

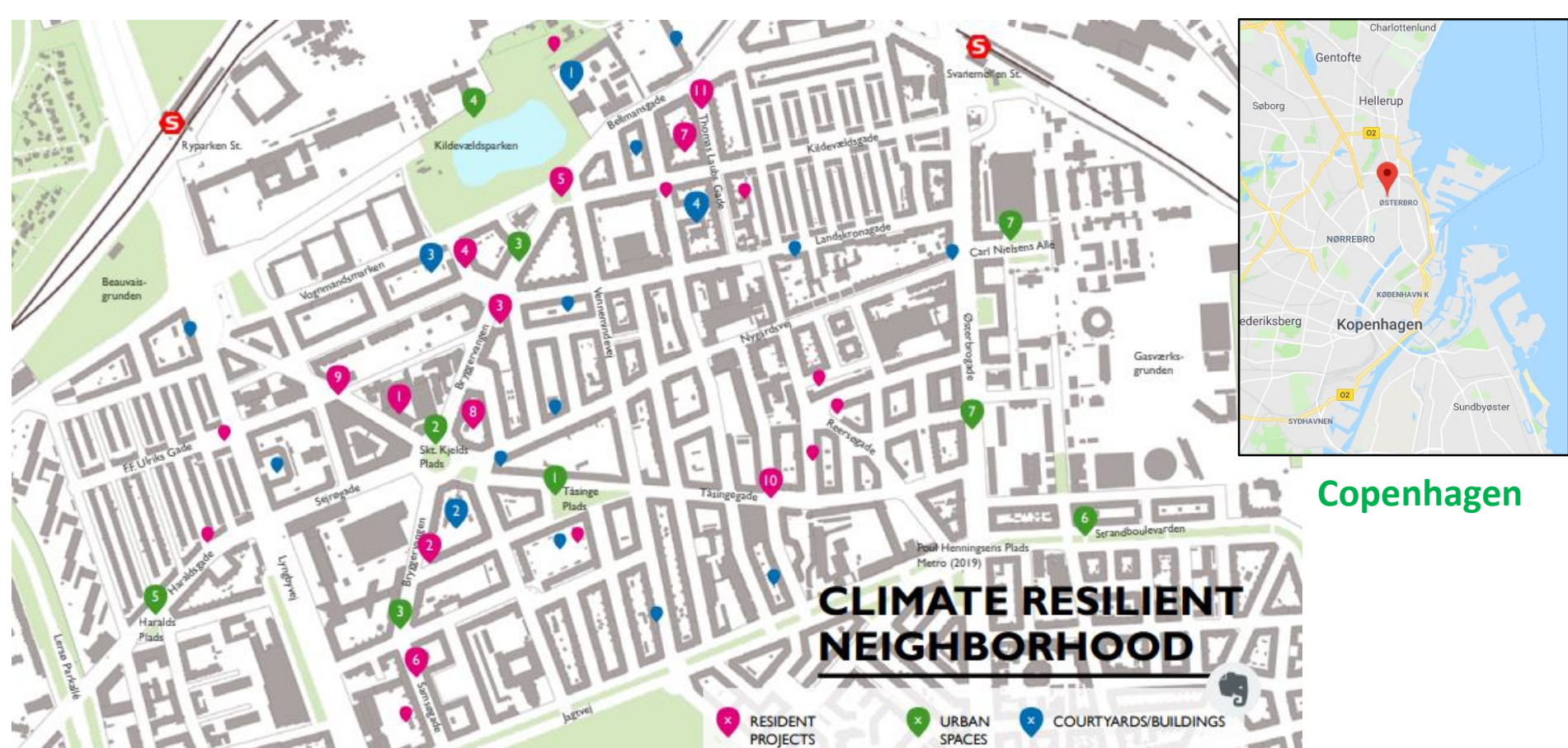
NAIAD: Nature Based Solutions in Copenhagen, Rotterdam and Łódź

