

Linking Sustainable Drainage Systems (SuDS), ecosystem services and disservices using a communication and planning tool: new connections in urban ecology

Chunglim Mak¹, Philip James¹ and Miklas Scholz²

¹Ecosystems & Environment Research Centre, School of Environment & Life Sciences, Peel Building
²Civil Engineering Research Group, School of Computing, Science and Engineering, Newton Building

Email: c.mak@edu.salford.ac.uk

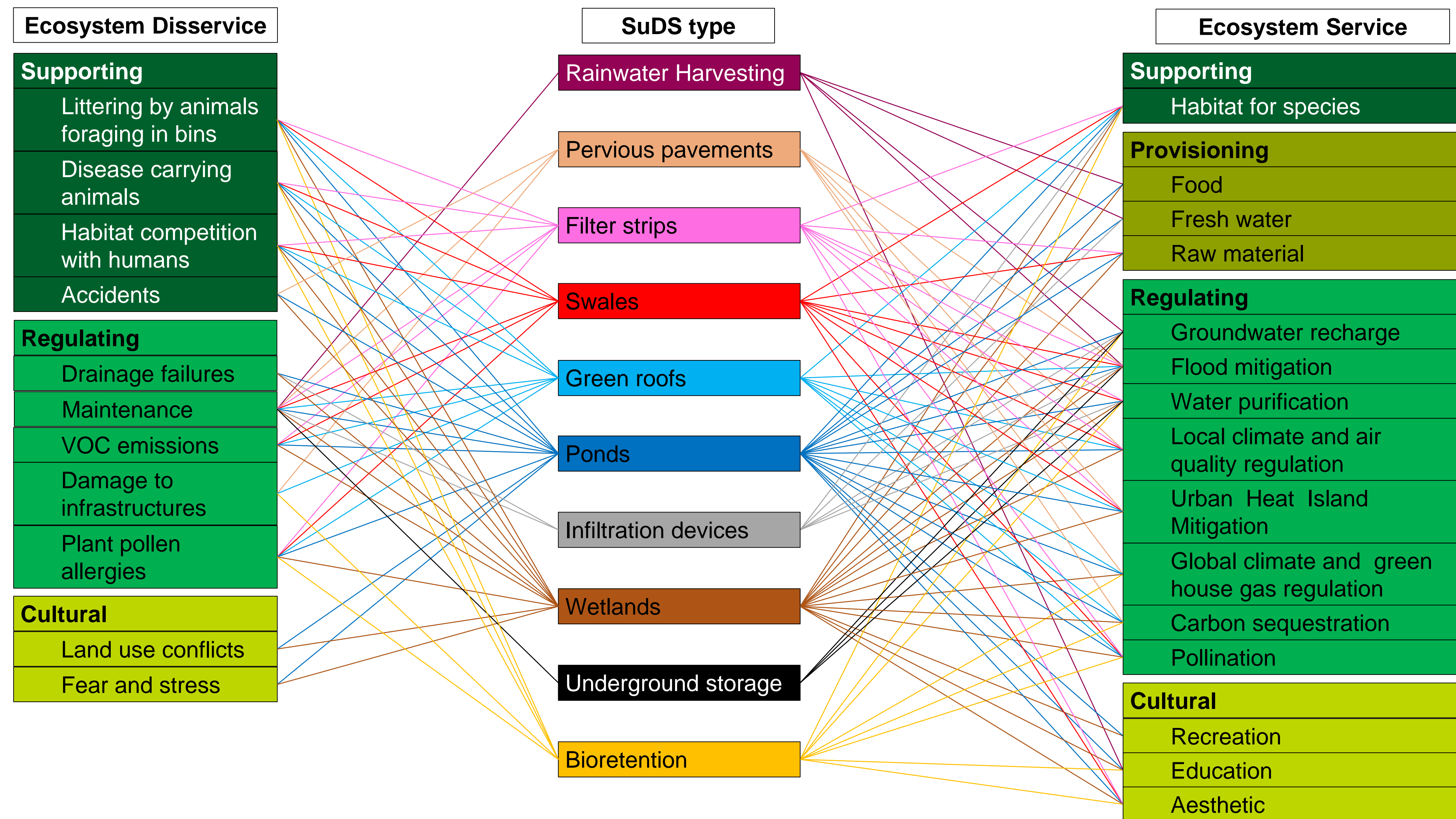
University of
Salford
MANCHESTER

1. Background and aim

A SuDS communication and planning tool is proposed to tackle urban diffuse pollution. This planning tool examines SuDS through the ecosystem services and disservices approach in order to illustrate the actual