
ENERGY	06 Net Positive Water	Imperative	Imperative	Not Required	Imperative
	07 Energy + Carbon Reduction	Imperative	Imperative	Requirement Dependent	Imperative
HEALTH + HAPPINESS	08 Net Positive Energy	Imperative	Imperative	Imperative	Imperative
	09 Healthy Interior Environment	Imperative	Imperative	Imperative	Not Required
MATERIALS	10 Healthy Interior Performance	Imperative	Imperative	Imperative	Not Required
	11 Access to Nature	Imperative	Imperative	Imperative	Not Required
	12 Responsible Materials	Imperative	Imperative	Imperative	Imperative
	13 Red List	Imperative	Imperative	Imperative	Imperative
	14 Responsible Sourcing	Imperative	Imperative	Imperative	Imperative
EQUITY	15 Living Economy Sourcing	Imperative	Imperative	Imperative	Imperative
	16 Net Positive Waste	Imperative	Imperative	Imperative	Imperative
BEAUTY	17 Universal Access	Imperative	Requirement Dependent	Requirement Dependent	Requirement Dependent
	18 Inclusion	Imperative	Imperative	Imperative	Imperative
BEAUTY	19 Beauty + Biophilia	Imperative	Imperative	Imperative	Imperative
	20 Education + Inspiration	Imperative	Imperative	Imperative	Imperative

-  CORE IMPER.
-  SCALE JUMP ALLOWED
-  HANDPRINT IMPERATIVE
-  IMPERATIVE FOR TYPOLOGY
-  REQUIREMENT DEPENDENT
-  NOT REQUIRE TYPOLOGY



LIVING BUILDING CHALLENGESM 4.0

A Visionary Path to a Regenerative Future



INTERNATIONAL LIVING FUTURE INSTITUTESM


JUNE 2019


The Place Petal

Intent: *To realign how people understand and relate to the natural environment that sustains us.*

The Place Petal clearly articulates:

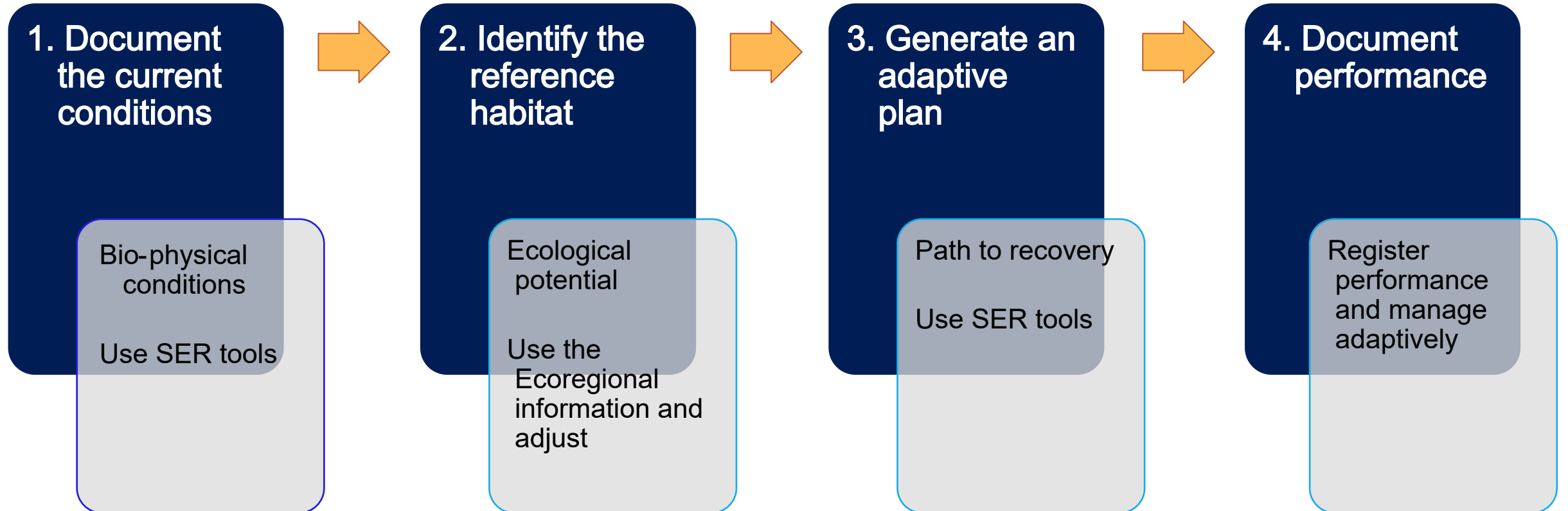
- 1. *Where*** it is acceptable for people to build
- 2. *How to protect and rehabilitate*** a place once it has been developed
- 3. *How to encourage the creation of communities*** that are once again based on the pedestrian rather than the automobile

