



Ambitious dam removal projects in Finland

Life Good Water Conference,
20.-21.9.2023, *Cēsis, Latvia*

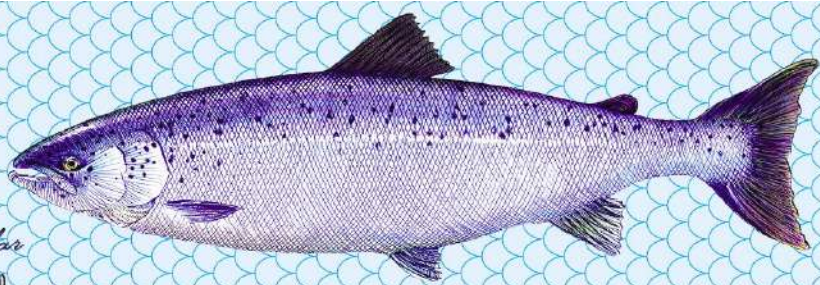
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Salmo salar

Lohi (meri- ja järvi-lohi)

R: Atlantlax — E: Atlantic Salmon



www.wwf.fi



Cobitis taenia

Rantanuoliainen

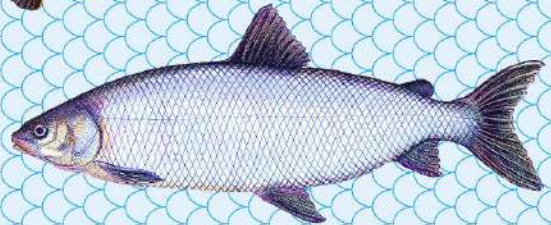
R: Nissöga — E: Spined Loach



Anguilla anguilla

Ankerias

R: Europeiskäl — E: European Eel



Coregonus lavaretus

Siiika (vaellus-, kari- ja planktonsiiika)

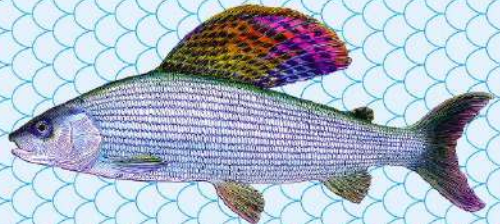
R: Sik — E: Whitefish



Salvelinus alpinus

Nierä (Saimaan nierä)

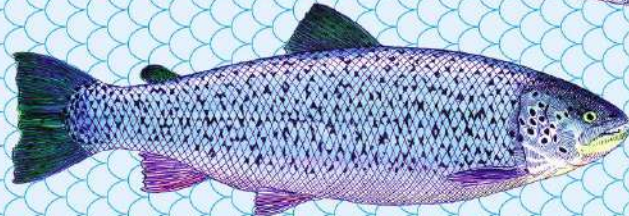
R: Röding — E: Arctic Charr



Thymallus thymallus

Harjus (merikuttiset kannat)

R: Harr — E: Grayling



Salmo trutta

Taimen (meri- ja järvi-taimen)

R: Öring — E: Brown Trout

Uhanalaiset kalamme



© Sakke Yrjölä / WWF



Migratory fish species became endangered in Finland

Critically endangered species: eel, landlocked salmon, arctic char (Lake Saimaa population), grayling (sea population)

Causes for the endangerment



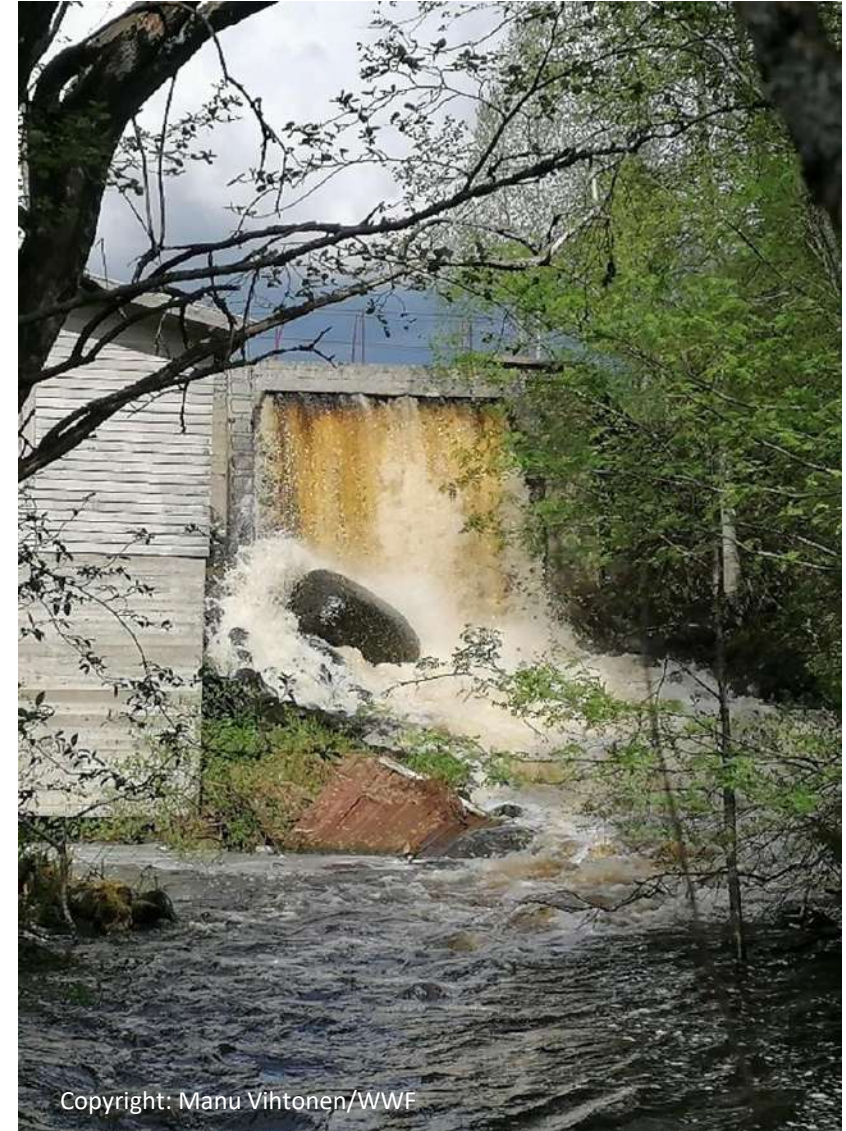
Dams are the main cause for the poor conservation status of migratory fish in Finland. Dams block the fishes' routes to their spawning grounds. Hydropower plant turbines are dangerous for fish migrating downstream.