benefits of SuDS to all stakeholders involved in the planning process. The planning tool uses a web based user interface, with clickable links containing specific, detailed information to aid the following tasks: deciding on where to locate a new SuDS development, analysing an existing SuDS system, designing a new SuDS system, and compiling public policy documents. This tool is currently being used in the Irwell River Catchment Plan Pilot to quantify the benefits that may accrue from SuDS installations.

2. SuDS Planning Tool

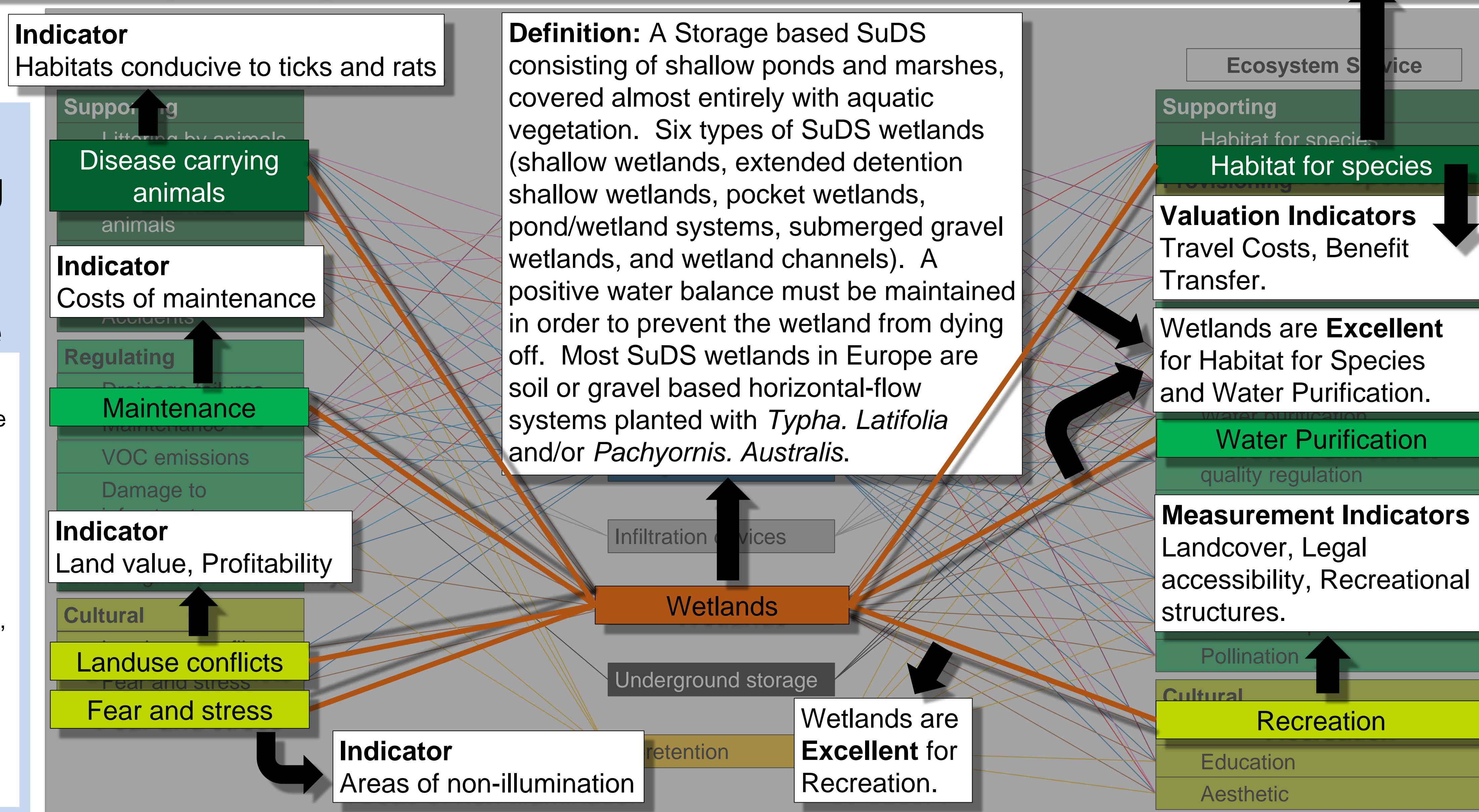
This section illustrates the proposed SuDS communication and planning tool to tackle urban diffuse pollution, using the ecosystem services and disservices approach.



