



Natural Water Retention Measures

Web-based knowledge
Community of practice
NWRM practical guide



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

Service contract n°ENV.D.1/SER/2013/0010

Biophysical Impacts: Evidence from Sustainable Urban Drainage Systems

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Building a Knowledge Base

Natural Water Retention Measures enhance hydrological system function

- Using / mimicking / promoting natural processes to retain water in the landscape

Key part of this project is to build an evidence base for Natural Water Retention Measures

- What are Natural Water Retention Measures?
- How do they work?
- What benefits do they provide?
- How to the contribute to EC Policy objectives?



Building a Knowledge Base

Understanding **how** NWRM work is central to building the evidence base

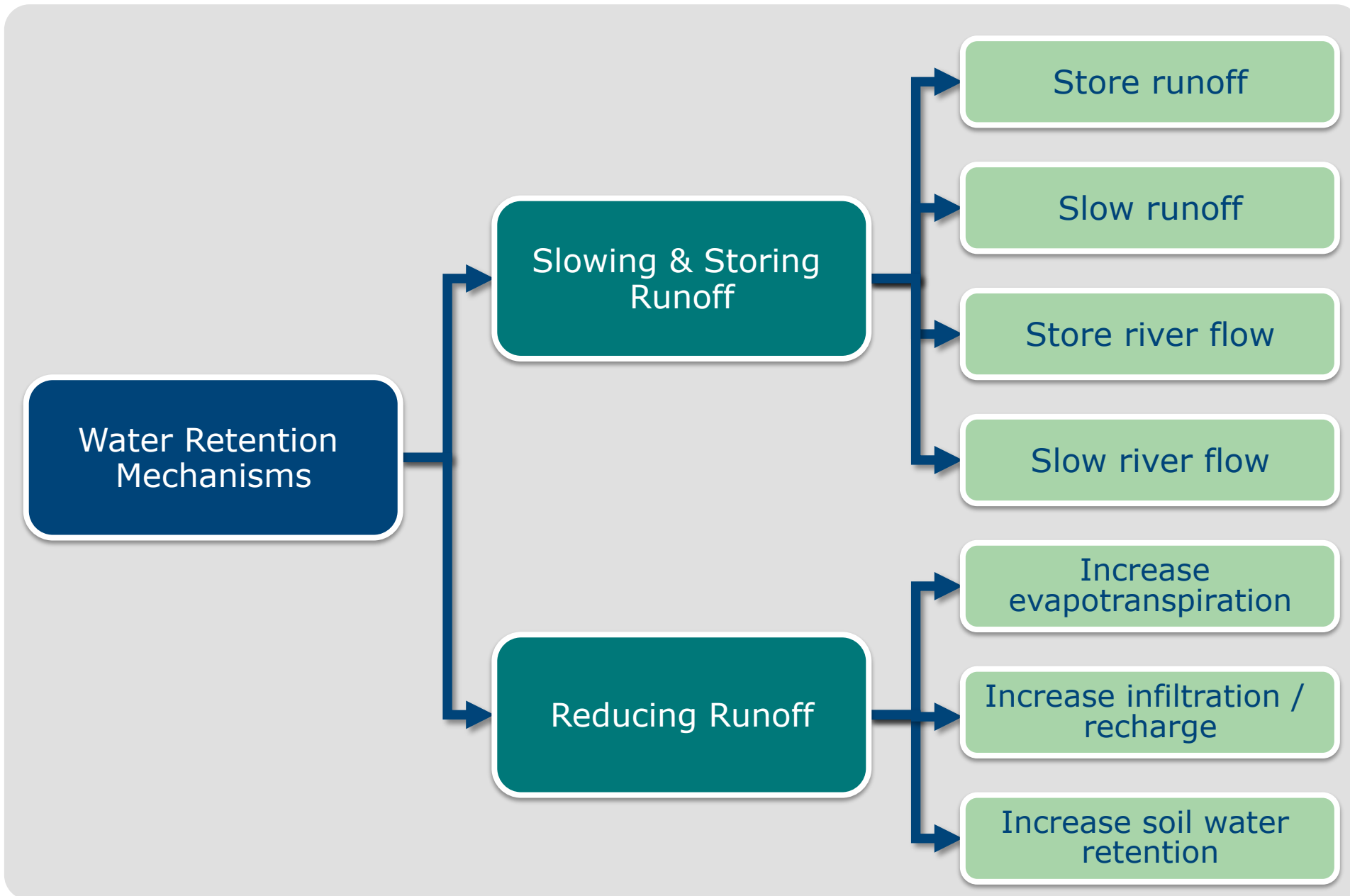
We must think about biophysical impacts in a structured manner:

