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The spread of signal crayfish and crayfish plague in Norway

Monitoring and mitigation measures

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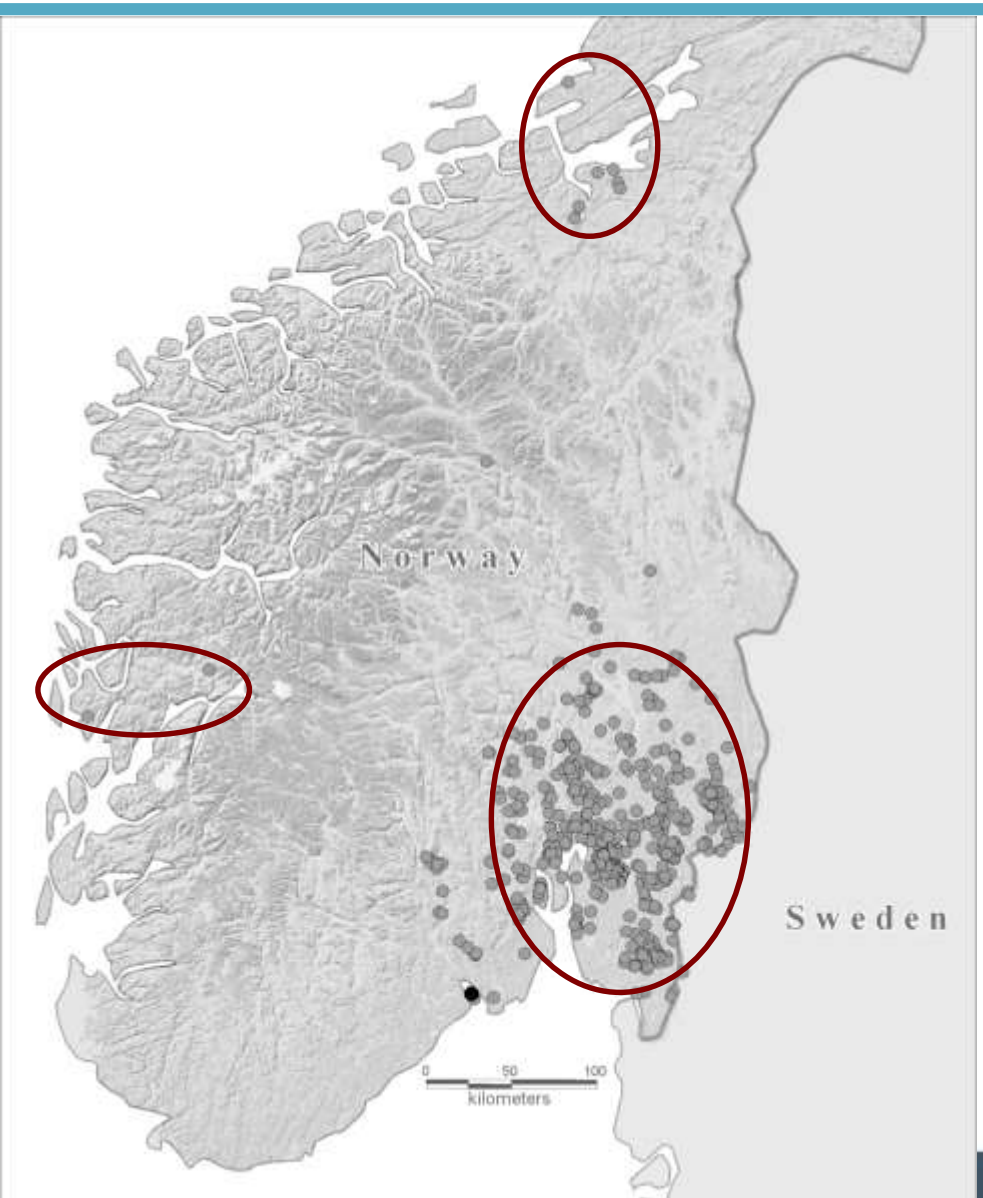
Stein I. Johnsen & David A. Strand