Description: Habitats provide everything that an individual plant or animal needs to survive: food, water, and shelter. Each ecosystem provides different habitats that can be essential for a species' lifecycle. Migratory species including birds, fish, mammals and insects all depend upon different ecosystems during their movements.

3. SuDS Planning Tool user interface

This section demonstrates the proposed web based user interface, with clickable links containing SuDS, ecosystem services and disservices information.



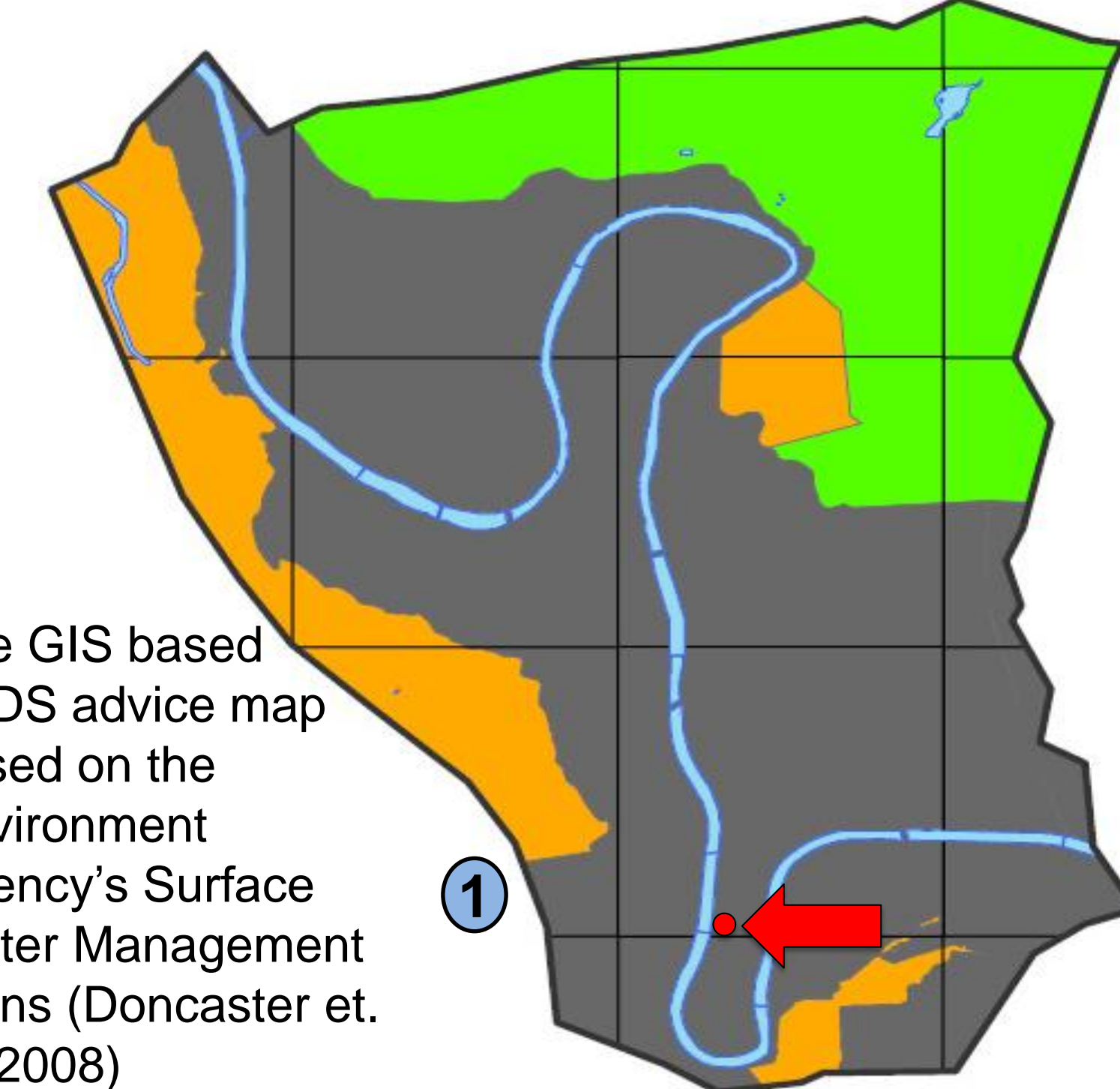
4. River Irwell Catchment Demo

A mock up using the SuDS communication and planning tool in conjunction with an existing SuDS decision making method to form SuDS development decisions. Only the ecosystem services side of the tool was used.



A potential SuDS site near the University of Salford (Google Map, 2013)

Map key explaining the colour coding of the SuDS advice map.



The GIS based SuDS advice map based on the Environment Agency's Surface Water Management Plans (Doncaster et. al, 2008)

< 5m above nominal river level. Underlain by unfavourable drift geology (till). Within flood protection zones 2 or 3. Storage based SuDS.