- The mechanisms by which measures **retain water**
- The **biophysical impacts** that result from water retention

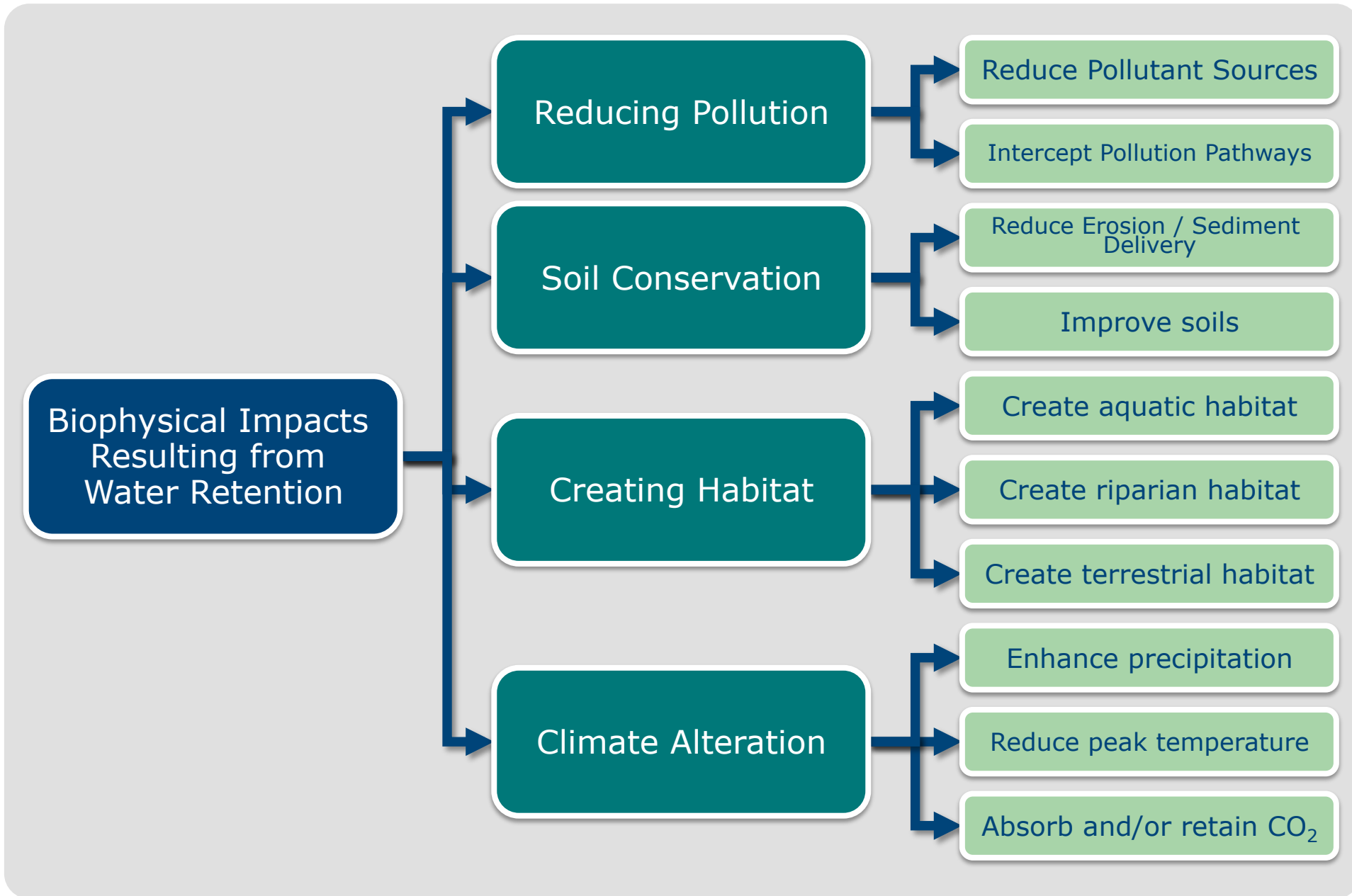
Separate consideration of the **outcomes** of these impacts

