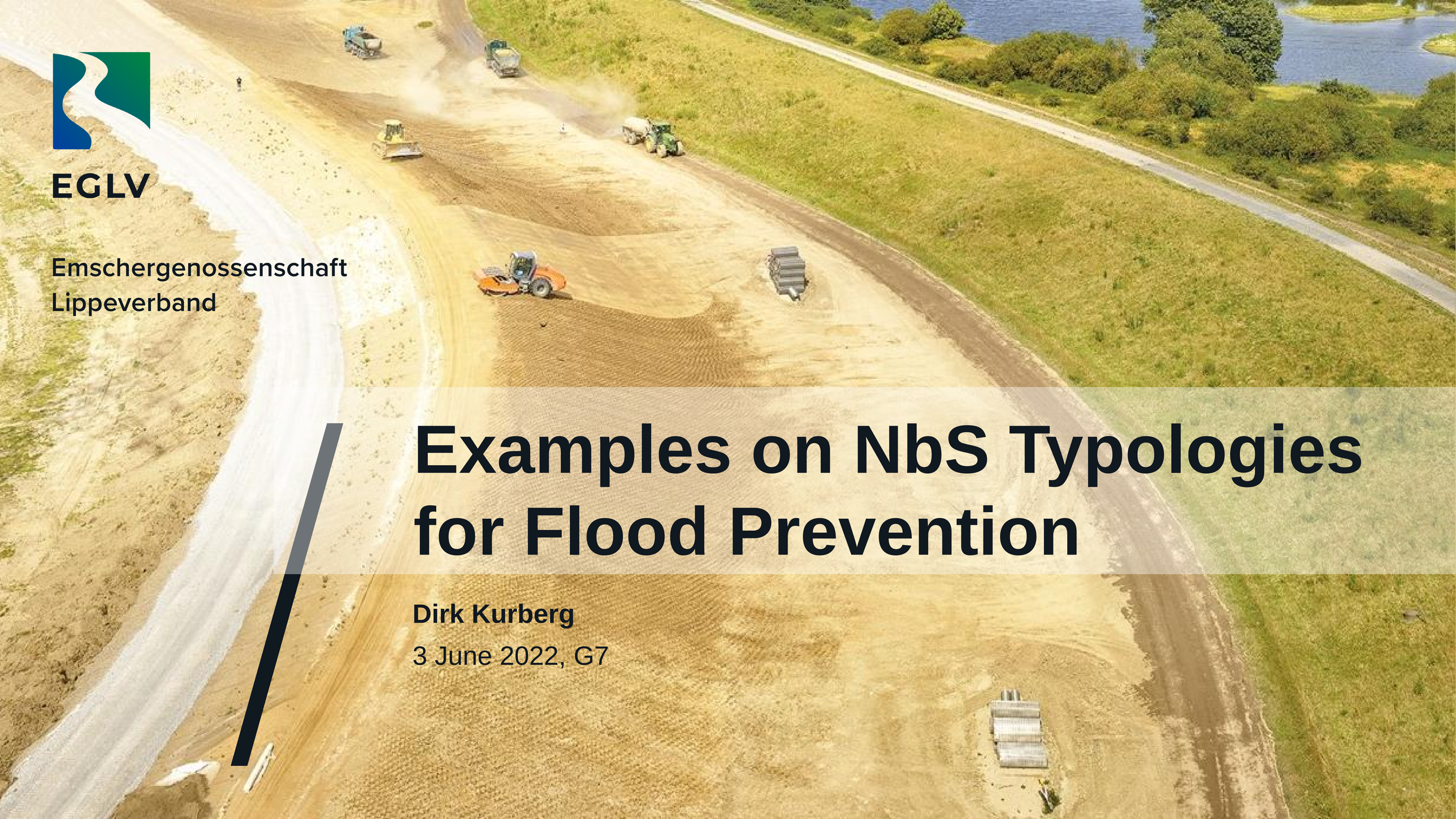


EGLV

Emschergenossenschaft
Lippeverband

Examples on NbS Typologies for Flood Prevention

Dirk Kurberg

3 June 2022, G7

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Agenda

1. Introduction EGLV
2. Lake Phoenix, Dortmund
3. Ecological Water Re-design
4. Decentral rainwater management

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1. Introduction

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Where we are



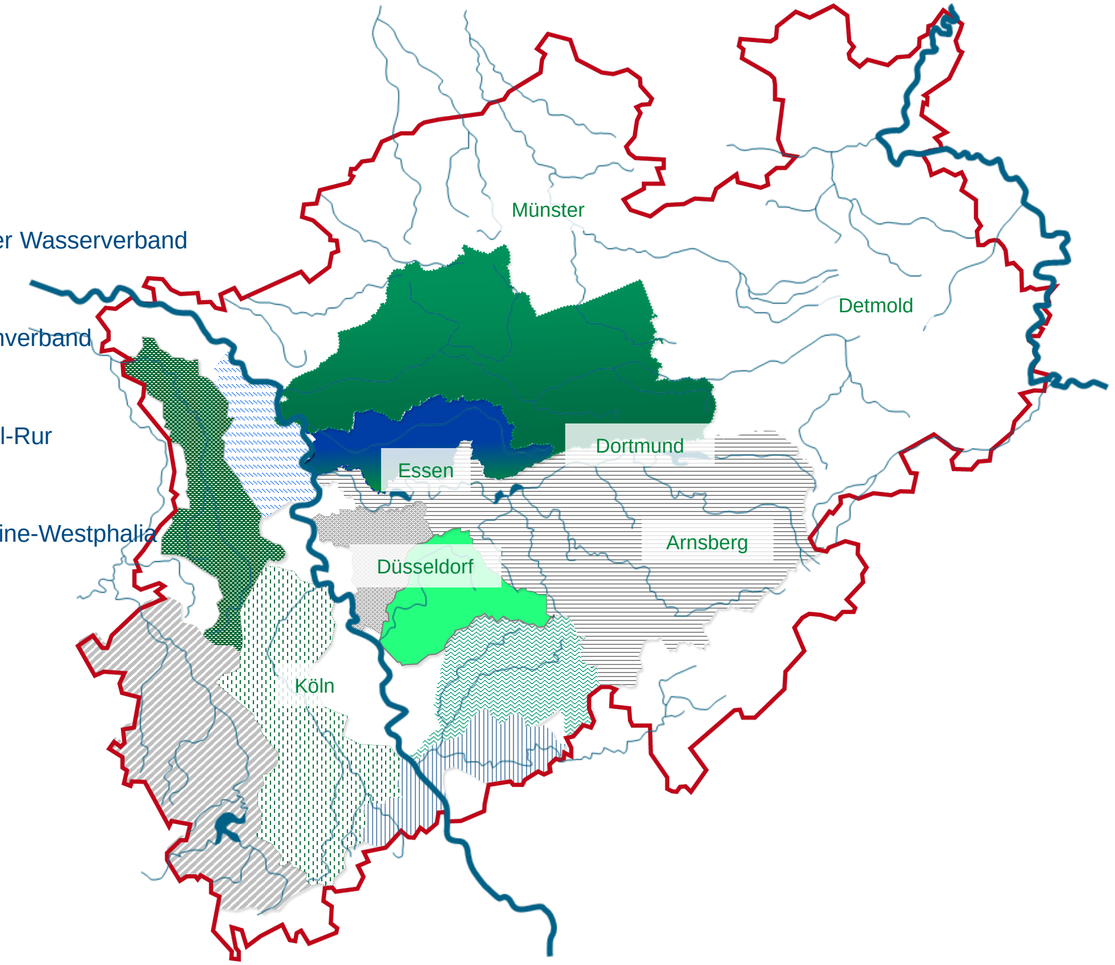


Emschergenossenschaft Lippeverband

Waterboard in Northrhine-Westphalia



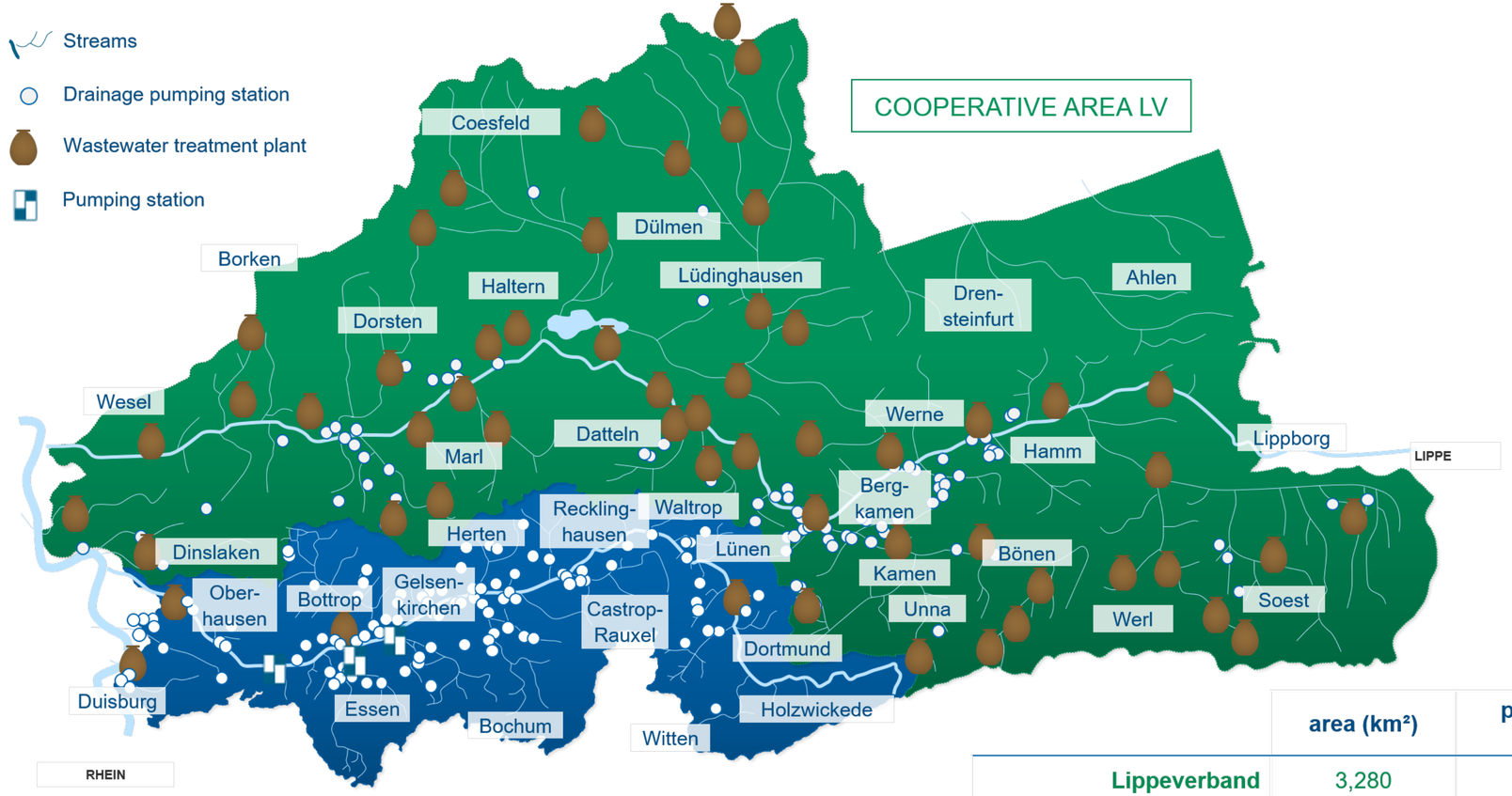
- **Emschergenossenschaft**
- **Lippeverband**