Content

- Distribution of noble crayfish (native) in Norway
- Distribution of signal crayfish (alien) in Norway
- Outbreaks of crayfish plague in Norway
- Monitoring of crayfish and *Aphanomyces astaci* in Norway
- Mitigation measures against signal crayfish and crayfish plague

Distribution of noble crayfish in Norway



- About 470 localities in Norway
- Main distribution in the south-eastern part of Norway
- Most populations are a result of stocking
- Regarded “Endangered” on the Red list, mostly due to the threat from alien species.

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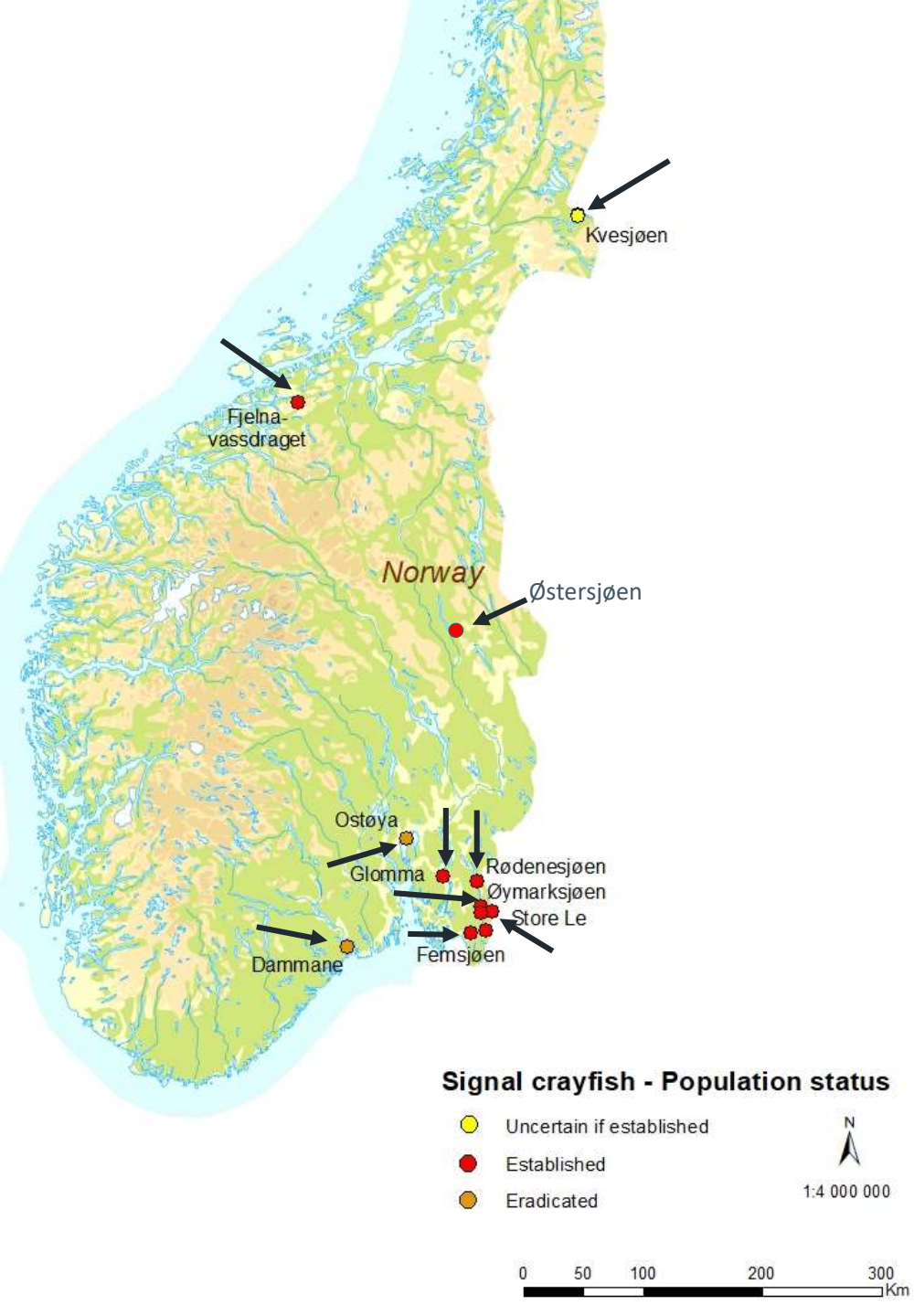
Distrubution of signal crayfish



