41ST IAHR WORLD CONGRESS SINGAPORE
22 – 27 JUNE 2025
INNOVATIVE WATER ENGINEERING FOR SUSTAINABLE DEVELOPMENT

A Collaborative Study of Nature-Based Solutions in intensively Farmed Catchments

Shifteh Mobini[1,2],

Amir Rezvani[3], Elisie Kåresdotter[3], Zahra Kalantari[3]

[1] Division of Water Resources Engineering, Lund University, Sweden

[2] Trelleborg Municipality, Sweden

[3] Department of Sustainable Development, Environmental Science and Engineering (SEED), KTH Royal Institute of Technology, Sweden

How it started

- Municipality partnered with university on NbS modeling in one catchment
- Realized NbS documentation across the municipality were scattered
- Responsibility for Nbs is fragmented:
  - Water Council (15 catchments, 3 municipalities)
  - Private landowners (main landholders)
  - Municipality (minor landowner)

- Institutional memory is fading as key staff approach retirement
- This was a unique opportunity to act © to preserve knowledge, learn from experience, and build a broader strategy

Study Aims

- To map and analyze existing NbS across the municipality
- To understand what works, for whom, and under what conditions
- To capture local expertise before it disappears © and turn it into a shared knowledge base
- To test a municipality-driven approach that brings together university researchers, the Water Council, landowner organizations, and municipal actors
- To build a foundation for future planning, scaling, and landowner engagement