- Delivering ecosystem services benefits
- Contributing to meeting policy objectives

Structured Grouping of Biophysical Impacts

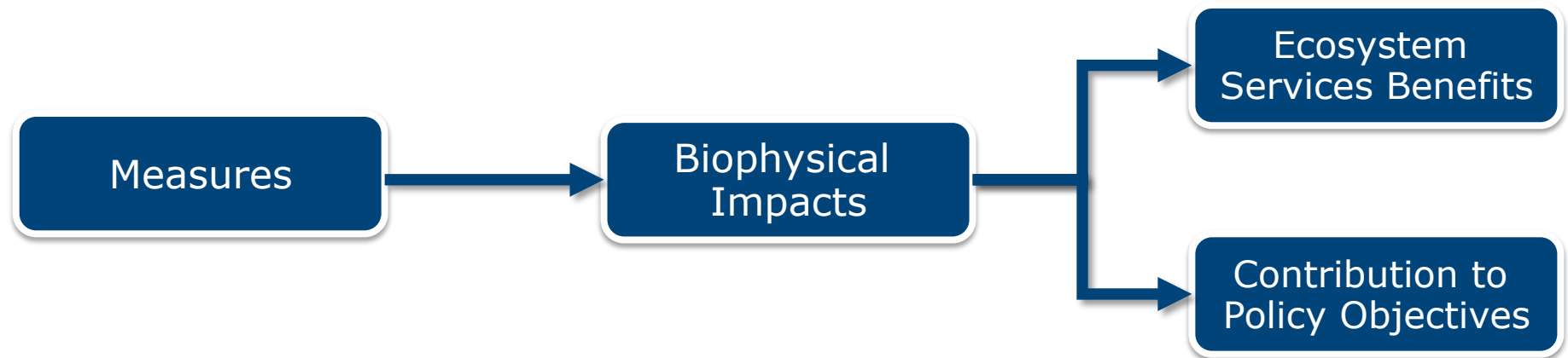


Structured Grouping of Biophysical Impacts



Building a Knowledge Base

From this, we can build the rest of the evidence base in a structured manner



Biophysical impacts are the central evidence component

- We must understand the mechanisms to show how benefits and policy objectives are realised

Common structured approach for all measures

- Some illustrations here for **urban** measures

Urban Natural Water Retention Measures

Project has identified 13 types of “urban” NWRM

- Effectively **Sustainable (urban) Drainage Systems**
- Although can be applied outside of urban areas!