**Aiming for green cities: what change is
needed in planning and governance**

***challenges and opportunities for symbiosis between urban
development and ecosystems***

Peter van der Keur, Senior Scientist, GEUS, Denmark
Karina Peña, Design Director, Field Factors, The Netherlands
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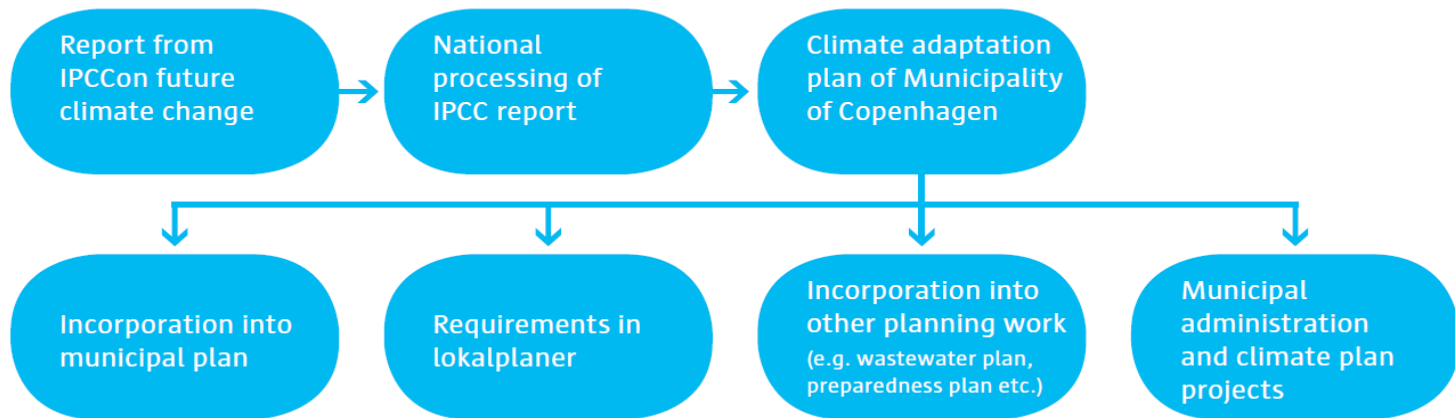
Seminar 9, session 2, International Water Week, Stockholm, 26/8/2018



Overall planning

Local planning

THE CLIMATE ADAPTATION PLAN



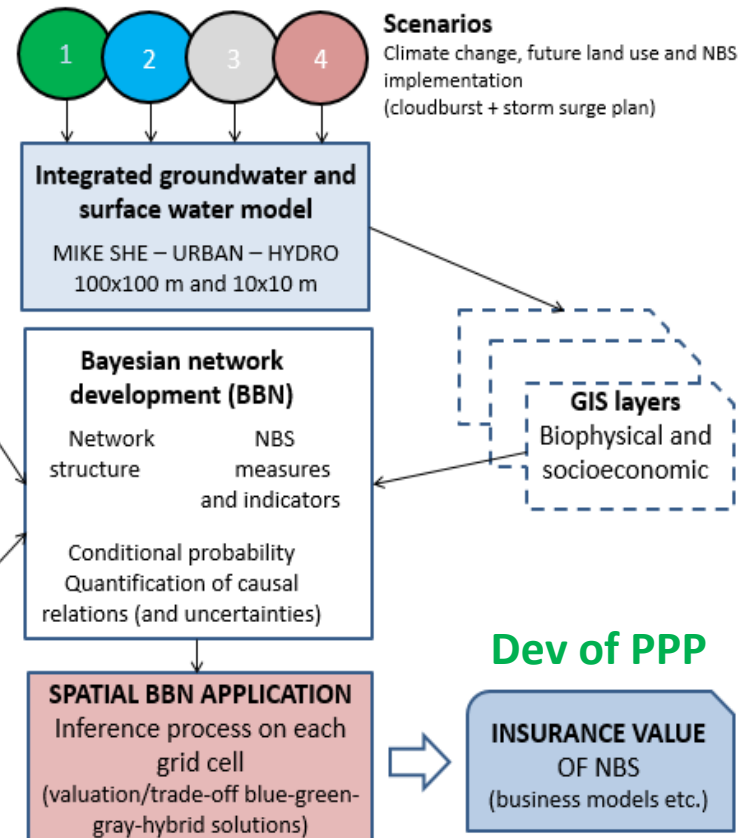
Governance and urban planning at water basin scale approach



Participatory process, expert opinion and groundwater monitoring data

- Key Stakeholders**
- City of Copenhagen and Frederiksberg
 - Water supply companies;
 - Citizens
 - Domain experts
 - Etc.

