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Republic of Estonia
Ministry of the Environment

Environmental Investment Centre

Eradication of aquatic invasive species in Estonian freshwaters

11.10.2021 - 30.04.2024

Katrin Kaldre
Assistant Professor of Aquaculture Biology, PhD

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Veterinærinstituttet
Norwegian Veterinary Institute

www.emu.ee
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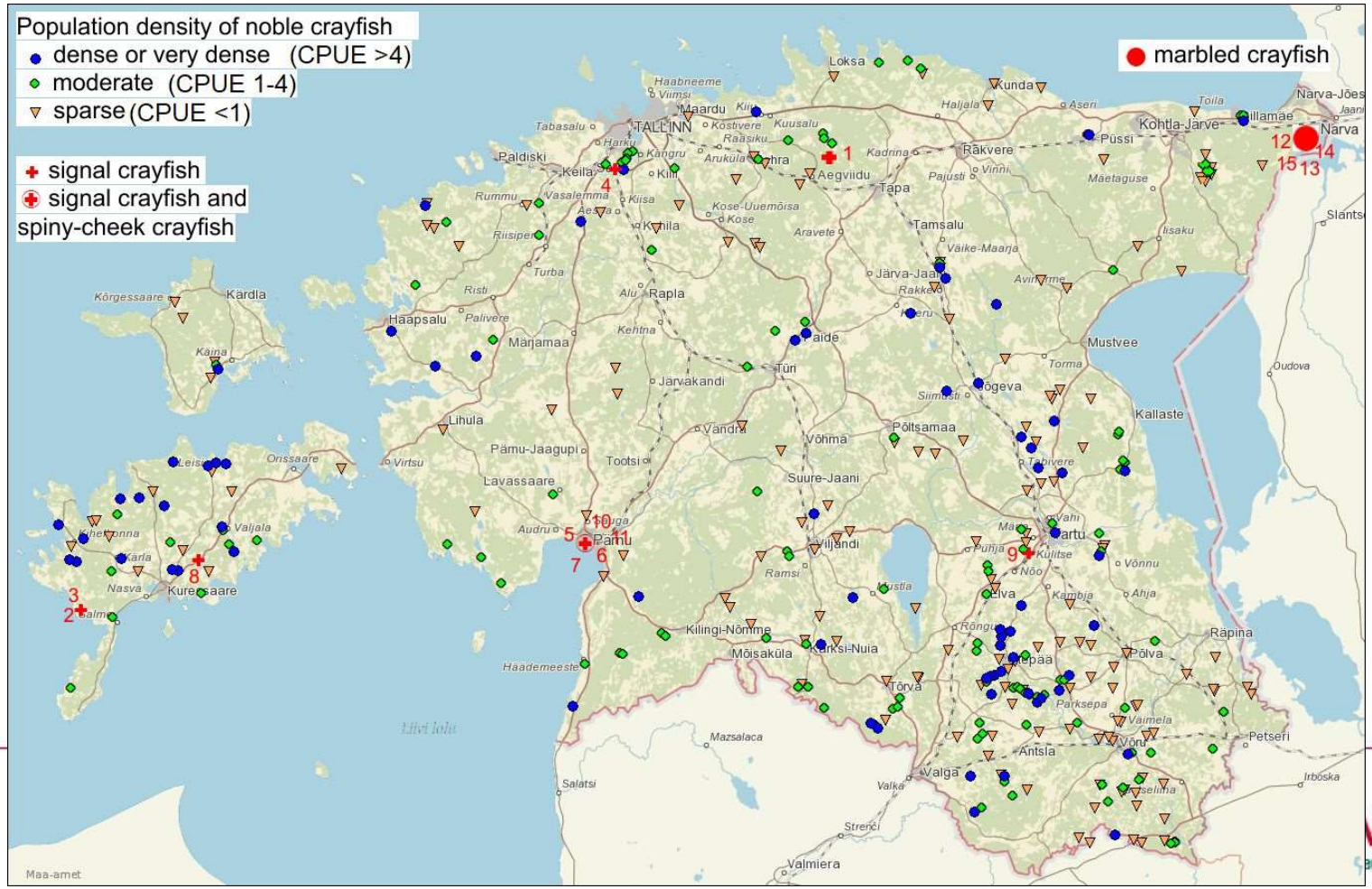
Background

- Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species.
- The spread of alien species mentioned in the list of alien species threatening the ecosystem (adopted on 07.10.2004 No. 126) must be prevented and if possible, eradicated.

The noble crayfish is the only indigenous decapod crayfish species in Estonia.

Astacus astacus

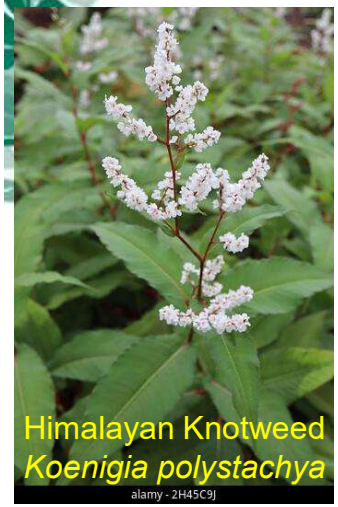


Project goals

1. To assess the risk of introduction, survival and spread of ten invasive non-indigenous crayfish species (NICS) in Estonia that are of concern in the EU.
2. To assess and control the spread of NICS and Nuttall's waterweed in Estonia and implement more effective measures for the detection (incl. application of eDNA-based methodology) and eradication of alien species.
3. To raise public awareness and competence of officials of the threats of alien species and control measures.

