

2nd SUGIR meeting, c/o Dr Jennifer Carfrae, SRUC,
University of Edinburgh, 12th May 2015

Multiple benefits from green infrastructure

Dr Brian J D'Arcy

Independent environmental consultant

www.enviroexperience.co.uk

INTRODUCTION

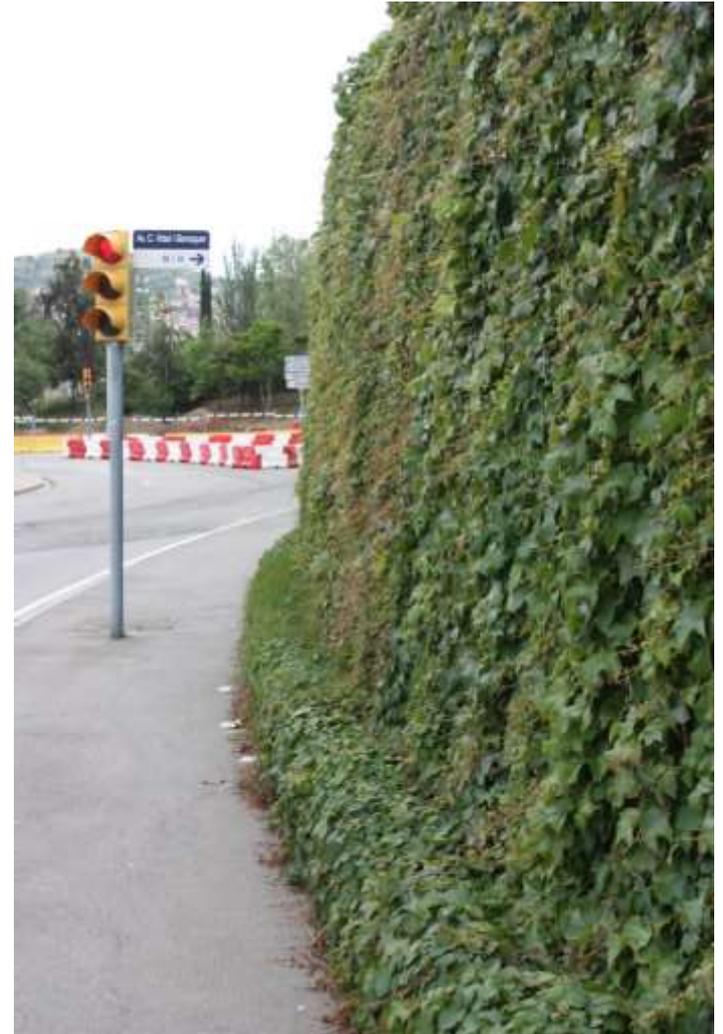


INTRODUCTION

SUGIR group: a sub-set of the Scottish Green Infrastructure Forum, see www.sgif.org.uk

- Set up informally in 2015, as the ***Scottish Universities Green Infrastructure Research*** group,
- the group aims to provide a point of exchange of ideas and needs for academics and practitioners

SGIF is chaired by Neil McLean (of WSP) for 2016-2018, and Secretary is Dr Emilie Wadsworth of CSGN. Past chair is Brian D'Arcy, who has agreed to chair SUGIR, at least initially.



SUGIR: Expectations & Aspirations

Broad aims

- Identify research needs of practitioners (public sector bodies such as SEPA, SNH, Govt., Scottish Water; consultants; developers; etc
- Engage with researchers in Scottish Universities and institutes
- Run 2 meetings per year, alternating East and West

Specific aims

- Provide project ideas for MSc students annually
- Provide a forum for students to present their work to potential employers and others
- Stimulate suggestions for research that might be funded by CREW, CS-IC or other funding bodies

Aims of the day

- *Float some initial research ideas*
- Learn of some current projects
- *Learn about research funding opportunities*
- Explore collaboratively how to research multiple benefits from green infrastructure



Meeting outputs

1. Note of meeting outputs to be sent to all on mailing list, and put onto SGIF website
2. Research ideas to be posted on website, and sent to all the public bodies eligible to apply for funds from CREW and CS-IC
3. Note to be written for Newsletter of diffuse pollution group of International Water Association (IWA)
4. Individuals welcome to progress ideas bilaterally or in other combinations as opportunities are created!



