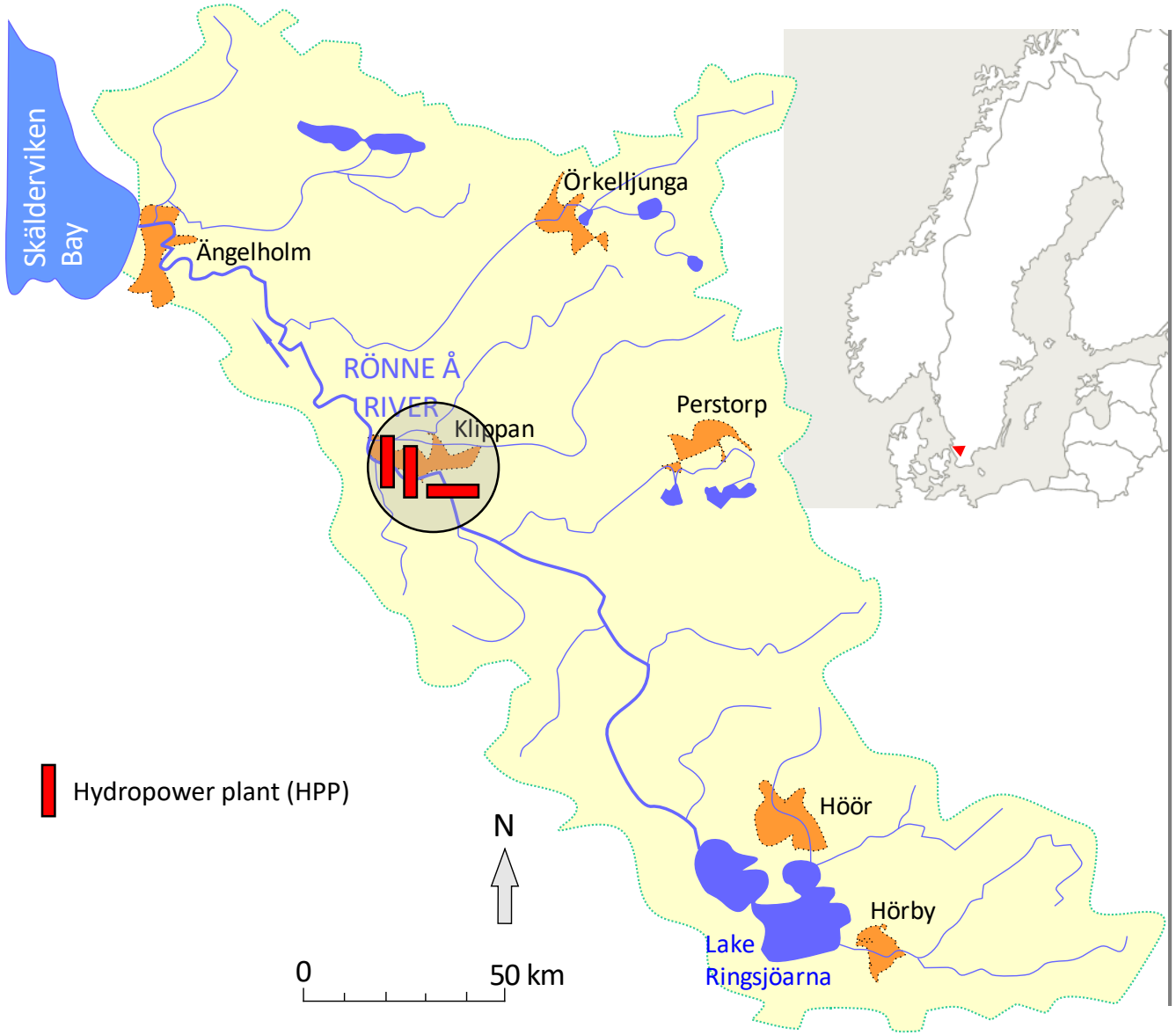
River connectivity, habitats and water quality towards restored ecosystem services in Rönne å River

Ivan Olsson, PhD | Project Manager *LIFE CONNECTS*
County Administrative Board Skåne

Rönne å River



Catchment size: 1900 km^2

Mean discharge: 23 m^3 per s

Most southerly **salmon** river in SE

River subjected to stocking by **European eel**

Two threatened species of **freshwater mussels**
- fragmented populations (few individuals)

Three **hydropower plants** in the main stem blocking migrations and species distribution.