Activity I

Compiled an analysis of the introduction pathways, survival and spread of ten alien invasive species that are of concern in the EU


Himalayan Knotweed *Koenigia polystachya*


Andean pampas grass *Cortaderia jubata*


Finlayson's squirrel *Callosciurus finlaysonii*


Rusty crayfish *Faxonius rusticus*


Tree of heaven *Ailanthus altissima*


New Zealand flatworm *Arthurdendyus triangulatus*


Box tree moth *Cydalima perspectalis*


Japanese climbing fern *Lygodium japonicum*


Japanese hops *Humulus japonicus*


Pumpkinseed *Lepomis gibbosus*

Activities II

- Mapping of the spread of NICS and Nutall's waterweed, including the application of eDNA methods in the detection of invasive crayfish species
- Research and developing eradication methods
- Carrying out the eradication and evaluating the effectiveness of eradication, using eDNA methodology in addition to catching, at least in 20 sites


Signal crayfish
Pacifastacus leniusculus


Spiny-cheek crayfish
Faxonius limosus


Marbled crayfish
Procambarus virginalis

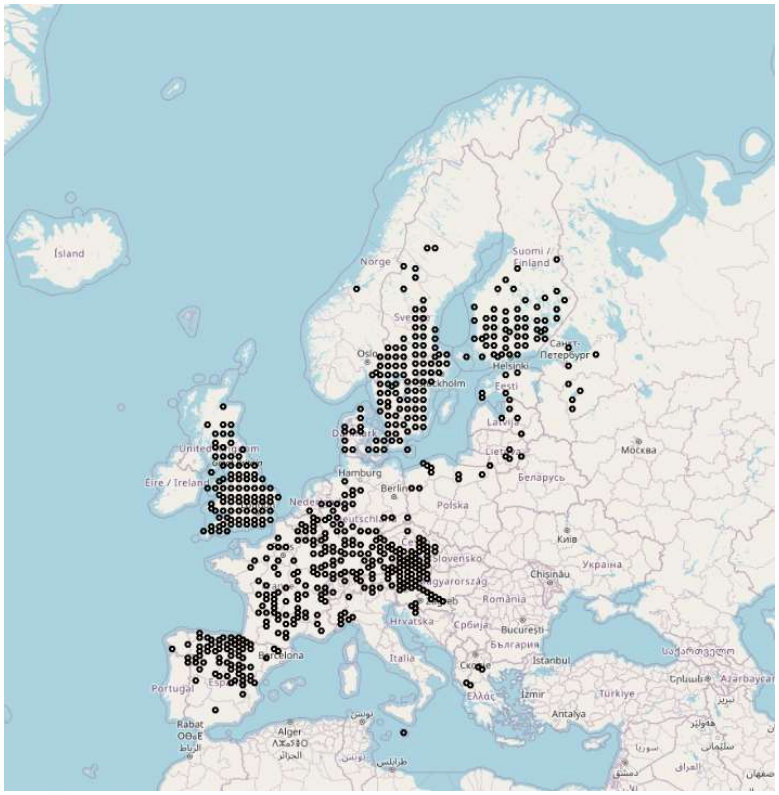

Nutall's waterweed
Elodea nutatallii

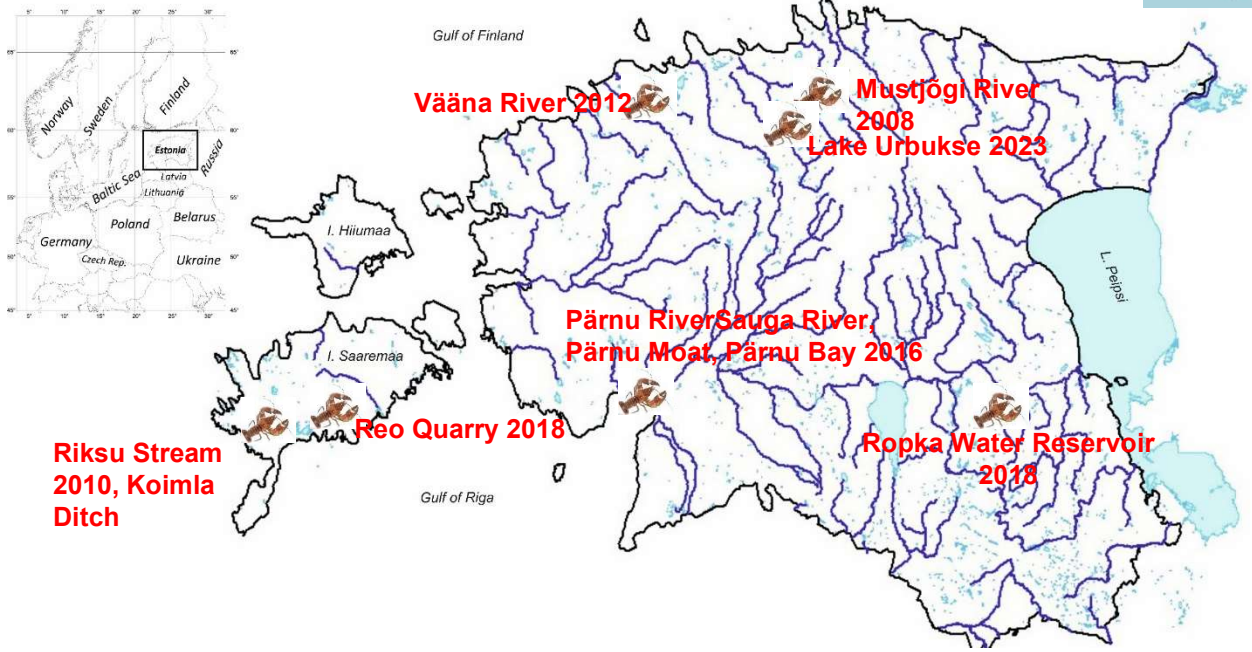
Consultations with NVI

- Chemical eradication was planned in Reo Quarry and Ropka Water Reservoir

Signal crayfish

Family: *Astacidae*
Genus: *Pacifastacus*
Species: *Pacifastacus leniusculus*





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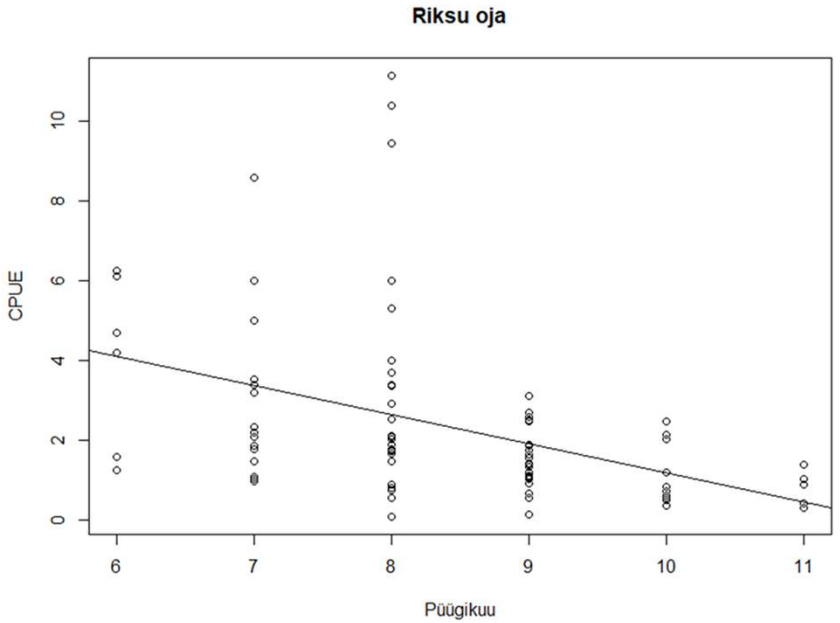
Intensive trapping in Riksu Stream

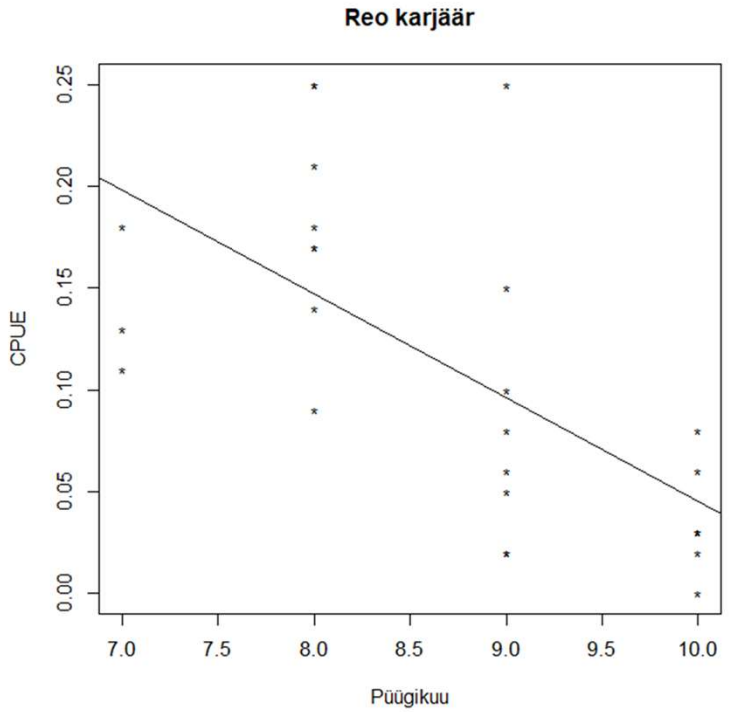
- Length 19.7 km
- Moderate population, CPUE 2.2
- In 2022, total of 5646 signal crayfish were removed (155 kg)
- The number of signal crayfish decreased at the end of the trapping season

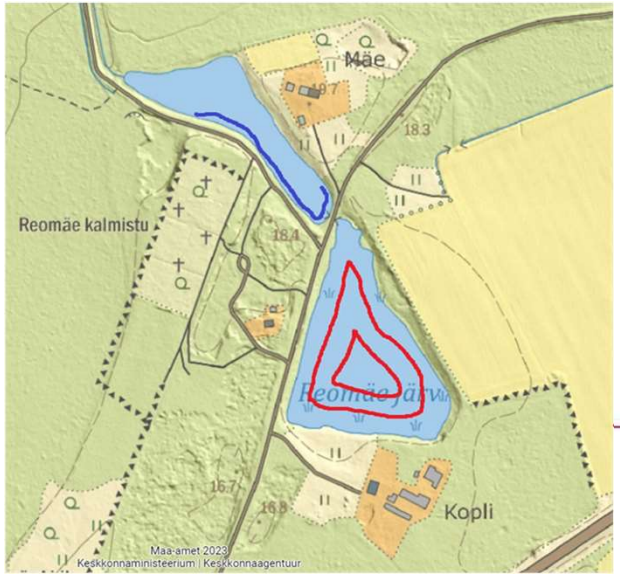


Electrofishing in Riksu Stream in 2023

Intensive trapping in Reo Quarry

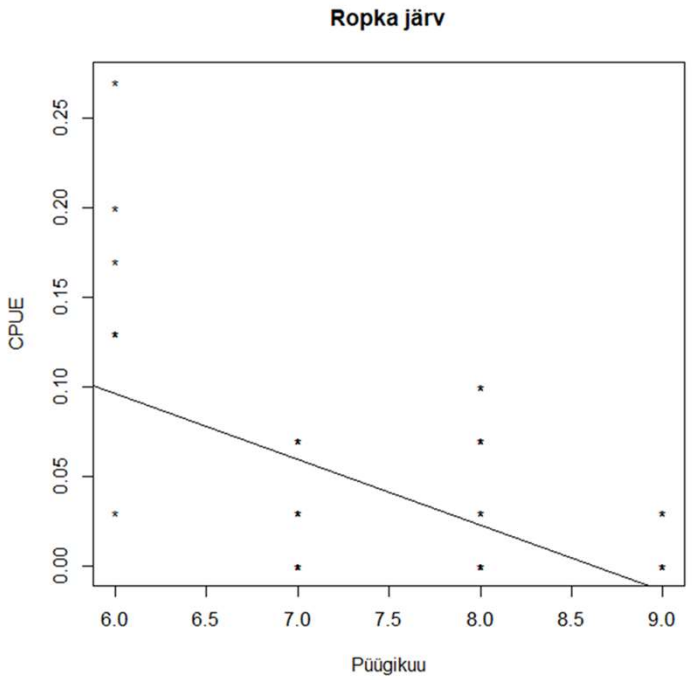
- Area 2.1 hectare
- Low population, CPUE 0.11
- In 2022, total of 286 signal crayfish were removed (8.1 kg)
- The number of signal crayfish decreased at the end of the trapping season