- Ruhrverband
- Wupperverband
- Lineg
- Niersverband
- Erftverband
- Aggerverband
- Bergisch-Rheinischer Wasserverband
- Wahnbachtalsperrenverband
- Wasserverband Eifel-Rur
- Borders of North Rhine-Westphalia



Emschergenossenschaft Lippeverband

Catchment areas





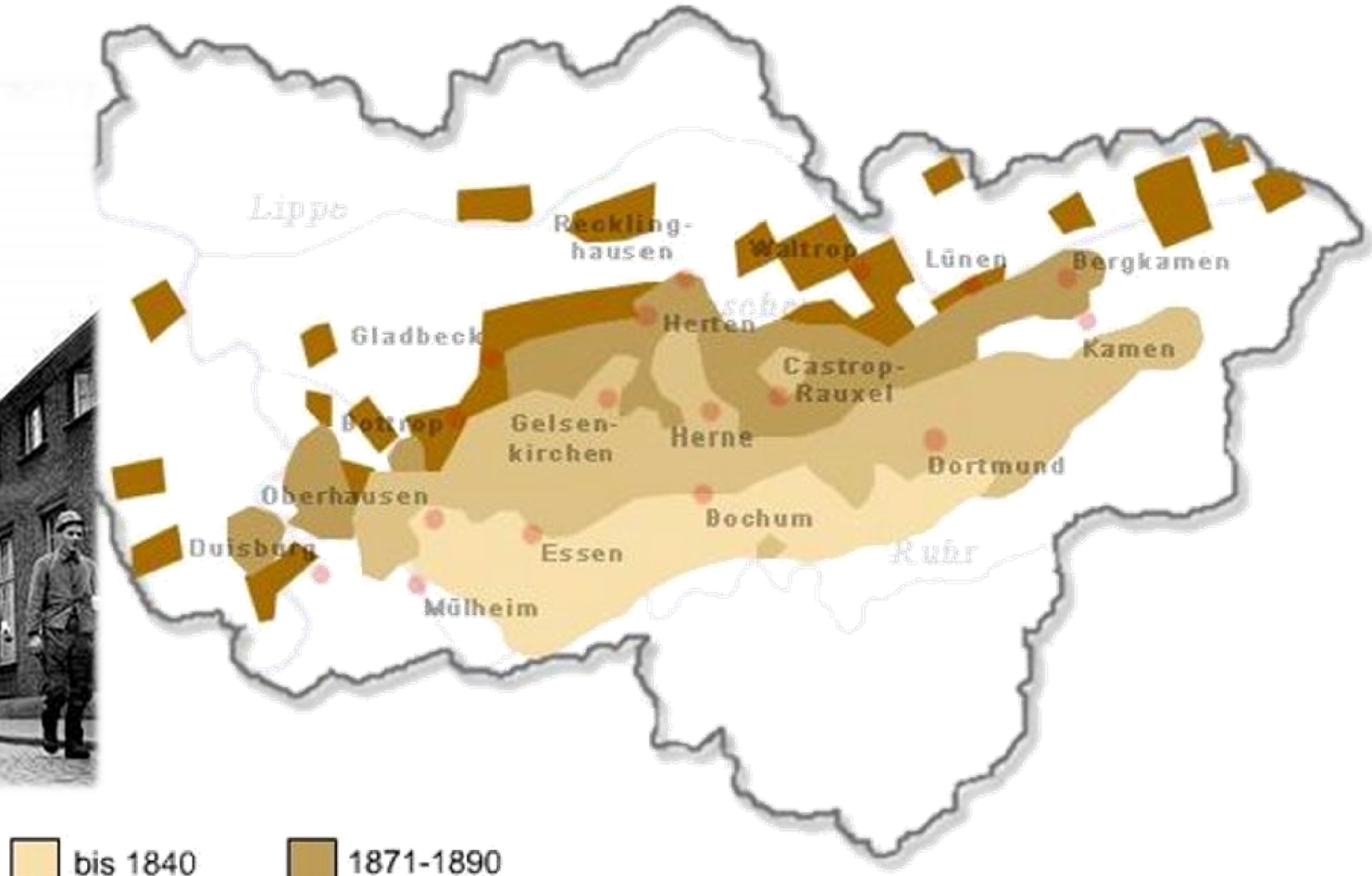
	area (km²)	population (mill.)	inhabitants/ km²
Lippeverband	3,280	1.4	427
Emschergenossenschaft	865	2.2	2,546

Emschergenossenschaft Lippeverband

Coal mining history



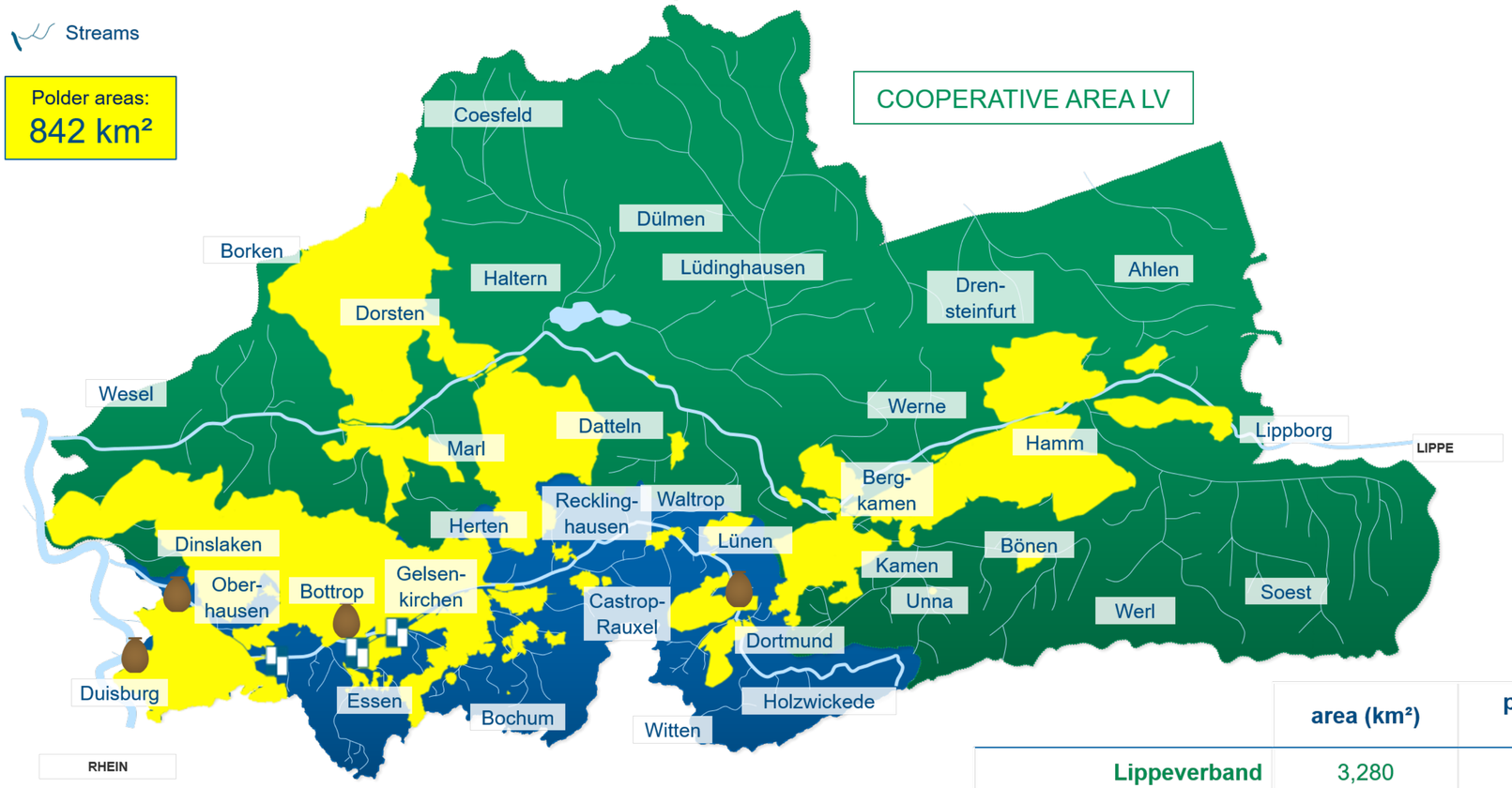




Emschergenossenschaft Lippeverband

Catchment areas





	area (km²)	population (mill.)	inhabitants/ km²
Lippeverband	3,280	1.4	427
Emschergenossenschaft	865	2.2	2,546

