NBS and Water

Creating multiple benefits for nature-based solutions for water management

Dr Laura Wendling
VTT Technical Research Centre
UNALAB project

European Commission | Horizon 2020 European Union funding for Research & Innovation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052 | ***Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions***

Water Resources

- Quantity of water on earth is approximately constant

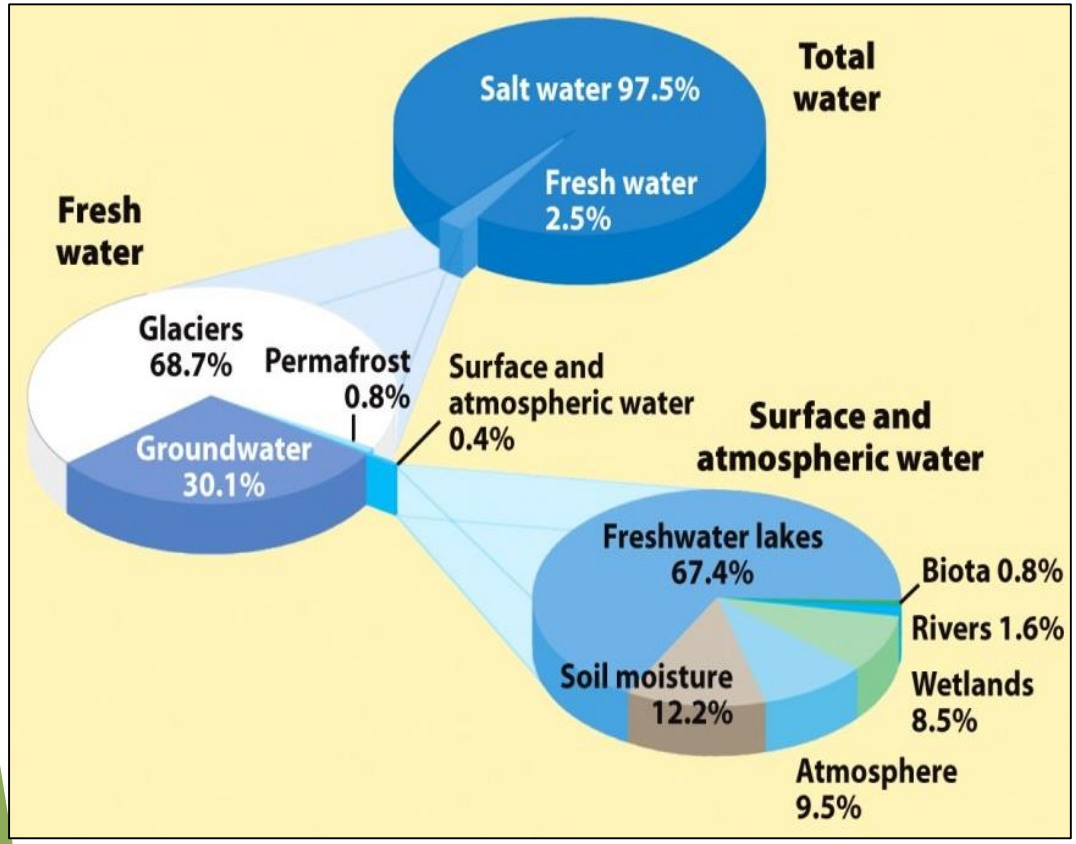


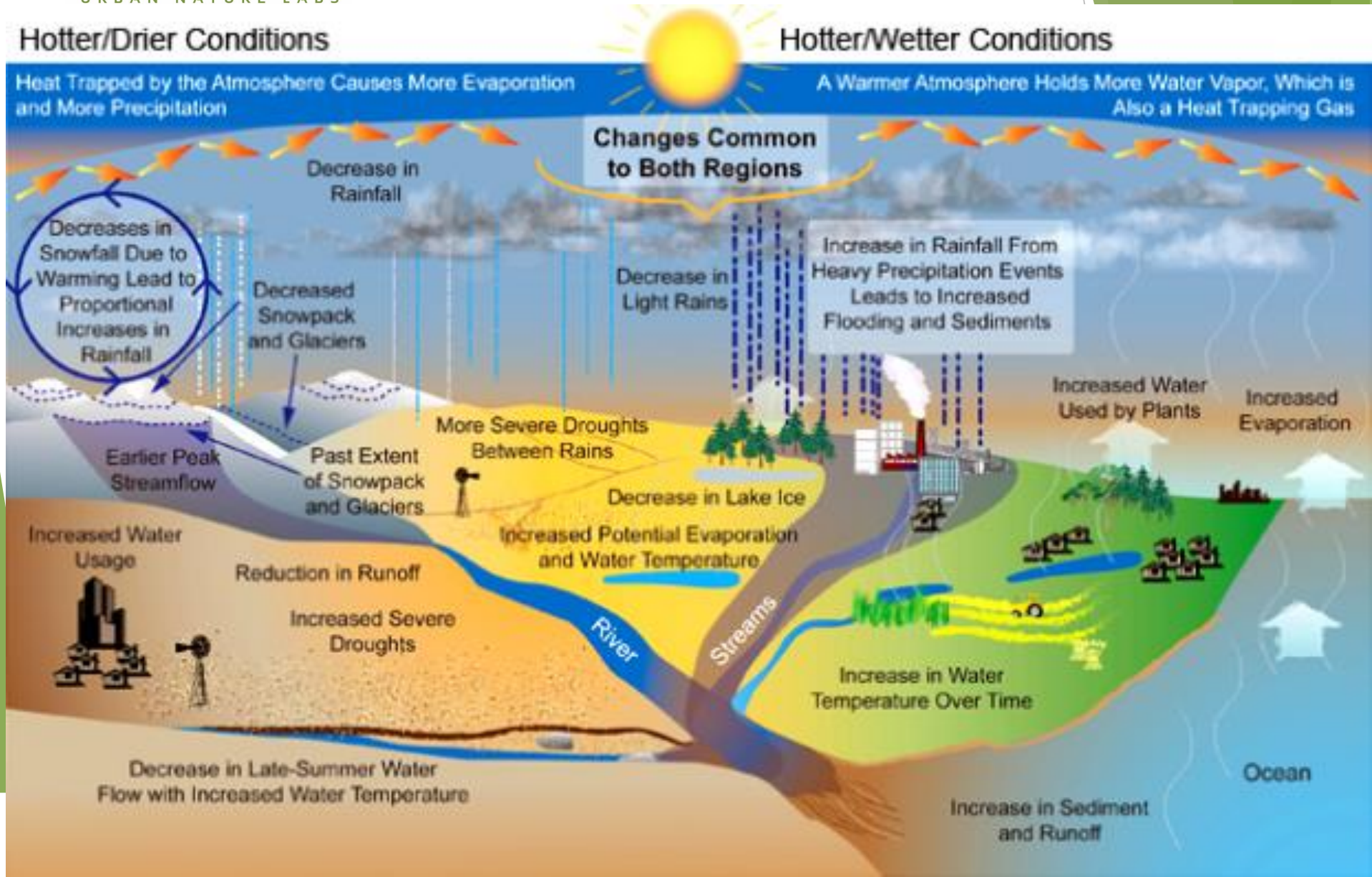
Image from Strahler and Merali (2008) Visualizing Physical Geography. Wiley, Boston, USA.

30% of the global population is impacted by flood or drought events

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052
Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions

Water Cycle Intensification



Water Scarcity

3,6 billion people are currently subject to water scarcity

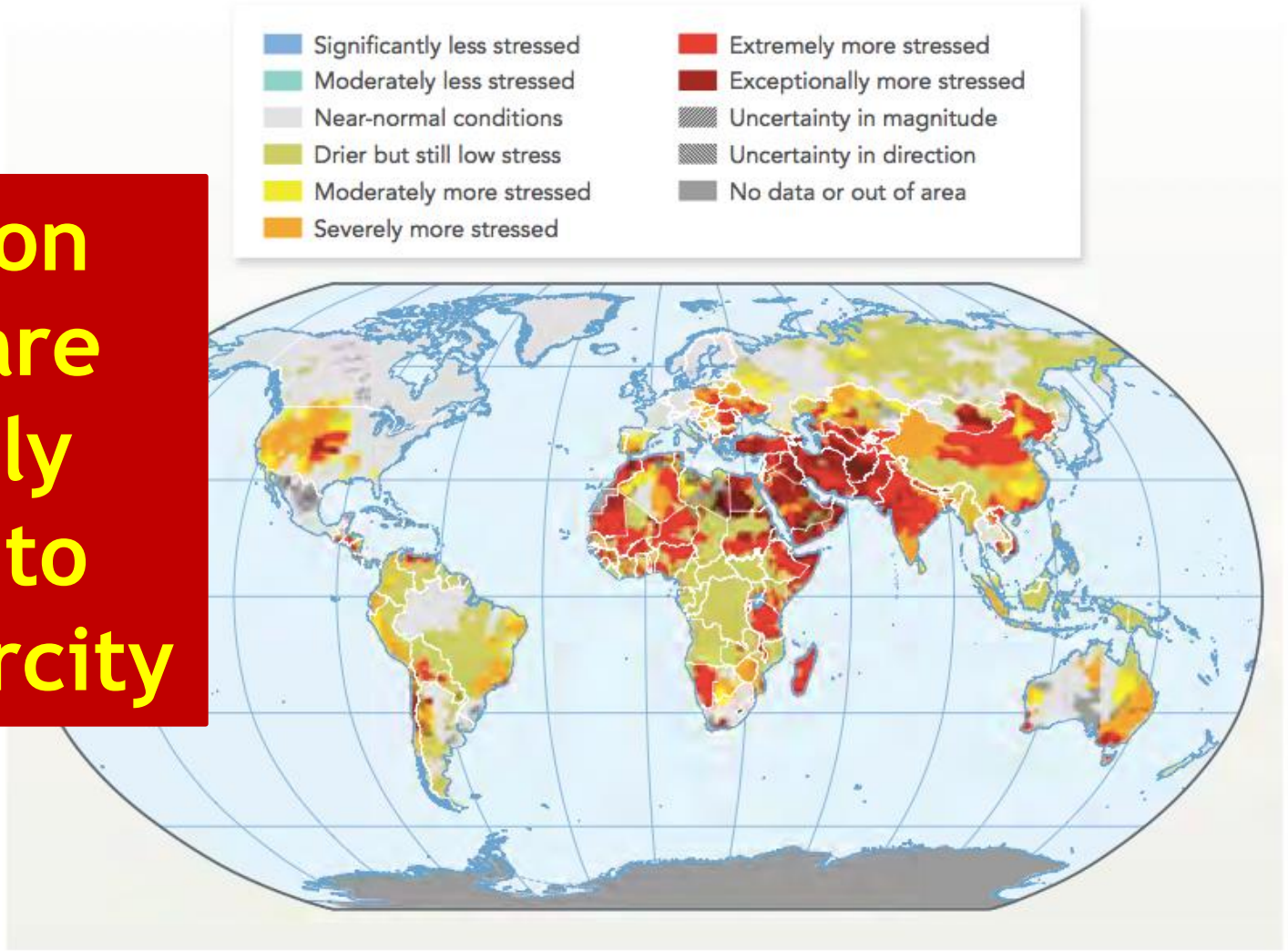


Image: NIC (2013); http://www.dni.gov/files/documents/GlobalTrends_2030.pdf

European Commission

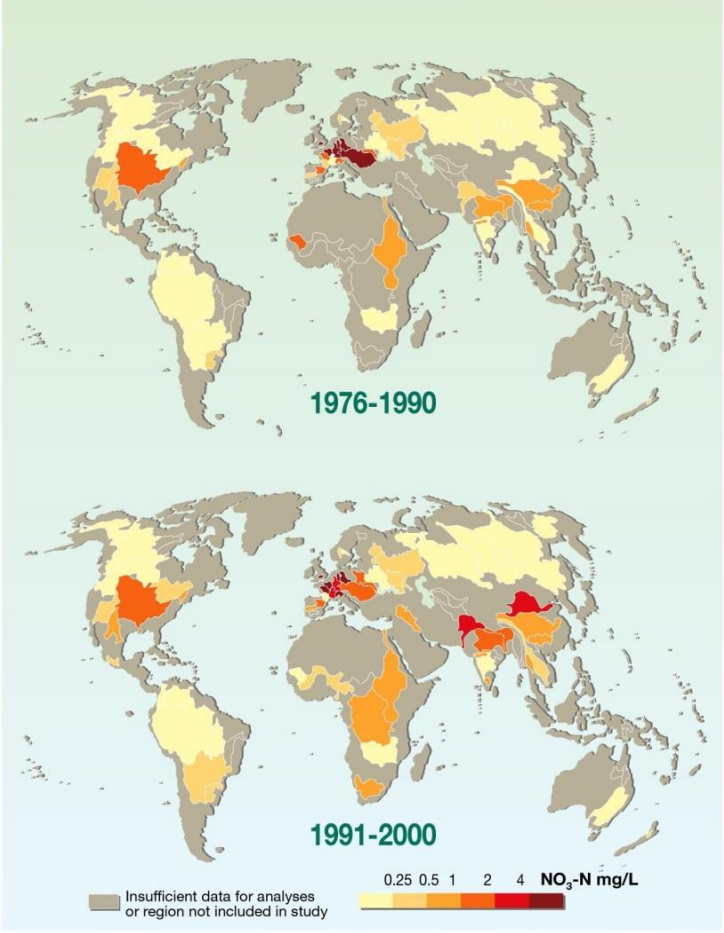
This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052

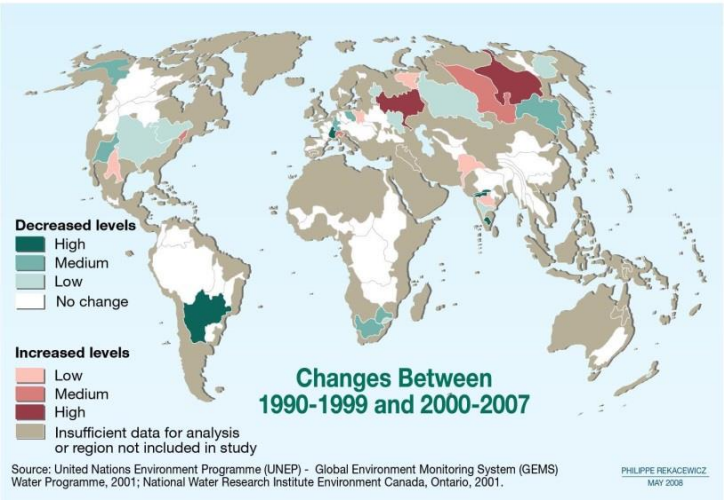
***Topic**: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions*

Increasing Pollution

- 80% of the world lives in areas where fresh water supply is not secure
  - *Contributors: water resource development, climate change & **pollution***

80% of industrial & municipal wastewater is discharged without any treatment





European Commission

This project has received funding from the European Union's Horizon 2020 research
Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutio

Increasing Floods

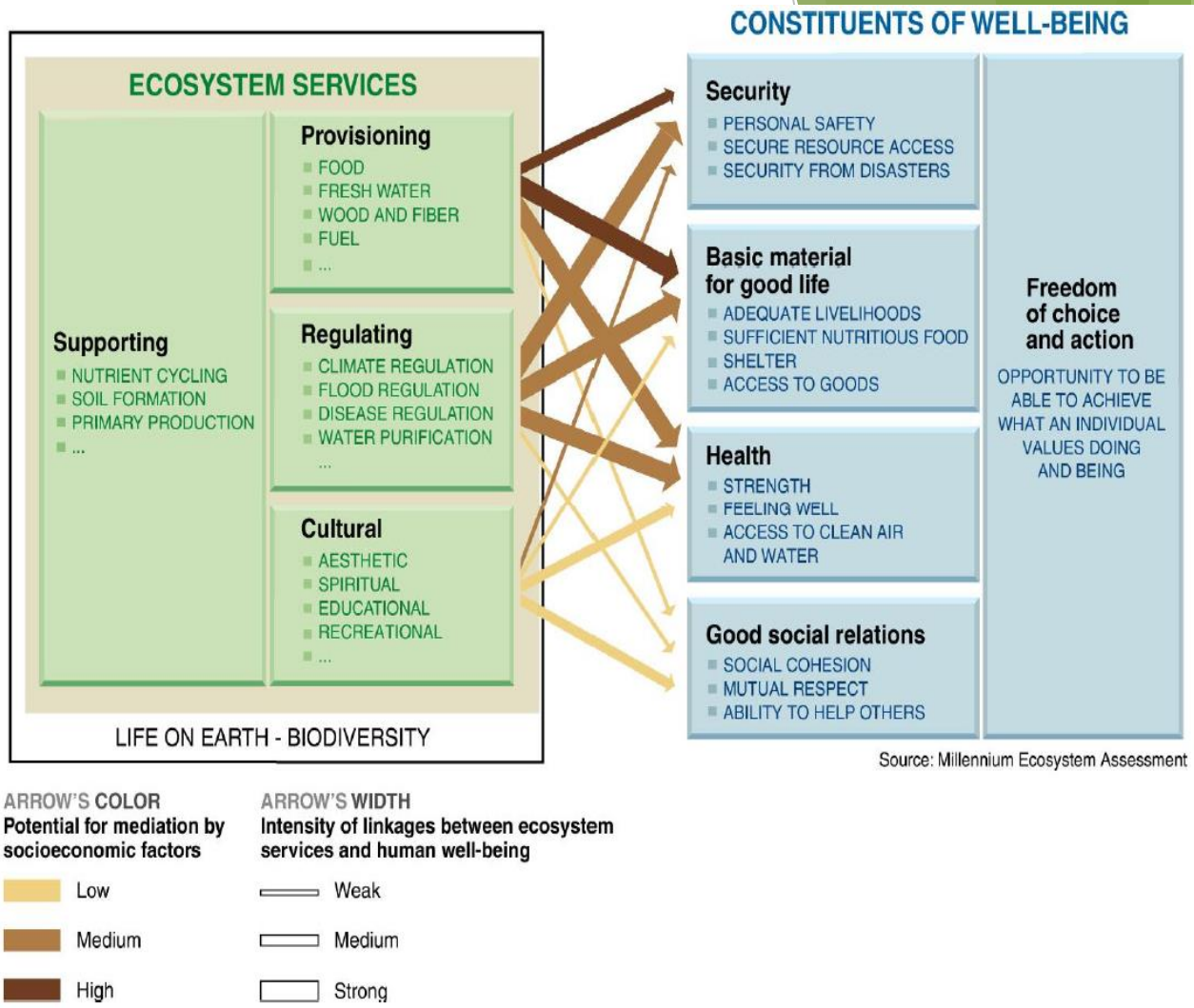
- 4.2 billion people affected since 1992
  - 95% of all those affected by disasters
  - ~1,1 trillion EUR damage (63% of all disaster-related damage)

Economic value of assets at risk from floods >38 trillion EUR by 2050

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052
Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions

- *Improved water quality?*
- *Reduced flood risk?*
- *Increased water security/reduced water scarcity?*



NBS typically deliver groups of benefits in the form of ecosystem services

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052
Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions

All ecosystem services are dependent on water

SECTION	CLASS	SERVICE UNIT	DEMAND
PROVISIONING	Cultivated crops	Fields, orchards, gardens	Consumption
	Surface water for drinking	Watershed	
	Groundwater for drinking		
	Surface water / non-drinking use		
	Groundwater / non-drinking use		
REGULATING	Air filtration/pollutant sequestration	Trees, shrubs	Risk of exposure to pollutants
	Reduced GHG concentration	Vegetation, soil	Risk of climate change
	Micro/regional climate regulation	Vegetation, water bodies	
	Smell/noise/visual impact buffer	Vegetation	Risk of exposure to noise etc.
	Hydrologic cycle maintenance	Vegetated & permeable surfaces	Risk of flood
	Flood control	Wetlands	Exposure to flooding
CULTURAL	Physical use of landscape/waterscape	Green and blue spaces	Potential & direct use
	Scientific/educational		
	Heritage, cultural		

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052

Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions

NBS in the City

NBS to manage water flows in urban landscapes

- **Catchment management** outside urban areas
- **Improved recycling of water** within urban areas
- **Green infrastructure implementation** within urban boundaries

Catchment-scale management & hydrologic connectivity are key

Use landscape to store & release water, regulate downstream flows

NBS for water quality management; MAR/ASR, non-potable re-use, etc.

