



WELCOME



Rural Economy & Agricultural Societies
In Halland county



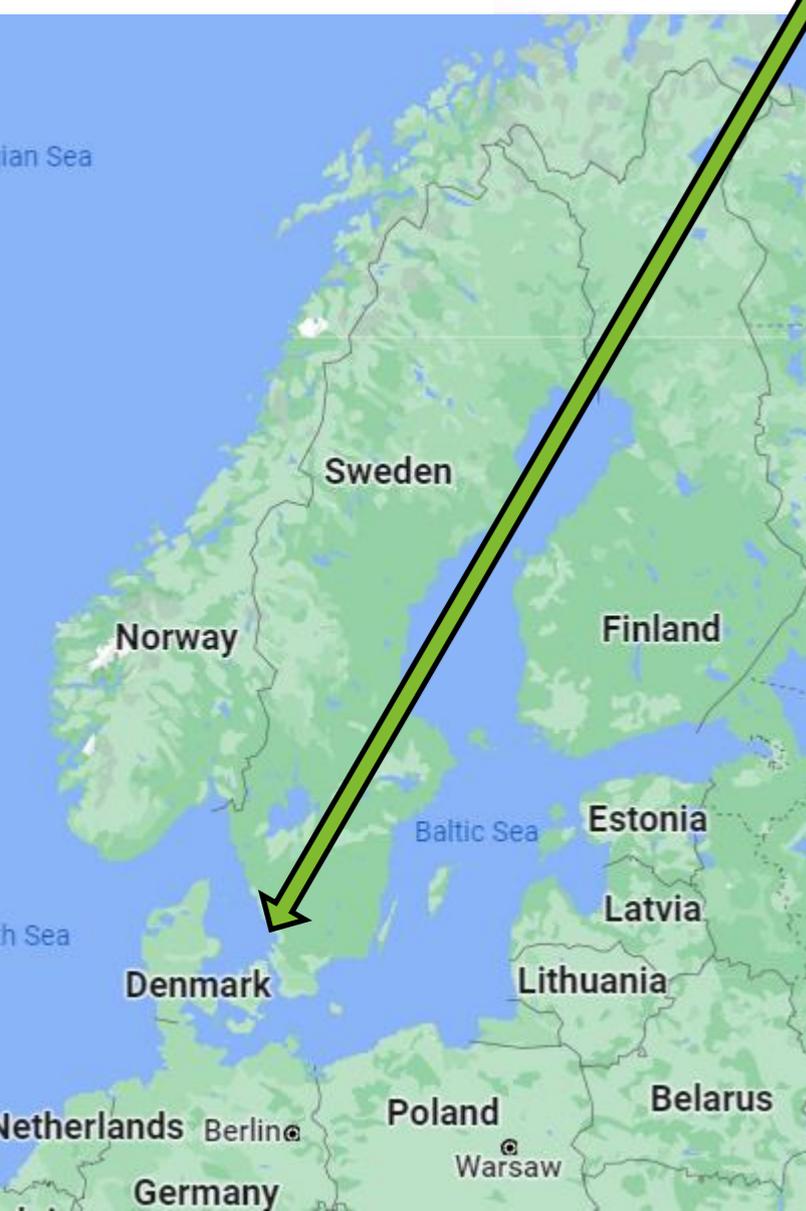
Hushållnings
sällskapet

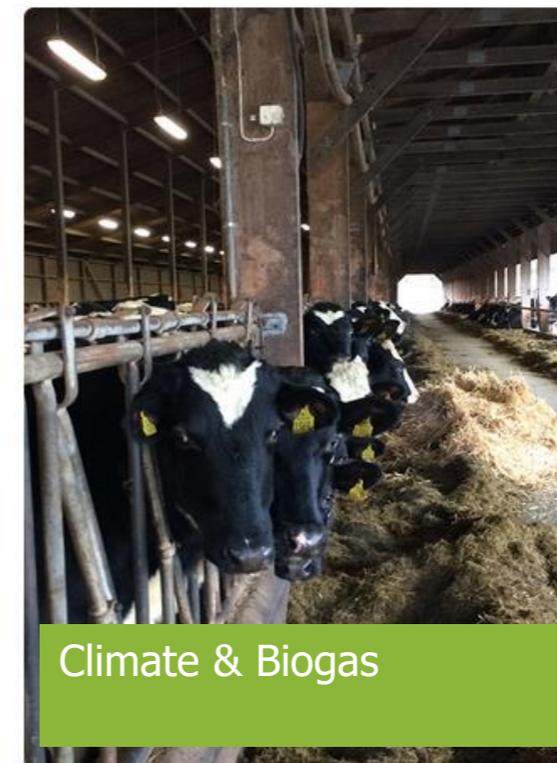
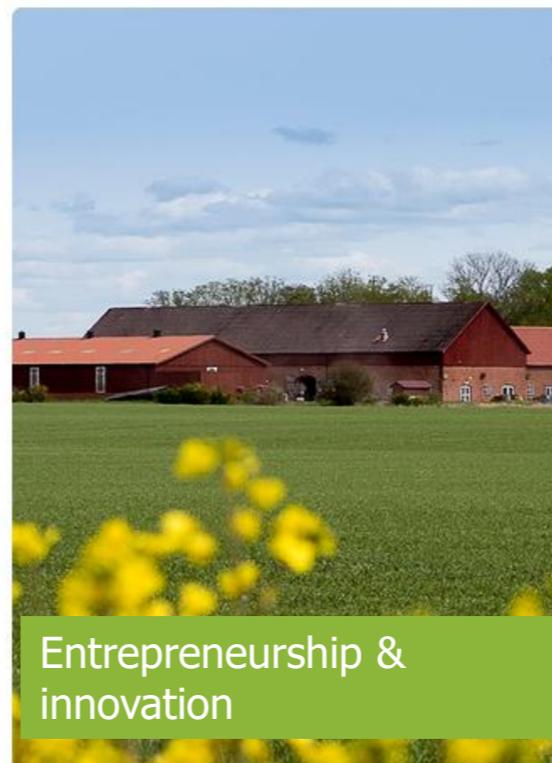


The Rural Economy and
Agricultural Societies –
Halland

NON-PROFIT !