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Emschertal around 1900

Boye at Essen-Karnap



Emschergenossenschaft
Lippeverband



Start of technical solutions

In response to diseases and epidemics

Emschergenossenschaft
Lippeverband

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The Emscher conversion

Start of the generation project 1990



Emschergenossenschaft
Lippeverband

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Der Emscherum

Start eines Generatione

Emschergenossenschaft
Lippeverband



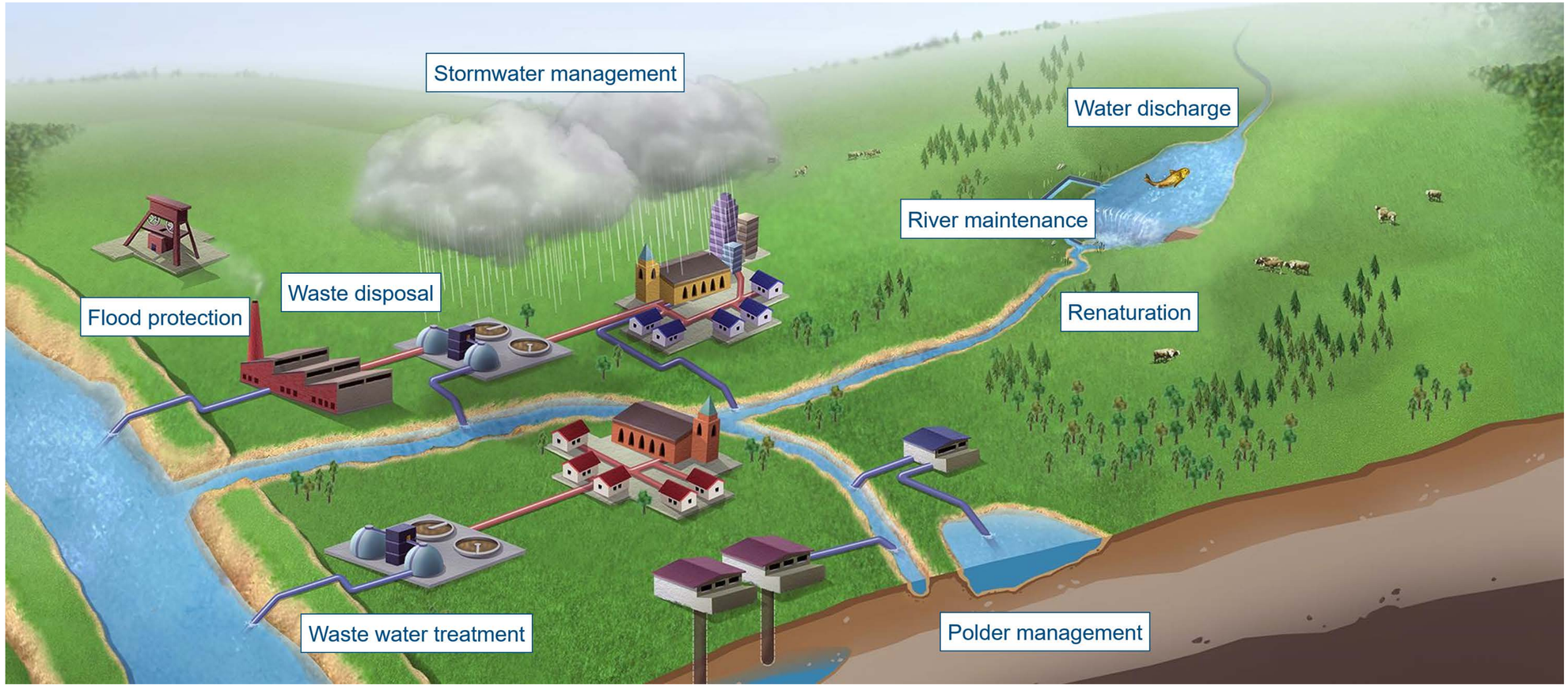
Groundbreaking ceremony 1992

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Emschergenossenschaft Lippeverband

