

# **WATER CYCLE AND ITS MODERNS SUSTAINABLE AIDS**

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## | WATER

- | OCEANS

- | LAND

- | ATMOSPHERE

- | BIOTA

## | WATER CYCLE

- | BIG WATER CYCLE

- | SMALL WATER CYCLE

- | COLLAPSE OF WATER CYCLE

## | TYPES OF URBANIZED VEGETATION

- | GREEN ROOFS

- | GREEN WALLS

## | EXPERIMENT

- | ASLA

# WATER

## | OCEANS

- | covers 70,8% of the Earth's surface
- | seas and the oceans supply water to precipitation on the land

## | LAND

- | water in the rivers or natural or artificial lakes
- | water in solid form: ice, snow
- | groundwater and water forming soil moisture

## | ATMOSPHERE

- | has crucial local thermoregulation function

## | BIOTA

- | in living organisms
- | around us, inside us
- | volumes of water accumulated in the vegetation cover are not minor
- | vegetation on the land has the critical role in the regulation of evaporation from the soil
- | on the existence and prosperity of vegetation depends consequently all higher life on the Earth

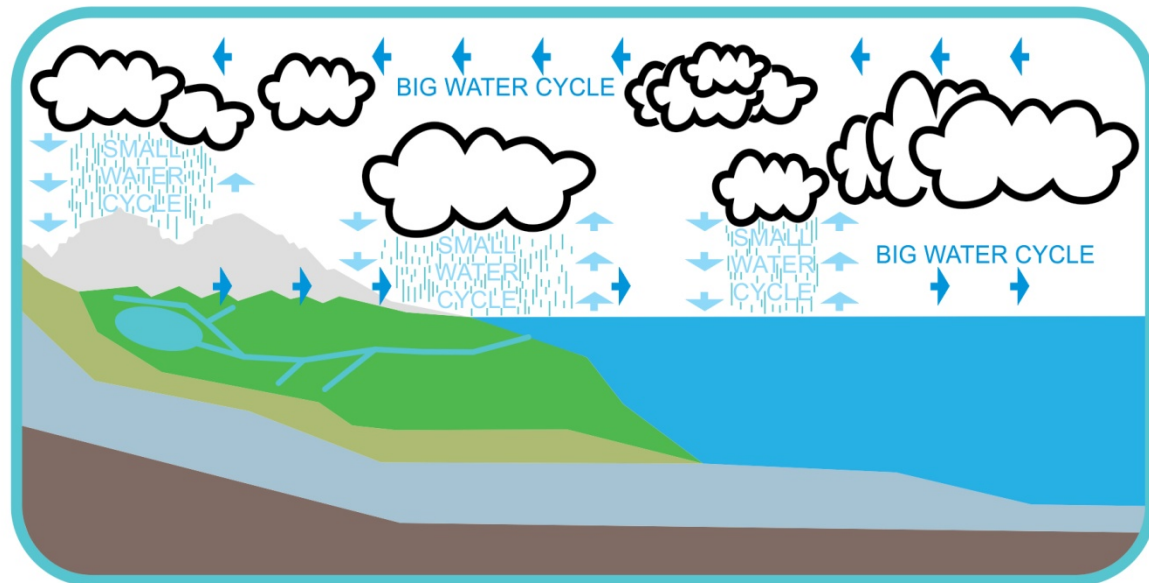
# WATER CYCLE

## | BIG WATER CYCLE

- | exchange of water between the ocean and the land
- | from seas, oceans around 86% of water evaporates
- | from the mainland 14% of water evaporates
- | seas and oceans through the evaporation and precipitation subsidize land with water
- | by atmospheric and thermodynamic vertical flows gets through distances over continents and expires