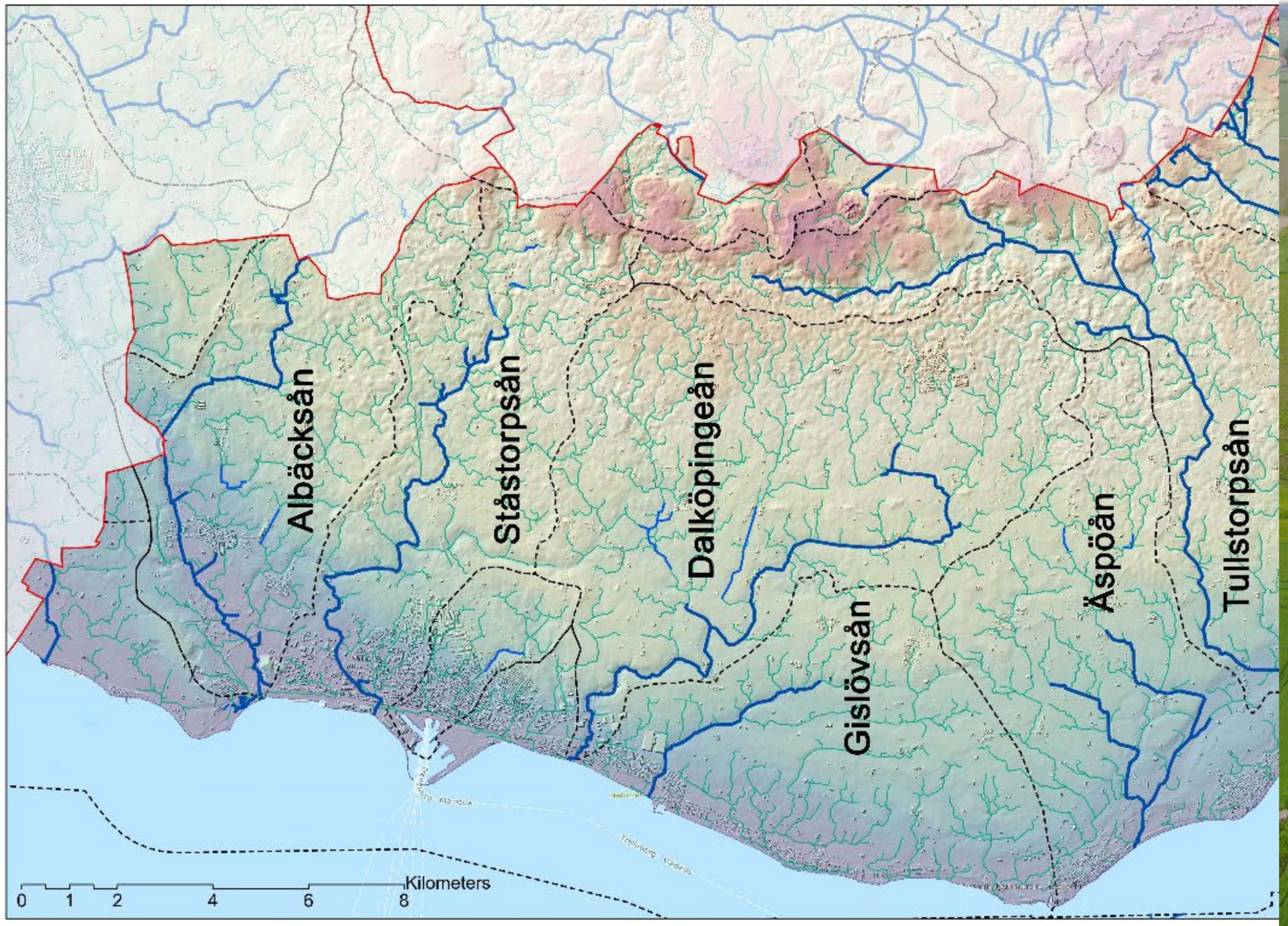
Study area: Trelleborg

Area Approx. 344 km²

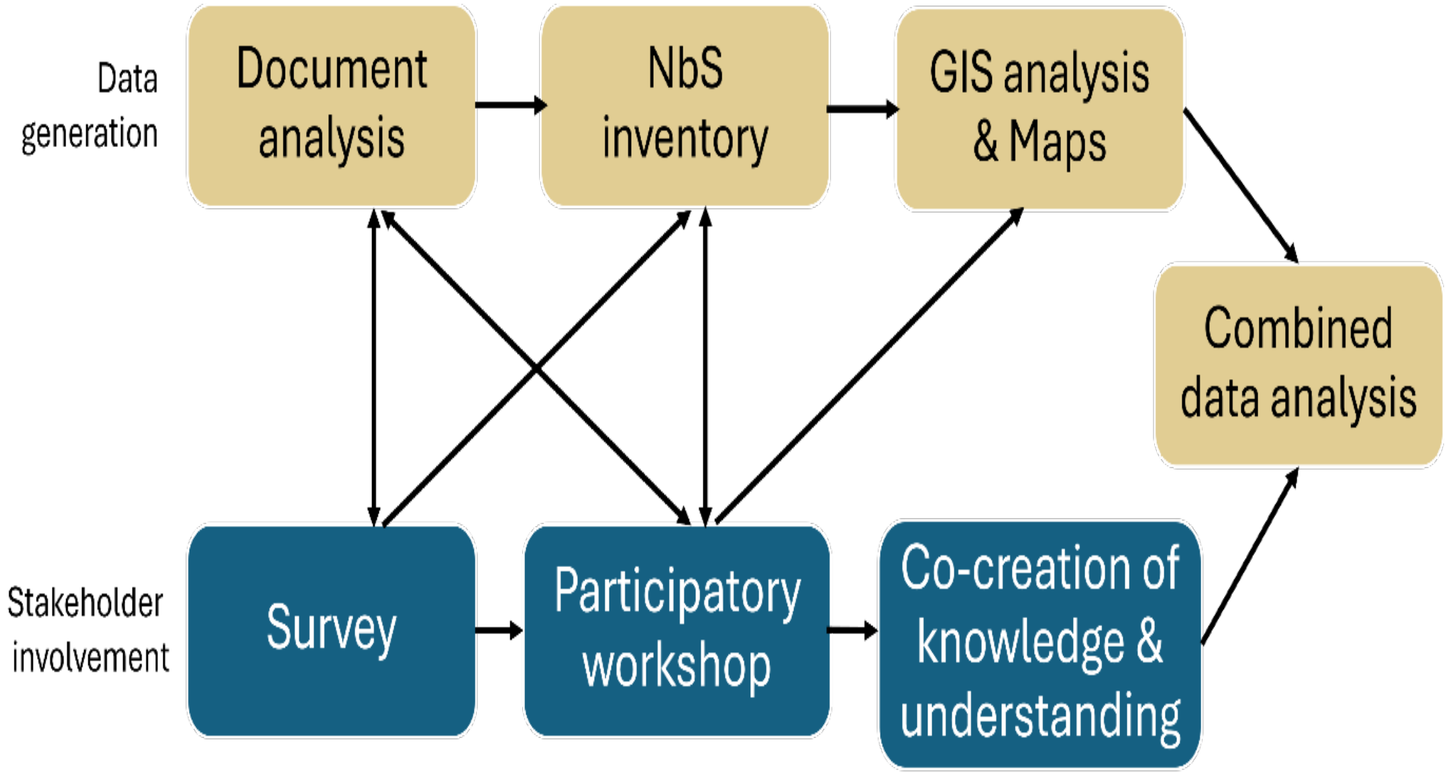
Population (2023) Approx. 46,936

Population Density ~126 inhabitants per km²

Small Streams in an Intensively Farmed Landscape



Mix Metod Approach



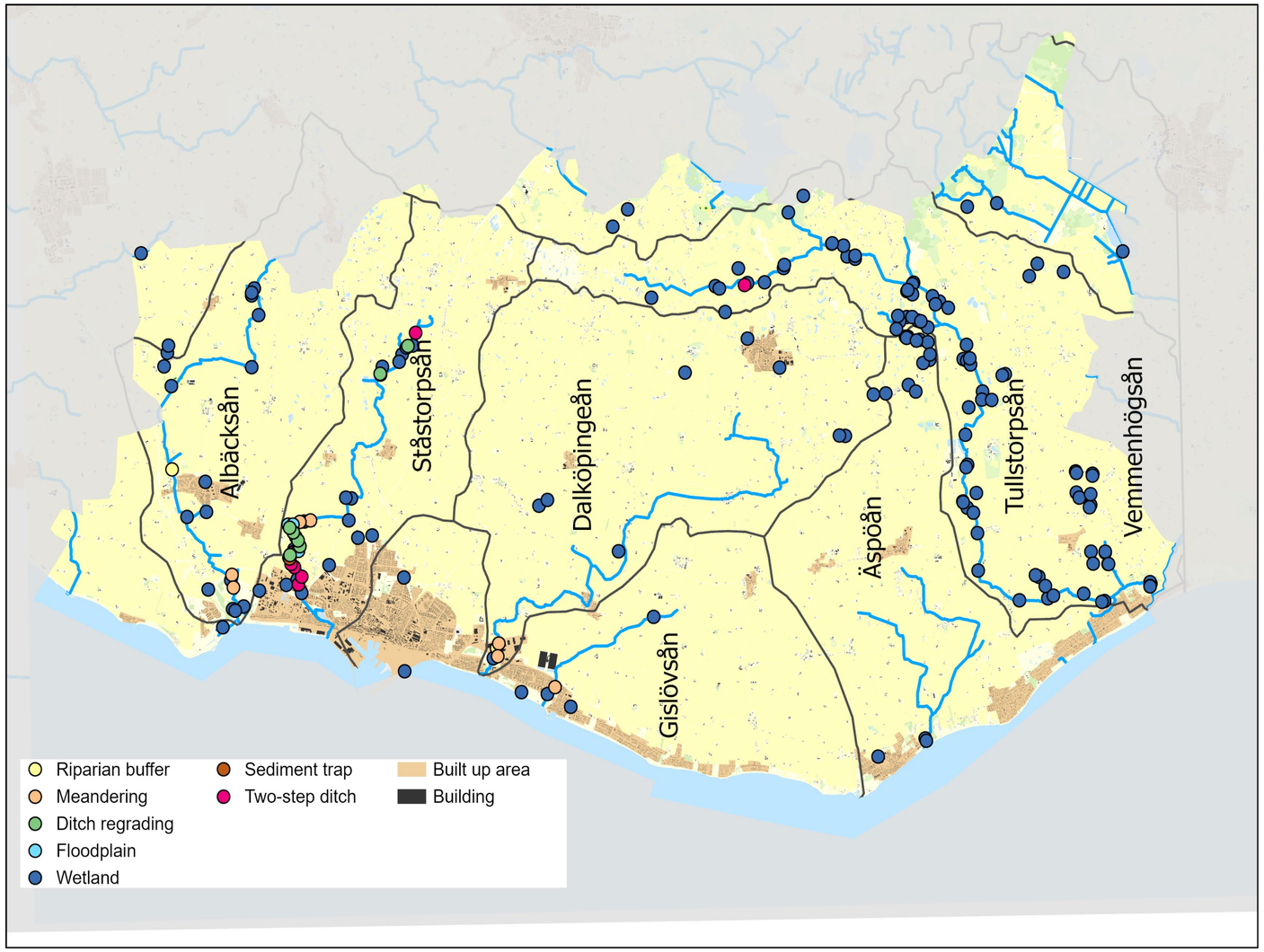
Document Review and Expert Survey

- Reviewed local reports, project documentation, and an online database of implemented measures