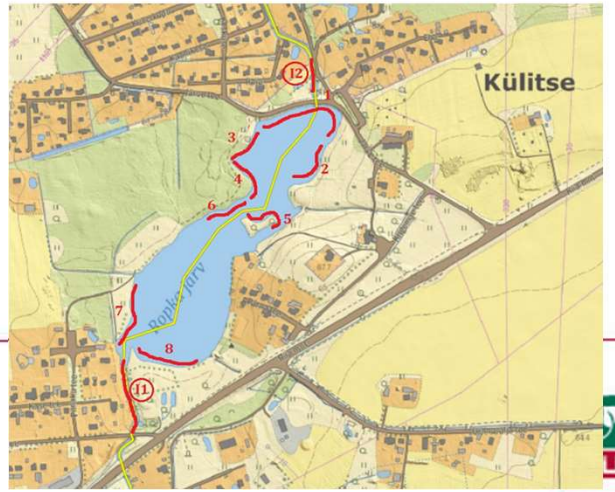




Intensive trapping in Ropka Water Reservoir

- Area 9 hectare
- Low population, CPUE 0.05
- In 2022, total of 63 signal crayfish were removed (2.1 kg)
- The number of signal crayfish decreased at the end of the trapping season



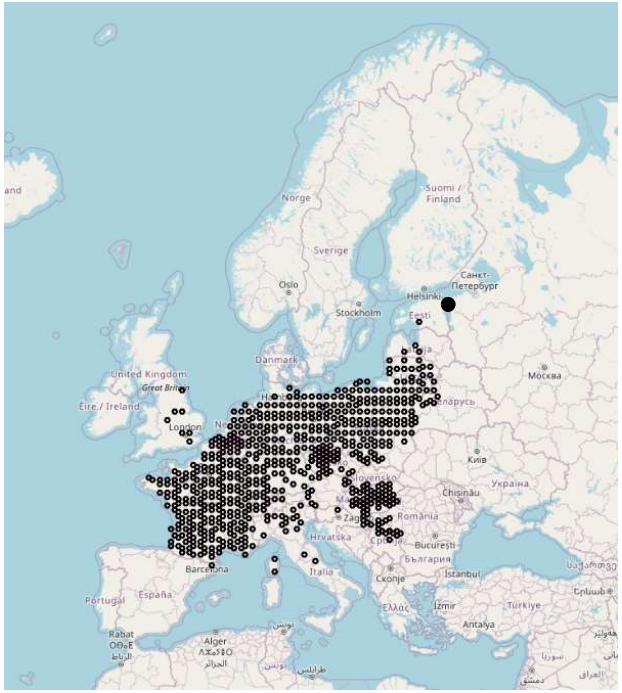


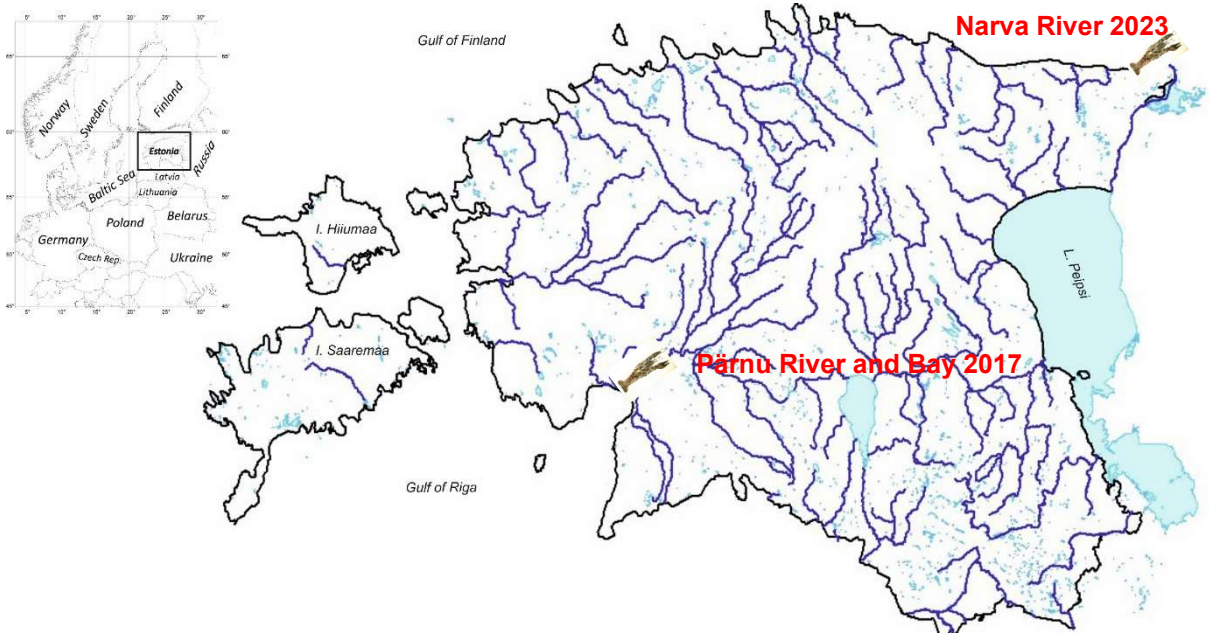
Stocking of eels into the Reo Quarry and Ropka Water Reservoir

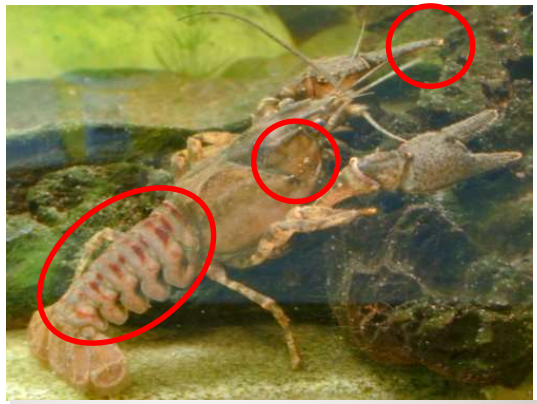
- Experiment with 30 farmed eels (~400 g)
- 1000 eels (~250 g) were stocked to Ropka Water Reservoir in 2023 spring
- 200 eels (~250 g) were stocked to Reo Quarry in 2023 spring