Integrated Water Management around the Water Cycle



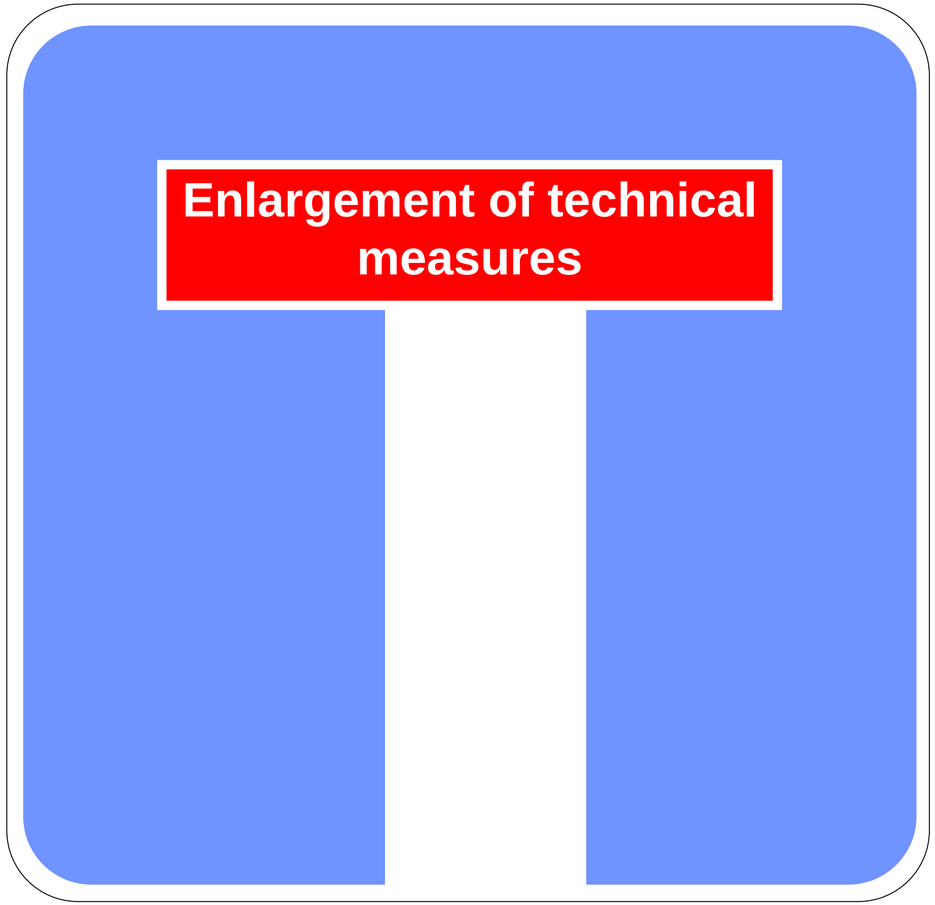


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Flood Retention Measures

Climate change – Concepts for the future answers from water management



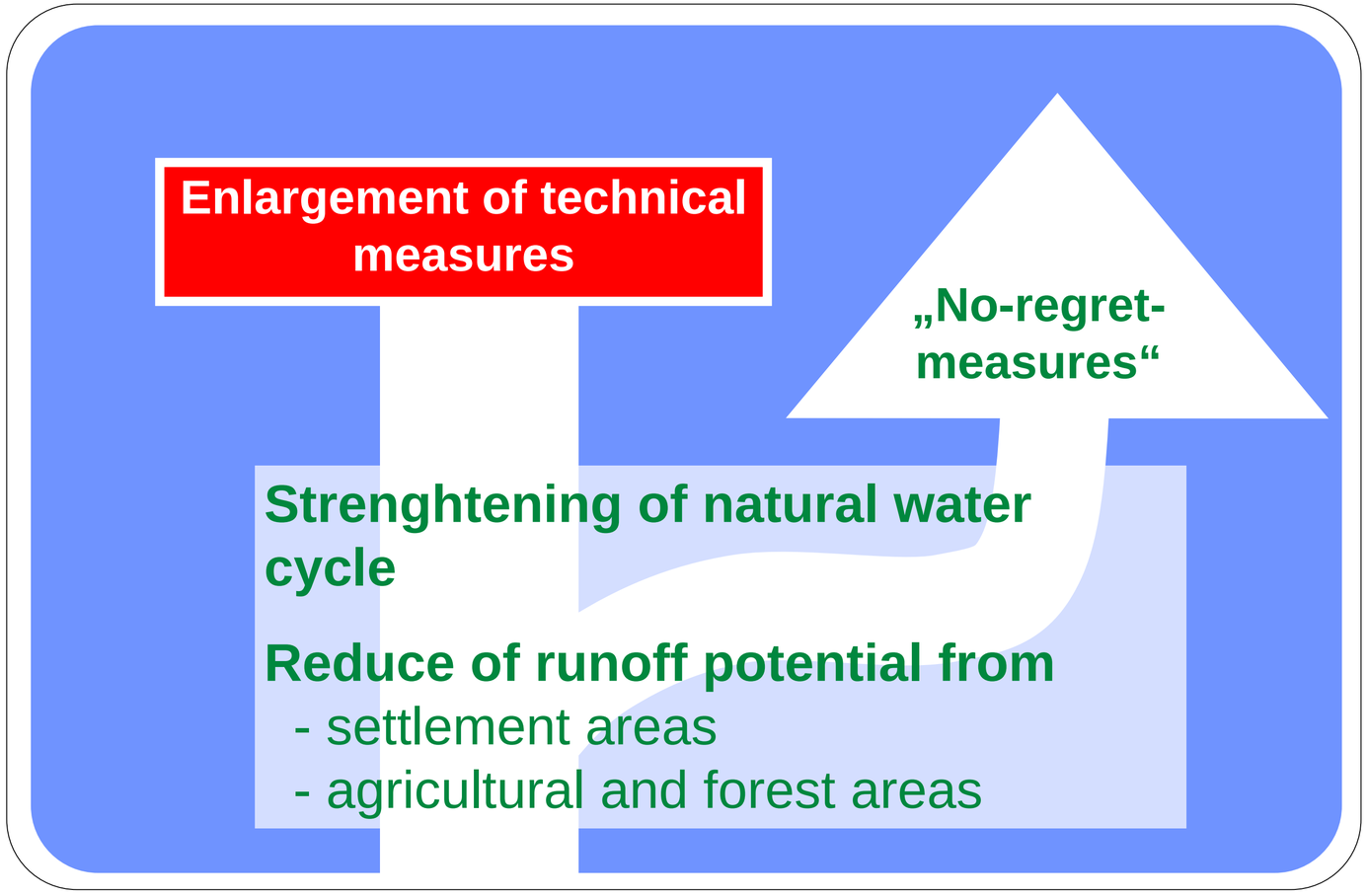


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Flood Retention Measures

Climate change – Concepts for the future answers from water management



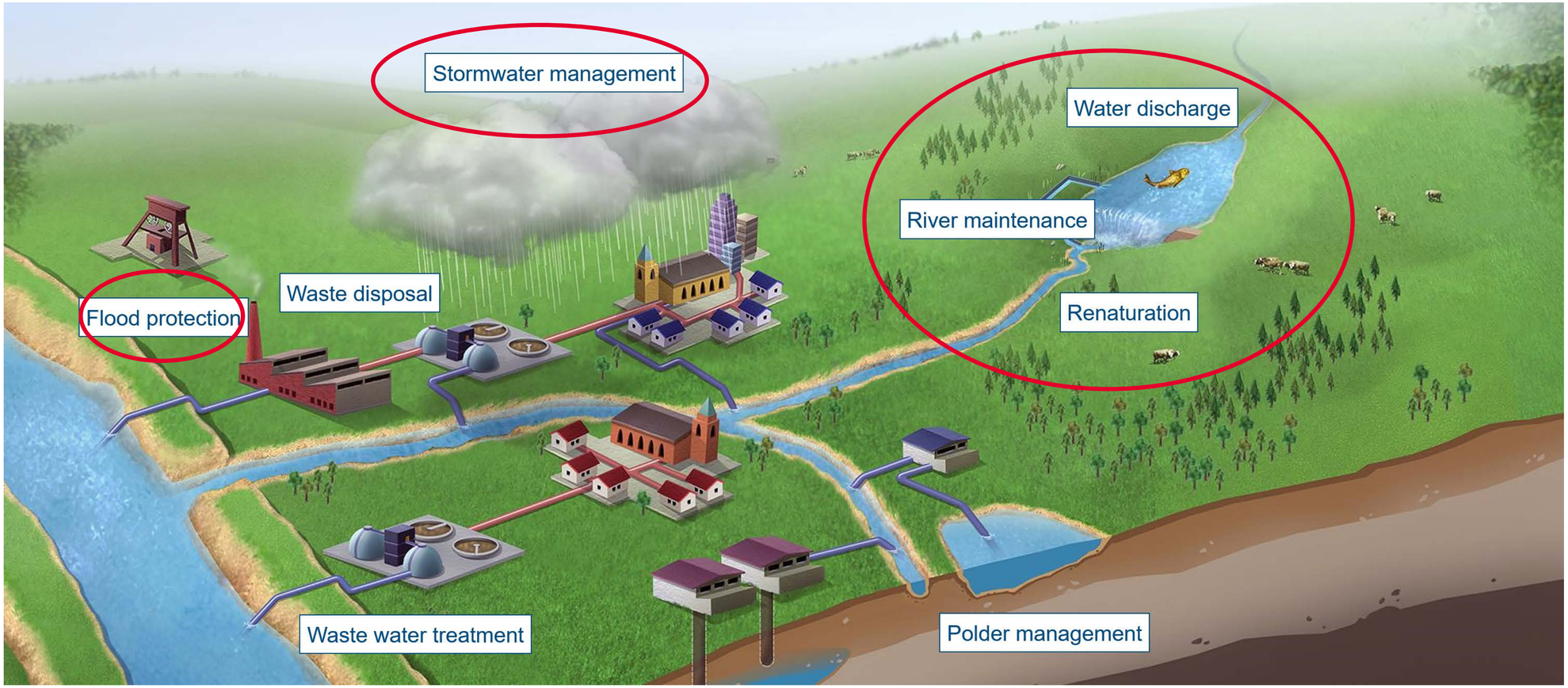


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Nature-based measures

Applications





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Flood Retention Measures

Technical solutions vs. Natural based solutions



Technical solutions

- Massive (conrete) retention bassins
- River Weirs
- Artificial water channels
- Concrete embankments

Nature-based solutions

- Restauration of wetlands
- Dismantling of dykes
- Use of available space like football fields, farmland and woodland
- Use of wood structures
- Decoupling measures

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Nature-based solutions

Two main measure groups



Ecological watercourse re-design

- Widening of rivers, meadow expansion
- Slow down the flow velocity
- Dismantling of dykes (if possible)
- Lengthen the river bed

Decentral rain water management

- Decoupling measures
- Use of additional flood retention space in urban areas

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2. Lake Phoenix, Dortmund

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Lake Phoenix

Retention and Leasure



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Lake Phoenix

The former Steelwork, Krupp





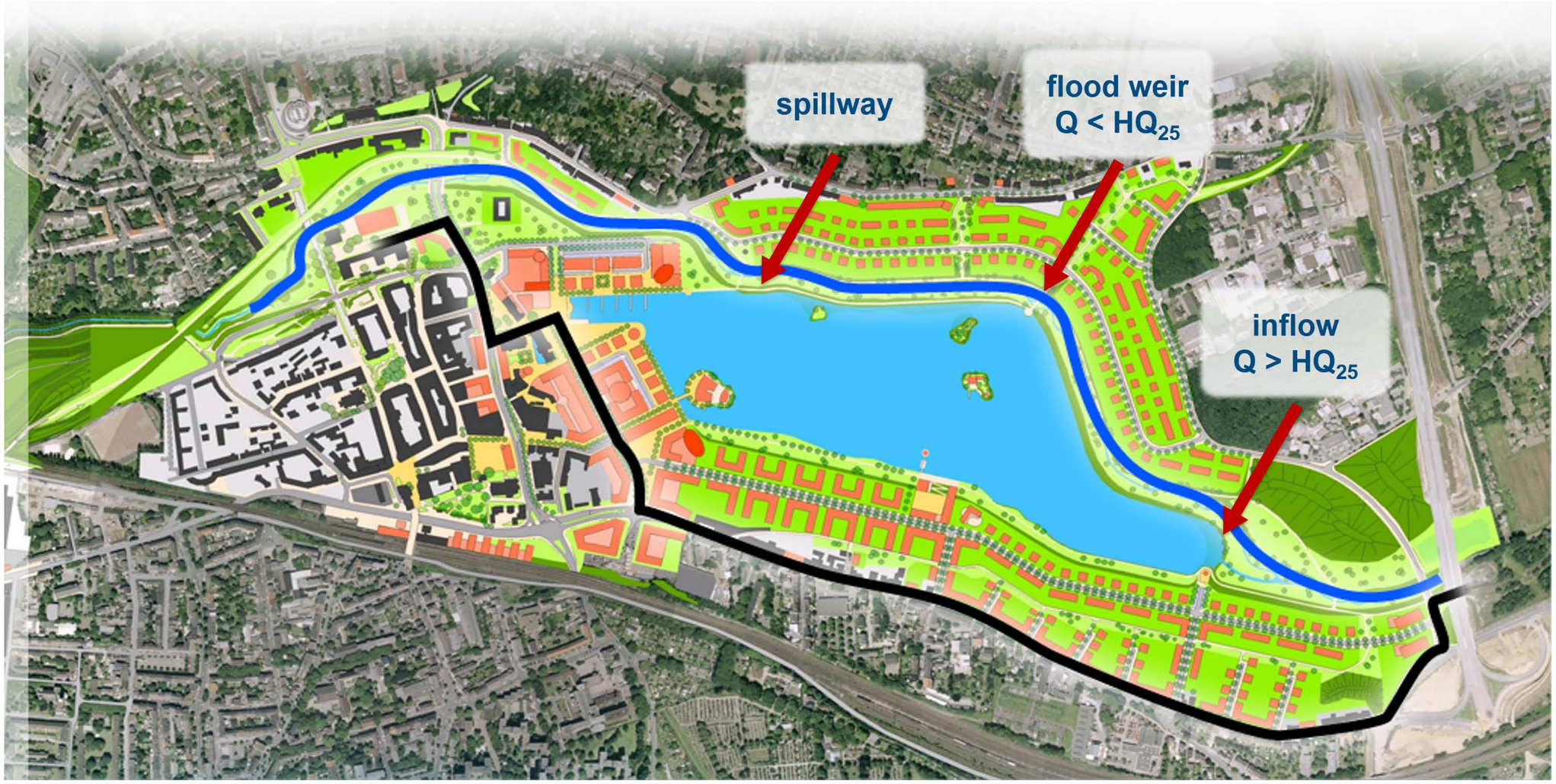
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Lake Phoenix