For the spawning to succeed the gravel size in the stream bed needs to right size and the flow velocity suitable so that the eggs get enough oxygen and that they are not washed away with the current.

Rivers and streams have been drained, cleared of rocks and wood and straightened for decades for forestry and agriculture. Only a few percent of streams in southern Finland are in natural condition.

Naturally also fishing affects the fish stands.

Nutrients and sediment ending up in water bodies through erosion cover the gravel beds that are important for stream organisms. Climate change and mild winters will make the situation worse.



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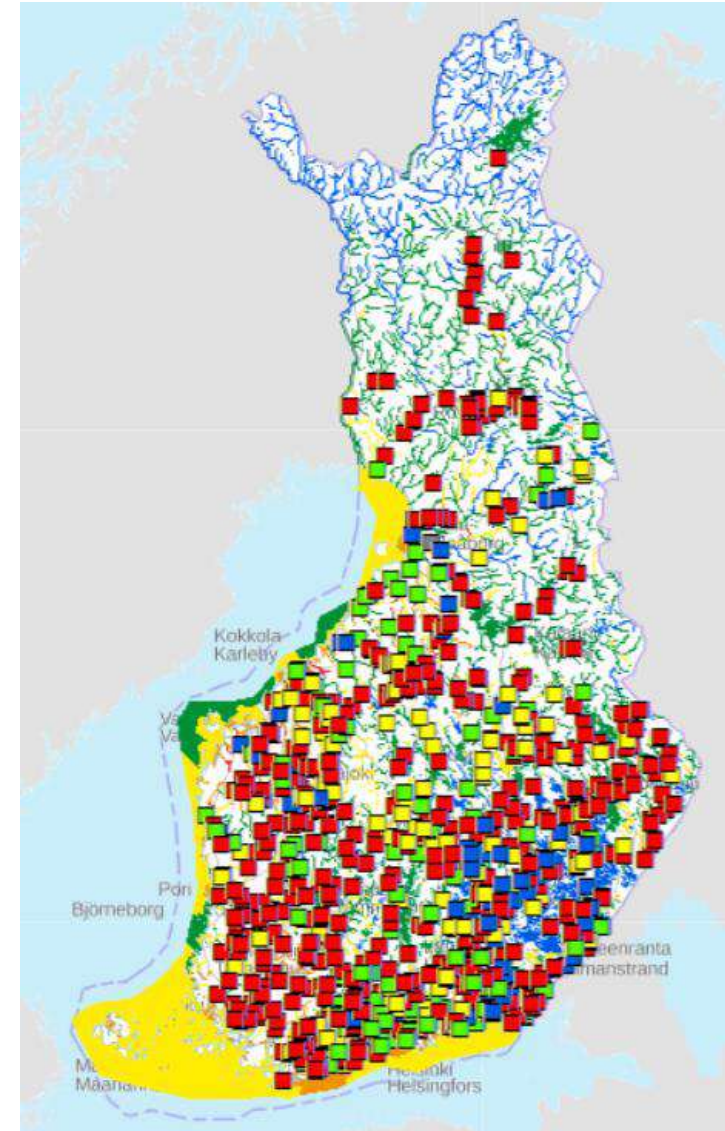


Copyright: Joonas Fritze/WWF

Migration obstacles in Finland



- There are about 5200 dam structures in Finland of which 2000-3000 are obstacles for fish migration. (Finnish Environmental Institute, 2021 VESTY-database; Koljonen, 2021)
- About 700 dams are in hydropower use but only 219 are connected to the national electricity grid.
- Majority of the hydropower plants are insignificant for the grid (Koljonen, 2021)
- There are at least 140 and at most 500 hydropower plants or former hydropower dams, whose water permits completely lack obligations towards the environment, i.e. for example the obligation to organize free passage for the fish.
- In addition, there are about 30 000 culverts that are migration obstacles (Eloranta & Eloranta, 2016).



Source: Finnish Environmental Institute: Vesikartta

Migratory fish have hope for the first time in a century

Systemic change in Finland?