Spiny-cheek crayfish

Family: *Cambaridae*
Genus: *Faxonius*
Species: *Faxonius limosus*

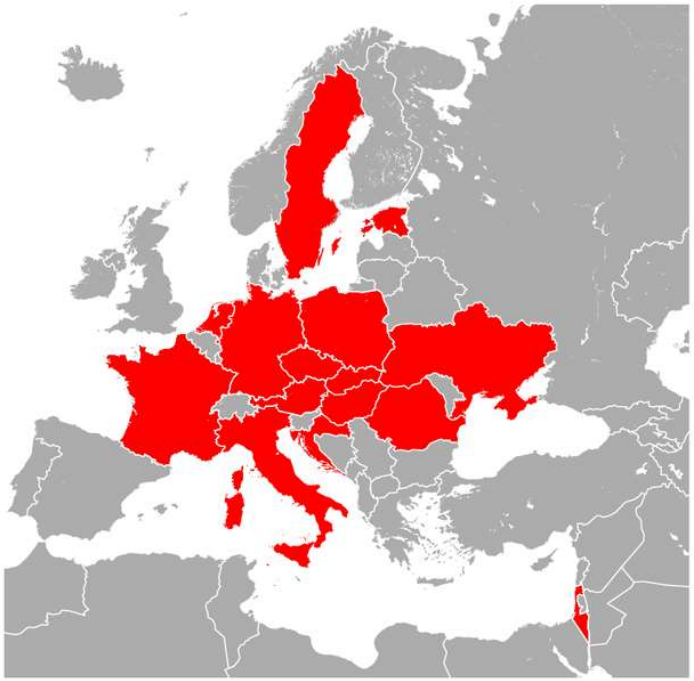


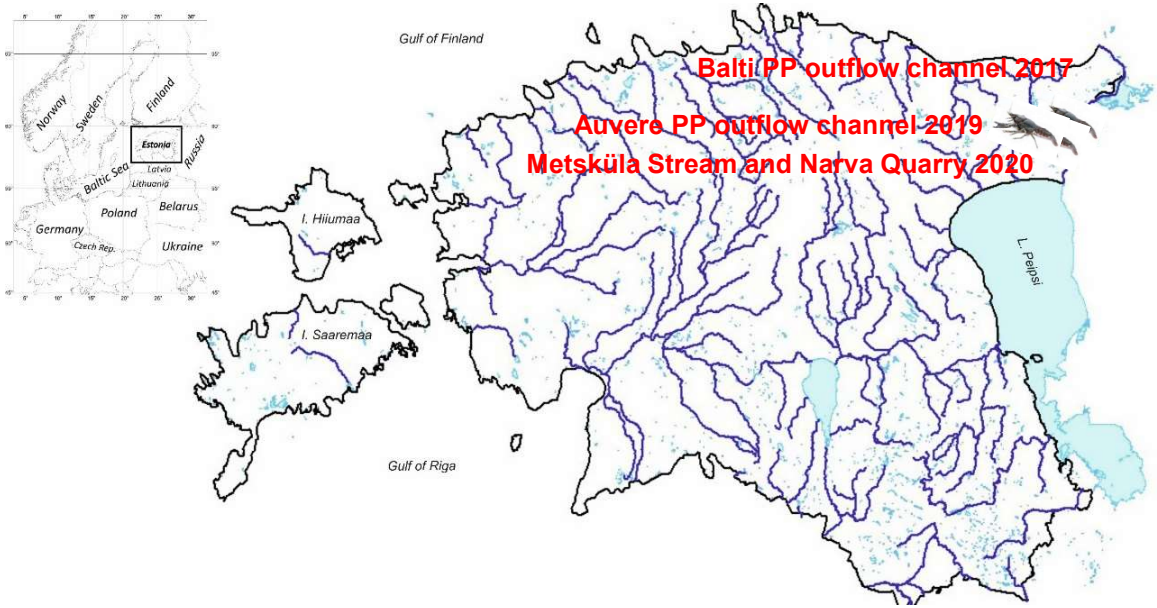




Marbled crayfish

Family: *Cambaridae*
Genus: *Procambarus*
Species: *Procambarus virginalis*

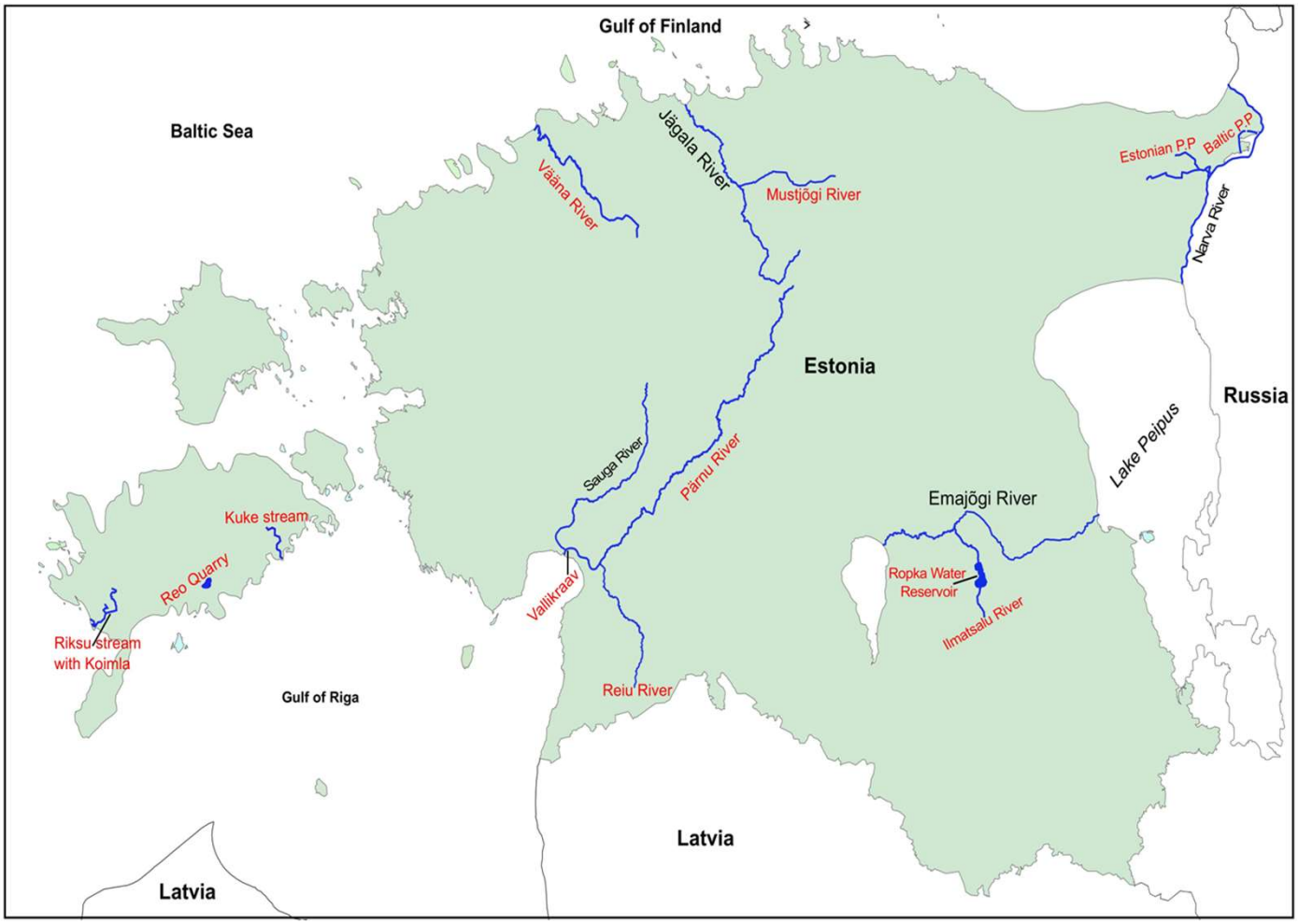




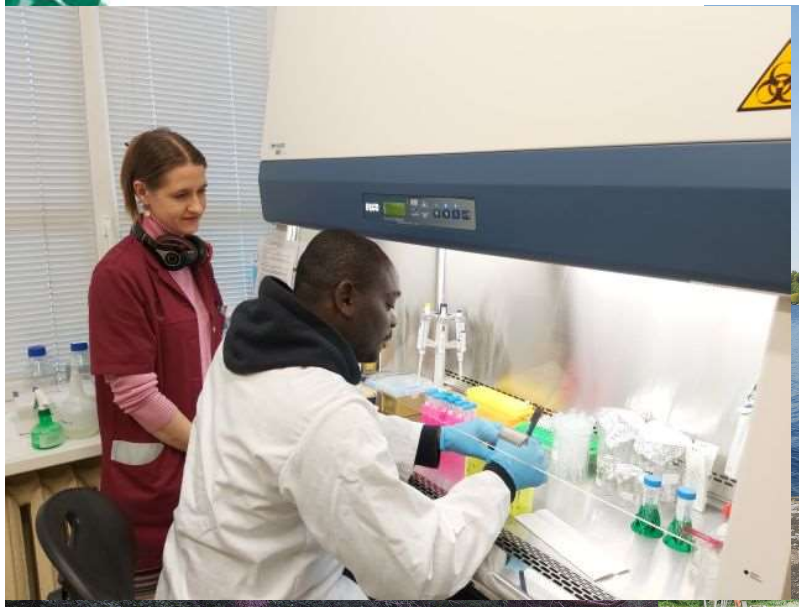
eDNA studies

Study area

- 13 water bodies were sampled across Estonia
- Between one and four sampling points were selected per location
- All 83 samples and 9 field negative controls were taken from August to September 2022 and additional samples were taken in2023



eDNA studies



Nuttall's waterweed studies in Estonia

Lake	Kuupäev	Elodea spp.
Beresje	13.08.2022	+
Käsmu	28.07.2022	+
Martiska	27.06.2022	+
Nikerjärv	06.08.2022	+
Purgatsi	06.08.2022	+
Rava	06.08.2022	-
Räbi	28.06.2022	-
Sillamäe Alumine Water reservoir	27.06.2022	-
Sillamäe Keskmine Water Reservoir	27.06.2022	-
Tänavjärv	27.07.2022	-
Udriku	06.08.2022	+
Võrtsjärv, Ulge Channel	07.08.2022	-
Urbukse	06.08.2022	+
Veisjärv	28.06.2022, 07.08.2022	+
Tõhela	5. ja 6.09.2022	+
Rõuge Valgjärv	30.06.2022	-
Rõuge Liinjärv	30.06.2022	-
Vaskna	5.08.2022	-
Alasjärv	5.08.2022	+
Udsu	29.07.2022	+
Hainjärv	5.08.2022	-
Hurmi	29.06.2022	-
Ihamaru Palojärv	15.05 ja 29.06.2022	+
Rõngu Mädajärv	29.07.2022	+
Uhtjärv	30.06.2022	+
Peipsi, Rannapungerja	25.07.2022	-
Kauru	29.06.2022	+

Difficult to distinguish morphologically from the Canadian waterweed.

Additional DNA analyses did not confirm the Nutall's waterweed present in Estonia