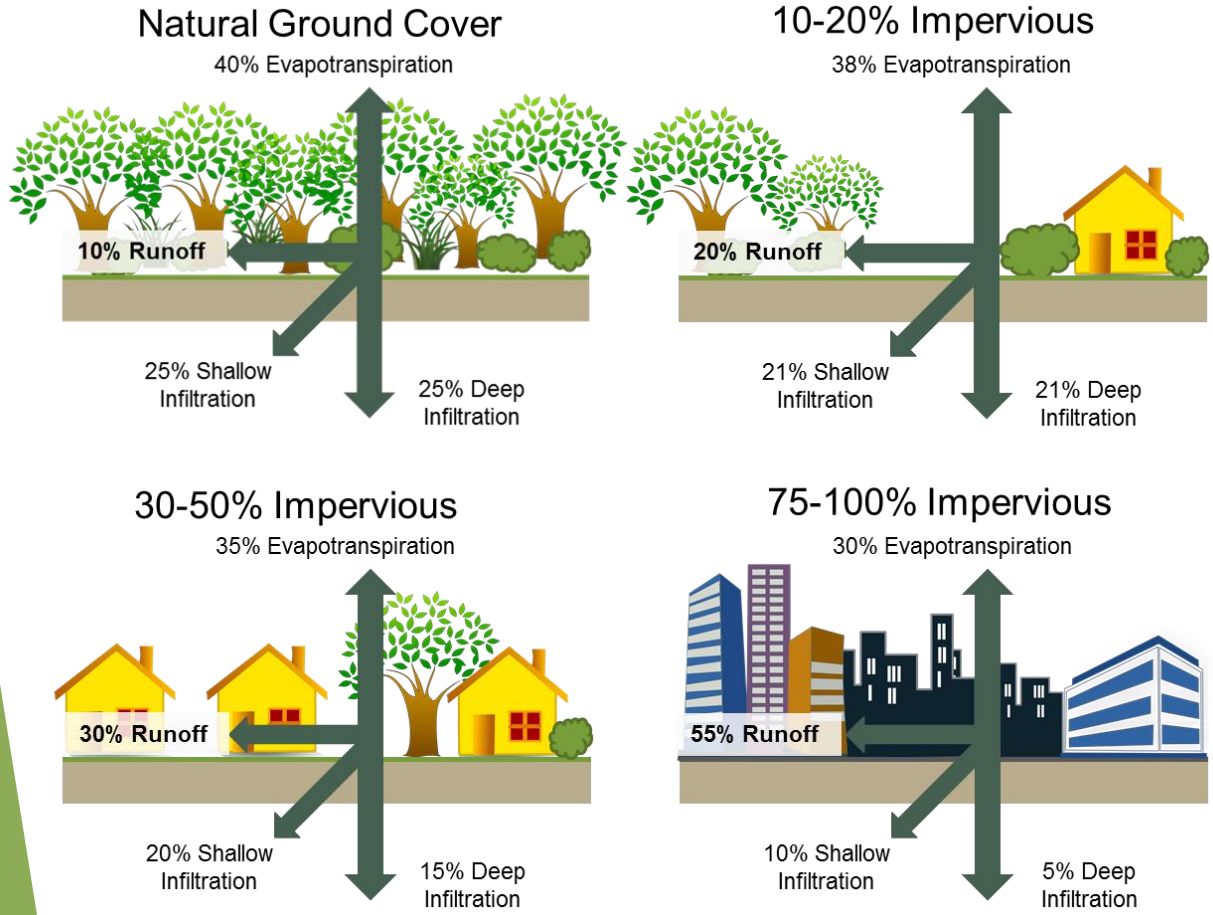
Reconnect or improve hydrological cycle by managing pathways

