River restoration experiences in Estonia

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Quality of Estonian running water-bodies

Main factors assessing the hydromorphological status of rivers in Estonia

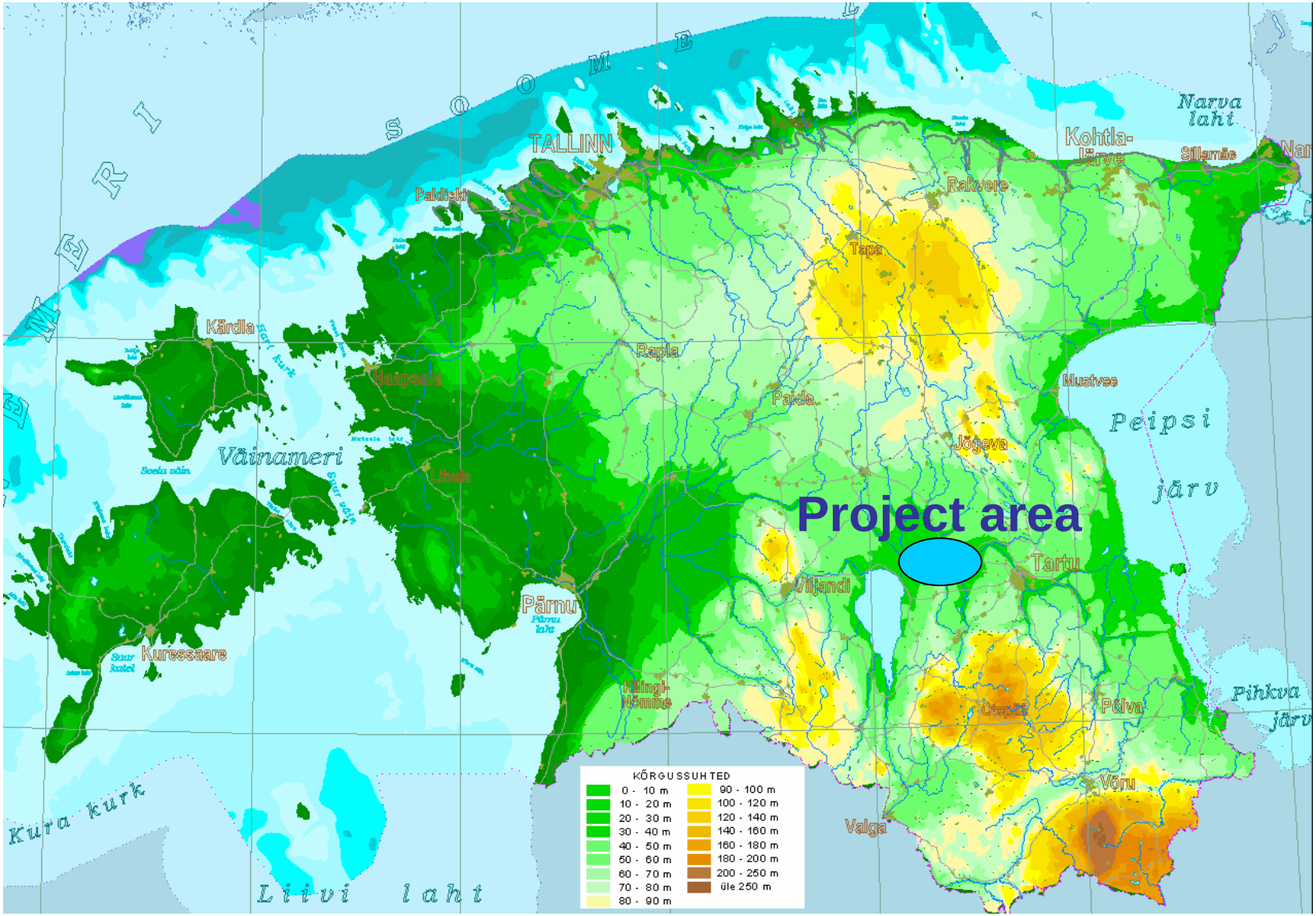
- Dredging of rivers (influence connected with amelioration). Intensive dredging activity in 1950-s and 1960-s. **No actions nowdays**.
- Physical conditions of river beds – falling trees and bank erosion. Detailed analysed only in some extent.
- River fragmentation by damming. Mainly watermill dams from the period before II World War. **No new dams from the period after 1990**.
- **Beaver dams mainly from the last 20 years**.
- Runoff regulation: **very local extent**.