 LIVING BUILDING CHALLENGE™ FULL CERTIFICATION	
Summit of holistic aspiration and attainment; fully restorative. All Imperatives must be achieved to certify:	
1	Ecology Of Place
2	Urban Agriculture
3	Habitat Exchange
4	Human Scaled Living
5	Responsible Water Use
6	Net Positive Water
7	Energy + Carbon Reduction
8	Net Positive Energy
9	Healthy Interior Environment
10	Healthy Interior Performance
11	Access To Nature
12	Responsible Materials
13	Red List 90%
14	Responsible Sourcing
15	Living Economy Sourcing
16	Net Positive Waste
17	Universal Access
18	Inclusion
19	Beauty + Biophilia
20	Education + Inspiration

 CORE GREEN BUILDING CERTIFICATION	
Responding to climate change with holistic high performance.	
Required Imperatives:	
1	Ecology Of Place
4	Human Scaled Living
5	Responsible Water Use
7	Energy + Carbon Reduction
9	Healthy Interior Environment
12	Responsible Materials
17	Universal Access
18	Inclusion
19	Beauty + Biophilia
20	Education + Inspiration

Ecology of Place - Four Basic Steps

Intent: *To realign how people understand and relate to the natural environment that sustains u*

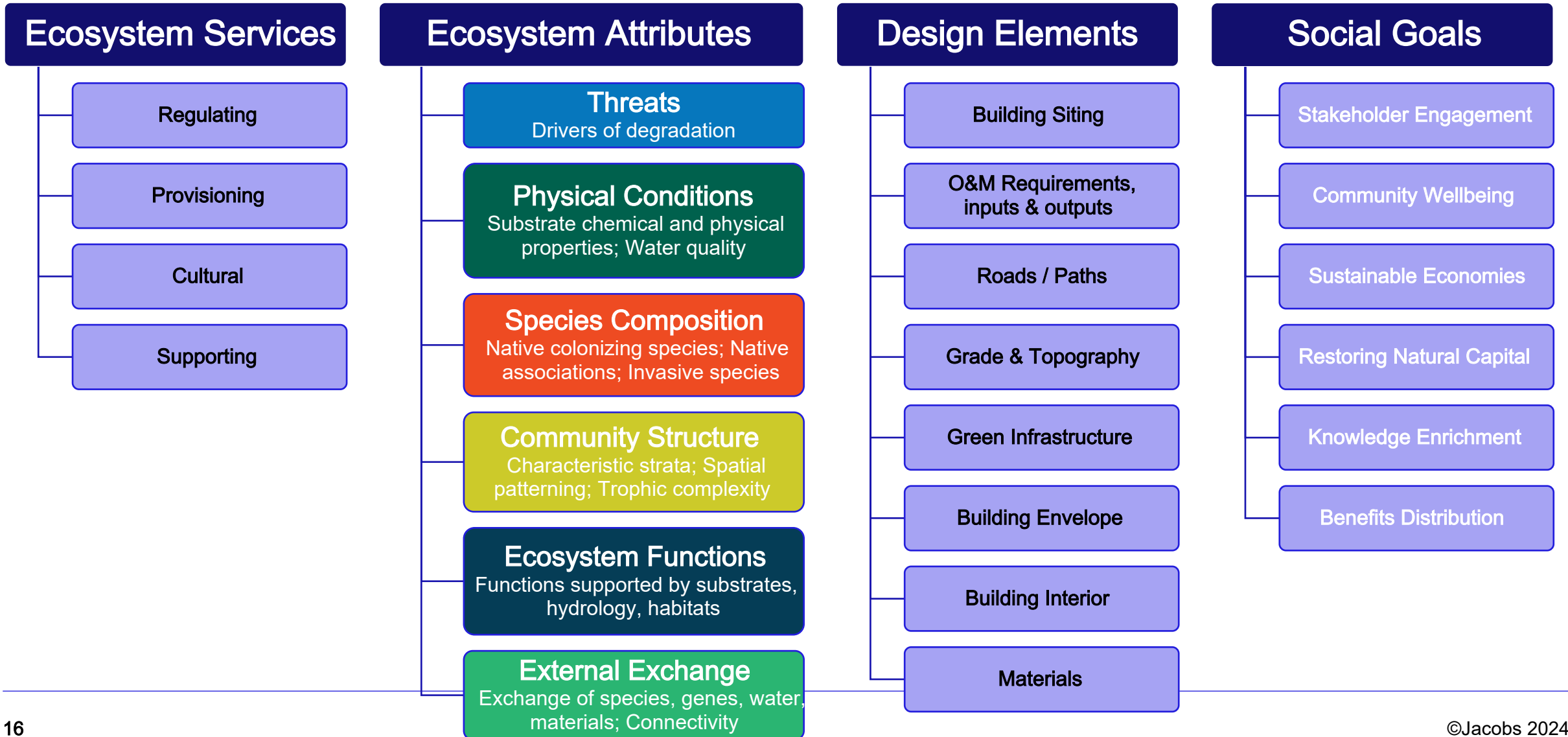




Key Ecosystem Attributes

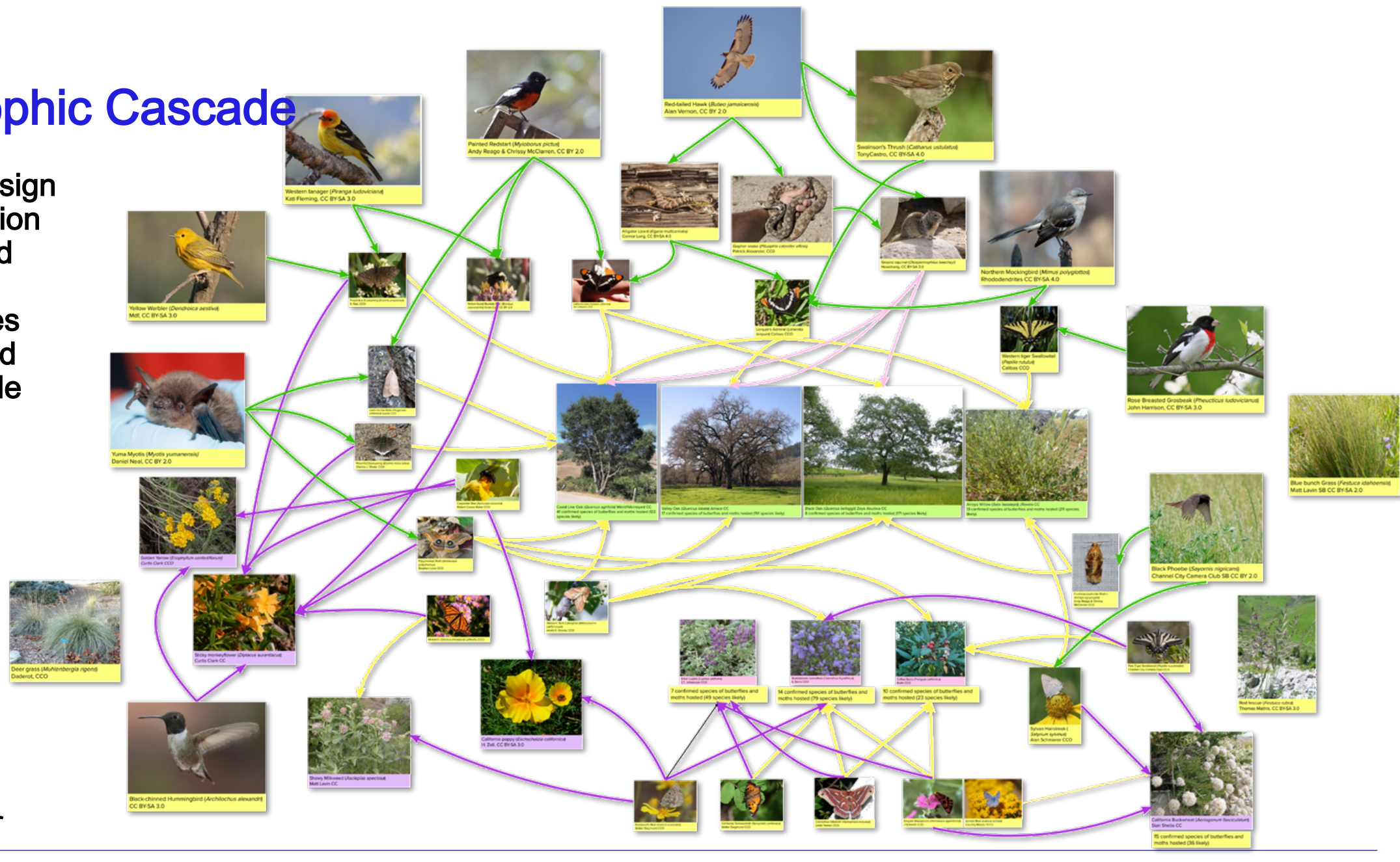
The six categories of ecosystem attributes facilitate a comprehensive understanding of the living systems we interact with in every place, their current condition, and their roadmap to recovery.

