SUSTAINABLE URBAN DRAINAGE SYSTEMS
COMPLEMENTING GREY WITH GREEN FOR IMPROVED ADAPTATION

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Gathering the evidence base


- Developed series of narratives, e.g. nature-based solutions

- **Goal**: market potential and economic benefits of SuDS (e.g. effectiveness and costs / benefits compared to traditional engineered solutions); scope of uptake; barriers to wider use

- **Approach**: literature review, feedback from DG Environment, two strategic workshops, expert interviews

http://www.recreate-net.eu/
Urban flooding – what’s the threat?

- Increase in intensity and frequency of (urban) flood events
- Most widespread European natural hazard in terms of economic losses
- Traditional management with grey, piped drainage systems
  - Single-objective designs with insufficient capacities
  - Inadequate discharge of excess water to regional water system
  - Increase of pollutants and algal blooms from run-off
  - Property damages and financial losses incurred
  - Potentially high construction, maintenance and repair costs
SuDS as a promising nature-based solution

- Adaptable flood risk management tool: surface water drainage discharge; address water quality and environmental enhancement
- Reliance on natural processes and green/blue infrastructure

Adapted from Graham et al. (2012)
Co-benefits and multifunctionality

(Woods-Ballard et al., 2015)

Water Framework Directive
Floods Directive
Climate change adaptation strategy
Green Infrastructure Strategy
EU Biodiversity Strategy
Green growth
Circular economy
Resource efficiency
Potential barriers to implementation and uptake

- Skepticism of general public **
- Potentially high land requirement
- Lack of diffusion across institutional and stakeholder networks, creating knowledge and capacity gaps
- Site-specific, preventing ‘one size fits all’ solutions
- Lacking standardized tools for measuring performance and costs/benefits
# Potential impacts of SuDS on other urban components’ functioning

(Hoang and Fenner, 2015)

<table>
<thead>
<tr>
<th>Urban components</th>
<th>Services</th>
<th>Potential disruptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply (sources)</td>
<td>Trap pollutants, reduce water treatment need and can release water back to the water system and underlying ground</td>
<td>Become a pollutant source if not treated properly</td>
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<tr>
<td>Wastewater (conveyance and treatment)</td>
<td>Provide local solution for wastewater treatment</td>
<td>Tree roots can damage sewer pipes</td>
</tr>
<tr>
<td>Food and agriculture</td>
<td>Reduce pollutants and provide pollination and grazing sites</td>
<td>Pest and disease hotspot if not maintained properly</td>
</tr>
<tr>
<td>Transportation</td>
<td>Traffic calming, traffic noise reduction</td>
<td>May block views if trees are too high, risk of branch and leave falling in strong wind</td>
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<tr>
<td>Energy</td>
<td>Urban cooling from heat island effect, carbon sequestration which might reduce climate change impacts fuelling energy demand</td>
<td>May require energy to maintain such as pumping water</td>
</tr>
<tr>
<td>Communication</td>
<td>n/a</td>
<td></td>
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<tr>
<td>Ecology</td>
<td>Provide corridors and habitats for wildlife species</td>
<td>May host pests and pollutants</td>
</tr>
<tr>
<td>Health</td>
<td>Provide spaces for physical activities and relaxation, improve air quality</td>
<td>Pollen allergy, may host disease vectors</td>
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<tr>
<td>Social</td>
<td>Provide space for socialising; crime reduction</td>
<td>May create opportunity for crime at night due to reduced vision, may be aesthetically unpleasant</td>
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<tr>
<td>Buildings</td>
<td>Provide shading (green roof) and reduce carbon footprints via carbon sequestration</td>
<td>Might increase water-related risks around the building and loads on the structural strength of the building</td>
</tr>
<tr>
<td>Economic</td>
<td>Provide services that might have economic values such as carbon sequestration</td>
<td>May incur costs for maintenance and cleaning</td>
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</table>
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Where to go from here?

<table>
<thead>
<tr>
<th>European research &amp; innovation policy</th>
<th>National policy frameworks</th>
<th>Supportive actions</th>
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<tbody>
<tr>
<td>• Funding for long-term research</td>
<td>• Involving wider range of stakeholders</td>
<td>• Strengthen ‘business case’ for value of SuDS</td>
</tr>
<tr>
<td>• Showcase results and best practices</td>
<td>• Use standardized monitoring and reporting processes</td>
<td>• Public-private partnerships</td>
</tr>
<tr>
<td>• Highlight synergies with existing policies</td>
<td>• Decision-making criteria that reflect cross-sectoral goals and priorities</td>
<td>• <em>Increase knowledge basis, perceived legitimacy, awareness</em></td>
</tr>
<tr>
<td>• Policy framework supporting NBS over grey solutions</td>
<td>• Regulation fostering SuDS as ‘business as usual’</td>
<td></td>
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</table>
Thank you!
Any questions...?

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