- Two past and the present government acknowledged the problems related to migratory obstacles and funding instrument (NOUSU-programme) was developed. Ca. 18 million has been directed to dam removal so far.
- More than 200 obstacles have been removed in Finland during the years 2021-2022 alone (NOUSU- and Helmi Habitats Programmes).
- Finnish Forest Administration aims to remove 970 obstacles by 2030 (Helmi Habitats programme).
- Together with other actors WWF Finland has removed 50 obstacles within 6 years.
- The conservation status of Brown trout (*Salmo trutta*) improved 2010-2019 and the cause was the removal of migration obstacles and stream restorations.
- After Hiitolanjoki dam removals the return of migratory fish was unprecedented = fast results!



Cooperation is at the center of dam removal



- Dam removal from start to finish is rarely completed by one single actor. In fact, many times cooperation leads to better results.
- The **leading actor** should have enough resources to finalize the project and they may need:
 - Financial support
 - Know how in dam removal procedure
 - Encouragement
 - Speeding up
- Procedure to apply for the water permit may be dreadful thing: Support, support, support!
- Very important to engage all the relevant stakeholders.
- Include The National Heritage Agency in every relevant case.



Dam removal needs a lot of local actors



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Who are the actors?

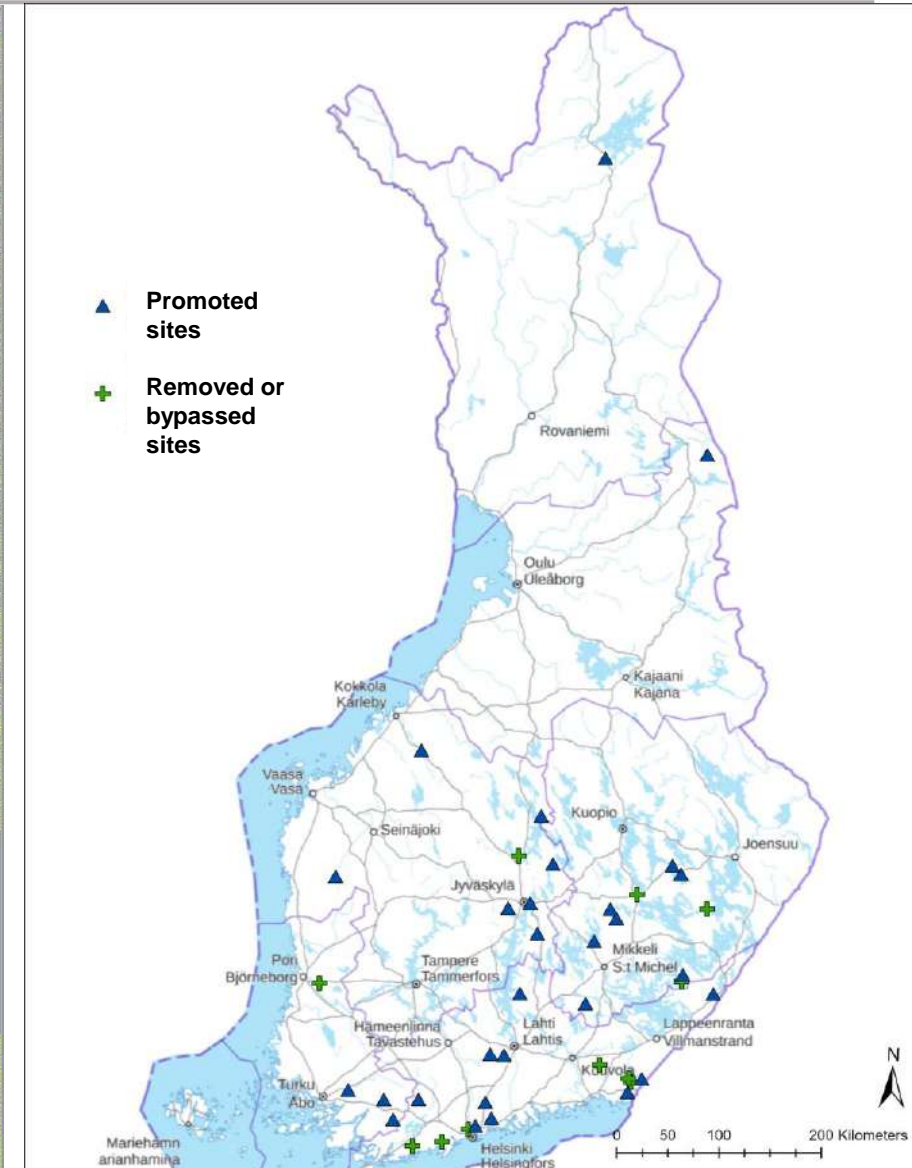
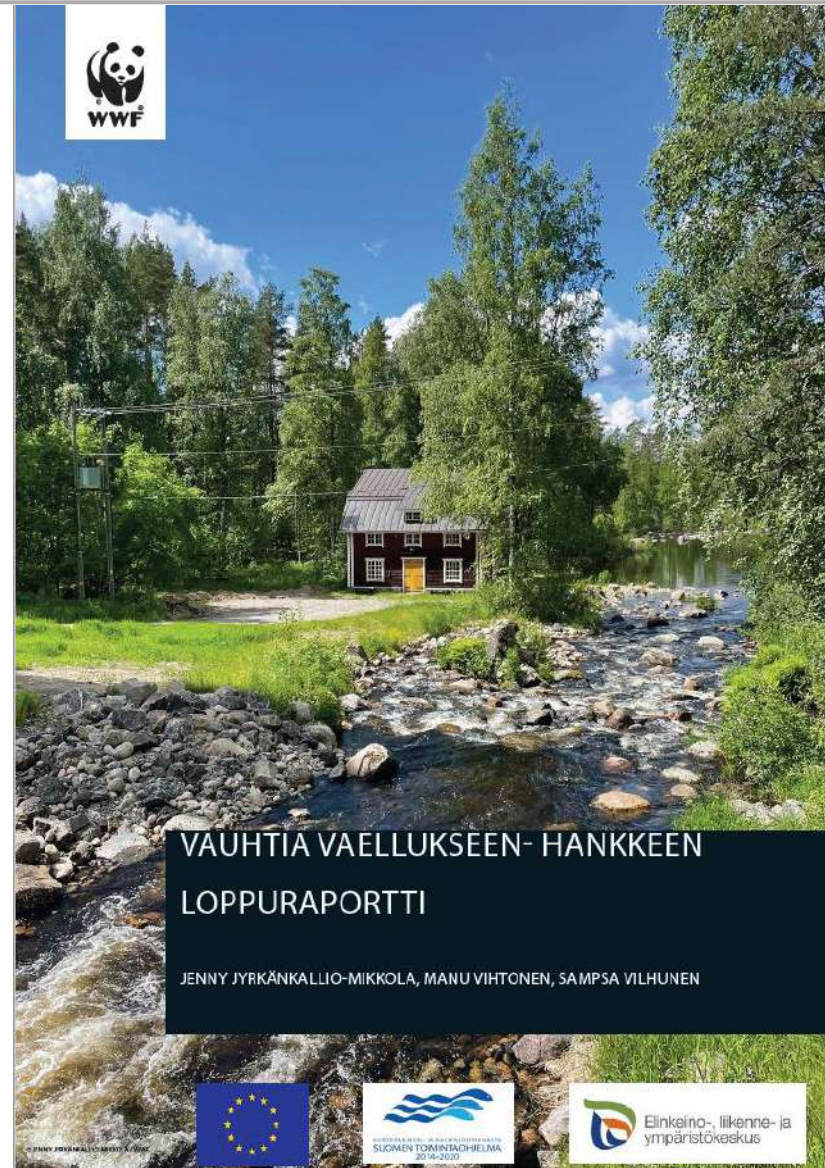
- Companies
- Joint water management associations
- Municipalities
- NGOs and projects
- Regional recreational and development foundations
- Centres of Economic Development, Transport and the Environment
- Fishery Regions