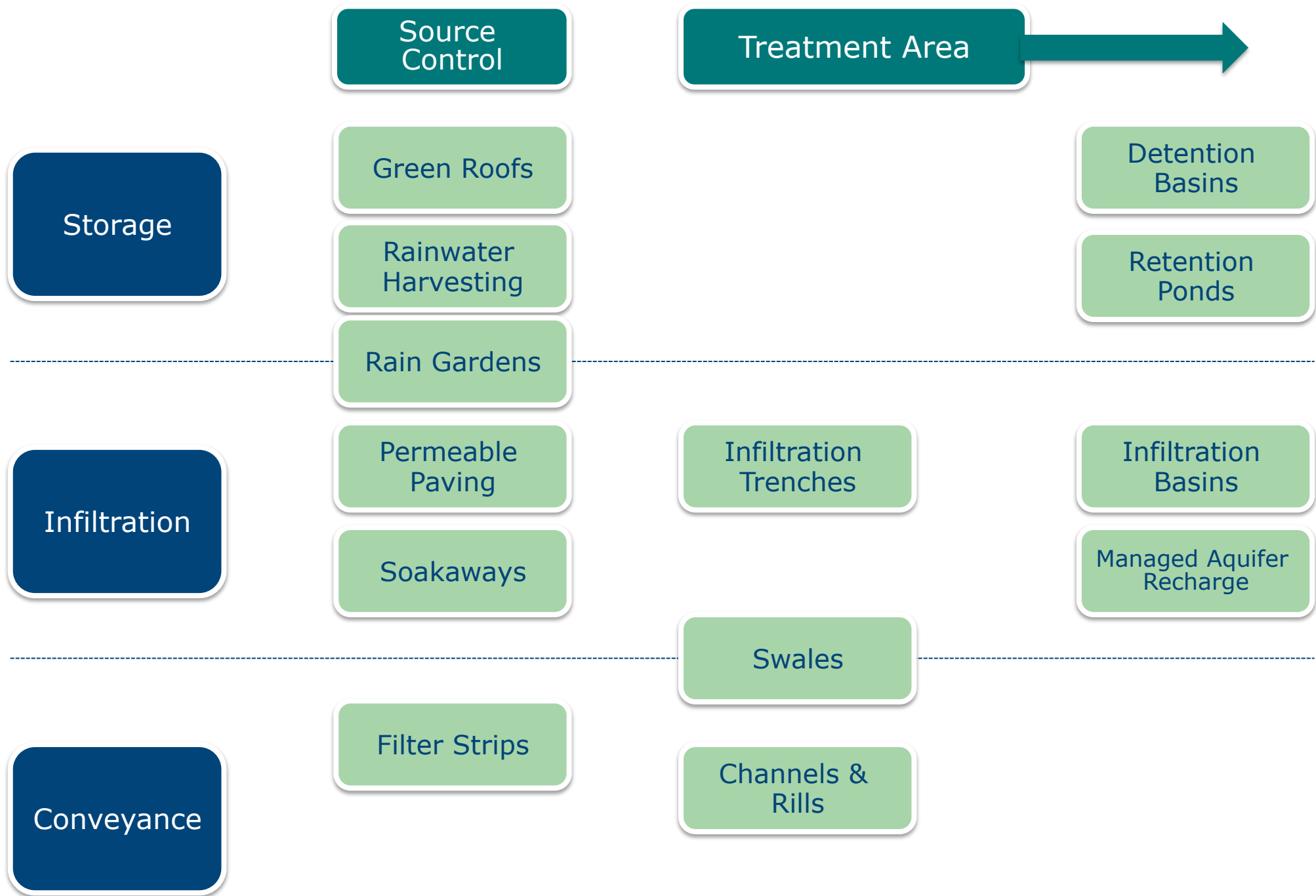
Urban Natural Water Retention Measures

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SuDS can be considered in terms of:

- Mechanism (type)
 - ◆ Storage
 - ◆ Infiltration
 - ◆ Conveyance
- Scale
 - ◆ Source Control
 - ◆ Increasing treatment area (drainage catchment)