- Distribution range limited by diadromous fish
- Turbine mortality
- Fragmentation
- Loss of ecosystem functions and services

Target areas

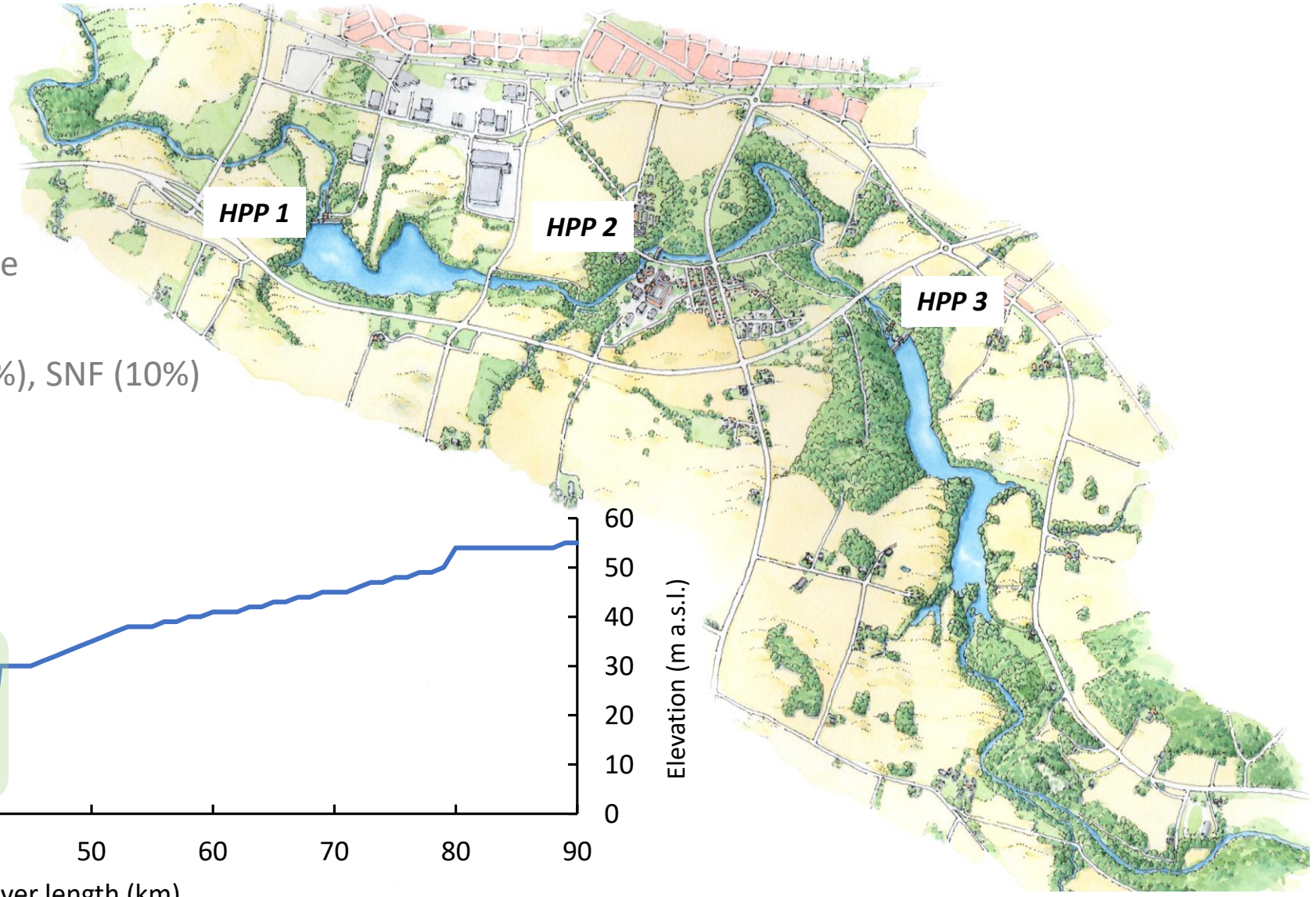
Total elevation gradient 30 m

Production: 10 GWh per year

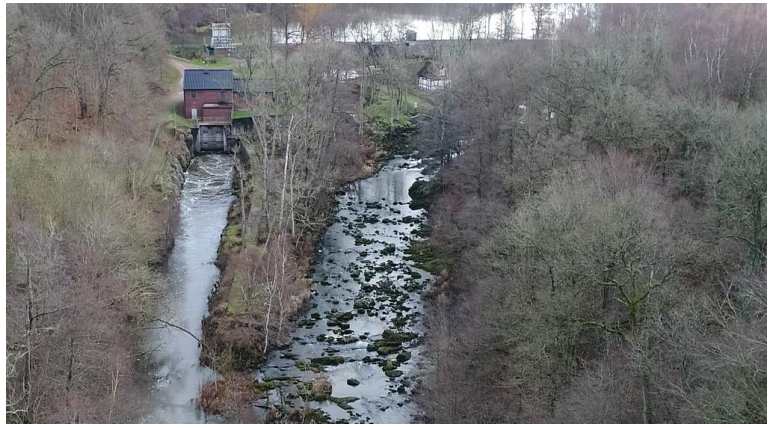
Kaplan turbines, not fish friendly

No regulation capacity, i.e. the plants can't store water for later use

Purchase price: 2.8 M€ (2019)
Financing: the state (50%), KM (40%), SNF (10%)



The hydropower plants (HPP)

	Stackarp, HPP1	Klippan, HPP2	Forsmöllan, HPP3
Aerial view			
Downstream view			

Negative effects…

Fish populations:
Not passible for upstream moving fish.

Production areas for e.g. salmon and trout (migratory) lost / not utilized.

High turbine mortality rates (> 90% in total)
Reduced migration speed (> one month).

Ecosystem functions and services

Recreation, tourism (blue growth), e.g. fishing and canoeing

Water temperatures and flow regimes

Climate adaptation / resilience, flood control, temperatures etc

Potential **pay-off** is high (ecosystem services) following restoration…

- The benefits removing the plants outweigh the energy production

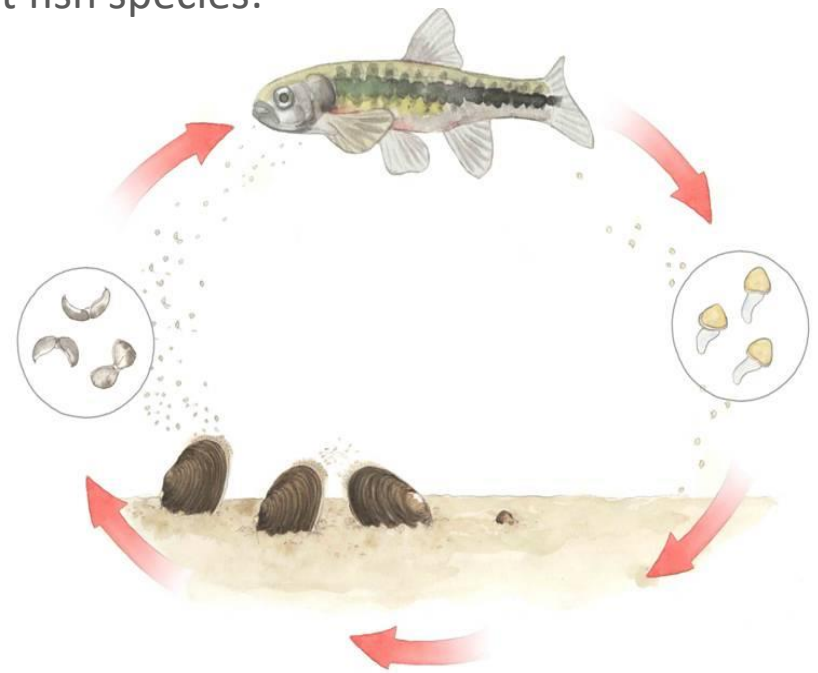
Mussel populations (FPM and TSRM):