The new layout

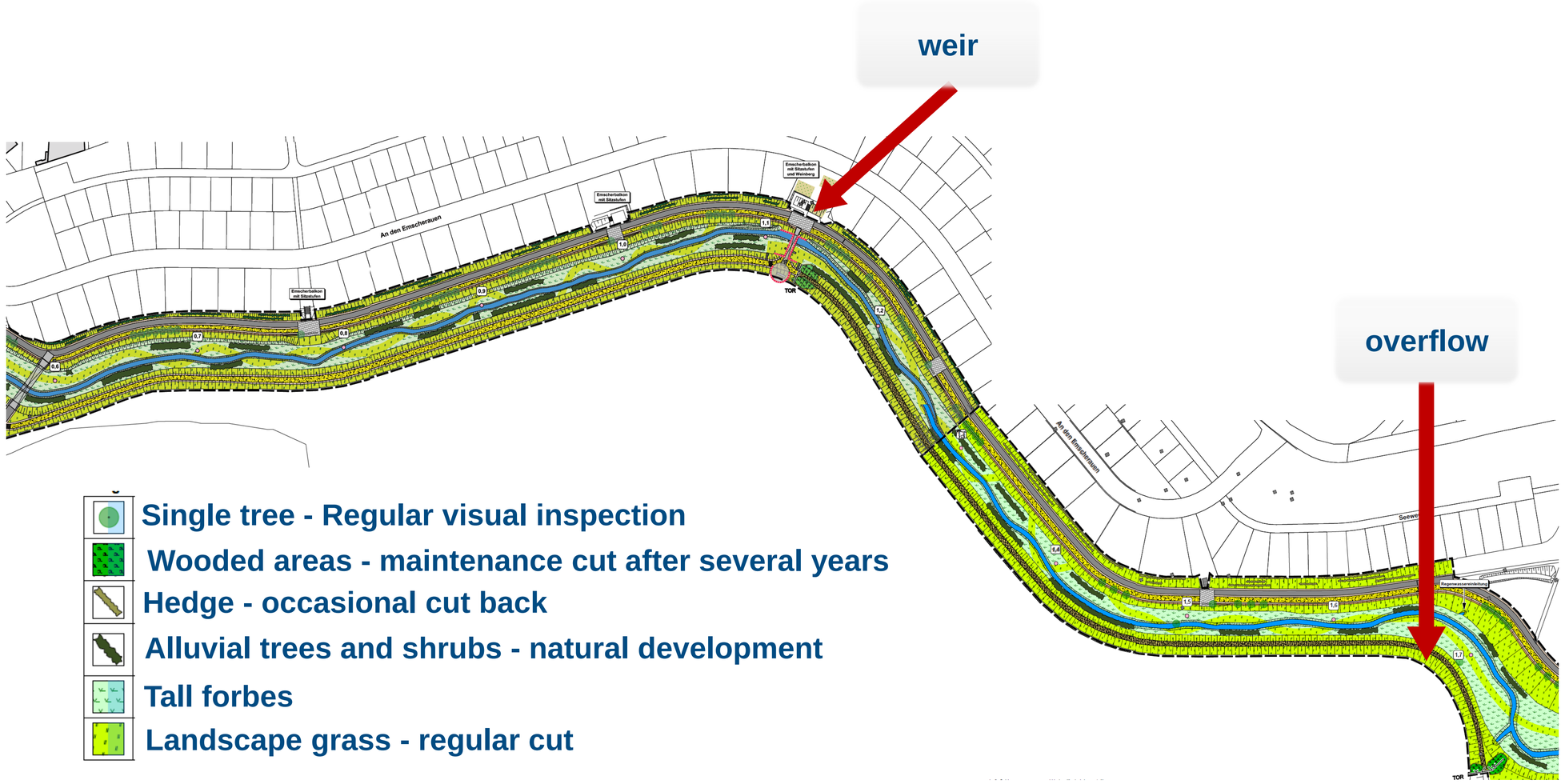




Lake Phoenix

But: Maintenance & development Plan
based on hydraulic modelling necessary

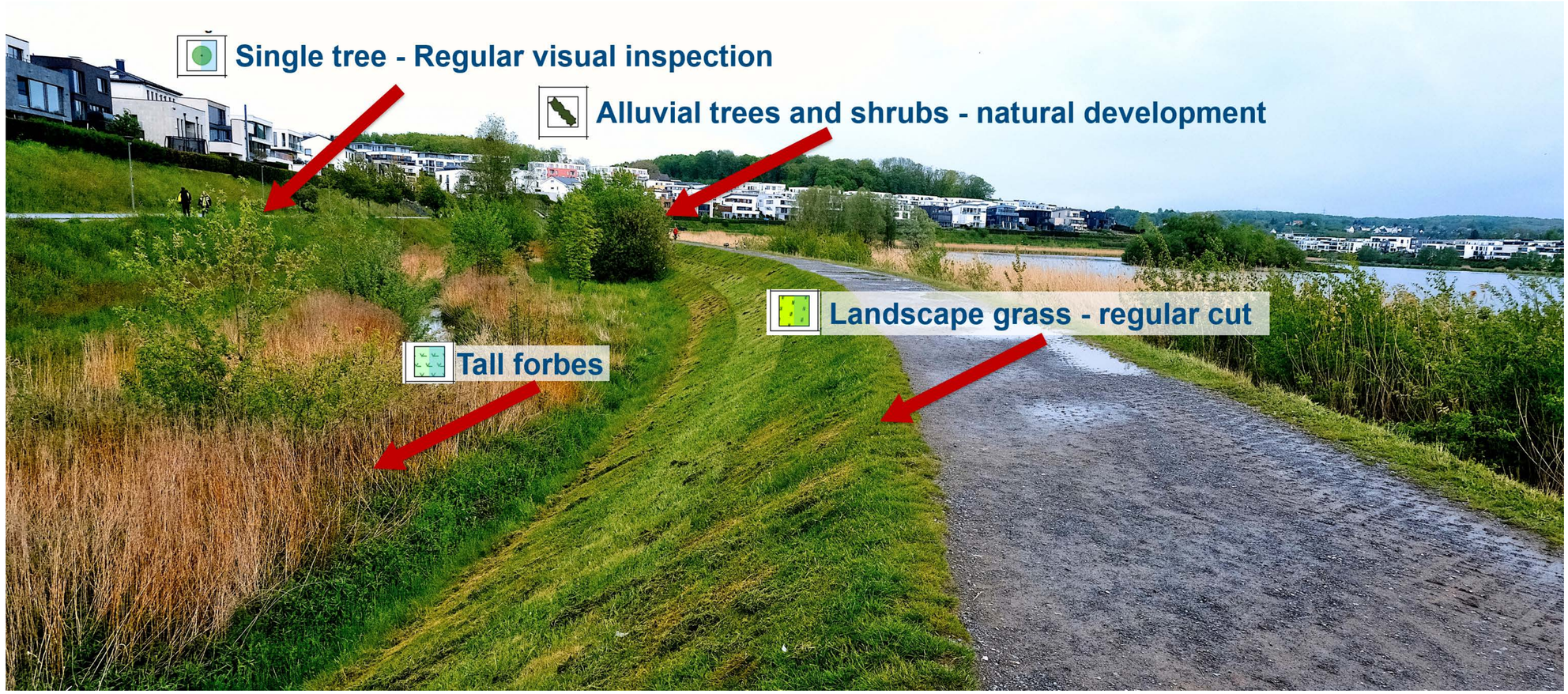




Lake Phoenix

Vegetation to slow down flow velocity (retention)





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Lake Phoenix

Phoenix site



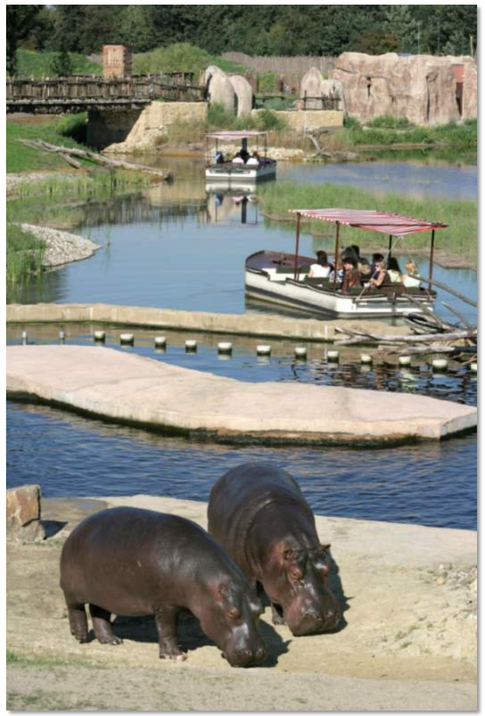




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Zoological garden „Zoom“ Gelsenkirchen