You are at Lilla Böslid





Approx. 30 employees



Hushållningssällskapet Halland

Nature & Water conservation group

Research, development, advice in nature conservation and environmental protection



Lisa Feuerbach-Wengel
(B.Sc Environmental Sci.)



Lea Schneider
(PhD. Aquatic ecology)



John Strand
(PhD. Limnology)



Sofia Hedman
(B.Sc. Biology)



Björn Klatt
(Sci.agr.dr. Agroecology)
(50% Lunds universitet)



Harald Lagerstedt
LEVA-Catchment Officer



Sam Bengtsson Gartner
Field assistant



Kalle Ström Töttrup
(B.Sc. Biology)

www.biowetland.se

www.goodstream.se

EXPERIENCE EXCHANGE VISIT

LIFE GOODWATER IP & LIFE GOODSTREAM



19.09.2022.

9:00 – 9:15	Welcome and introduction	
9:15 – 9:45	What is LIFE GoodWater IP project about?	Jānis Šīre/ Linda Fībiga (Latvian Environment, Geology and Meteorology Centre)
9:45 – 10:15	What is LIFE GoodStream project about?	Sofia Hedman, Lisa Feuerbach-Wengel, Peter Feuerbach, Hushållningssällskapet (Rural Economy and Agricultural Society)
10:15 – 10:45	Activities within LIFE GoodWater IP regarding agriculture – nutrients and hydro-morphological alterations – problems and solutions	Ainis Lagzdīns (Latvian Agriculture University)
10:45 – 11:00	Special interests in agriculture sector and targeted actions	Zanda Melnalksne (Farmers Parliament)
11:00 – 11:30	How LRF (The Federation of Swedish Farmers) work with implementation of environmental measures	Markus Hoffman (LRF - The Federation of Swedish Farmers) https://www.lrf.se/om-lrf/in-english/
11:30-12:00	Poster/film session	Time to see posters and films from our work in different projects. Also, time for discussions
12:00 – 13:00	Lunch break (LIFE-Goodstream cover the costs)	At Ebbas café at Hushållningssällskapet premises
13:00 – 13:30	Research on 2-stage ditches and sloping of water courses (increase cross section area).	Lukas Hallgren, Swedish University of Agricultural Sciences (will present via link).
13:30 – 14:00	Swedish environmental policies, incentives and tools for implementation and examples from the LEVA-concept	Anna Ek (HaV - Swedish Agency for Marine and Water Management) https://www.havochvatten.se/en
14:00-14:30	Local measures to combat eutrophication (LOVA)	Magnus Redegard, County Administration of Halland.
14.30-15.00	Coffee break and discussions	
15:00 – 16:00	Short field visit	If we have time we could visit a nearby constructed wetland which is built with the purpose of bird habitat and for recreation

20.09.2022.

9:00 – 11:00	Field visit	Visit farmer Peter Strömblad to see and hear about construction of different wetlands for irrigation, nutrient retention and biodiversity.
11.00 – 12.00	Field visit	Short stop at another CW-site
12:00 – 13:00		Lunch break (self-paid) at “Lundåkra pensionat”
13:00-15:00	Field visits	Visit farmer Jan Hamilton and see different measures done in LIFE-Goodstream (constructed wetlands, integrated buffer zones, biotope enhancements, removal of migration barrier, wild life cameras etc)
15.00 – 16.00	Field visit	Second site on Jan Hamilton land to see new streambed construction (previously piped). If we have time we can also stop at a nearby site where we have constructed a fish passage around a migration barrier in the stream.

21.09.2022.

9:00 – 13:00	Demonstration day of agricultural machinery, irrigation and more. Location: Lilla Böslid (Hushållningssällskapet Offices and farm)	
13:00 – 14:00	Lunch break (self-paid) and goodbye	

Activities at the Demonstration day:

-Väderstad demonstrates machines <https://www.vaderstad.com/lv/>

Other Machine companies that will be there: <https://www.lantmannenlantbrukmaskin.com/>
<https://www.gunnarnilssonmaskin.se/> <https://floxrobotics.com/>

- Irrigation <https://www.ostorpsbevattning.se/>

LIFE-Goodstream

Reaching **Good Ecological Status** in an agricultural stream



LIFE-Goodstream



- 6 years (Oct 2015- Oct 2021), extened to Dec 2022 (2023)
- Budget ca 20 MSEK (2 M. €)
- Financing:
 - 49% EU
 - 45.7 % Swedish Agency for Marine and Water Management
 - 5.3 % own financing by partners
- Coordinating Beneficiary: Hushållningssällskapet Halland
- Associated Beneficiaries: County Administration board
Halmstad municipality