Locality is important because of dedication and ownership of the project.

Project Vauhtia vaellukseen (Speed for migration)



- 3,5 year project that ended in December 2022.
- Focused on removing obsolete dams. However, even dams in active hydropower use were eventually removed.
- During the project together with other actors 14 obstacles were removed or bypassed and the removal of 29 obstacles were promoted. 570 km of free flowing streams were opened and 1,8 ha of spawning grounds created.

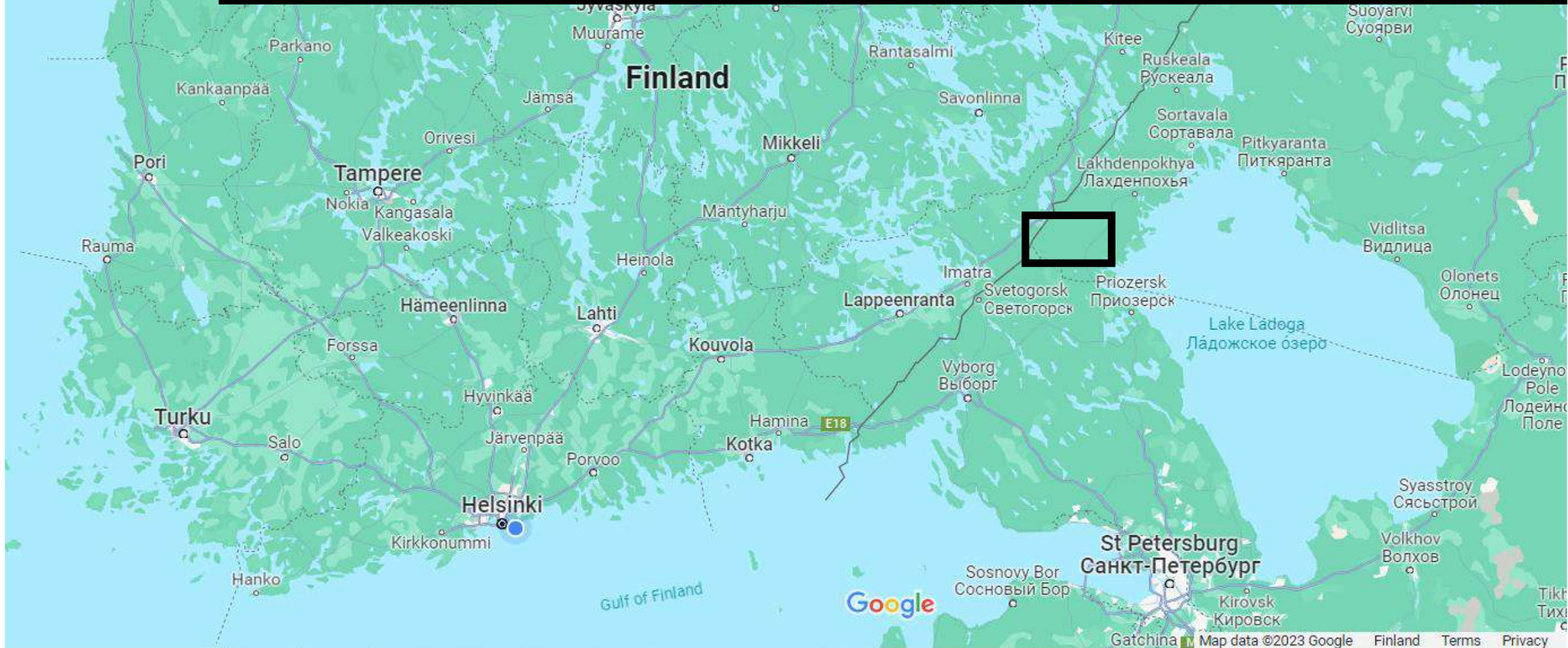




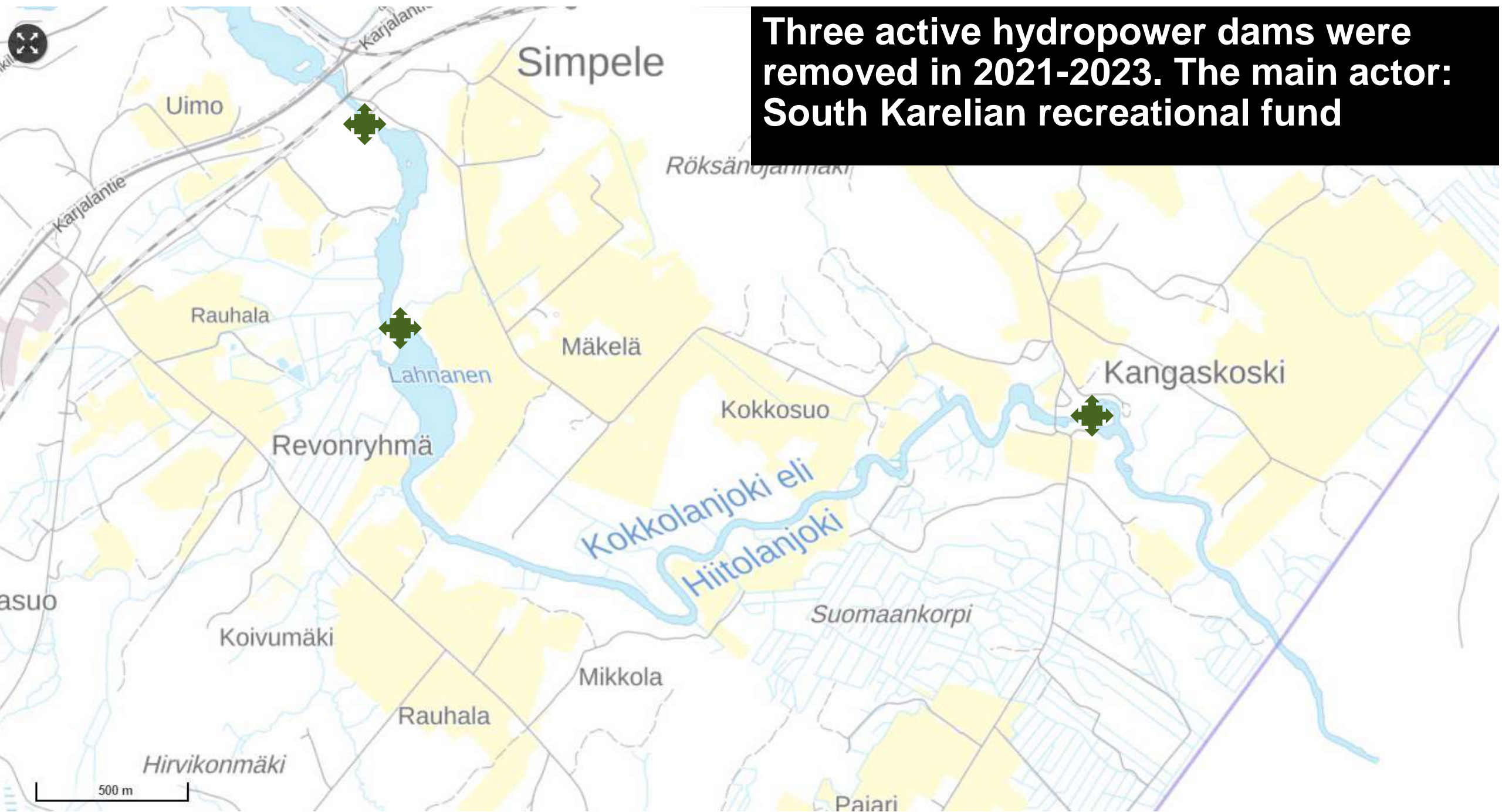
Case Hiitolanjoki, Rautjärvi



Hiitolanjoki is 53 km long transboundary river that flows into lake Ladoga in Russia. 8 km of the river is on the Finnish side of the border. The dams on the Russian side of Hiitolanjoki were already removed in the 90's.