1. *Dammane - 2006*
2. *Øymarksjøen – 2008*
3. *Ostøya – 2009*
4. *Fjelnavassdraget 2011*
5. *Store Le – 2014 (2004)*
6. *Kvesjøen -2013/2014*
7. *Rødenessjøen – 2014*
8. *Haldenvassdraget ned til Femsjøen (2020)*
9. *Glomma – 2020*
10. *Østersjøen - 2023*

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Prevalence and intensity (of infection)

All norwegian populations have been infected by *A. astaci*

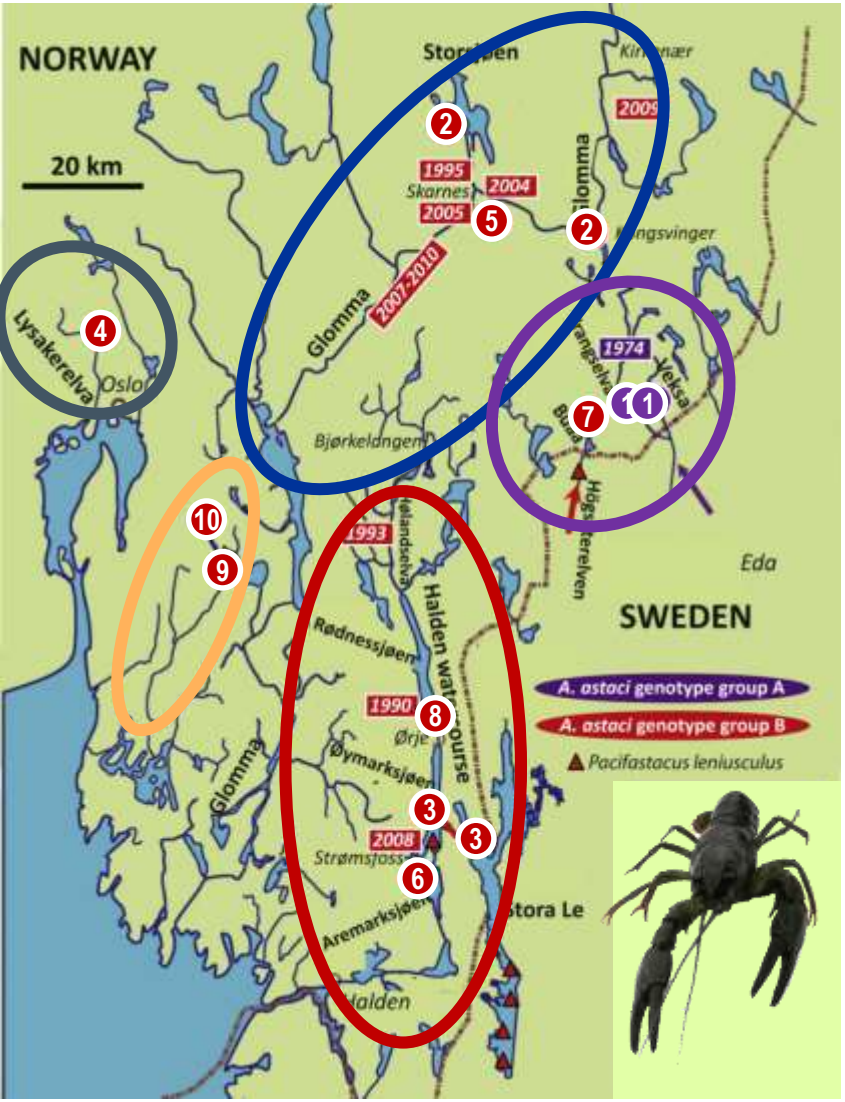
				Agensnivå*							
				Negative		Positive					
Lokasjon	År	#Kreps	Prevalens	A_0	A_1	A_2	A_3	A_4	A_5	A_6	A_7
Stora Le**	2002	70	49 %	29	7	10	16	4	2	1	1
Dammane	2006	5	100 %	-	-	-	-	-	-	-	-
Øymarksjøen	2008	44	86 %	6	0	1	15	15	3	4	0
Ostøya	2009	6	100 %	0	0	0	1	5	0	0	0
Skittenholvannet og Oppsalvatnet	2011	11	27 %	8	0	1	0	2	0	0	0
Kvesjøen	2013	1	100 %	0	0	0	1	0	0	0	0
Rødnessjøen	2014	5	100 %	0	0	2	2	1	0	0	0
Glomma v. Fossum	2020	5	100 %	0	0	1	1	2	1	0	0