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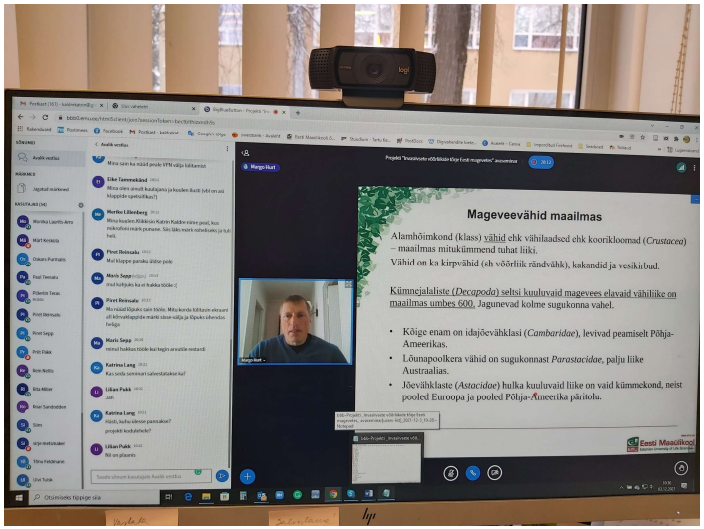
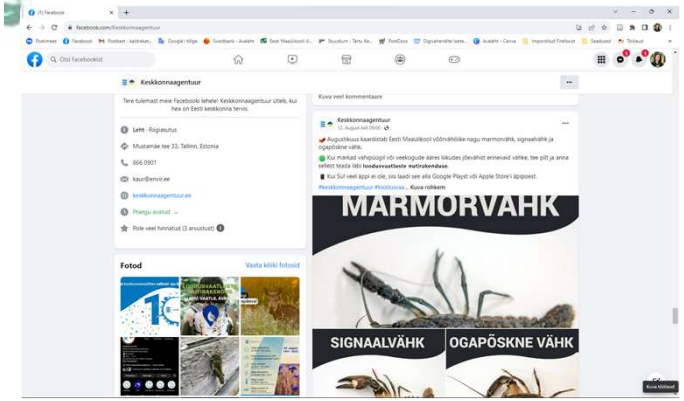
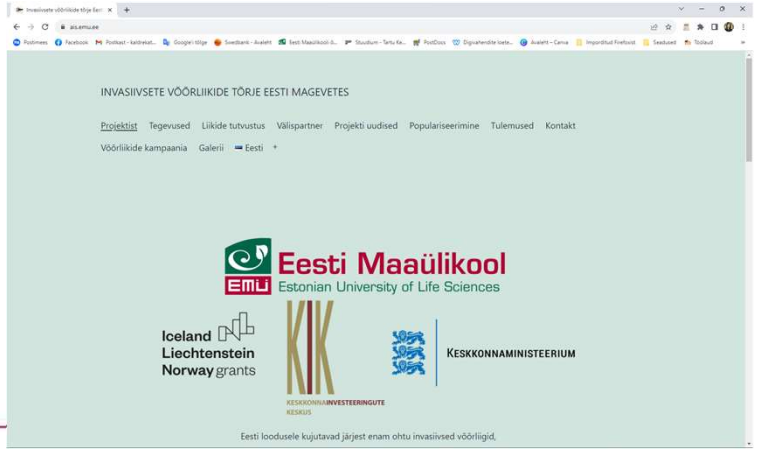
Activities III

Raising public awareness

- Opening seminar of the project
- Project homepage [ais.emu.ee](ais.emu.ee)
- Calls through the media to notice and report on NICS (social media, articles in journals, TV shows and news)







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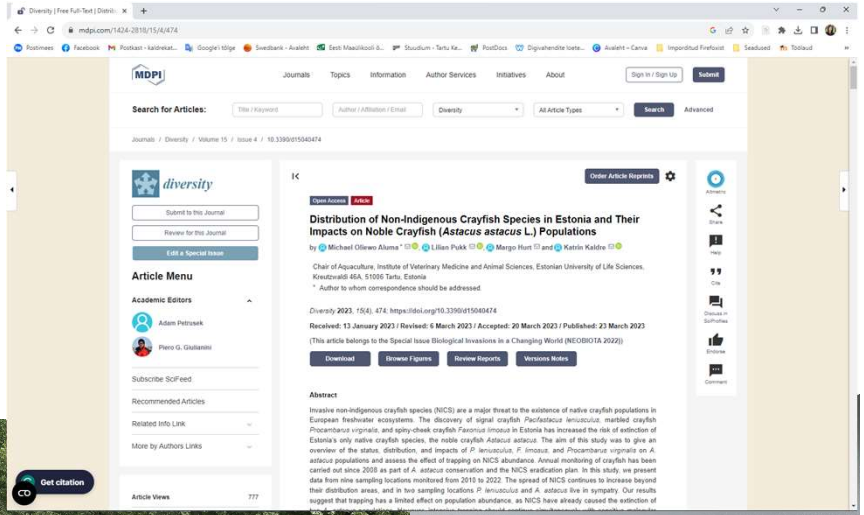
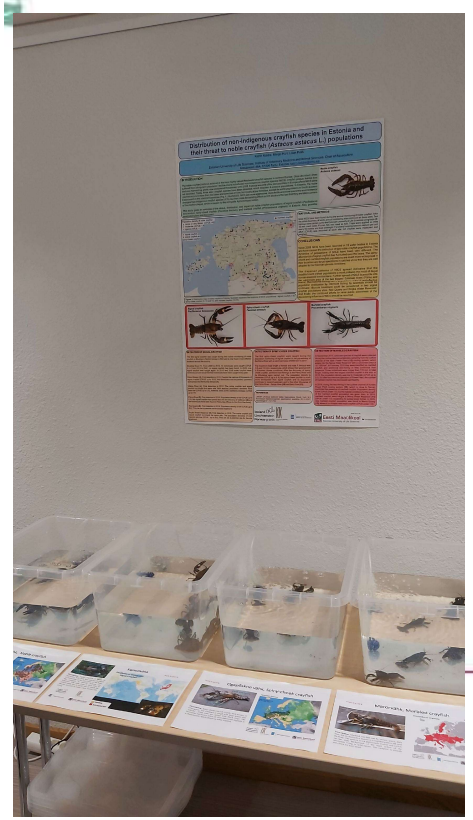
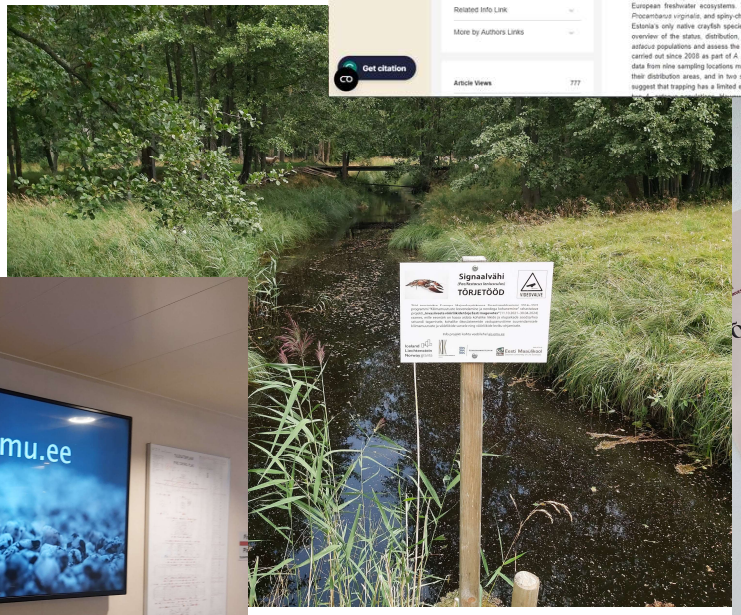
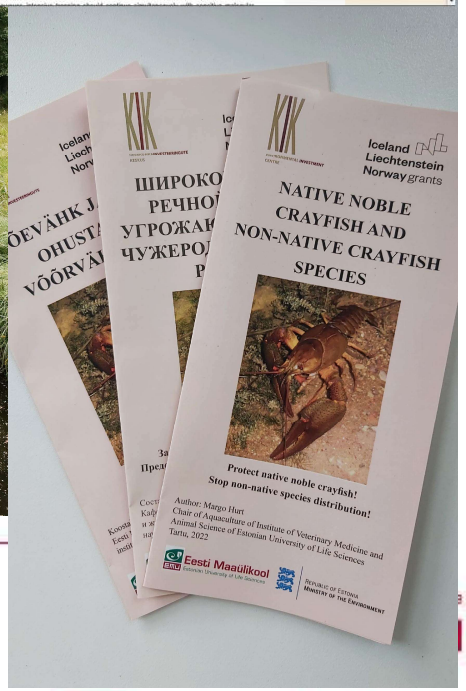
Raising public awareness