Fragmented populations without recruitment.

< 300 individuals of the freshwater pearl mussel (FPM)

< 50 individuals of the thick shelled river mussel (TSRM)

Lack of host fish species:



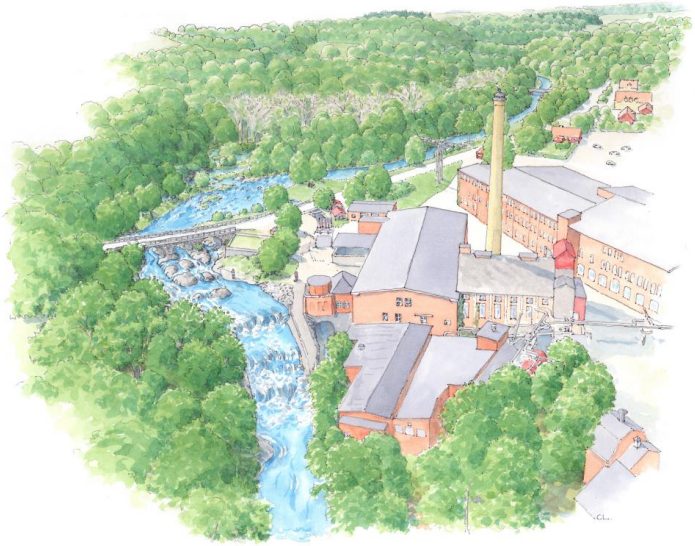
Becoming free flowing

Pre restoration conditions, HPP1

HPP2

HPP3

Post restoration conditions (2030)



Predicted outcome

Connectivity: > 125 km of “pristine” production areas accessible in the river

Habitats: > 40 ha transformed into floodplain and lotic habitats

Positive impacts on fish…

Production increase of salmonid smolts (>20000)

Survival of eels (>10000)

European river lamprey (?)

Host fish species for mussels: (20%)

A salmon caught (2018) downstream the HPP’s in Rönne å River (Sommer)

Positive impacts on mussels / biodiversity …

Positive impacts on ecosystem services…

Increases in “blue growth” corresponding to > 4 M€ annually, e.g. angling tourism, tax revenues, coastal sand deposition

Timeline

2018 - 2019: HPP's purchased, downstream migration by fish secured by closing turbines and opening spill gates.

2020 - 2021: Monitoring (pre restoration) programs.

2020 - 2022: Technical and environmental impact assessment plans established, permits / licenses granted.

2022 - 2025: Dismantling and removal of HPP-structures

2025 - 2026: Monitoring (post restoration) programs.

2027 - 2030: Follow up phase, additional restoration spin-offs(?)

Potential risks *and* possibilities

Public **opinion** …

Sediment **contaminations** higher than predicted …

Lack of funding – for robust (costly) long term monitoring programs

Permissions (by the environmental court) will be appealed by stakeholders

Research programs:

- *Terrestrial / aquatic interactions*
- *Migration ecology - host fish / mussel dispersal*
- *Dam removal and sand dynamics*
- *Socio-economic impacts*

Boosting up **public understanding** for river restoration and management.

Transfer and replicate methods / achievements / results elsewhere.

THANKS

Tord Andersson, Klippan Municipality | tord.andersson@klippan.se

Lukas Österling, CAB Skåne | lukas.osterling@lansstyrelsen.se