Three active hydropower dams were removed in 2021-2023. The main actor: South Karelian recreational fund



Hiitolanjoki, Kangaskoski dam removal 2021

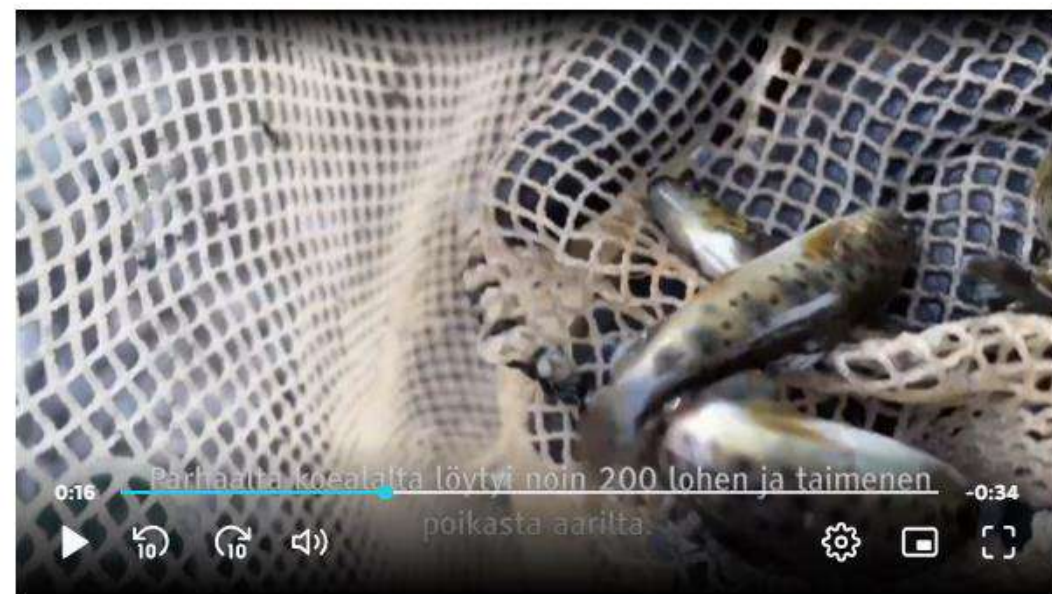


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Padon purku riehaannutti harvinaiset lohet kutemaan – tutkijat hämmästyivät: "En ole törmännyt tällaiseen koskaan Suomessa"

Yli sata vuotta valjastettuna olleen Kangaskosken ennallistaminen Etelä-Karjalassa on onnistunut yli odotusten. Ensimmäisessä sähkökoekalastuksessa laatokanlohen ja -taimenen poikasia löytyi määrä, jota kukaan ei olisi voinut kuvitella.



Kangaskosken ennallistaminen villitsi laatokanlohet kutemaan - koekalastuksessa hurja poikasmäärä.

SIRKKA HAVERINEN

22.8.2022 19:42

 Jaa

After Kangaskoski dam removal in summer 2022 over 200 juvenile salmonids / are were found from the best test area = unprecedented result in Finland

<https://yle.fi/a/3-12586930>

Hiitolanjoki, Lahnaskoski dam removal 2022



Hiitolanjoki, Lahnasenkoski dam removal 2022



Ennätykset paukkuvat harvinaisella lohijoella – "Muutaman vuoden päästä voi olla kova ruuhka", sanoo asiantuntija

Kaakkois-Suomen ely-keskuksen koekalastajat ovat äärimmäisen tyytyväisiä sähkökoekalastusten tuloksiin.



Vesistöpäällikkö Matti Vaittisen (vas.) mukaan järvilohet ja taimenet viihtyvät samassa ympäristössä. Isompi lohi kuitenkin valtaa parhaat kutupaikat ja taimen kutee siellä, missä mahtuu. Kuva: Ville Toijonen / Yle

MARIKA ANTTONEN, VILLE TOIJONEN

10.9. 9:31

↪ Jaa

After the second dam removal in 2023 the numbers in Kangaskoski (1.) were much higher than 200 salmonid juveniles / are and more than 100 juveniles / are were found from Lahnaskoski (2.)

<https://yle.fi/a/74-20049016>

Ritakoski dam removal in 2023



Copyright: Mikko Nikkinen/Storymakers



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Case Ämmäkoski dam, Varkaus

Ämmäkoski, Varkaus

In autumn 2022 a natural bypass was built around Ämmäkoski dam. At the same time the rapids were restored to enhance the spawning of migratory fish. Forestry company Stora Enso gave 10 m³ from the hydropower of their factory to the bypass and to rewet the rapids.

A magnificent example of cooperation: Navitas Kehitys Oy (leading actor), City of Varkaus, Stora Enso Varkaus Factory, NOUSU-programme by the Ministry of agriculture and forestry, WWF Finland, Rudus Oy





19.09.2023 05:59:31



Case Palokki dam, Heinävesi



Endangered migratory fish in Lake Saimaa

The existence of the land locked salmon (*Salmo salar m. sebago*) and the lake trout has (*Salmo trutta m. lacustris*) for decades based on rearing for restoration purposes because of the dams blocking majority of their natural spawning grounds.