- Conducted a targeted survey involving:
  - Municipal staff
  - The Water Council
  - Catchment-based landowner associations (Tullstorpsån and Ståstorpsån)
- Focus areas:
  - Types of nature-based solutions implemented
  - Purpose and intended outcomes
  - Perceived challenges and benefits

Stakeholder Workshops for Data Validation and Experience Sharing

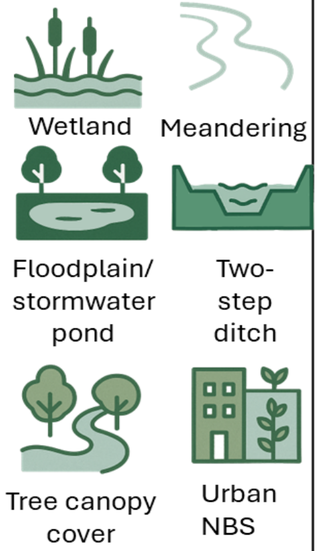
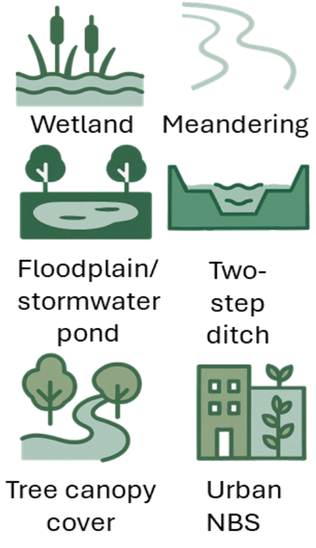