SOME RESEARCH IDEAS



Green infrastructure research needs

1. IWA diffuse pollution impacts
2. Soils, SUDS & climate change gases
3. Optimising SUDS for nutrient management
4. Creating artificial soils for urban drainage
5. “Natural raingardens”
6. Filter drains & green walls
7. SUDS inspections: achievement of aspirations ?
8. Green roofs evaluation (in Edinburgh?)
9. Evaluating CIRIA raingardens designs
10. Well being & green infrastructure
11. Effects of fencing and exclusion on biodiversity and amenity
12. SUDS as elements in linked green infrastructure landscapes

Land use and water quality

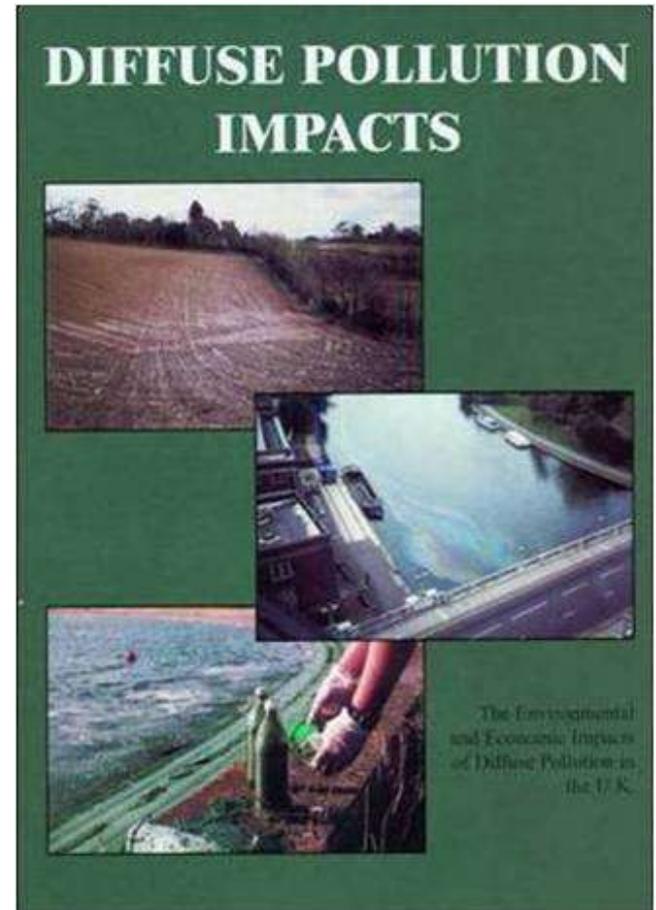
IWA report on Global Diffuse Pollution Impacts

Papers sought during 2017 on impacts of diffuse pollution (**major driver for GI**):

