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When is it enough? When is a restoration project finished?



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Photo: Anna Broich

Noble crayfish in Europe

- Noble crayfish (*Astacus astacus*)
- Red-listed
- Invasive crayfish
- Crayfish plague
- Environmental factors
- Overfishing

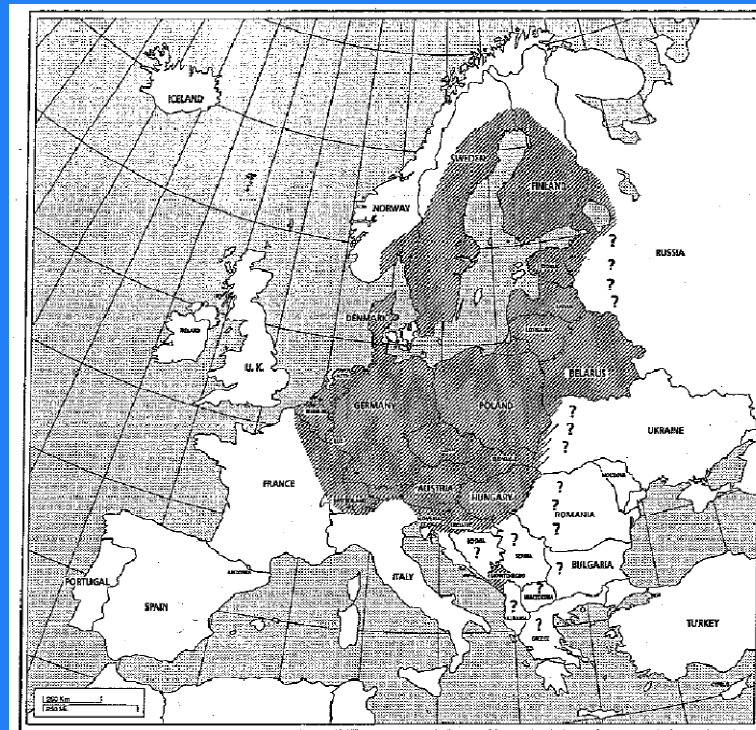
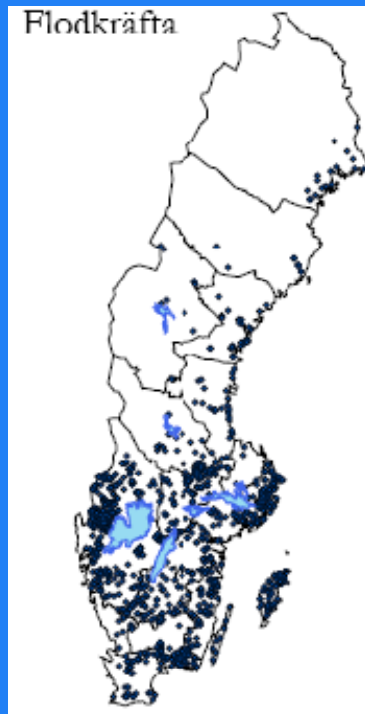
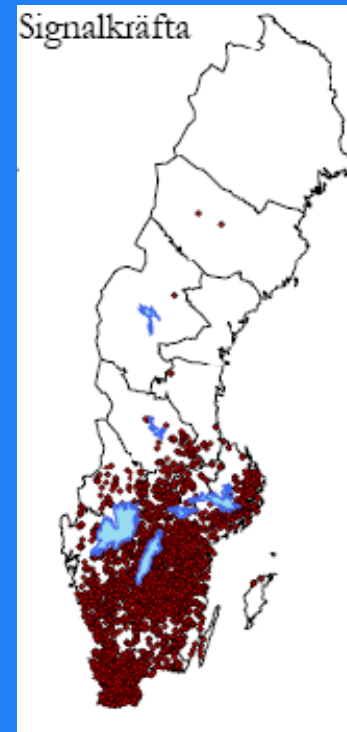


Fig. 42.1 The area of distribution of the noble crayfish, *Astacus astacus*. Not shown are some of the recently introduced populations, e.g. England and Morocco.

Noble crayfish in Sweden



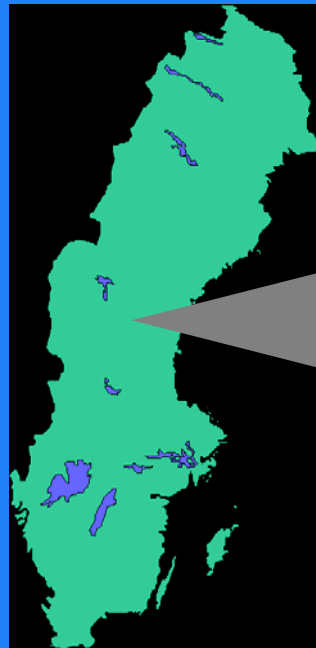
The known localities of Noble crayfish (*Astacus astacus*) has decreased by 95% the last 100 years, to less than 1000 localities.



The known localities of Signal crayfish (*Pasifastacus leniusculus*) has increased from 3000 to 4000 the past 10 years in Sweden.

Noble crayfish in Ljungan a Northern

- Probably introduced into the beginning of the 20th century
- Very good crayfish catches in 1950-1976
- In 1976 decreased in a part of the river where a new power plant was built
- 1999 – went extinct in the main river, but remained in the tributaries.



"Reintroduction of noble crayfish into Ljungan"

- Ånge Municipality
- Swedish Board of Fisheries
- The county of Västernorrland
- local fishery associations

Milestones in the reintroduction project

- 2001 Crayfish held in cages all summer in the River
- 2002 Reintroduction started with a small number of females with eggs.
- 2003 Reintroduction in big scale! 31 sites. Crayfish from a lake in the region.
- 2004- Test fishing by fishermen.
Reintroduction continues! 75000 crayfish
Diver search for fries (reproduction)
- 2007- Mid Sweden University (=me) starts an evaluation project. 5 sites, baited traps, crayfish marked with PIT-tags, water chemistry, fauna and flora.

Mark and recapture study

- Population size (compare with number of reintroduced)
- Individual growth
- Individual movement
- Fecundity
- Survival



Photo: Anna Broich

When is a reintroduction successful?

- Who decides when it is successful?



Photo: Thomas Palo

- The municipality of Ånge – preservation and interests in fishery and tourism
- Swedish Board of Fisheries – responsibility to preserve the species on a national and international plan
- The county of Västernorrland – Preservation and interests in fishery
- Fisherman – wants to fish

What tools do we need to evaluate?

- Available tools
 - Catch Data from 1963-1990
 - Diver data about fries
 - Test fishing data from the fishermen 2004-
 - Mark and recapture data from 2007
- Other tools?

How to plan a successful reintroduction?



THANK
YOU FOR
YOUR
ATTENTION
!!!

Photo: Anna Broich