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052

***Topic**: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions*

Surface Sealing



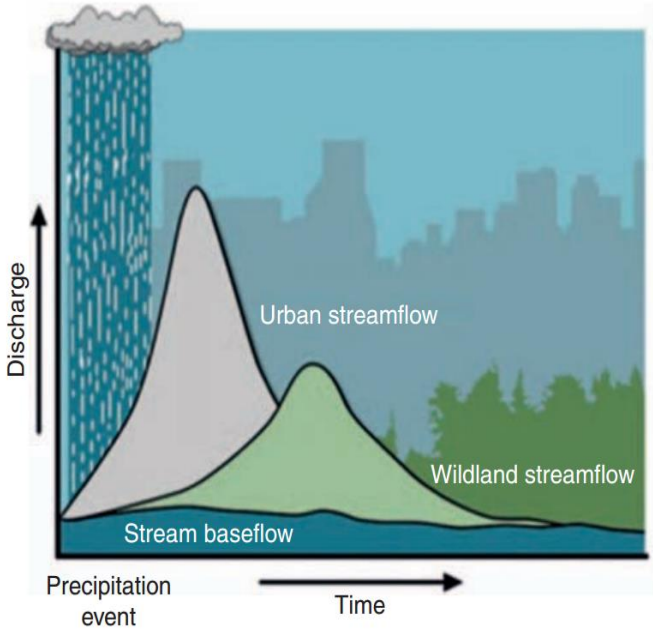


Image adapted from US EPA 1993, Pub. #840-B-92-002

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052
***Topic**: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions*

UNaLab
URBAN NATURE LABS

ACKNOWLEDGED

- Co-creation is critical to NBS success
- Need for adaptive management schemes & detailed NBS monitoring
- Need for coherent legal and governance frameworks
- Valuation of ecosystem services required for successful NBS mainstreaming

MORE DISCUSSION NEEDED

- **Scale of interventions** & effects on NBS impact
- **Ecosystem-based management** as primary means of climate change adaptation
- **Collaborative transboundary management** of water resources is essential
- **Effective integration of blue-green & grey infrastructure** and supporting technologies

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052
***Topic**: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions*