Acute threat is the water mould that kills spawners and juvenile fish in aquaculture facilities.

The last original stock of lake trout has survived in the free rapids of Heinävesi route. Land locked salmon has been able to breed in these rapids for in a small scale. The most important rapids in Heinävesi route were lost when Palokki was dammed. There are fewer spawning lake trouts than Saimaa seals.

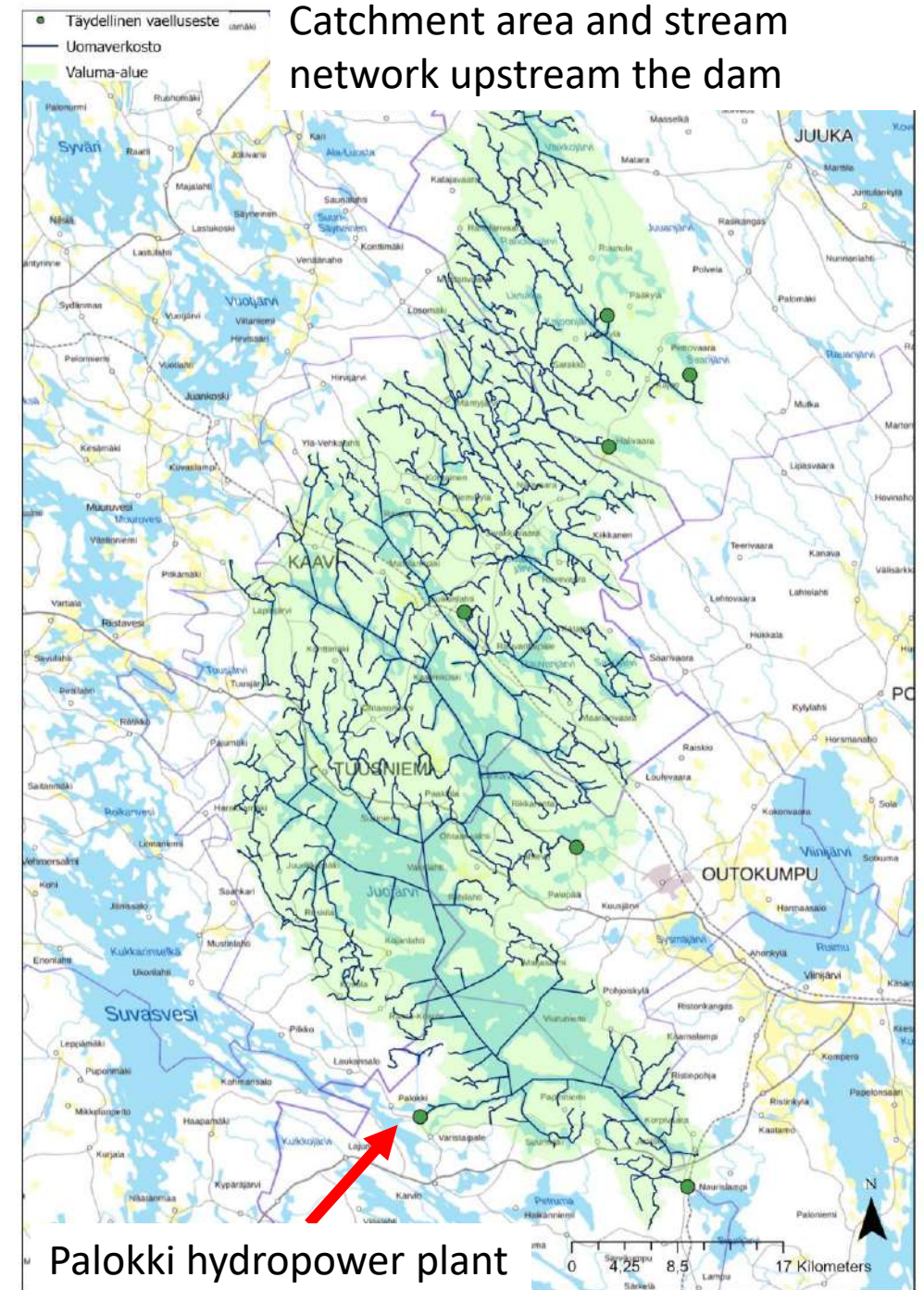
Ending the hydropower production, removing the dam and restoring the rapids is critical for the survival of the lake trout and critically endangered land locked salmon.