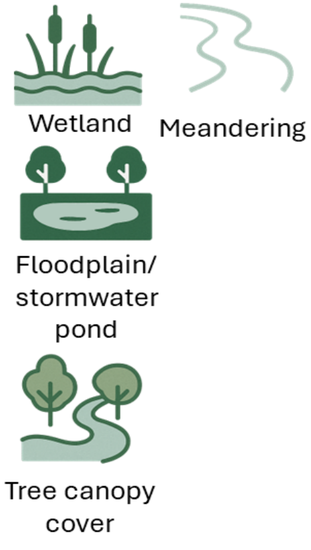
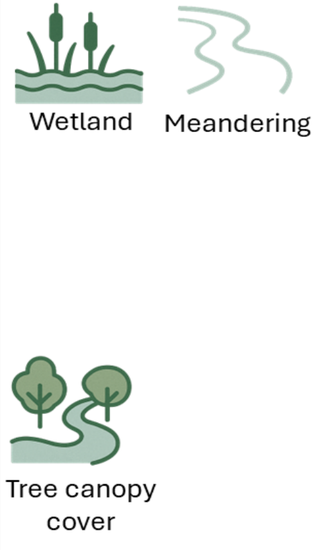
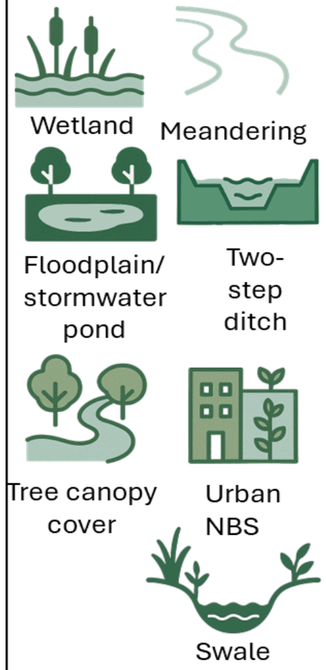
- Two participatory workshops conducted with municipal staff, Water Council, and local associations
- Workshop 1:
  - Field visits to selected sites
  - Discussed practical experiences and outcomes of NbS measures
- Workshop 2:
  - Validated preliminary inventory results
  - Identified missing measures, challenges, and future needs