Nature Positive – NbS Design for the Built Environment



Site - Trophic Cascade

Landscape design species selection to promote and leverage local habitat, species interaction, and trophic cascade



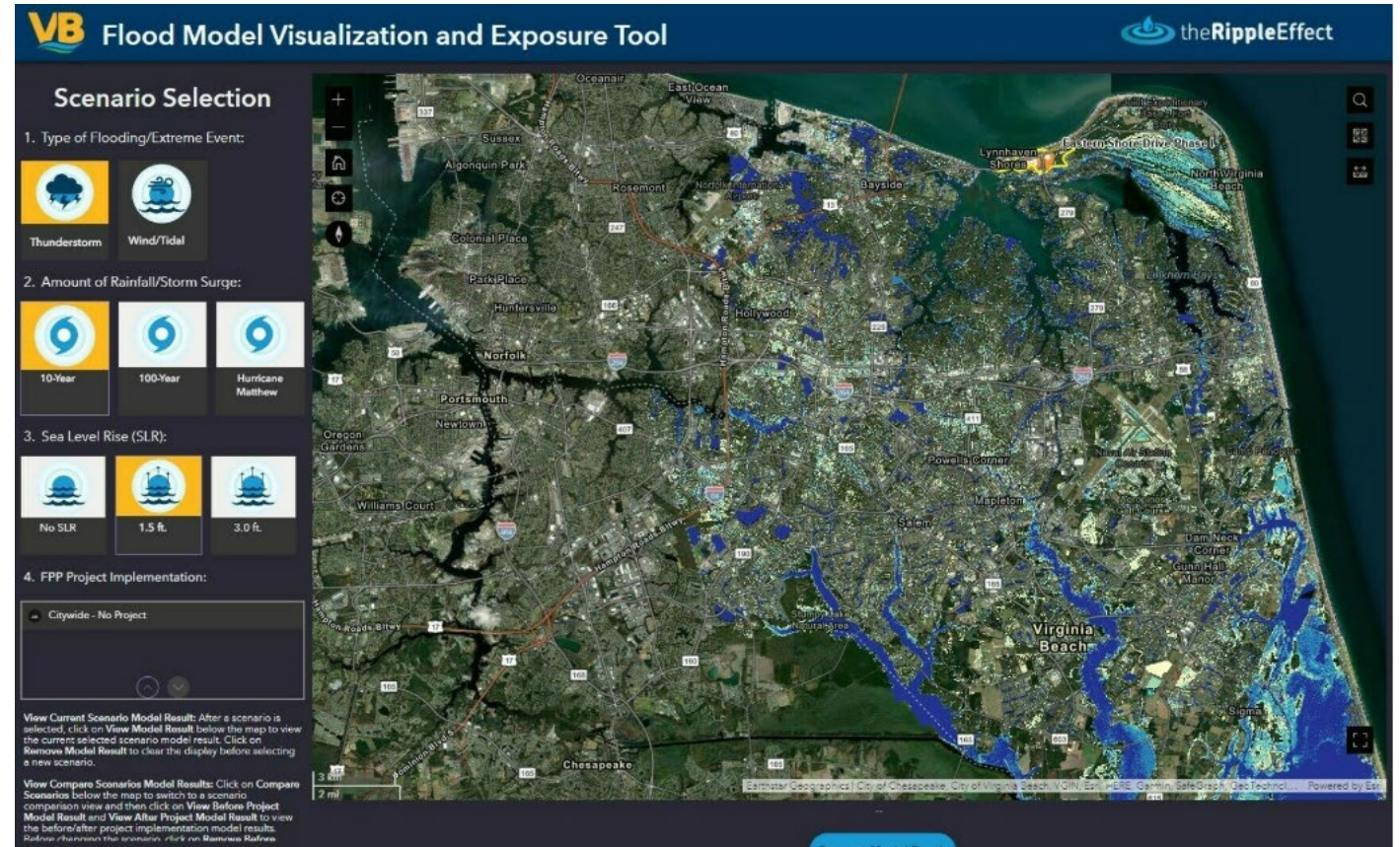
Urban Regeneration and Green Infrastructure



- **The Ellinikon** program is the largest urban infrastructure development investment in Europe, and the largest urban regeneration investment ever in Greece. The regeneration of the former Athens airport and the neighboring coastal front, Ellinikon, includes one of the first green architectural landmarks in Greece.