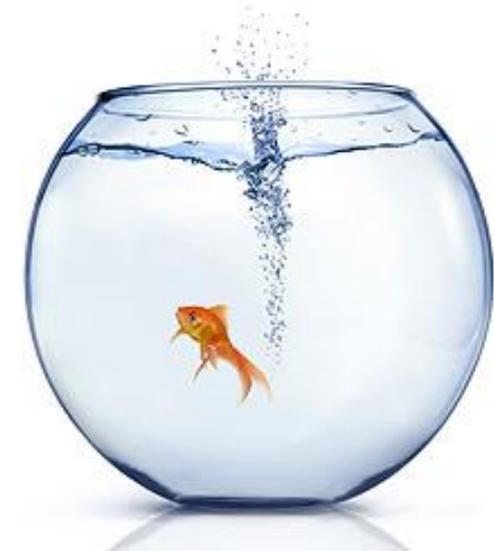




Problems



Eutrophication



Fish migration

Floods

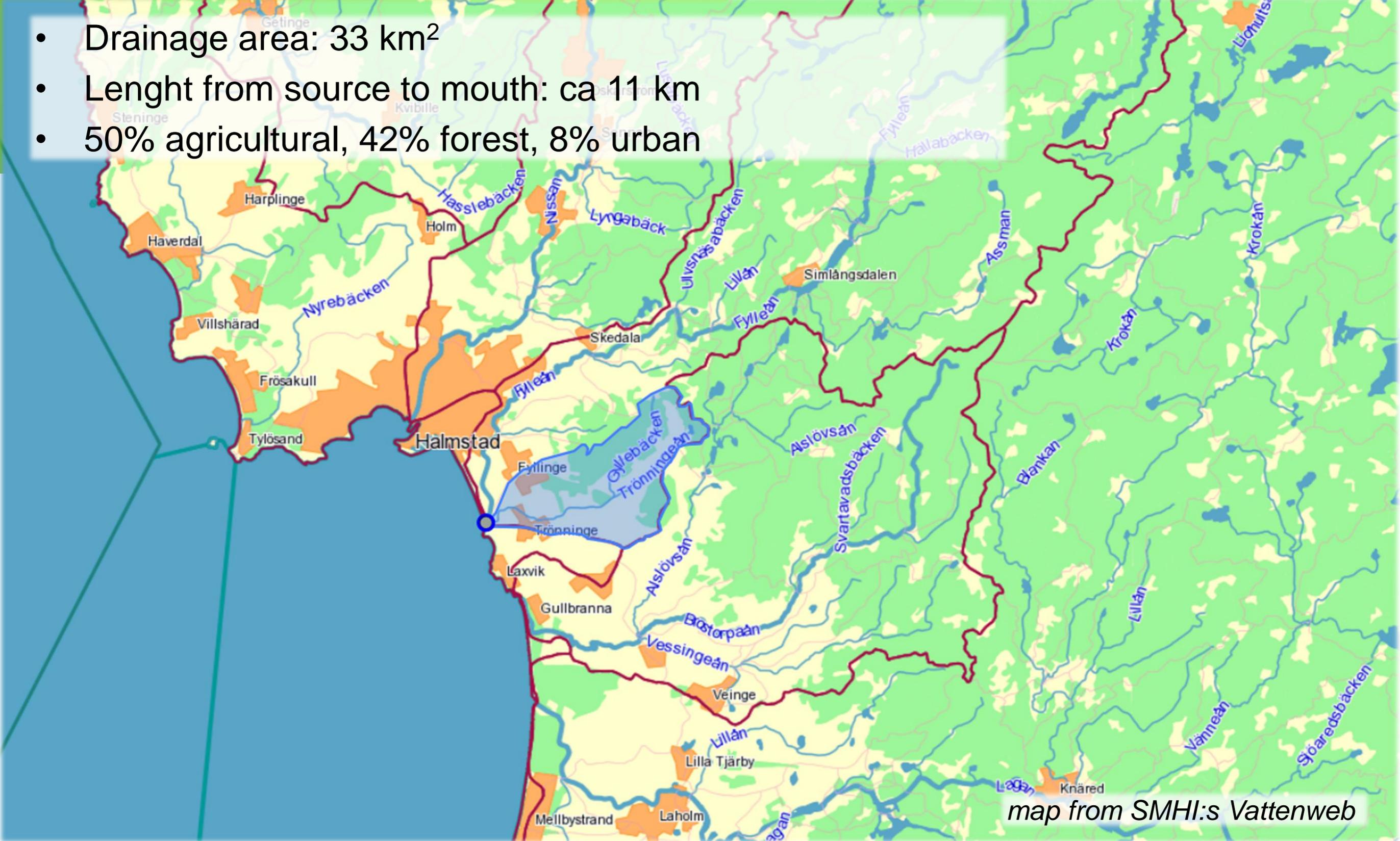


Biodiversity



Richard Tholin tog denna bilden i morse när han skulle svänga ut från Trönninge mot Halmstad. Bild: Richard Tholin

- Drainage area: 33 km²
- Length from source to mouth: ca 11 km
- 50% agricultural, 42% forest, 8% urban



map from SMHI:s Vattenweb



Expected results



- Good Ecological Status in river Trönningeån
 - P-conc. in the stream reduced to $< 40 \mu\text{g/l}$
 - Migration possible in the whole stream
 - 10 % increase in Salmonid density
- Reduced flood risk in the village of Trönninge
- Increased biodiversity in the catchment
- Calculations showing economic cost-effectiveness
- Quantified carbon sequestration in IBZs and LWs



Long-term goal:
the concept is implemented throughout EU



Havs
och Vatten
myndigheten

www.goodstream.se



What we planned

- 30 Integrated Buffer Zones
- 8 Wetlands
- 60 Creotopes
- 500 nest boxes
- 1 Removal of migration barrier
- 1 Urban Storm Water Pond



- 22 Constructed wetlands (CVs) + 13 Integrated buffer zones (IBZs)
- 30 amphibian ponds + 30 other "creotopes" (constructed biotopes)
- 3 new stream parts (previously piped)
- 2 migration barriers removed
- 575 nest boxes (birds, bats, solitary bees)
- 1 Urban Stormwater Pond (1 more planned 2023)
- Widening of 1 km of the stream (see poster # 184)