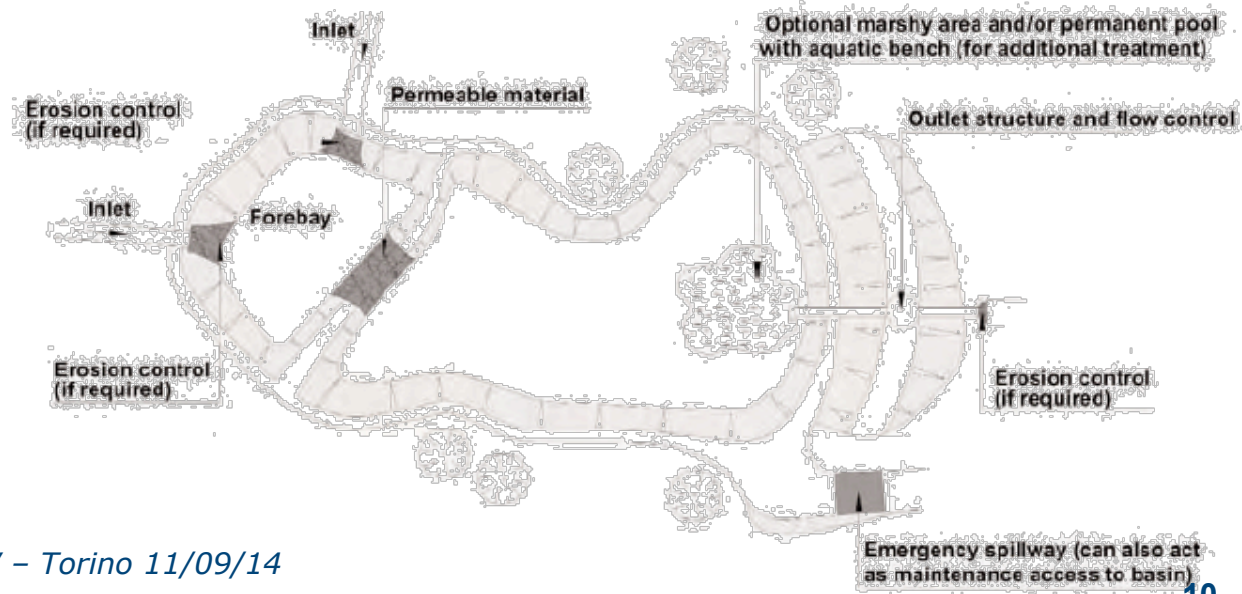


Detention Basins



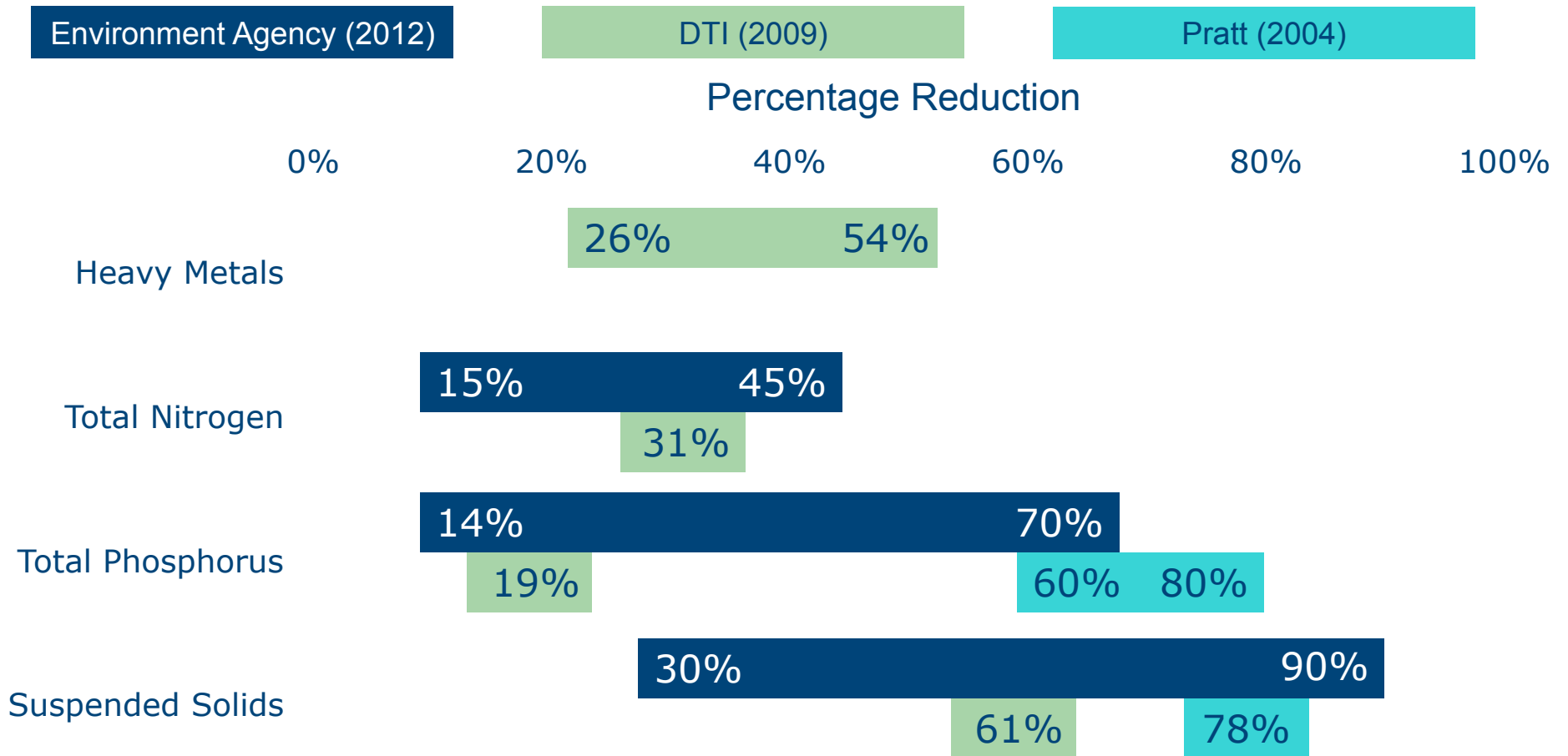
Primary purpose to store and slow runoff

