

Pilot Project - Atmospheric Precipitation - Protection and efficient use of Fresh Water: Integration of Natural Water Retention Measures in River basin management

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Thematic Group Session on URBAN AREAS

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Urban measures

◦ Green Roofs

Systems to cover the roof of a building or structure with vegetation cover and/or landscaping. Green roofs are designed to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.



◦ Rainwater Harvesting

Collecting and storing rainwater for subsequent use – for example, using water butts or larger storage tanks.



Urban measures

◦ Permeable Paving

Pervious surfaces (either porous or permeable) designed to allow rainwater to infiltrate through the surface and into underlying layers (soils and aquifers).

◦ Other Permeable Surfaces

Use of other permeable surfaces within the urban environment to promote infiltration into soils and aquifers – for example, grass or gravel areas.



Urban measures

◦ Swales

Shallow, broad and vegetated channels designed to store and/or convey runoff.

◦ Channels and Rills

‘Hard-edged’ conveyance channels to move water between components in a SuDS ‘train’. Typically narrower than swales, but may also include vegetated aspects.

◦ Filter Strips

Gently sloping vegetated strips of land that provide opportunities for slow conveyance and infiltration. Designed to accept runoff as overland flow from upstream and to slow the progress of this runoff.



Urban measures

◦ Filter Trenches

Shallow excavations filled with gravel to create temporary subsurface storage of runoff.

◦ Bioretention Areas

Shallow landscaped depressions, typically under-drained, relying on engineered soils, vegetation and filtration to reduce runoff downstream and remove pollution.

◦ Soakaways

Excavations, typically filled with gravel, designed to store water and allow it to infiltrate into underlying soils or aquifers. Soakaways would typically receive point-source inflow (e.g. from roof drainage).



Urban measures



◦ Infiltration Trenches

Shallow excavations filled with gravel or other material to create temporary storage and to enhance the natural capacity of the ground to infiltrate.

◦ Infiltration Basins

Vegetated depressions designed to store runoff on the surface and allow it to gradually infiltrate into soil. Infiltration basins are dry except in periods of heavy rainfall.

◦ Rain Gardens

Small-scale depressions used for storage and infiltration, typically at a property-level and close to buildings



Urban measures



o Detention Basins

Larger-scale surface storage basins to provide flow control through attenuation of runoff. Primary purpose is to provide storage of runoff at the end of a SuDS 'chain'.

o Retention Ponds

Ponds or pools with additional storage capacity to attenuate surface runoff during rainfall events.

o Wetlands

Wetlands provide both storm water attenuation and treatment, comprising shallow ponds and marshy areas covered in aquatic vegetation. Wetlands detain flows for an extended period to allow sediments to settle and to remove contaminants. They also provide runoff attenuation and can provide significant ecological benefits.



Urban measures



o Urban channel restoration

Working within engineered river channels to restore the operation of natural processes to improve water quality, sediment retention and slow down runoff conveyance. Utilising reaches where rivers pass through open space (parks) to restore more natural channels and manage flood risks.

o Floodplain restoration

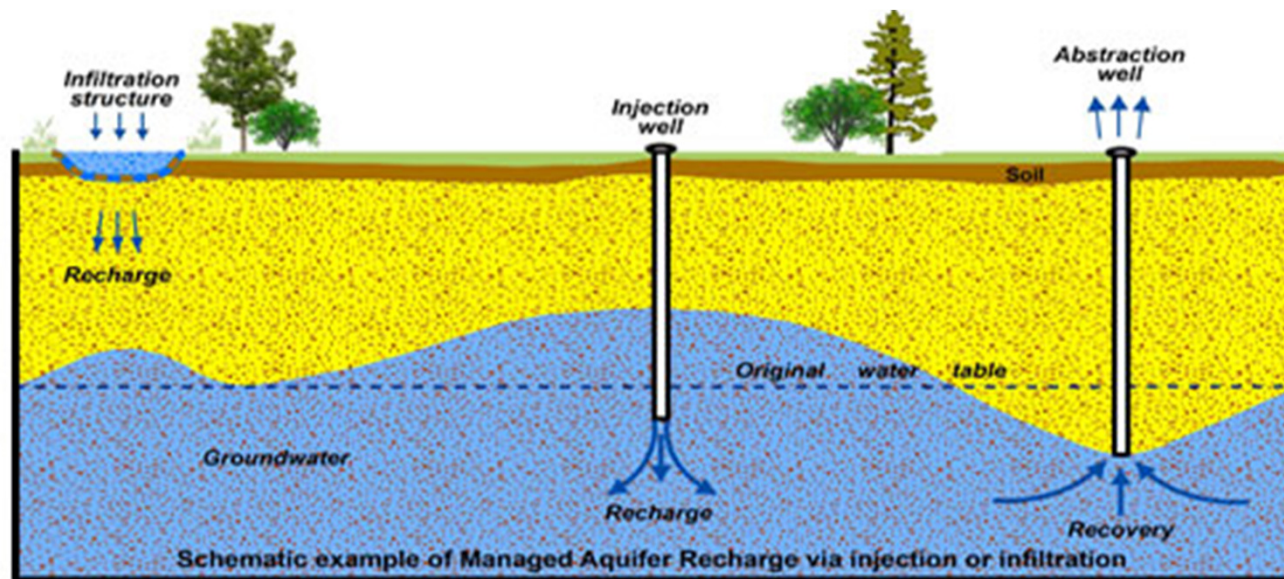
Restoring a river's floodplain to its original conditions before having been affected by the construction of levees (dikes) and the draining of wetlands and marshes. This may reduce the incidence of floods, the provision of habitat and shelter, the improvement of water quality and the increased recharge rate of recharge of groundwater sources.



Urban measures

o Managed Aquifer Recharge

MAR is the purposeful recharge of water to aquifers for subsequent recovery and environmental benefit. Within the context of urban environment, MAR covers the injection and infiltration of captured storm water – as such, it is linked to SuDS measures such as rainwater harvesting and infiltration techniques, but worth differentiating as a case where the primary purpose is to increase recharge to aquifers in addition to attenuating surface runoff





Discussion: The measures

- o Any measures excluded?
- o Any listed measure that do not belong here?
- o Distinction between NWRM and SUDS (sustainable drainage systems)
- o Examples from the Danube region



Discussion: Benefits, good practices

- o Less pressure on wastewater systems
- o Lower flood risk
- o Local water retention
- o Quality of life
 - ◆ tempering effects
 - ◆ green areas
 - ◆ cleaner air
 - ◆ leisure
- o What else?



Discussion: Challenges in implementation

- Space, rigidity of urban structure
- Financing
 - ◆ investments
 - ◆ maintenance
- Lack of knowledge
- Lack of interest
- Institutional issues, organisation
- Urban planning process
- Safety and health considerations
- Urban diffuse pollution
- What else?



Discussion: Potential instruments to promote urban NWRMs

- Standards
- Voluntary agreements
- Information campaigns, education
- Subsidies
- Taxes, fees (e.g. stormwater fee)
- What else?



Discussion

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BENEFITS, GOOD PRACTICES

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Thank you for attention