Multifunctional use of areas



- multi functional use of areas:
  Emschergenossenschaft & Zoo Gelsenkirchen
- Volume: 165.000 m³



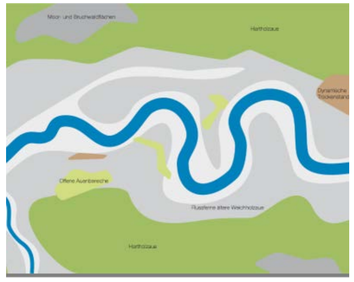


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3. Ecological Water Re-design meausres

Natural water retention meausres

Ecological watercours redesign, Emscher



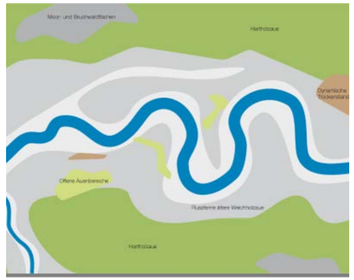


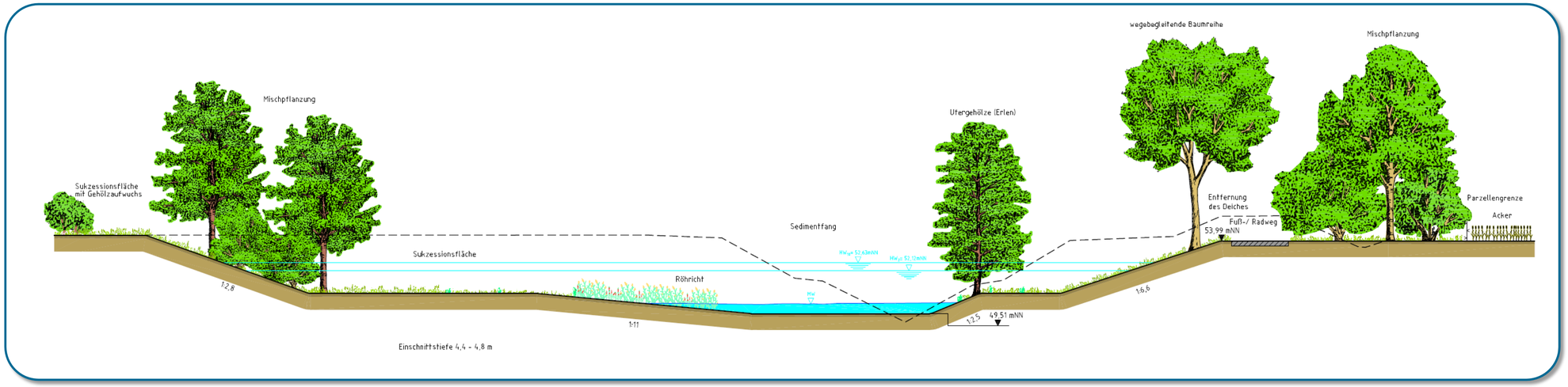




Natural water retention meausres

River meadow expansions

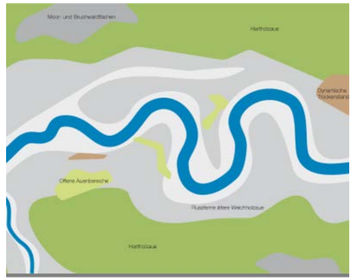




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Natural water retention meausres

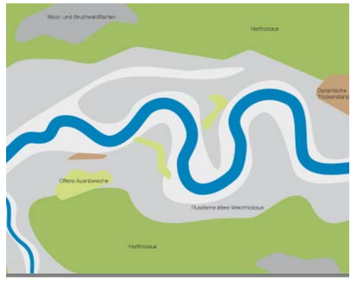
Ecological watercours redesign, Emscher 1952





Natural water retention meausres

Ecological watercours redesign, Emscher 2016

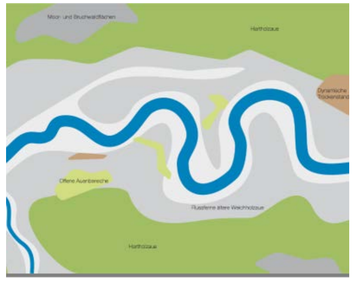




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Watercourse Conversion

From the industrial conurbation to the green heart of the region



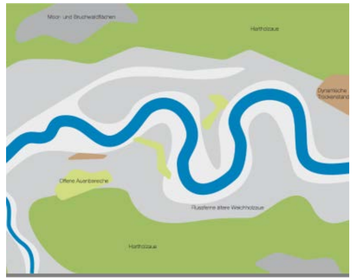


Emschergenossenschaft
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Dyke Dismantling