Multiple Benefits

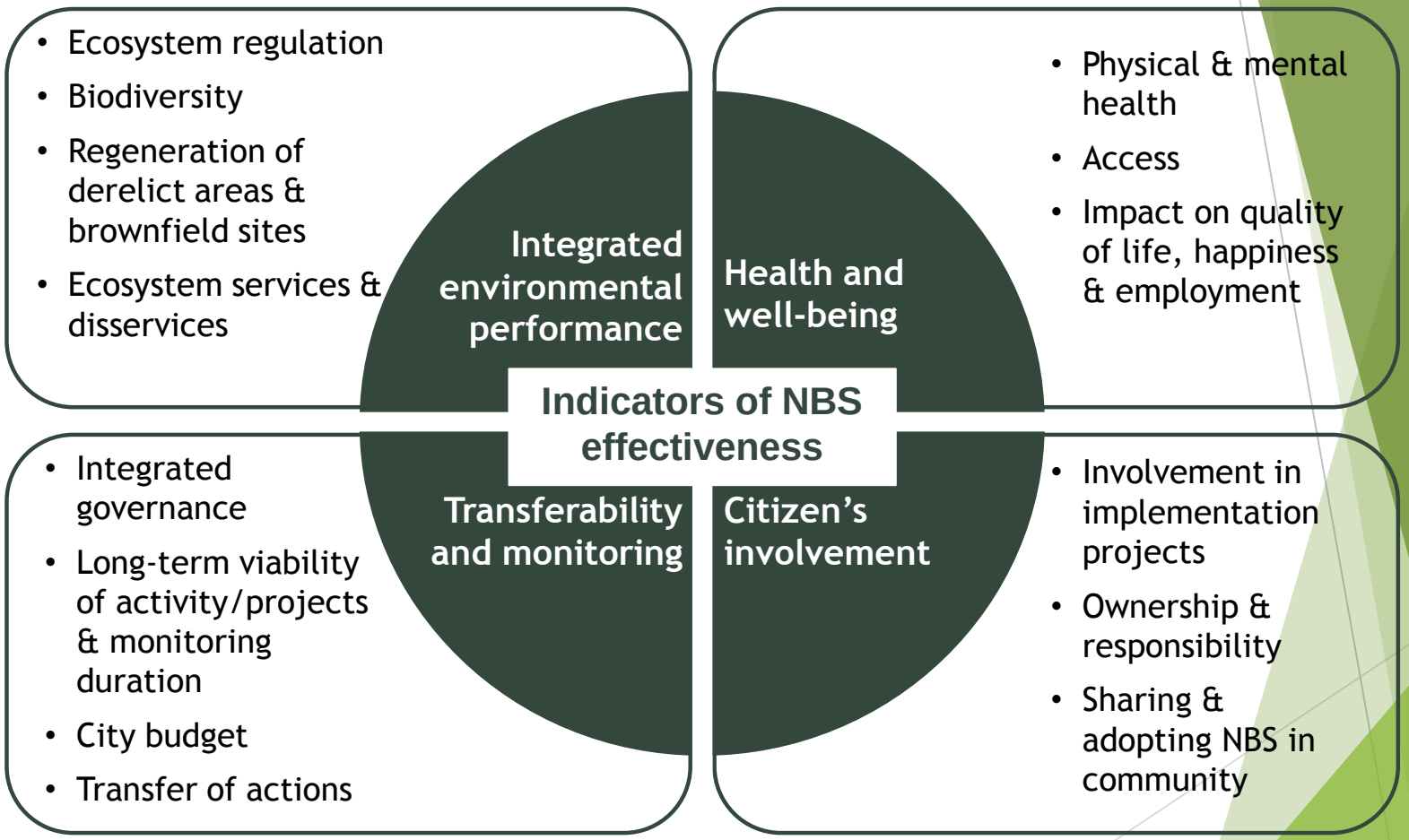
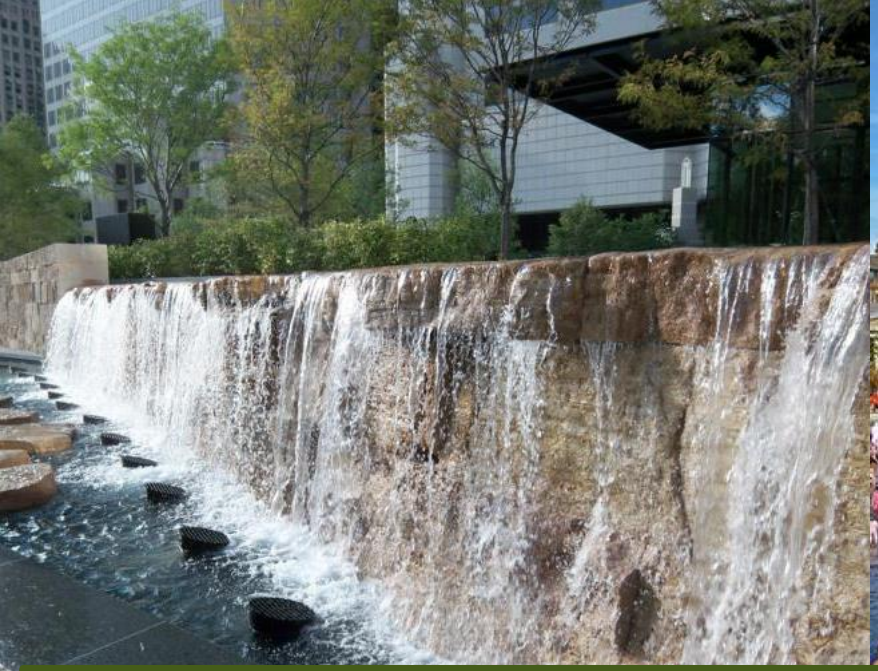


Image reproduced from Kabisch et al. 2016, Ecology and Society 21(2):39

European Commission

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 730052
Topic: SCC-2-2016-2017: Smart Cities and Communities Nature based solutions



We don’t inherit the earth from our ancestors, we borrow it from our children