Constructed wetlands



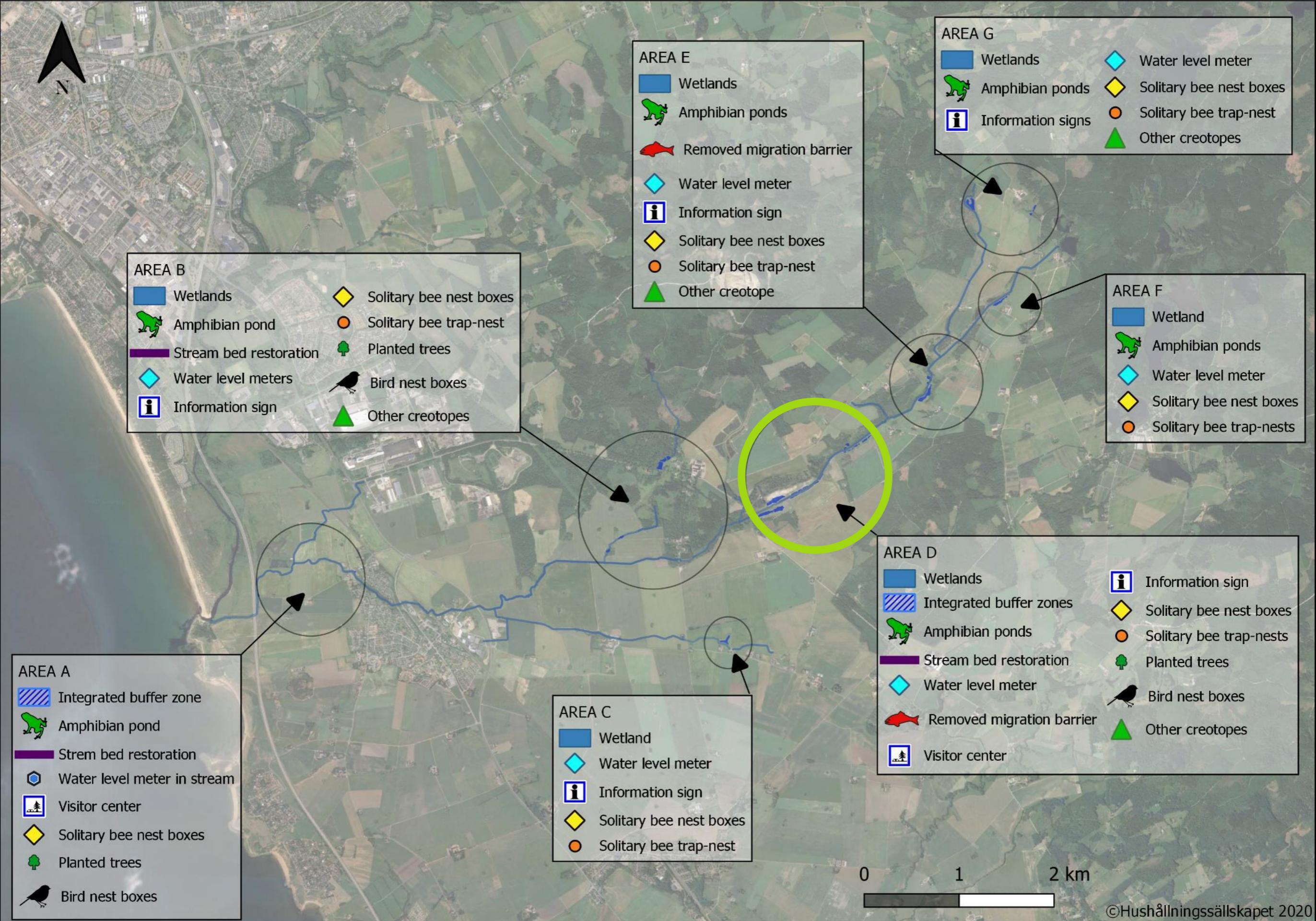
Amphibian ponds



Integrated Buffer Zones

Papers on Integrated Buffer Zones:

- Strand, J.A, et al.. 2018. Multi-functionality and holistic approach when ecologically improving an agricultural stream – A case study introducing Integrated Buffer Zones as a landscaping tool in the project LIFE-Goodstream. In: V.G. Sychev and L. Mueller, F (Eds). 2018. *Novel Methods and Results of Landscape Research in Europe, Central Asia and Siberia*. Vol 5: 141-145. ISBN 978-5-9238-0251-1
- Zak, D, et al. 2018. Nitrogen and phosphorus removal from agricultural runoff in integrated buffer zones. *Environmental science & technology* 52.11: 6508-6517
- Zak, D, et al. 2019. An assessment of the multi-functionality of integrated buffer zones in Northwest Europe. *Journal of Environmental Quality*, 48(2):362-375. doi:10.2134/jeq2018.05.0216



Measures completed up until year 2020

Problem: remove a migration barrier in the form of a wetland and still keep (and increase) nutrient retention and biodiversity

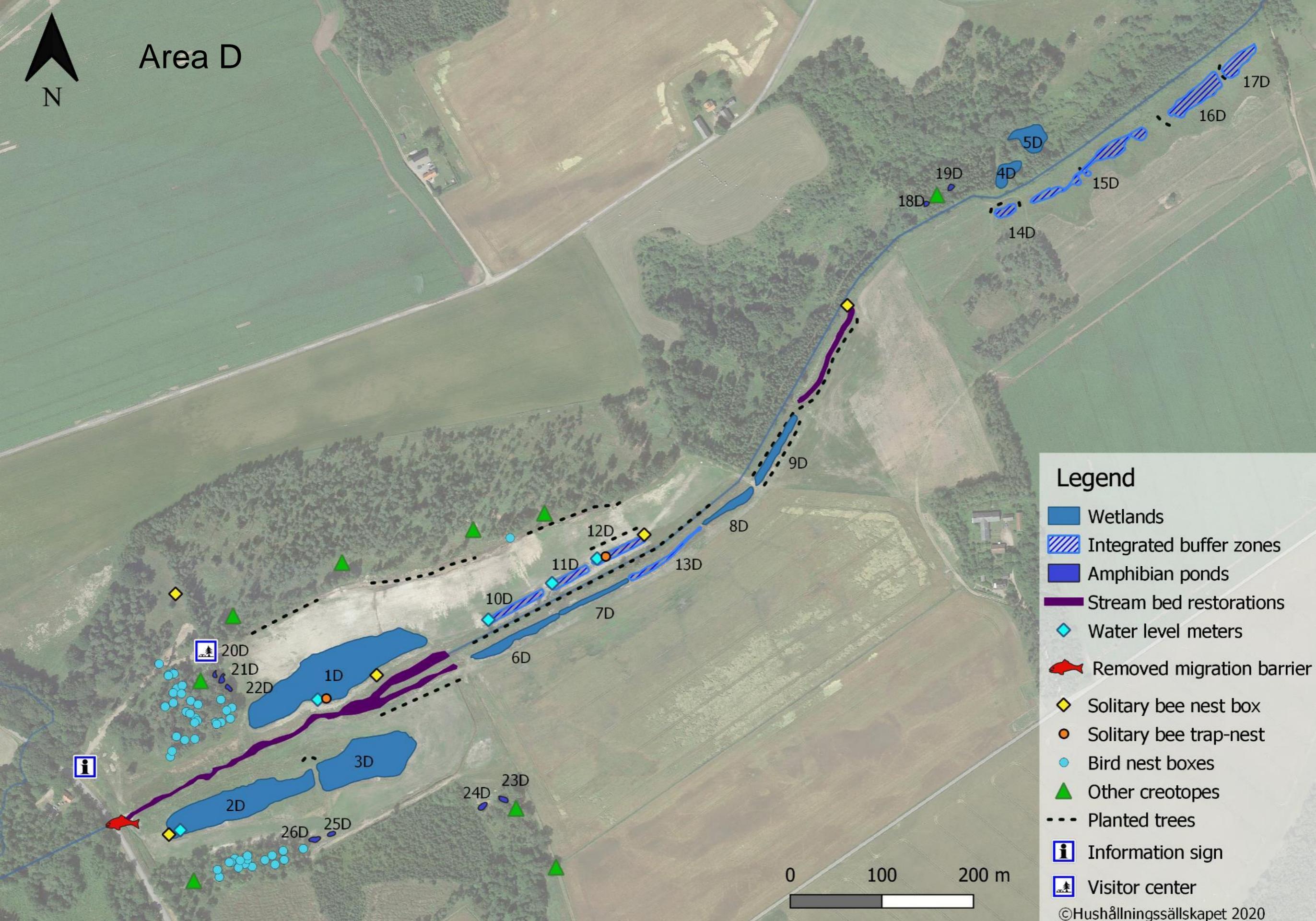
Solution: construct several measures adjacent to the stream instead



