Evaluating the multiple benefits of Blue-Green infrastructure

Dr Emily O’Donnell
University of Nottingham

24th November 2016
Blue-Green Infrastructure Conference, Belfast
Overcoming barriers to Blue-Green infrastructure

1. Promote multifunctional space and identify, quantify and monetise the multiple benefits

2. Improve education and communication, raise awareness, community engagement

2. Partnership working from the project outset
Limit flows entering man-made drainage systems

Controlling the water at source, slowing conveyance, attenuation and storage = reduce flood risk

Managing flows above ground

Improves resilience

Improves water quality

Increasing extent and health of GI

Surface water as an amenity

Biological breakdown of sediment pollutants

Improves water quality

Water and sediment management benefits
Environmental benefits: habitat and biodiversity

Source www.nwl.co.uk
Environmental benefits

- Improve air quality
- CO$_2$ sequestration
- Reduction of the urban heat island effect
- Reduction in noise
Social and cultural benefits

- Recreation
- Aesthetics
- Amenity

- Wellbeing and liveability (stress relief, restorative benefits)
- Encourages community cohesion, social interaction
- Physical and mental health
Green streets - traffic calming
Adaptability and flexibility
(climate change adaptation)

➢ Technological lock-in?
Evaluating the multiple benefits of Blue-Green infrastructure

ArcGIS toolkit for multiple benefit evaluation

- Air pollution
- Access to greenspace
- Carbon sequestration
- Noise
- Habitat connectivity
- Flood damage reduction

Morgan and Fenner, in review

Free to download: http://www.bluegreencities.ac.uk/bluegreencities/publications/multiple-benefit-toolbox.aspx
Blue-Green Scenario: urban greening and permeable paving, Newcastle UK

Blue-Green Scenario:
urban greening and permeable paving, Newcastle UK
Multiple benefits
Single benefits

Habitat size

Flood damage reduction

Noise reduction

Carbon sequestration
Benefits of SuDS Tool (BeST)

Benefits of a permeable paving and urban greening scheme

- Health
- Recreation

Legend:
- Flooding
- Biodiversity and ecology
- Air quality
- Groundwater recharge
- Recreation
- Health
Monetary benefits

Flooding: £1,732
Biodiversity and ecology: £63,525
Air quality: £65,026
Groundwater recharge: £72,994
Recreation: £2,979,475
Health: £4,127,484
Noise and disruption: -£125,249
Potential multiple benefits

Evaluates whether the area selected for an intervention has the potential to create the maximum benefits possible, or whether other locations are preferable.
Potential single benefits

- Carbon sequestration
- Habitat size
- Noise

Legend:
- No change
- Low potential
- Medium potential
- High potential
Concluding remarks

• Promotion of multifunctional space, and identification, quantification and monetisation of the multiple benefits will be key to helping many cities overcome the barriers to Blue-Green infrastructure

• New tools can provide an indication of the likely benefits:

Benefits of SuDS Tool (BeST)  Multiple Benefits GIS Toolbox