Regional Models

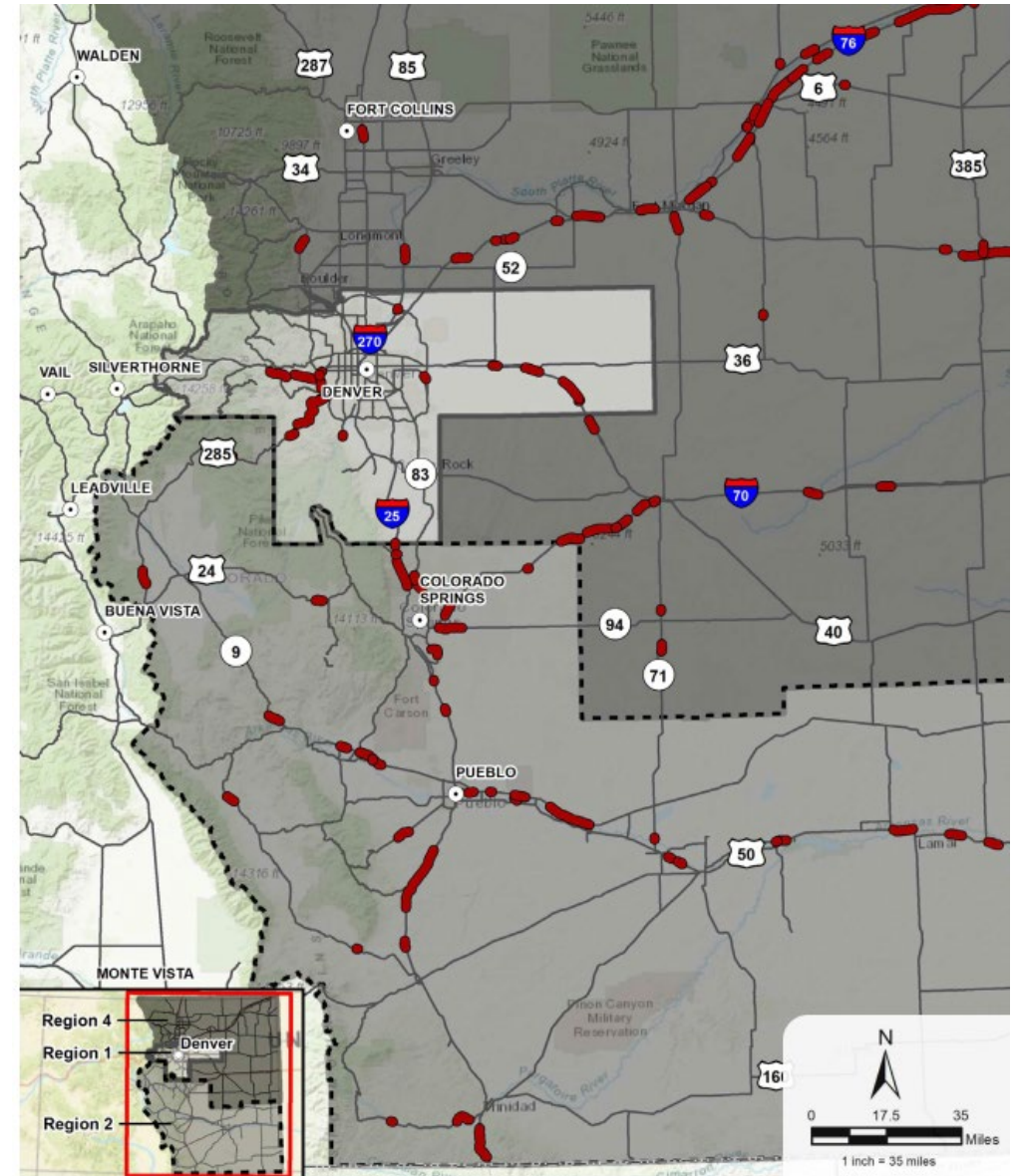
- The Ripple Effect — a 10-year plan to address recurrent flooding in Virginia Beach. Central to this plan is the recently released **Flood Model Visualization and Exposure Tool**, an easy-to-use platform designed to inform residents about flood exposure risks before and after the completion of Flood Protection Program (FPP) projects.



<https://pw.virginiabeach.gov/stormwater/flood-protection-program/flood-model-vis-tool>

Wildlife Connectivity

- Connectivity Assessments and Prioritization
- Roadkill and Movement Data Analytics
- Wildlife Crossing Prioritization and Siting
- Modelling, Design and Engineering
- Stream and Hydraulic Design and Engineering
- Landscape, Habitat, and Native Vegetation Design
- Wildlife Fencing and Barrier Design
- Regulatory and Policy Compliance
- Engagement and Facilitation
- Tribal Ecological Knowledge Integration
- Monitoring and Adaptive Management





NATURE POSITIVE AND NET ZERO: THE ECOLOGY OF REAL ESTATE



**Urban Land
Institute**



Challenges and Opportunities



Is “Extra”– Lack of familiarity with potential – Internal Champion



Corporate Biodiversity– Disconnect between commitments and reality.



Regulatory Compliance –Decarbonization- Nature Positive Design– GAP



Inertia, loss of creativity and curiosity



CERTAINTY THROUGH KNOWLEDGE VS. CERTAINTY THROUGH ACTION

A bright future

“Expansion and stewardship may appear at first to be conflicting goals, but they are not.”