Area D



Area D



Legend

- Wetlands
- Integrated buffer zones
- Amphibian ponds
- Stream bed restorations
- Water level meters
- Removed migration barrier
- Solitary bee nest box
- Solitary bee trap-nest
- Bird nest boxes
- Other creotopes
- Planted trees
- Information sign
- Visitor center



AREA B

Wetlands	Solitary bee nest boxes
Amphibian pond	Solitary bee trap-nest
Stream bed restoration	Planted trees
Water level meters	Bird nest boxes
Information sign	Other creotopes

AREA E

Wetlands	Amphibian ponds
Removed migration barrier	Water level meter
Information sign	Solitary bee nest boxes
Solitary bee trap-nest	Other creotope

AREA G

Wetlands	Water level meter
Amphibian ponds	Solitary bee nest boxes
Information signs	Solitary bee trap-nest
	Other creotopes

AREA F

Wetland	Amphibian ponds
Water level meter	Solitary bee nest boxes
Solitary bee trap-nests	

AREA D

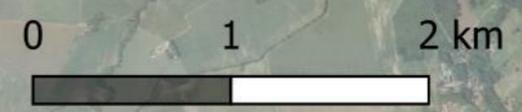
Wetlands	Information sign
Integrated buffer zones	Solitary bee nest boxes
Amphibian ponds	Solitary bee trap-nests
Stream bed restoration	Planted trees
Water level meter	Bird nest boxes
Removed migration barrier	Other creotopes
Visitor center	

AREA C

Wetland	Water level meter
Information sign	Solitary bee nest boxes
Solitary bee trap-nest	

AREA A

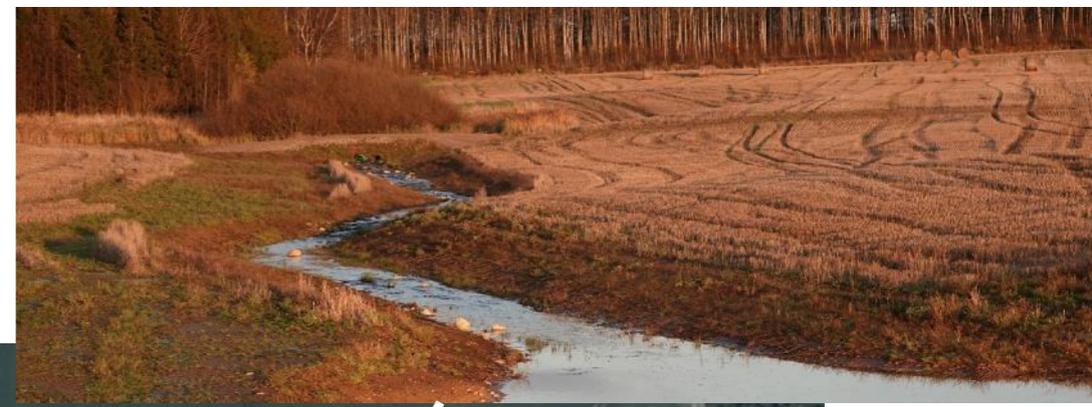
Integrated buffer zone	Amphibian pond
Stream bed restoration	Water level meter in stream
Visitor center	Solitary bee nest boxes
Planted trees	Bird nest boxes



Area B
(we will visit tomorrow)



Area B





AREA B

Wetlands	Solitary bee nest boxes
Amphibian pond	Solitary bee trap-nest
Stream bed restoration	Planted trees
Water level meters	Bird nest boxes
Information sign	Other creotopes

AREA E

Wetlands	Amphibian ponds
Removed migration barrier	Water level meter
Information sign	Solitary bee nest boxes
Solitary bee trap-nest	Other creotope

AREA G

Wetlands	Water level meter
Amphibian ponds	Solitary bee nest boxes
Information signs	Solitary bee trap-nest
	Other creotopes

AREA F

Wetland	Amphibian ponds
Water level meter	Solitary bee nest boxes
Solitary bee trap-nests	

AREA D

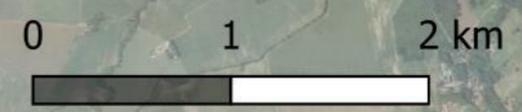
Wetlands	Information sign
Integrated buffer zones	Solitary bee nest boxes
Amphibian ponds	Solitary bee trap-nests
Stream bed restoration	Planted trees
Water level meter	Bird nest boxes
Removed migration barrier	Other creotopes
Visitor center	