*Agensnivå gjenspeiler høyeste påviste verdi per kreps der det er analysert opp til tre vevsprøver, og evt melaniserte flekker.

**Påvist på Svensk side i grenseinnsjø

				Agensnivå*							
				Negative		Positive					
Lokasjon	År	#Kreps	Prevalens	A_0	A_1	A_2	A_3	A_4	A_5	A_6	A_7
Østenssjøen	2023	5	40 %	3	0	0	2	0	0	0	0

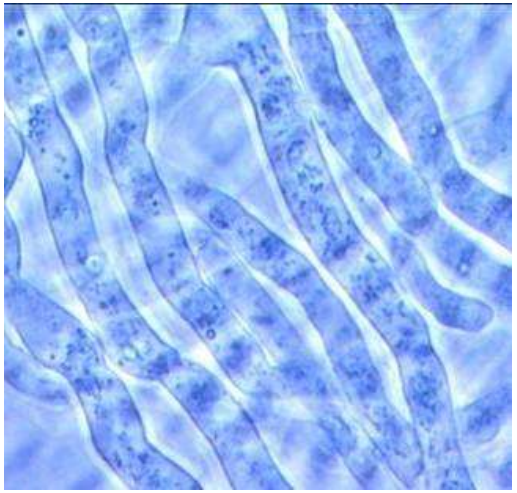
Crayfish plague outbreaks in Norway

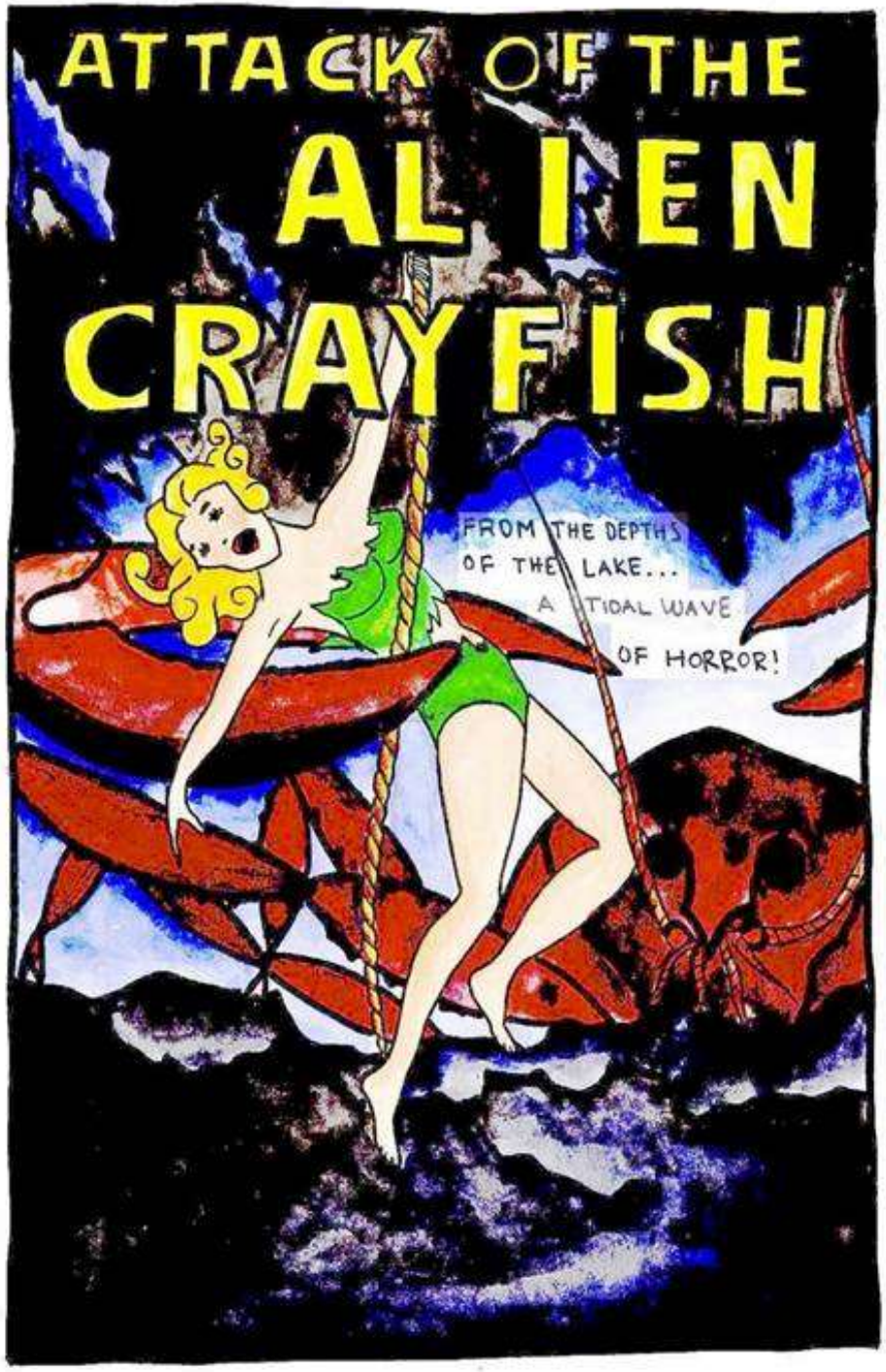


Year of outbreak

1. 1971 (1974)
2. 1987
3. 1989
4. 1998
5. 2003
6. 2005
7. 2010
8. 2014
9. 2016
10. 2018

- Veksa, Vrangselva
- Glomma
- Store Le
- Haldenvassdraget
- Lysakerelva
- Mossevassdraget





How big is the threat?

- In Norway, the catches of noble crayfish is reduced by 75 % since 1966
- In Sweden, 95-97 % of the locations with noble crayfish is lost since 1900
- Near 10 000 localities of signal crayfish in Sweden today

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National monitoring programme

- Started in 2001

- Objective: Monitor a range of noble crayfish localities in order to reveal prominent changes in population density

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Noble crayfish – national monitoring

- The localities differs in:

  Trophic level

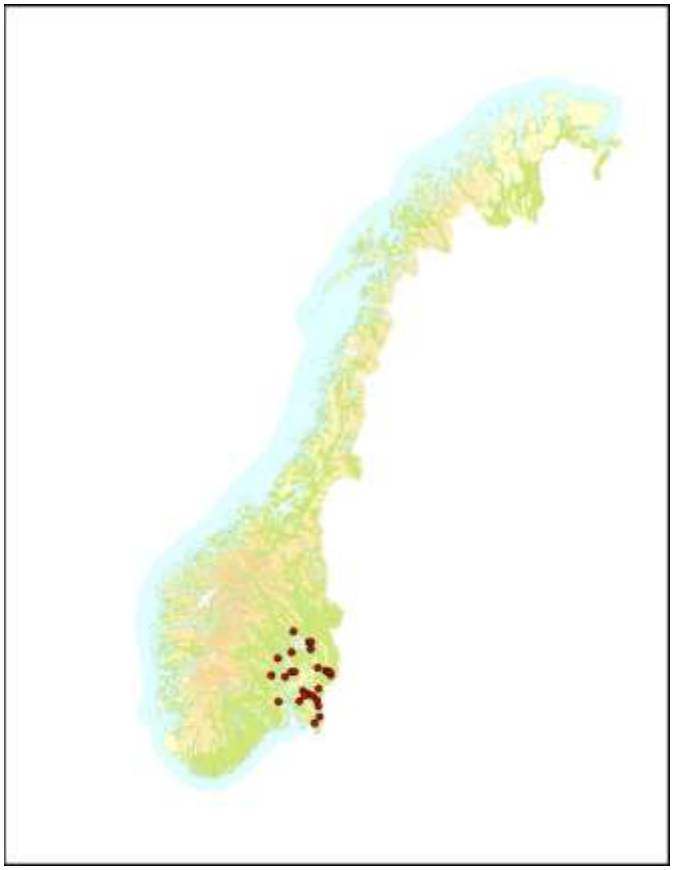
  Calsium and pH levels

  Hydropower influence

  Time of stocking

  Harvest pressure

- 27 localities included in 2001
  - 10 are extinct due to crayfish plague



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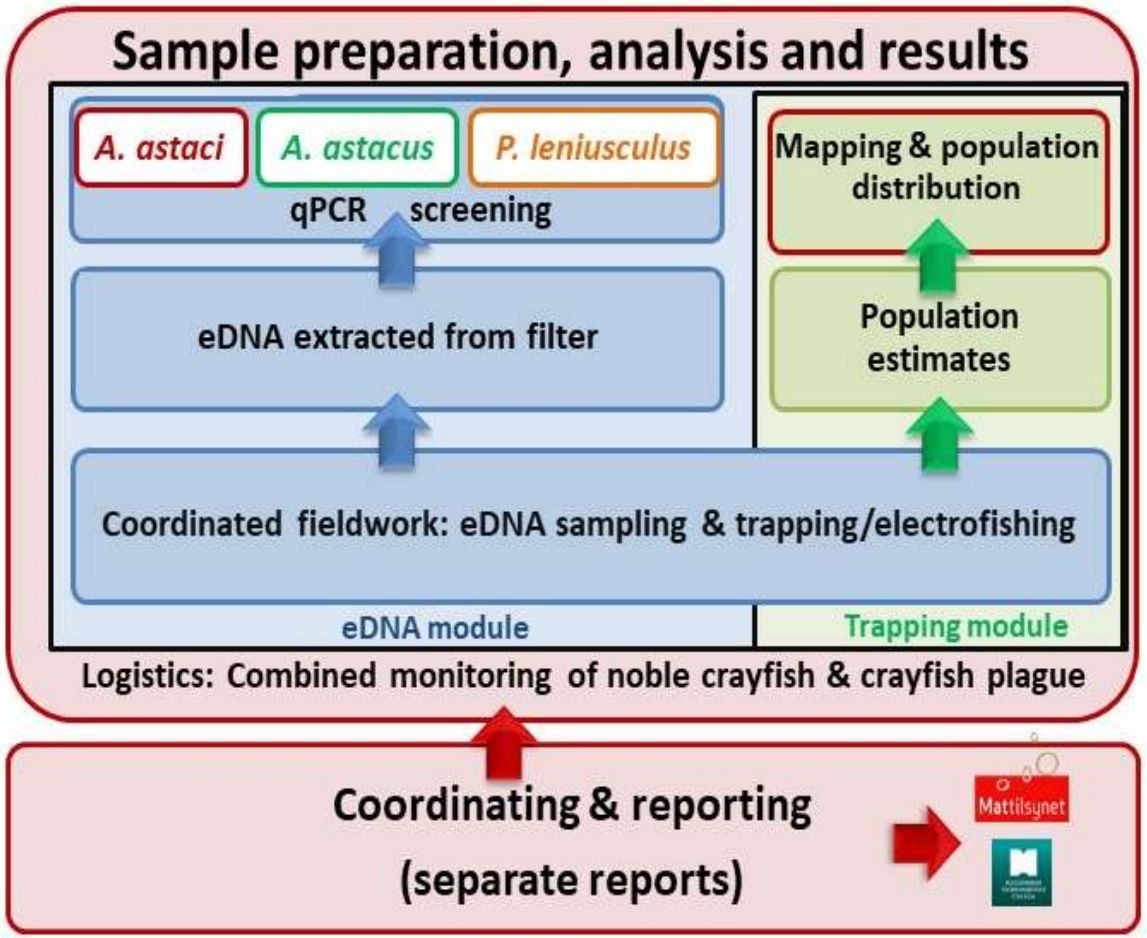
Noble crayfish – national monitoring