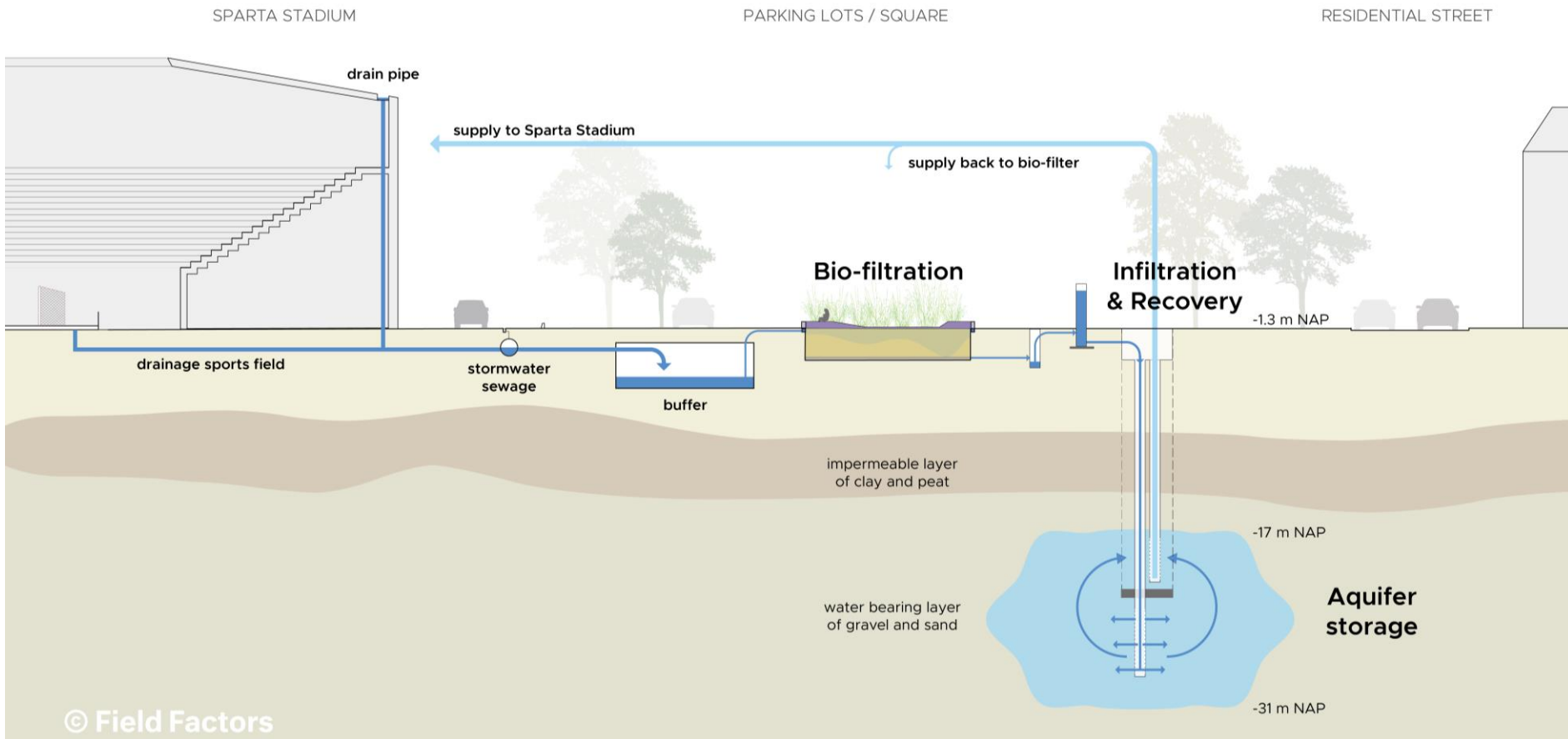
Modified after Gonzales-Redin et al. (2016)



Opportunities for urban development and NBS



Urban Waterbuffer: an integral approach to reducing risk of pluvial flooding and mitigating drought



Chance for multiplication of NBS and their impact – CATCHING THE MOMENTUM (funding & demand)

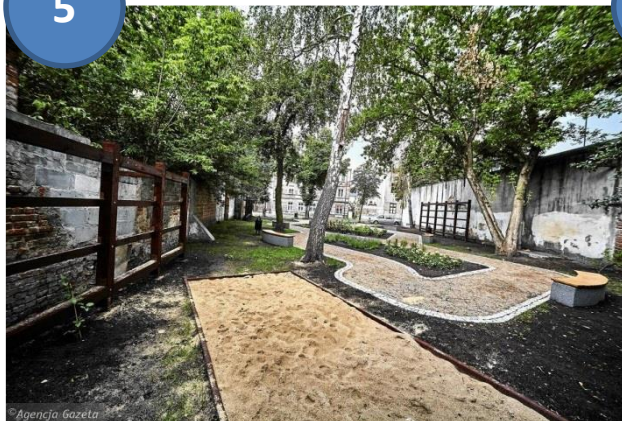
- 1) One of the biggest city revitalization projects in Europe
- 2) Development of national level city climate change adaptation strategy with involvement of city authorities
- 3) Increasing urgency to develop the water management strategy at the city level, including rivers and stormwater system
- 4) Just launched river revitalization action
- 5) Developing programme of pocket parks for people, water and nature