AREA C

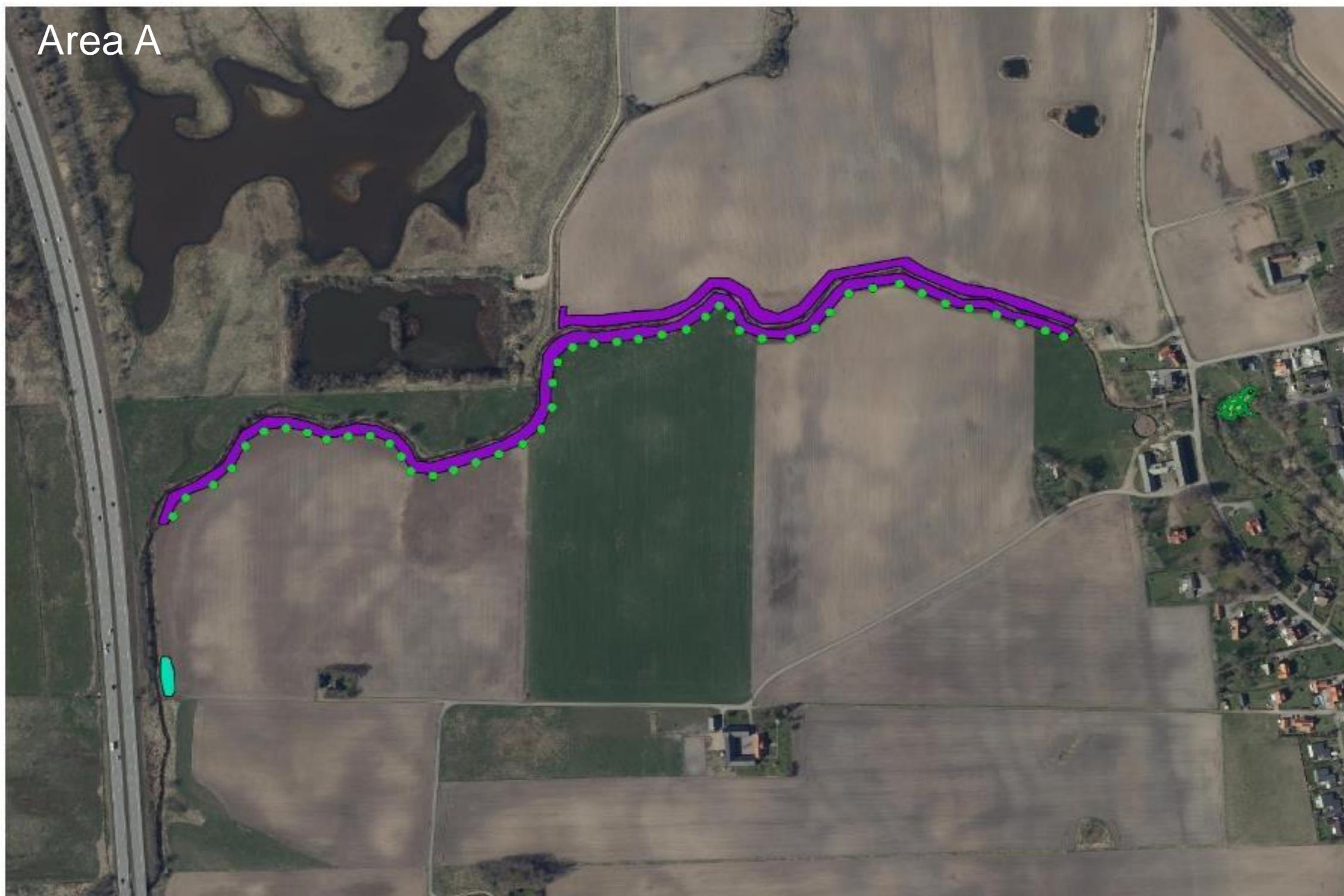
Wetland	Water level meter
Information sign	Solitary bee nest boxes
Solitary bee trap-nest	

AREA A

Integrated buffer zone	Amphibian pond
Stream bed restoration	Water level meter in stream
Visitor center	Solitary bee nest boxes
Planted trees	Bird nest boxes



Widening of the stream bed downstream of Trönninge Village



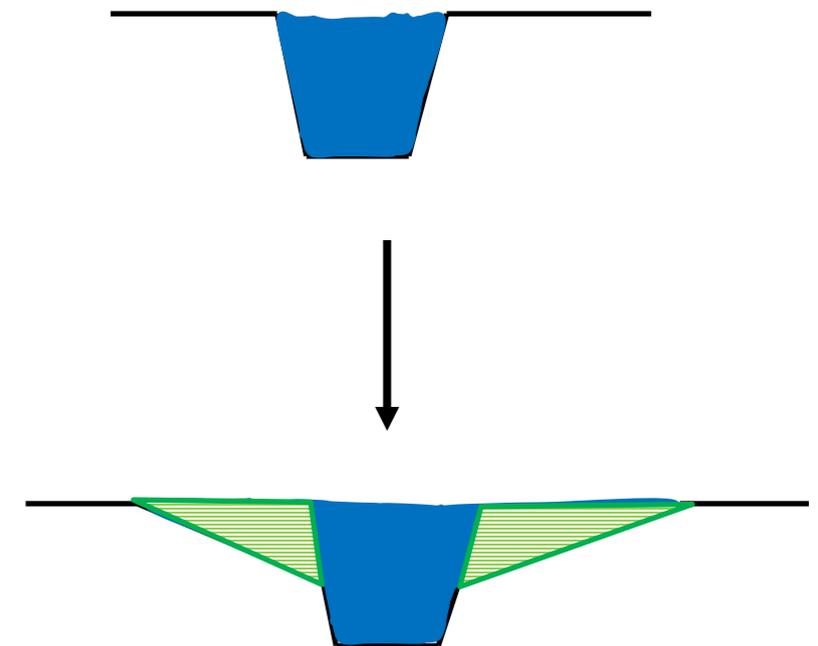
Area B



4 okt 2018.



15 nov 2018.



SMHI: Class 1 warning for high flows 2019

8 FEBRUARI



9 FEBRUARI



10 FEBRUARI



11 FEBRUARI



- Screening, water sampling at 20 sites prior to measures
- Bi-weekly water sampling during 1 year at 6 sites for tot-N + tot-P in 2016/17 + 2021/2022 (ongoing)
- “Campaign sampling” every day for 2 weeks summer + winter in 2018/2019 + 2022/2023
- Surveys of birds, mammals, adult dragonflies, vegetation, aquatic invertebrates, fish, amphibians.
- Sampling for PFAS in water, sediment and biota in a tributary from industrial areas