Also delivery improved water quality



Detention Basins: Water Quality Improvement

Use of sand/gravel substrate to filter outflow can significantly reduce sediment delivery during storm events





Lamb Drove SuDS Monitoring Project

Showcase project to demonstrate effectiveness of Sustainable Drainage Systems in residential developments

Long-term study

- Development completed in 2006
- Ongoing monitoring from 2006-2011
- Aim to investigate how SuDS perform

Promoted by Cambridgeshire County Council

- Forward-thinking authority
- Keen to promote use of SuDS



Lamb Drove SuDS Monitoring Project

Showcase project to demonstrate effectiveness of Sustainable Drainage Systems in residential developments

Application of a range of SuDS techniques:

- Rainwater harvesting
- Permeable paving
- Green roofs
- Swales
- Filter strips
- Detention basins
- Retention pond

Comparison against a control site on same estate with no SuDS implemented

Lamb Drove SuDS Monitoring Project



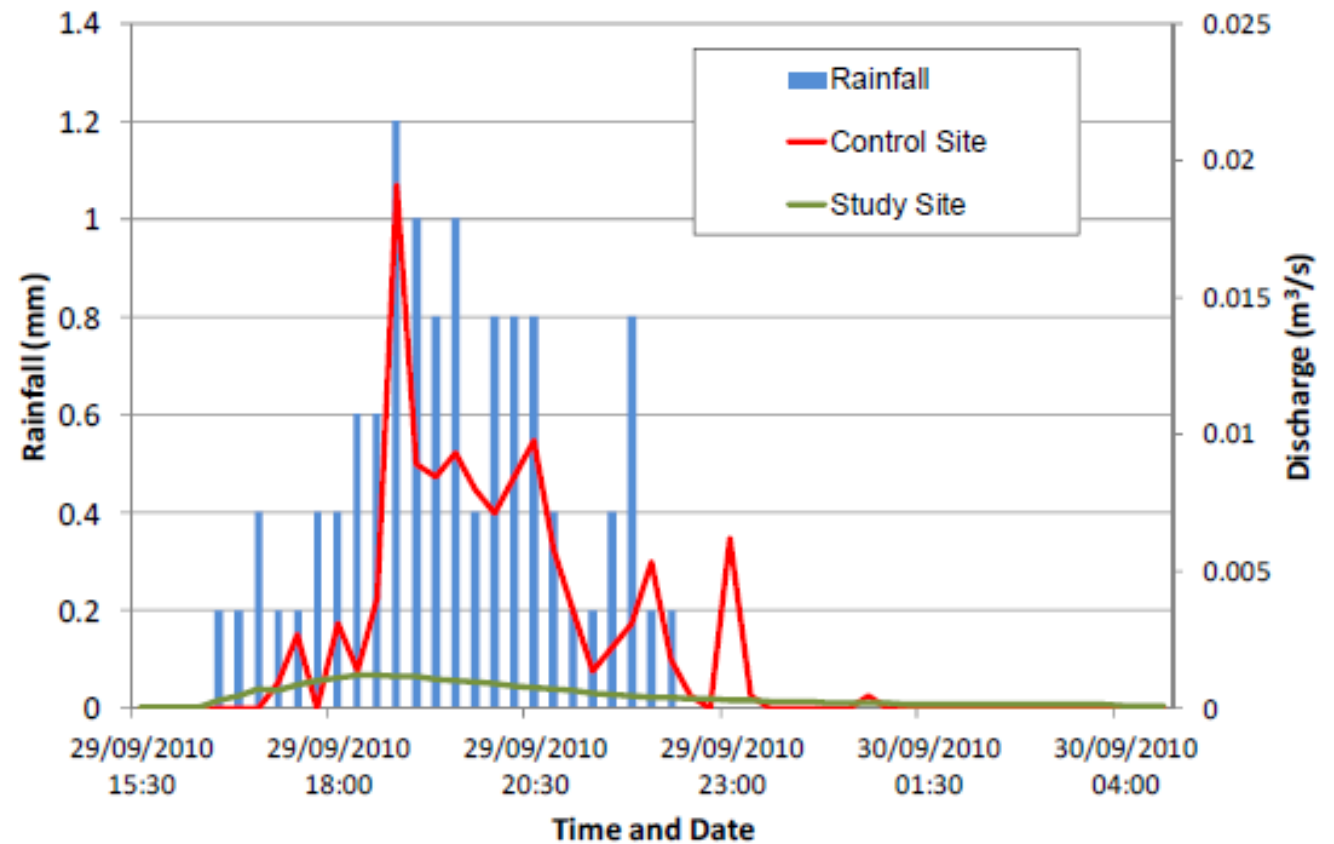
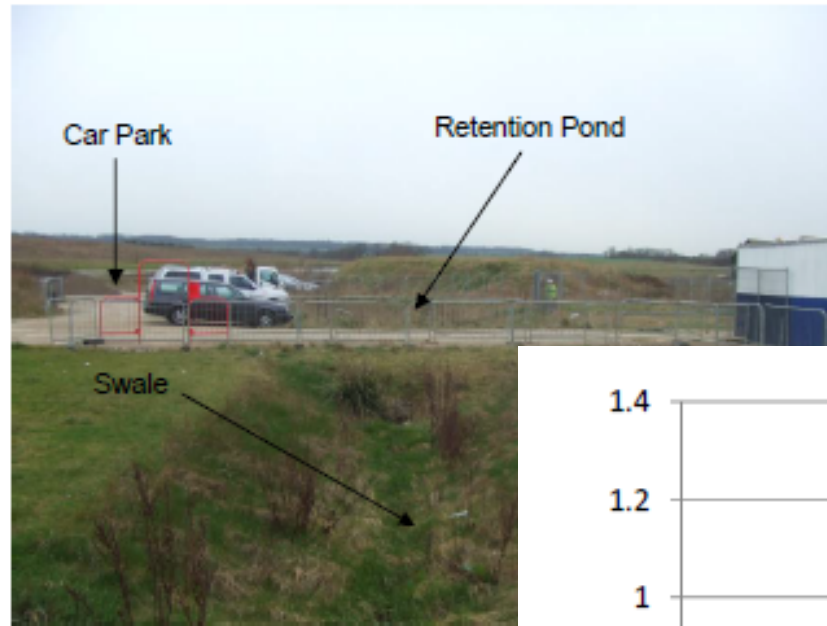
Lamb Drove SuDS Monitoring Project