*The depth of the conservation ethic will be measured by the extent to which each of the **two approaches to nature are used to reshape and reinforce the other.**”*



E.O. Wilson

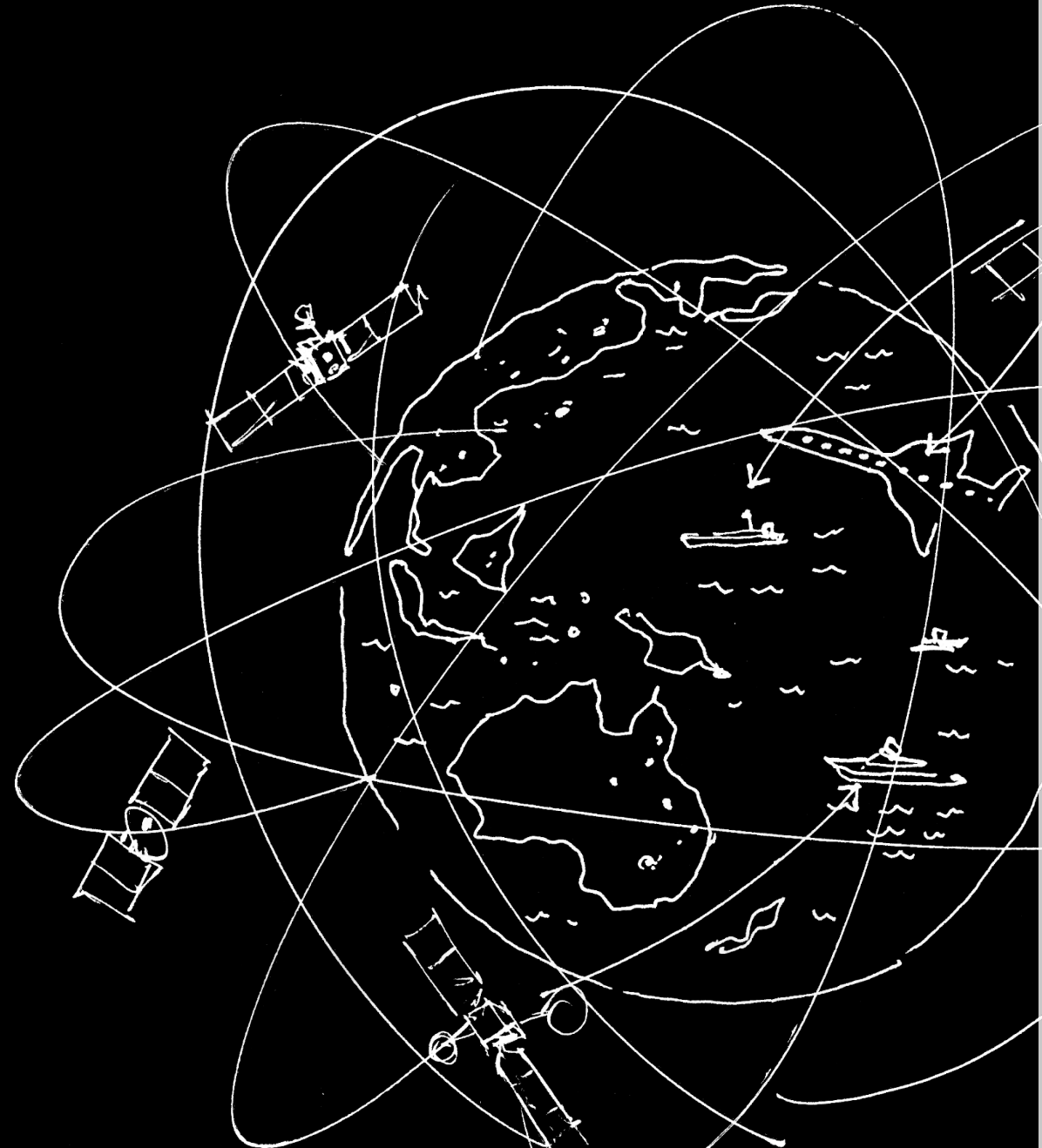
American biologist, theorist, naturalist and author

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Thank you.

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