- Information boards
- Leaflets
- Advertisement on ferries
- International NeoBiota conference
- Science publication, MSc and BSc theses



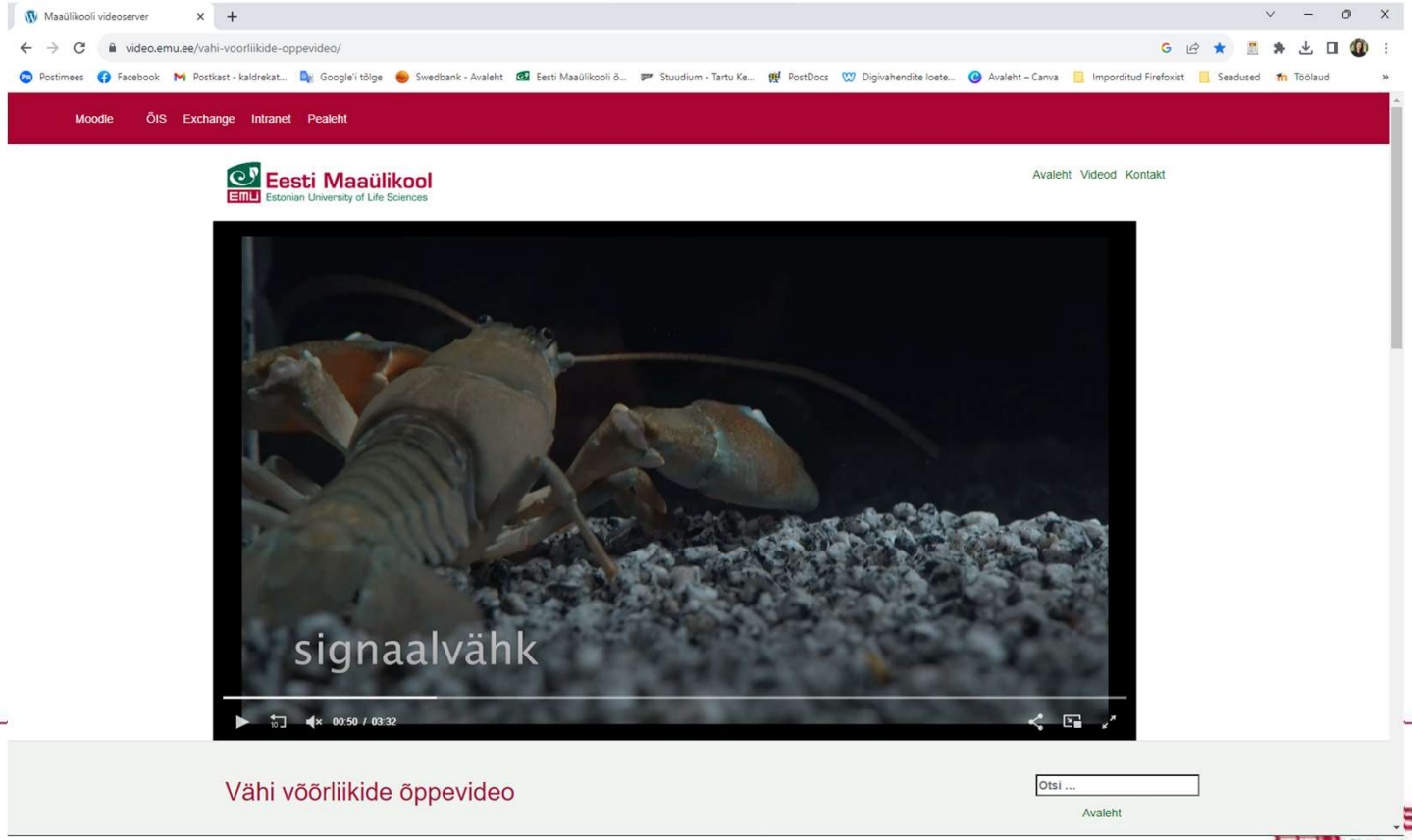






Raising public awareness

- Educational videos about the NICS
  - https://video.emu.ee/vahi-voorliikide-oppevideo/
  - https://video.emu.ee/vahi-voorliikide-kampaania-video/



Training courses for officials on the prevention and practical control of the spread of aquatic alien species

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