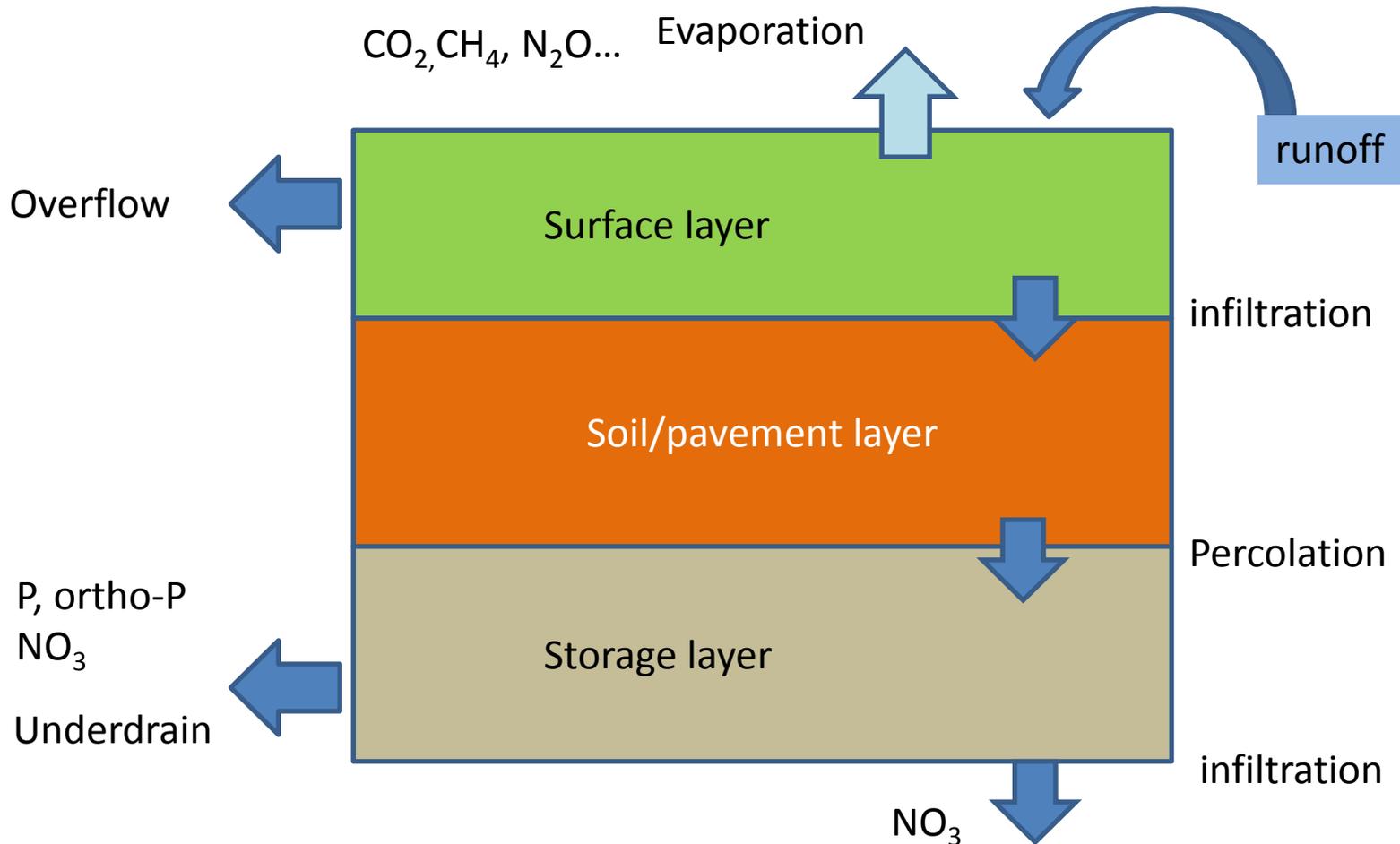
1. National, high level impact reports (e.g. for WFD compliance, USEPA)
2. Ecological impacts case studies
3. Economic impacts case studies
4. Water utility impacts (case studies... Scottish Water?)

Email:

brian@enviroexperience.co.uk



Soils, SUDS & climate change gases



Ref. USEPA, 2012. <http://www.epa.gov/nrmrl/wswrd/wq/models/swmm/> in JJ Huang et al, 2014, Wat. Sci & Tech. 70.11, pp1740-1745

Evaluating raingardens designs



- Raingardens at small scale: flow attenuation?
- Water quality?

Optimising SUDS for nutrient management

- Control of N & P from green infrastructure features to the water environment?
- Large areas of Scotland are mesotrophic or oligotrophic catchments
- SUDS for nutrient management?



Creating artificial soils for urban drainage



Filter drains and green walls

Can an *evergreen climber* such as ivy be planted in a filter drain and maintain permeability, whilst losing water through *evapotranspiration*, and contributing to inner city cooling?

Effects with/without planting on:

- water quality
- drying of a garden
- Maintaining permeability
- Scope for new build & retrofits

Design? Might a planted trench need to be:

- Wider?
- Deeper?
- Graded -> drier & wetter zones



Evapotranspiration and 'natural raingardens'

- Design to store average rainfall from catchment for no. days when $t^{\circ}\text{C} < 3^{\circ}\text{C}$
- A bog garden, or seasonal wetland
- In public park taking runoff from an adjacent street?



Green roofs evaluation in Edinburgh

- How many?
- What types?
- Any maintenance?
- Occupiers happy?
- Any problems?
- Habitat connectivity?



Well being & green infrastructure



Effects of fencing and exclusion on biodiversity and amenity

- Fencing often criticised as excluding any amenity value
- Exclusion of dogs, children & bikes, random walkers etc might have habitat protection benefits
- Fenced landscapes are still visible, what do residents think?
- What if evidence as above is put to them?



SUDS as elements in linked green infrastructure landscapes

- SUDS are not always inter-linked with other habitats
- How can other green infrastructure elements be included to create inter-linked habitat networks in developing (urbanising) districts?
- Fife case study?
Edinburgh/Glasgow too?
- Housebuilder willing to collaborate in a project?



Multiple benefits

- Multiple agendas?
- Multiple funders?
- Multiple researchers?
- (Don't forget to quantify multiple disadvantages too)