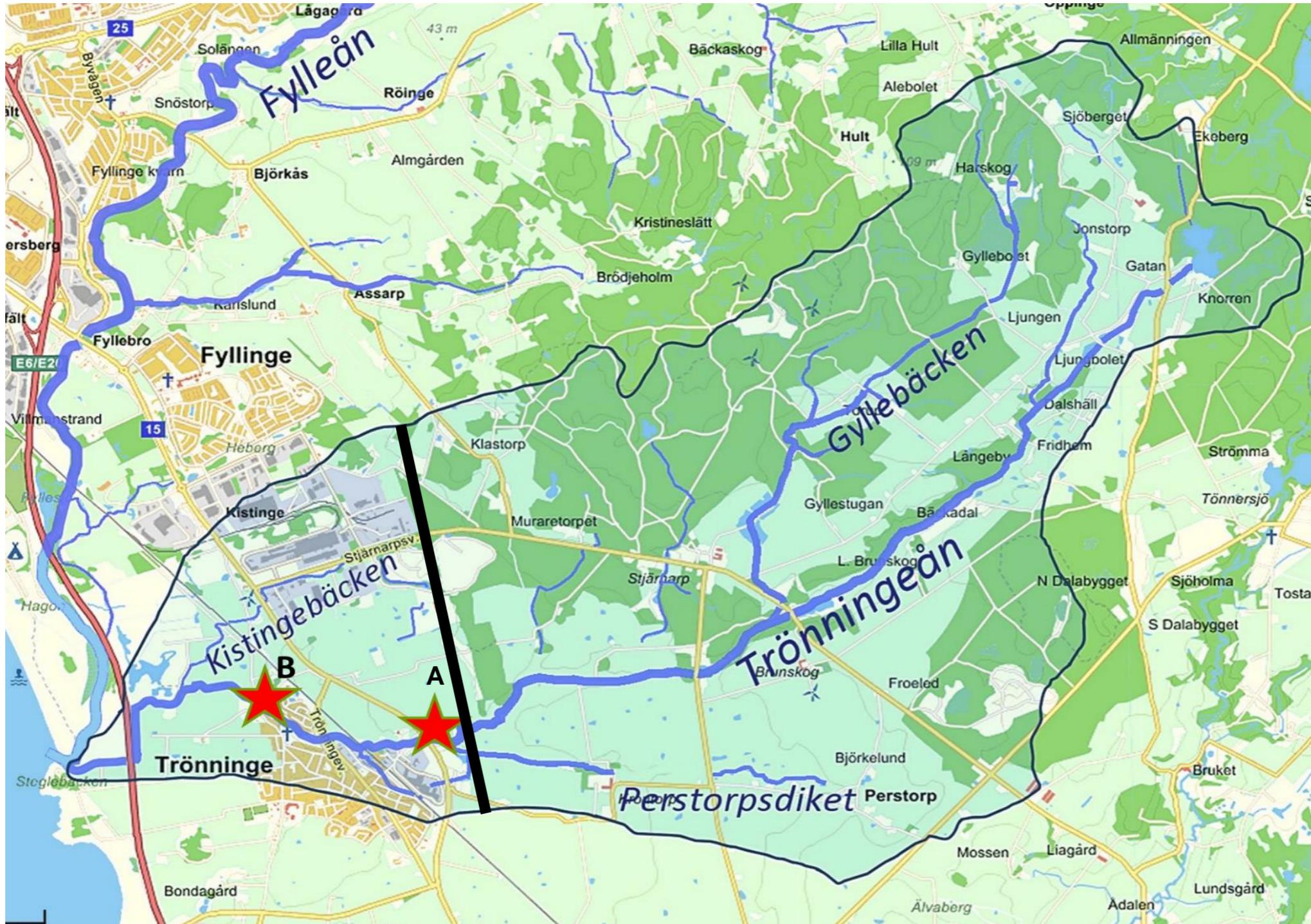


Examples of monitoring: Nutrients

Some preliminary results (nutrients)



- 80 % of drainage area now reach GES regarding Tot-P (everything east of the black line)



Site A:

Summer 2018 = 30,6 µg/l P

Winter 2019 = 31,2 µg/l P

Site B:

Summer 2018 = 60,3 µg/l P

Winter 2019 = 71,9 µg/l P

Urban areas
affects P conc. to
be above GES

Examples of monitoring: Wildlife cameras



The aim is twofold:

- Monitoring mammals and movement patterns
- Engaging landowners and the public

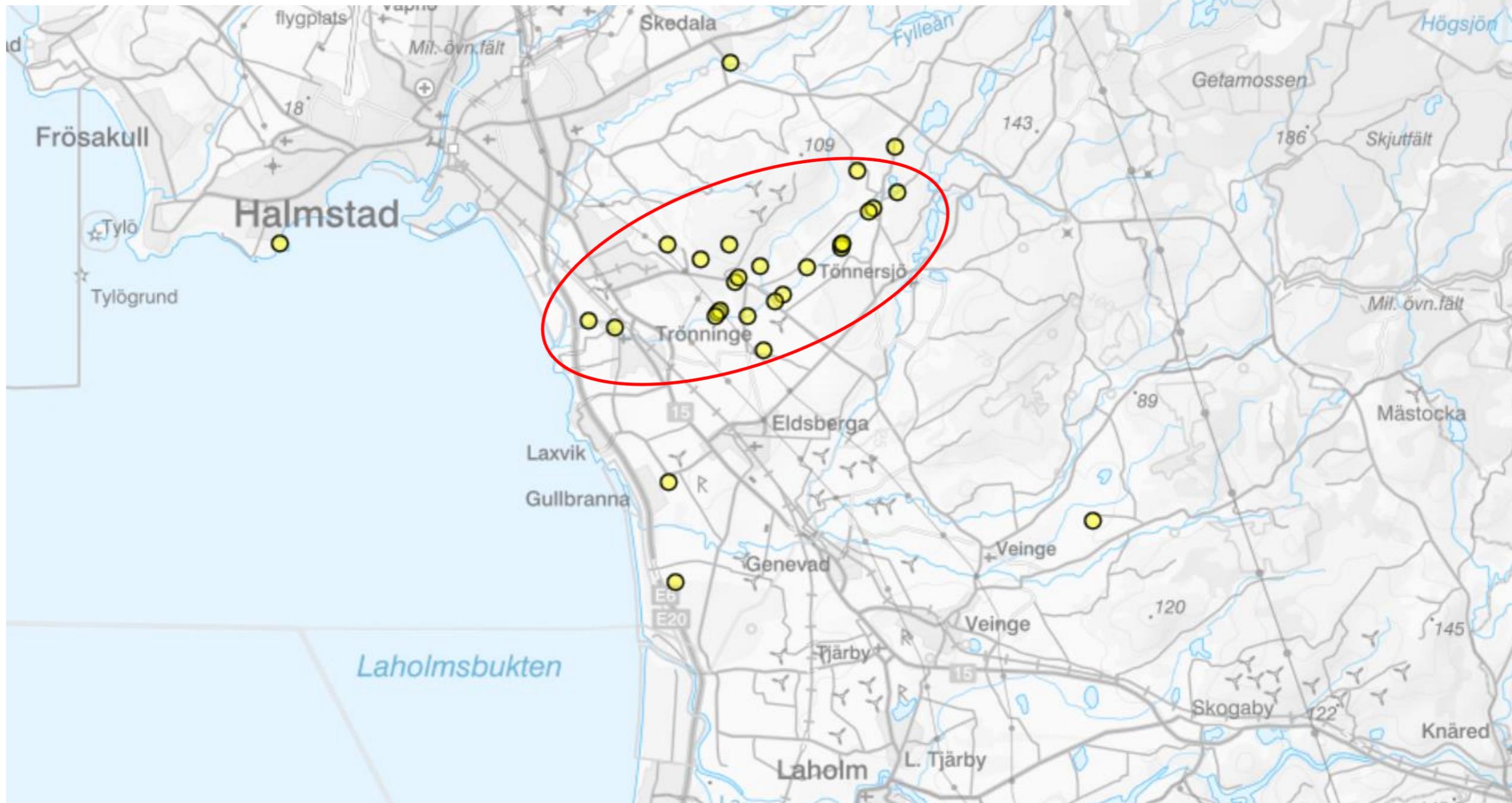
16 Mammal species

- Top-predator European otter (*Lutra lutra*)
- Least weasel (*Mustela vison*)



Colonization by dragonflies

29 CWs and amphibian ponds surveyed 2019-2021 (2022)
(23 in LIFE-Goodstream + 6 in the project: "CWs as buffers")



Example of monitoring: Dragonflies

Colonization by dragonflies



39 species found in total (36 in LIFE-Goodstream CWs)

- 60 % of the species in Sweden (65)
- 75 % of the species in the county (52)
- 85 % of the species in the municipality (46)

31 species in a single constructed wetland is the highest species nr/wetland so far



A total increase of dragonflies due to constructed measures.
Water brings life!



Using dragonflies for biodiversity awareness



All surveys shows an increase of biodiversity. Water brings life!

Brook lampray in the new stream bed



Increase in invertebrates such as dragonflies



Wetland birds

Increase in macrophytes



Frogs, toads and newts in amphibian ponds, creotopes and wetlands



Our approach

- Close collaboration with landowners (no set plans!)
- 100% voluntary
- Involve **schools and kids** in the project area
- All constructions/measures are 100% financed by the project
- **Monitoring** – before and after the project
- **Results** – science, popular science, landowners etc.

Communication to the landowners should be no.1 priority!



Kids are the future



Authorities, decision makers



Landowners



Construction companies



Research community

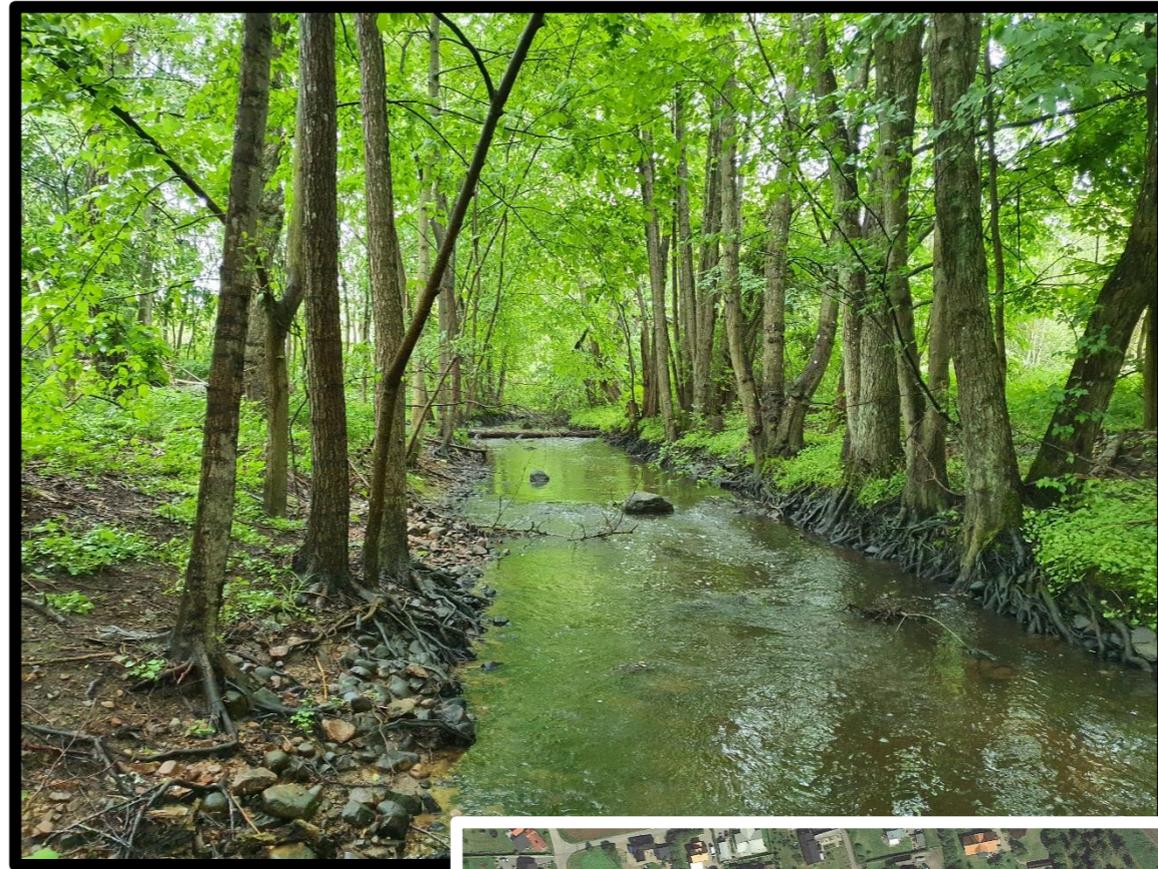


2022-2023

Trönninge village

Monitoring

Results



Thank you!