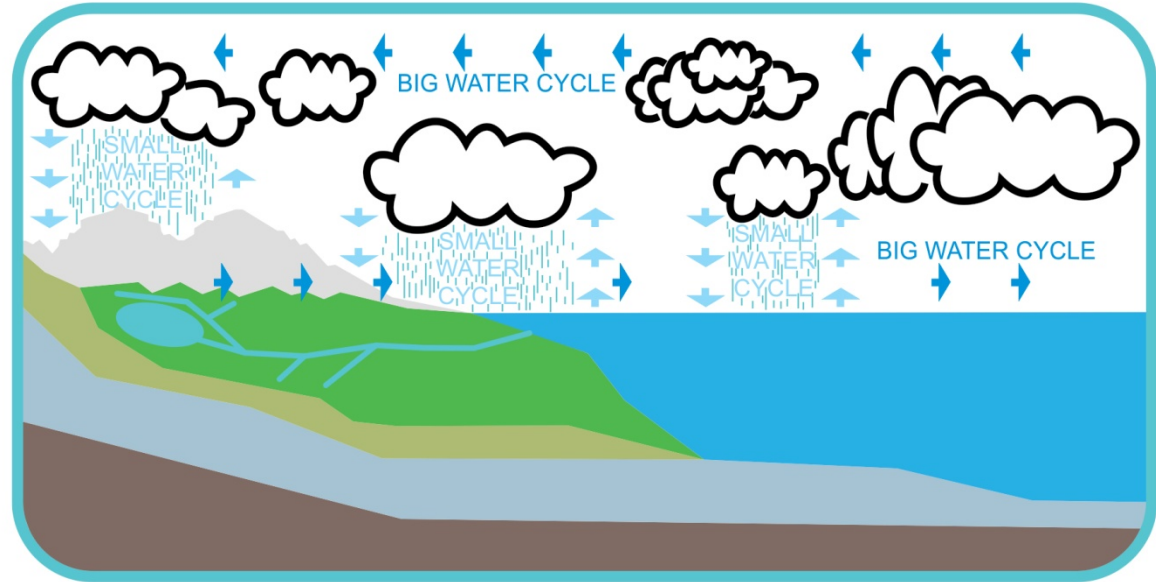
## | SMALL WATER CYCLE

- | vaporized water falls over the same land
- | exists over the land, exists over the sea or ocean
- | performs horizontal water circulation
- | small water cycles are donated by water from great water cycle



## | COLLAPSE OF WATER CYCLE

- | if there is disruption of vegetation cover
- | deforestation, agricultural activities, urbanisation
- | solar energy hits all the surfaces with low vapor and a part is converted to heat
- | extreme gives rise to variations in temperature
- | air circulation increases
- | hot air is drifted away
- | most of the evaporated water from country is lost
- | great water cycle starts to dominate
- | characteristic with erosion and washing away of soil and nourish to the sea
- | restoring small water cycle depends on functional recovery of plant cover and water areas



# WATER IN URBANIZED BIOTA

## | GREEN WALLS

- | use climbing plants (lianas, vines and scramblers)
- | cover building walls
- | offer flexible and adaptable tool for environmental design
- | cool building by intercepting, absorbing solar radiation
- | provide thermally insulating air cavity
- | depending on distance of the green facade from the wall
- | reduce wall surface temperatures by as much as 14°C
- | compared with exposed wall surfaces



# WATER IN URBANIZED VEGETATION

## | GREEN ROOFS

### | EXTENSIVE GREEN ROOFS

| lightweight veneer systems

| thin soil or substrate layers of:

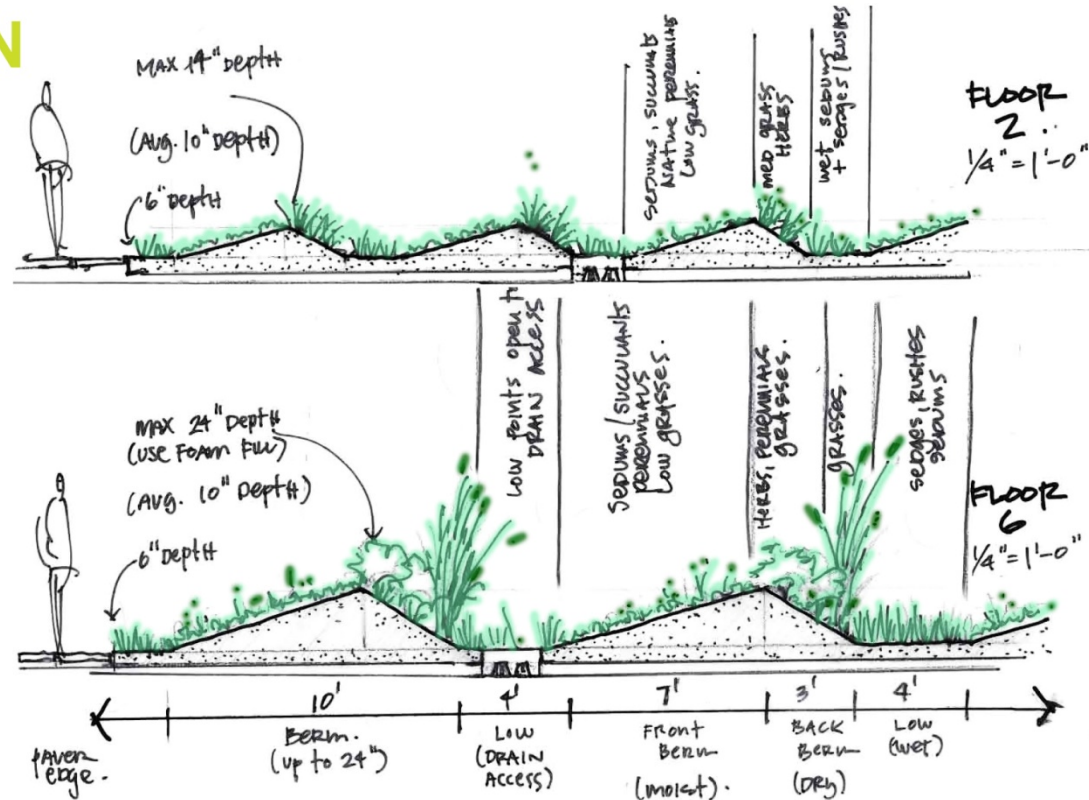
drought tolerant self-seeding vegetated roof covers