Boye River, new space for retention

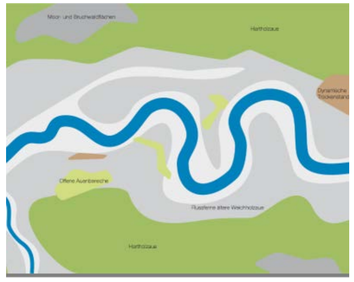


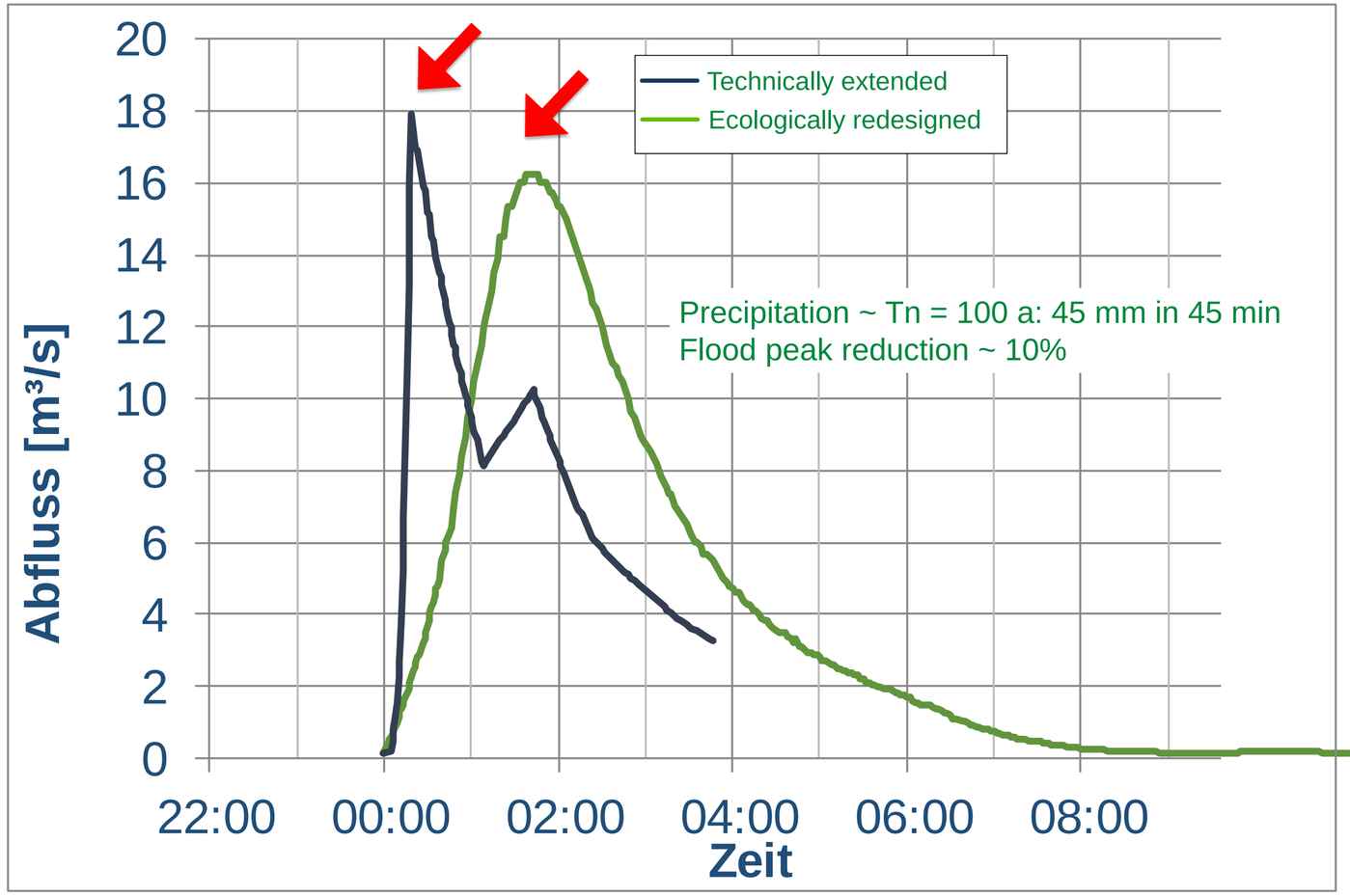




Ecological Watercourse re-design

Effect on flood behavior - Massener Bach



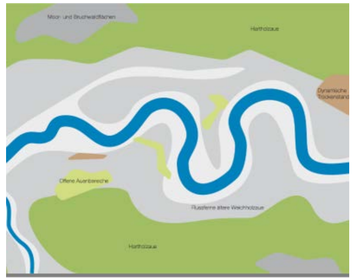






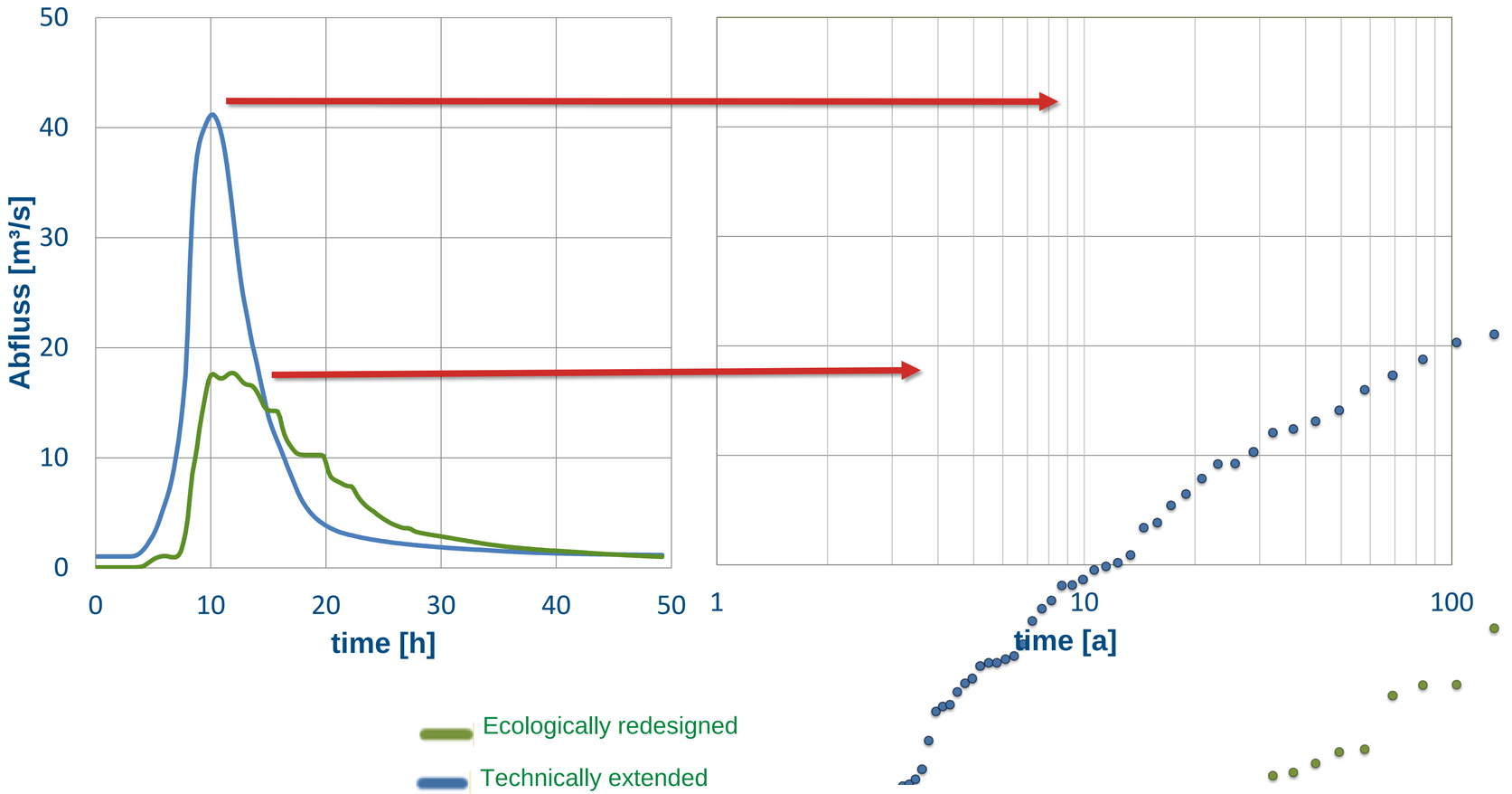
Ecological Watercourse re-design

Effect on flood behavior - Boye



Example
flood wave

highest flood of year
1950 - 2014



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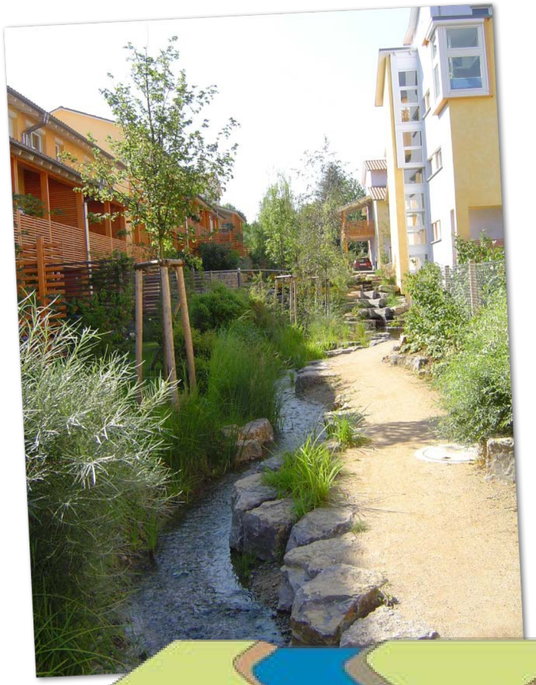
4. Decentral Rainwater Management

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Decentral Rainwater Management

A Component of Flood Provisioning





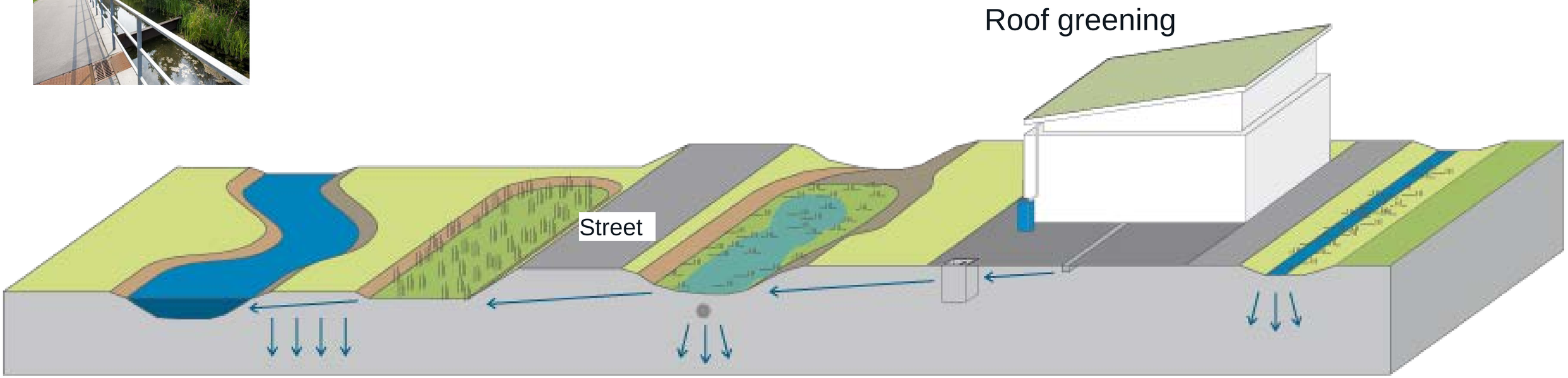
Objective:
Decoupling of 15% of runoff-influencing surfaces in 15 years

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Decentral Rainwater Management

A Component of Flood Provisioning





Drainage for seepage

Cleaning bed

Retention basin system with infiltration ditch for possible seepage

Open channel with light contaminant separator and shut-off valve

Yard surface with permeable surface Infiltration basin

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Decentral Rainwater Management

Cascade system







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Decentral Rainwater Management

Cascade system







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Decentral Rainwater Management