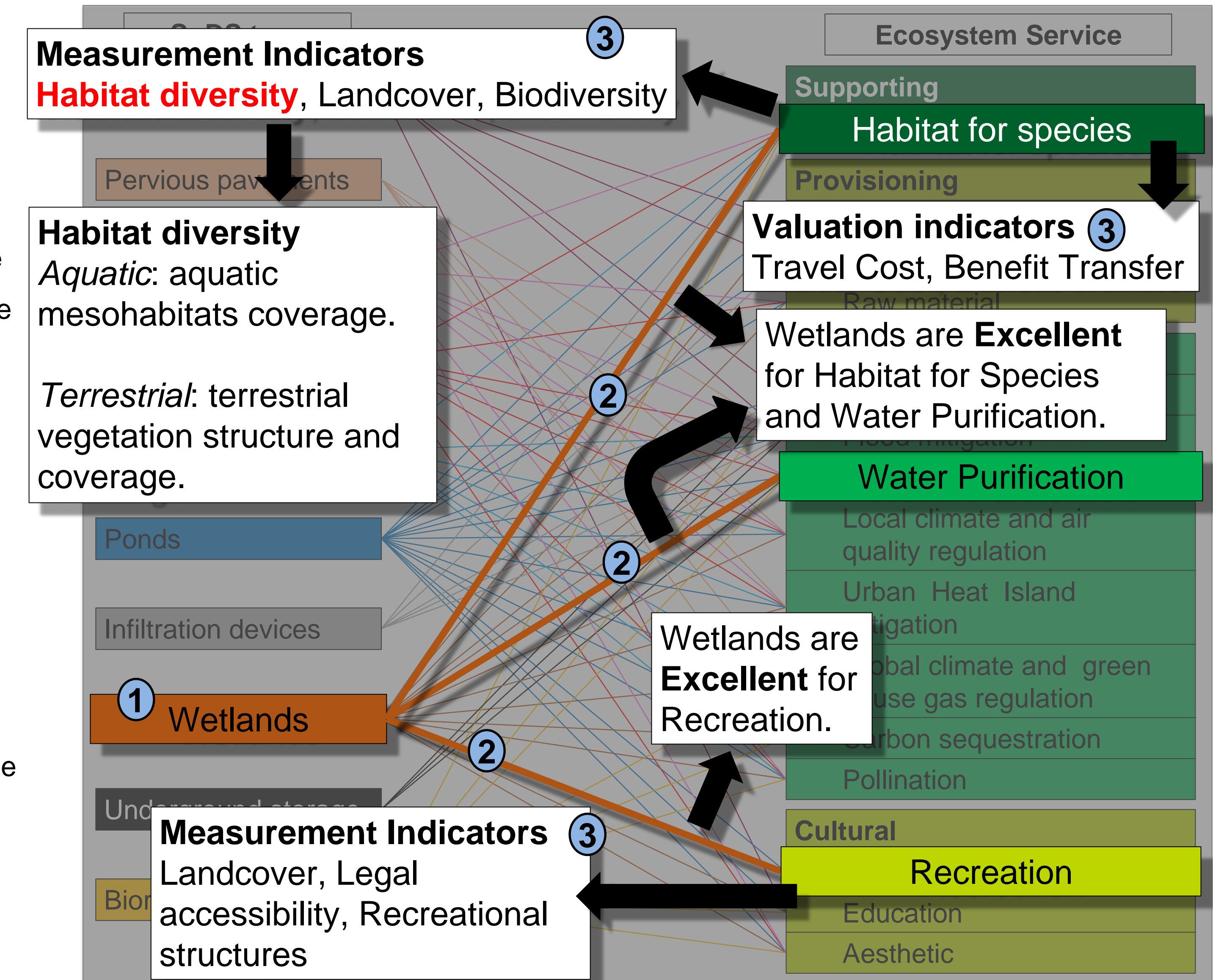
> 5m above nominal river level . Underlain by undifferentiated glacial deposits or alluvium. Outside all flood protection zones. Infiltration and storage based SuDS.

> 5m above nominal river level. Underlain by sand/gravel drift deposits. Outside flood protection zones 2 and 3. Infiltration based SuDS.

Step 1: Identify the most suitable SuDS type for the site using the SuDS advice Map.

Step 2: Identify the ecosystem services and their strength.

Step 3: Obtain valuation and measurement indicators for assessing the ecosystem services that the chosen SuDS type is capable of generating.



5. Further Developments

- SuDS, ecosystem services and disservices linkages validation and strength class developments
- Web site and application developments.
- Planning tool trials using existing and potential SuDS developments.

References:

- Lyttimäki, J.; Petersen, L. K.; Normander, B. & Bezak, P. (2008). *Nature as a nuisance? Ecosystem services and disservices to urban lifestyle*. Environmental Sciences, (5), pp.161-172.
- Millennium Ecosystem Assessment. (2005). *Chapter 2: Ecosystems and their services*. Ecosystems and Human Well-being: A Framework for Assessment.
- The Economics of Ecosystems and Biodiversity. (2011). *TEEB Manual for Cities: Ecosystem Services in Urban Management*.
- Woods-Ballard, B.; Kellagher, R.; Martin, P.; Jefferies, C.; Bray, R. & Shaffer, P. (2007). *C697 The SuDS Manual*. London: CIRIA.
- Doncaster, S.; Stovin, V. & Morrow, B. (2008). *Lower Irwell Valley, Salford Integrated Urban Drainage Pilot Project TRE344 Final Report*.