| plants are native from dry locations, stony surfaces

| typical mechanisms to survive extreme conditions

### | INTENSIVE GREEN ROOFS

| designed to look like gardens, landscapes



# EXPERIMENTS

## | ASLA

| 130 m<sup>2</sup> green roof for the building of the American Society of Landscape Architects in the heart of Washington  
| project was undertaken with the goals of demonstrating the environmental and aesthetic benefits of green roofs  
| processes that are being monitored:

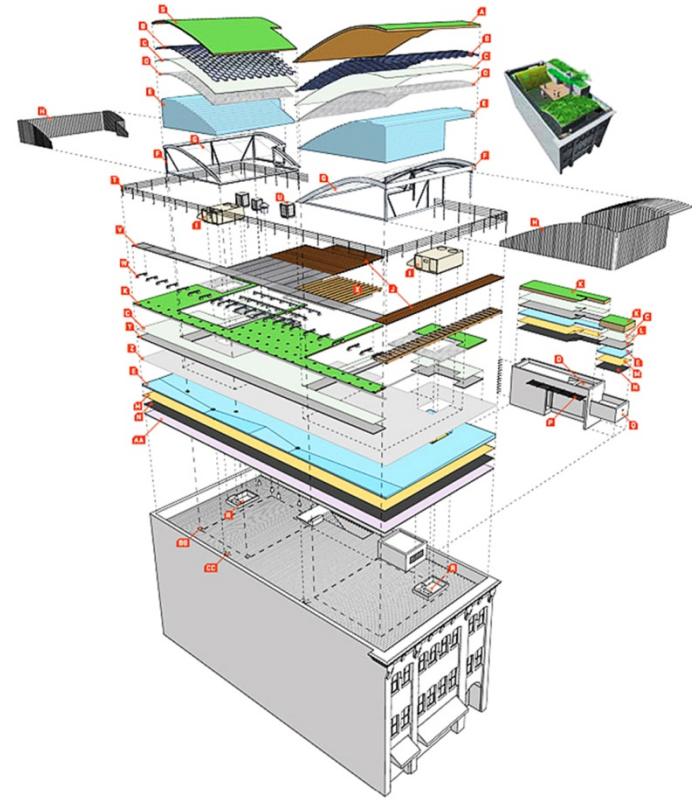
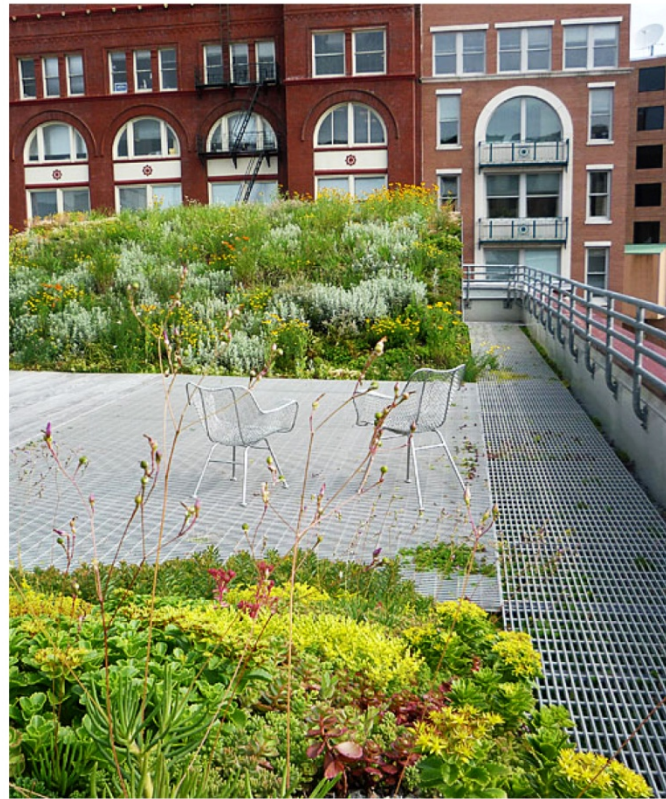
### | **water retention:**

- From July, 2006 to January, 2007, the green roof retained nearly 75% of the total rainfall (736mm)
- kept 105 000 liters out of the city sewer system
- roof retained 100% of (25 mm) rainfall

### | **water quality:**

- green roof did not add any nitrogen to the runoff
- water runoff contains fewer pollutants than typical water runoff
- roof is reducing the amount of nitrogen entering the watershed





**THANK YOU FOR YOUR ATTENTION**

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