Water ditch with infiltration



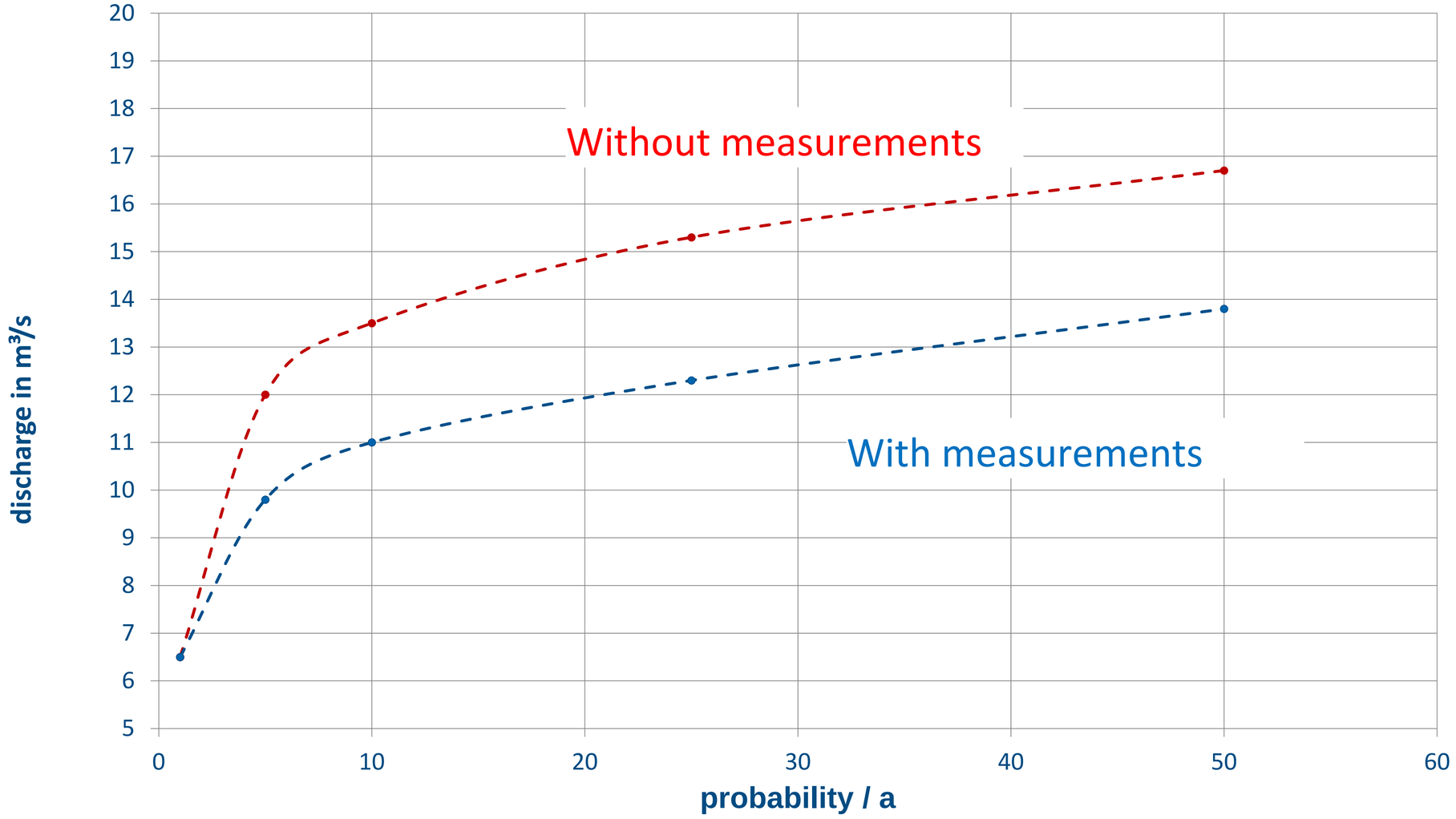


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Decentral Rainwater Management

Effect of management measures - comparison





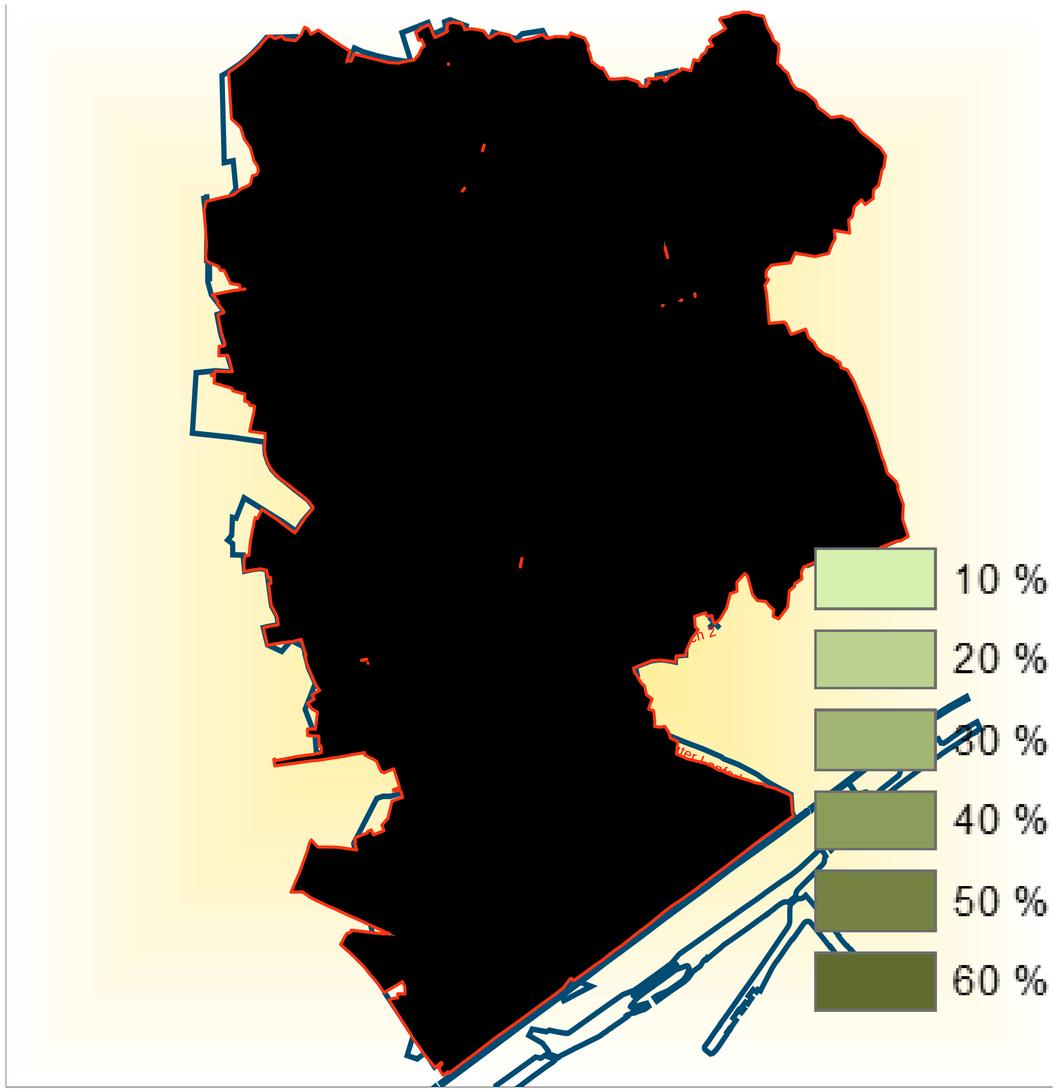
Emschergenossenschaft
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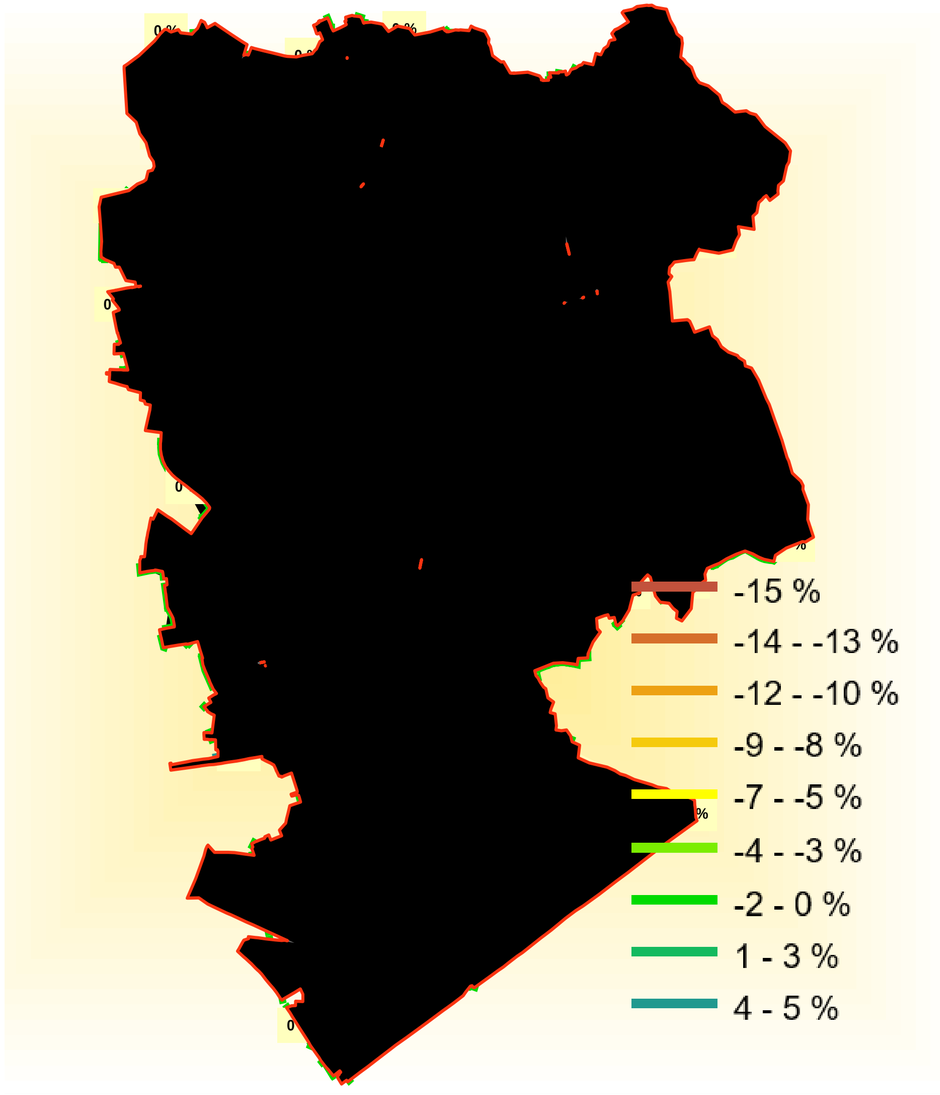
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Decentral Rainwater Management

Effect of management measures catchment Lanferbach







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Nature based measures work and we can see significant effects on flood protection



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Thank You

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