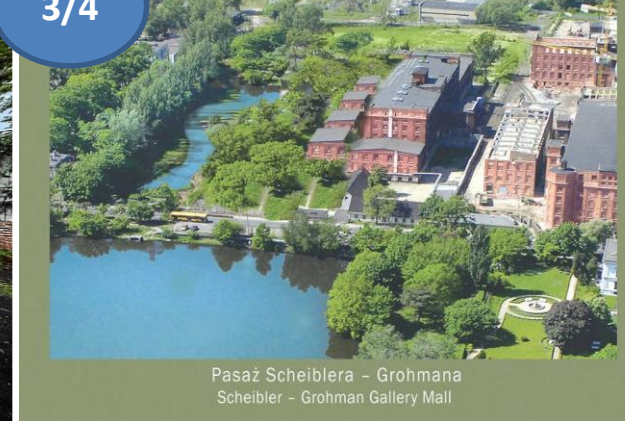
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Implementation of NBS along the reservoirs in the upper Bzura river valley – USE OF LOCAL KNOW-HOW AND HUMAN CAPITAL

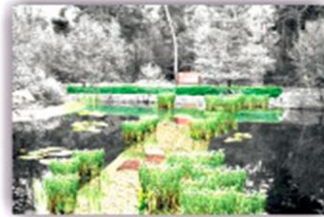
TASK 1

Construction of buffering zones with biogeochemical barriers, and floating vegetation (zooplankton refuges)



TASK 2

Ecohydrological adaptation of reservoir structure for self-purification purpose



TASK 3

Sequential biofiltration system for lowering stormwater pollution

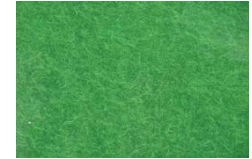


TASK 4

Ecohydrological adaptation of small retention ponds for enhancement of self-purification



CYANOBACTERIA BLOOM



NBS - BIOFILTERS

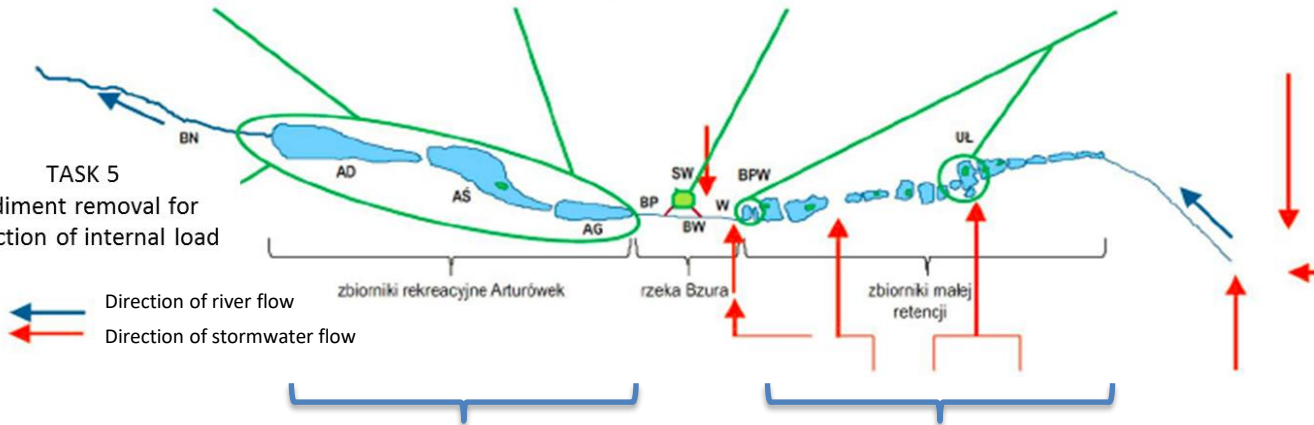


ACHIEVED WATER QUALITY



TASK 5

Sediment removal for reduction of internal load



Final effect: improvement of water quality for biodiversity and recreation in 3 reservoirs

Intermediate effect: reduction of road flooding, and flush of pollutants into water systems

Symbiosis between urban development and ecosystems (NBS)

Challenges	Opportunities
<p>An integral approach to integrating co-benefits of NBS into business case needs to be embedded in urban development</p>	<p>Moving from a singular approach to finance water management towards an integral investment case for multiple stakeholders and public-private partnerships</p>
<p>Grey solutions still needed next to NBS. Extensive and expensive construction work (especially in city centre).</p>	<p>Integrating urban planning and CCA, more attractive and climate proofed city. Flooding / drought symbiosis</p>
<p>Competitiveness of investments including NBS on the market so that social and economic factors could stimulate NBS implementations.</p>	<p>Programmes of city revitalization and awareness building offering funding for reconstruction, educational projects, biodiversity protection and NBS planning; high frequency of extreme weather contribute to awareness building</p>

Thank you for listening !