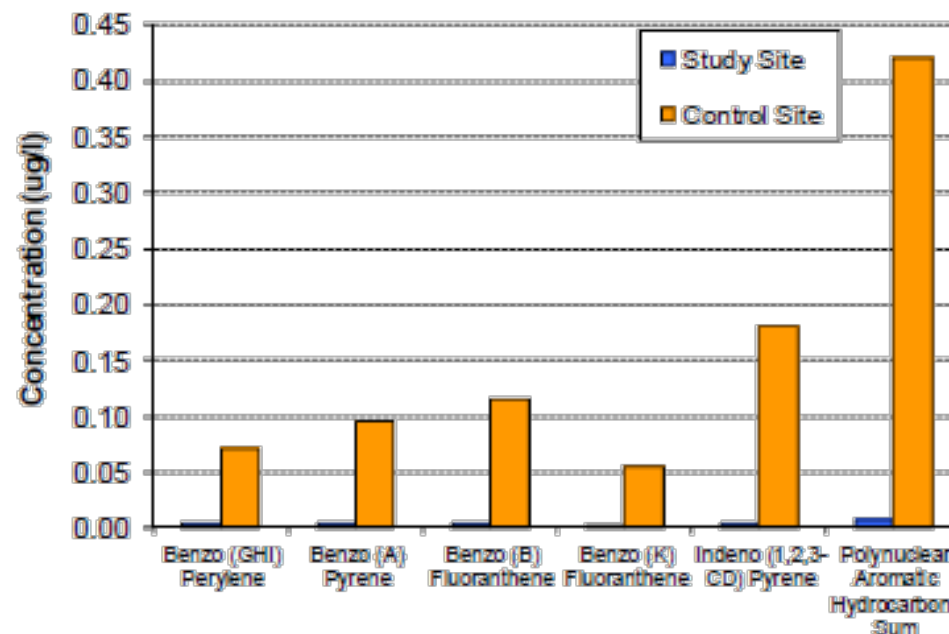
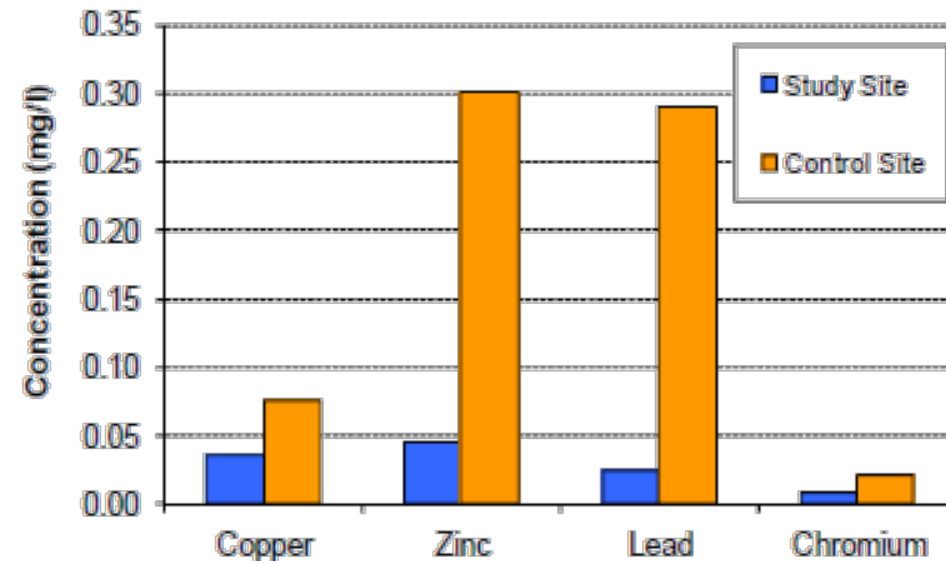
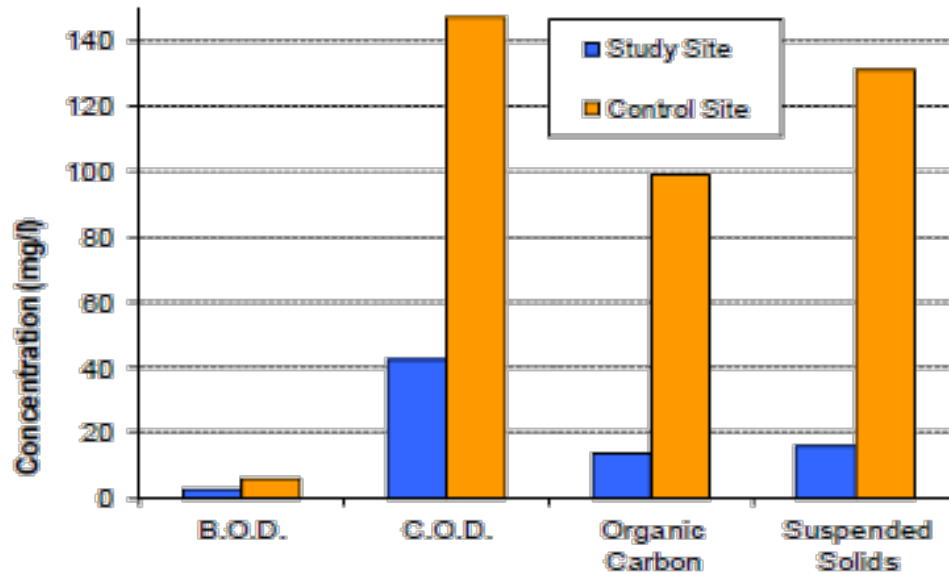
Lamb Drove SuDS Monitoring Project



Lamb Drove SuDS Monitoring Project



Lamb Drove SuDS Monitoring Project



Comparison of water quality parameters summarised across multiple storm events

Significant impact of SuDS measures to filter pollutants from urban runoff



Summary

Evidence of biophysical impacts of SuDS shows that they **work**

- Effective in delivering runoff control that they are designed to provide
- Also effective at intercepting and filtering urban diffuse pollution

Understanding and demonstrating biophysical impacts allows us to understand the benefits of NWRM

- Linking impacts to ecosystems services benefits & policy objectives

But what about the €€€ ...

Thank you for attention