Nature-Based Solutions Inventory



- A total of **127 measures**, dating back to **1988**, were documented
- **86%** of these measures are wetlands
- Other common solutions include **meandering streams** and **two-step ditches**
- The **Tullstorpsån catchment accounts for 46% of all documented measures**, highlighting strong local engagement and activity

Implemented NBS per catchment reported by stakeholders

Albäcksån 37,49 km2	Ståstorpsån 41,03 km2	Dalköpingeån 65,49 km2	Gislövsån 14,08 km2	Äspöån 17,81 km2	Tullstorpsån 62,05km2
					
Restoration of natural dune environments	Cover crops (drought) Erosion control using vegetation	Cover crops (drought)		Cover crops (drought) Erosion control using vegetation	Cover crops (drought) Erosion control using vegetation

Perceived Effectiveness of Nature-Based Solutions (NbS)

✅ Positive Outcomes Identified:

- Increased recreational value
- Improved biodiversity in and around small streams
- Enhanced phosphorus retention, especially in constructed wetlands
- Lower maintenance needs with tree-based buffer zones

⚠️ Limited or No Observed Effect:

- No significant reduction in nitrogen levels reported

Key Challenges in implementing NbS

- Limited Incentives for Landowners
  - ➢ Applications are complex and time-consuming
  - ➢ Benefits are long-term and collective
- Lack of Local Capacity
  - ➢ One coordinator covers 15 catchments
- Engagement Remains Difficult
  - ➢ Trust-building and presence take time
- Funding Shaped the Outcome
  - ➢ 86% of measures are wetlands
  - ➢ Reflects 20 years of targeted state funding

Main Achievements of the Study

1. **Preserved Local Knowledge**
   Field staff and stakeholders helped uncover and document important, previously unrecorded NbS
2. **Closed a Critical Knowledge Gap**
   The comprehensive inventory provides a valuable foundation for future planning, monitoring, and evaluation of nature-based solutions.
3. **Strengthened Collaborative Capacity**
   The project united Trelleborg Municipality, Lund University, the LandEX project at KTH, the Water Council, and catchment-based landowner associations — building a robust network for ongoing cooperation.
4. **Facilitated future Implementation**
   By making past efforts more accessible and engaging more landowners, the study supports continued NbS adoption and wider knowledge sharing across the region.

Thank you for your attention!

Shifteh Mobini
Water strategist è Trelleborg Municipality
Shifteh.mobini@trelleborg.se

This study and visit have been made possible through the support of:

- Trelleborg Municipality
- Lund University, SPARC research project
- KTH Royal Institute of Technology, LandEX research project