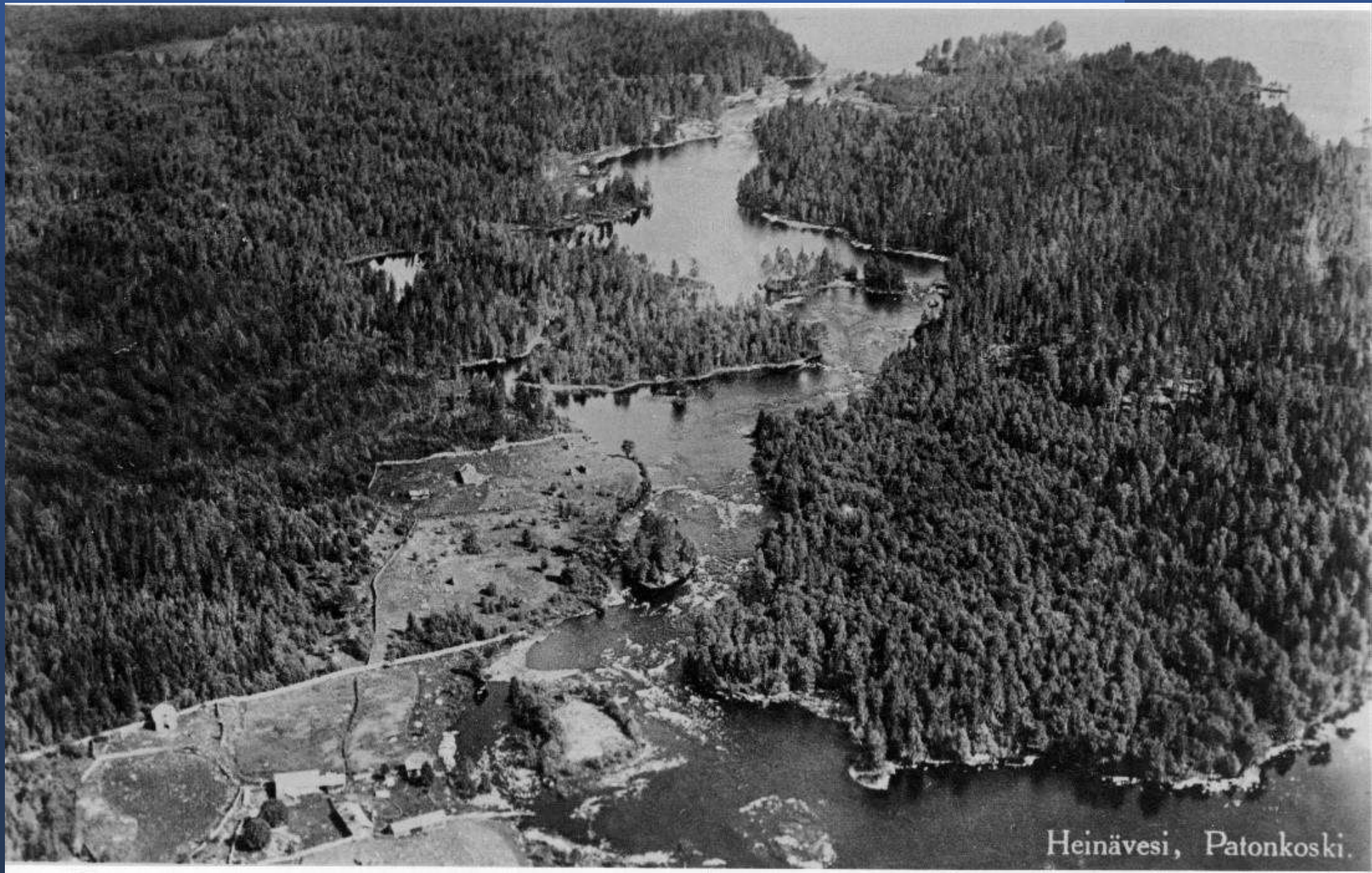


Palokki hydropower plant, Heinävesi

Palokin hydropower plant, Heinävesi:

- A very significant migration obstacle!
- The dam was built in the beginning of 1960 for the use of Outokumpu mining company partly in vain. From the nine rapids majority are now under the reservoir and the rest dry for most part of the year. Before the dam was built these rapids formed possibly the longest continuous rapid section in southern Finland.
- North Karelia Electricity owns the plant. From the total electricity produced in Finland (70 000 GWh) Palokki produces only 0,4 permille. Now the turbines need to be changed which is a big investment, and which will affect the company's will to sell the plant.
- Removal of the dam and restoration of the rapids would restore 26-30 ha of spawning grounds and would produce 20 000 - 32 000 fish juveniles /year.
- In March 2023 23 NGOs sent a demand for the environmental authorities to change Palokki hydropower plant fisheries obligations. Fisheries obligations based on the water act can be changed if conditions essentially change.
- The removal of the dam and stream restoration is mentioned in the governmental programme and funding is earmarked to buy factory and area around it and compensate the company for the missed electricity production. We live exciting times now!





Archive photo

Money may not be the most important thing but it helps dam removal



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Dam removal takes often several years from planning to implementation.

- Long lasting funding is crucial and NOUSU-funding has been a very important instrument.
- The importance of private funding will grow in the future.
- Project funding that enables the promotion of dam removal is much needed.

Dam removal benefits the economy directly through planning, construction and monitoring.

References:



Eloranta, A.J. & Eloranta, A.P. 2016. Prevention and remediation of environmental problems associated with culverts. Pilot research in Central Finland. - Keski-Suomen ELY-keskus, report, 198 p.

Finnish Environmental Institute. 2020. Vesistöiden tietojärjestelmä (VESTY). [Online-database]

Koljonen, S. EU:n biodiversiteettistrategian vaikutus Suomen kannalta VASU-hankkeen webinaari 15.6.2021, 8: Ennallistetaan vähintään 25 000 km vapaana virtaavia jokia, https://mmm.fi/documents/1410837/80728857/Luke+Syke+VASU_webinaari_esitys_15062021.pdf/73ae6850-54f7-7437-932a-56043df1002d/Luke+Syke+VASU_webinaari_esitys_15062021.pdf?t=1623831884743



Thank you