- 5 localities investigated each year

- Monitoring parameters:
  - Crayfish / trapnight
  - Crayfish / hour diving
  - Catch statistics
  - Water chemistry

- From 2018
  - Additional monitoring with eDNA

Three species from one water sample



- Sampling of eDNA spring and autumn
- Total 160 samples

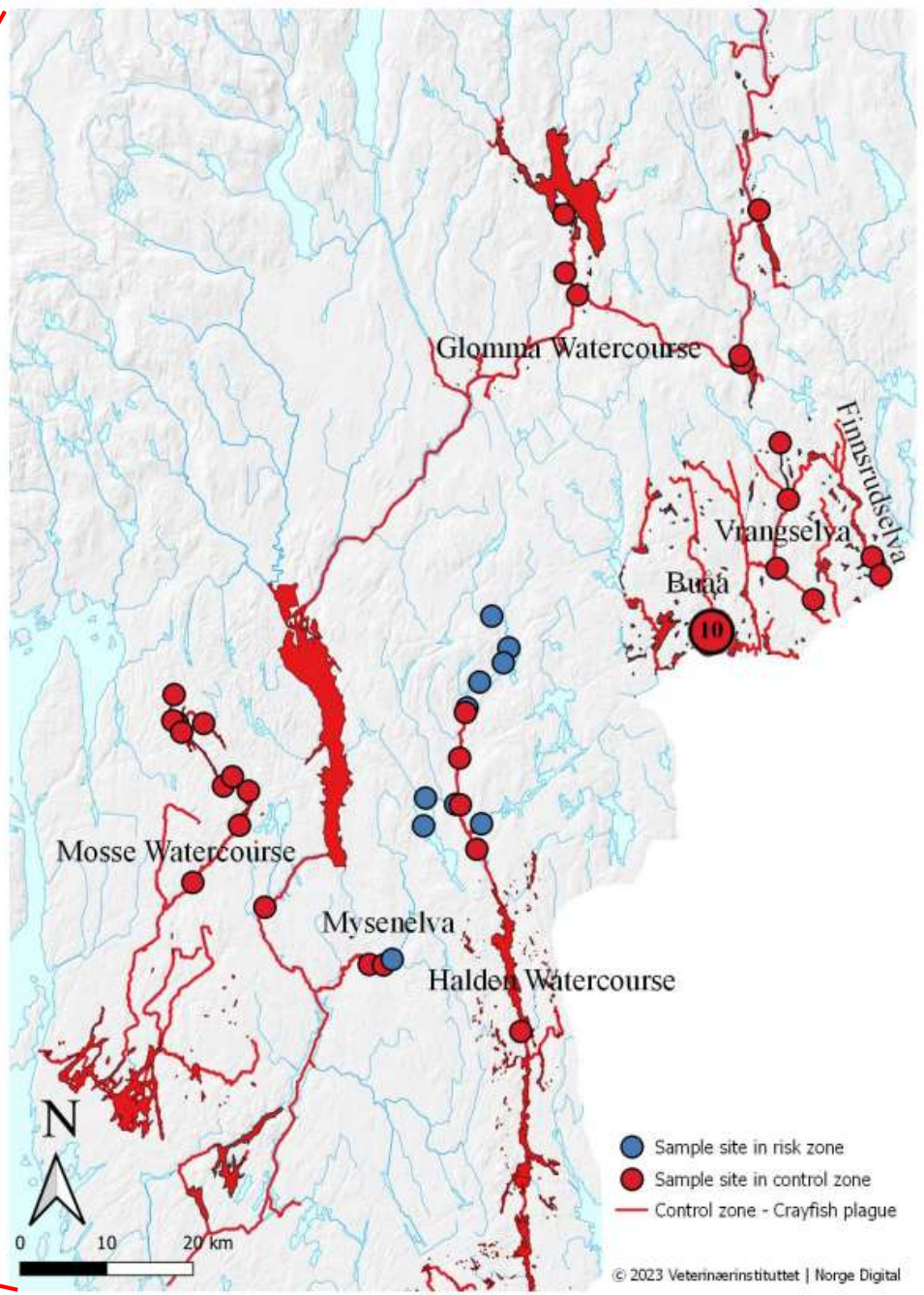


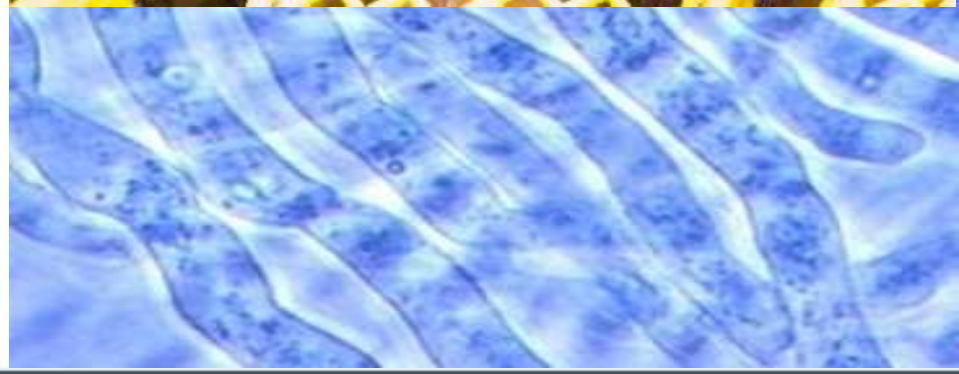
Figure 3. *Surveillance sites in South-Eastern Norway 2022. Water samples (circles) were collected in June and September. Regulated areas (crayfish plague control zones) are marked in red. Note: For Glomma, the control zone is an approximation.*

Mitigation measures

- Legislation

- Stocking of alien crayfish species are forbidden in Norway
  - **Sentencing framework of 6 years in prison**

- Localities with signal crayfish
  - No harvest allowed



NINA Rapport 474

Signalkreps og krepsepest i Haldenvassdraget

Forslag til tiltaksplan

Stein Ivar Johnsen
Trude Vrålstad

Veterinærinstituttet
National Veterinary Institute

Mitigation measures

- Legislation
- Management plans
- Action plans
- Expert group on freshwater crayfish
- Information
- Eradication
- Physical barriers
- Monitoring

Samarbeid og kunnskap for framtidas miljøløsninger

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Eradication with BETAMAX VET.

- Two small watersheds treated in Norway
- Syntetic pyrethroids, a common agent in commercial insecticides
- Crayfish extremely sensitive


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Physical barriers

Management of alien crayfish and crayfish plague is mostly about managing human actions

Thank you!

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