Main projects of river restoration in Estonia

- Opening connection between river and meanders and oxbow lakes
- Rewatering the old river beds
- Removal sediments, falling trees and vegetation mass from river bed
- Improwing the haydraulic conditions of articial channels
- Construction of fishpasses
- Sedimentation basins for amelioration systems
- Sanitation of small water reservoirs and watermill ponds

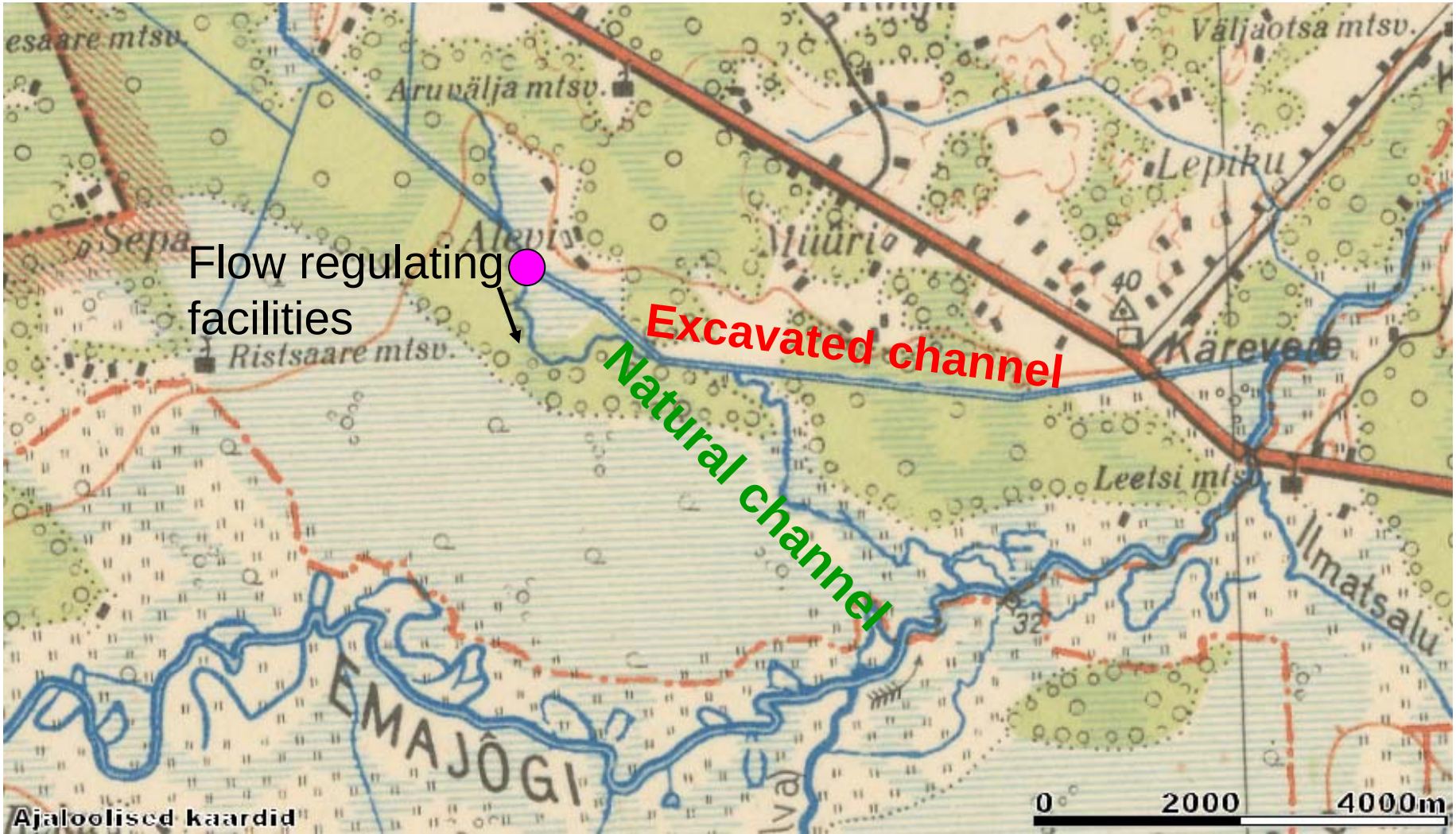
HAPPYFISH: LIFE+ project "Saving life in meanders and oxbow lakes of Emajõgi River"

The Emajõgi River is connecting the two biggest lakes of Estonia: L. Peipsi (the fourth largest lake of Europe) and L. Võrtsjärv.



Rewatering the old riverbeds

By human activities (dredging of watercourses) the running water in the natural riverbed is missing. The projects aim to restore the streches of the Laeva and Oostriku rivers.



River bed restoration (remove trees, plants and sediments)

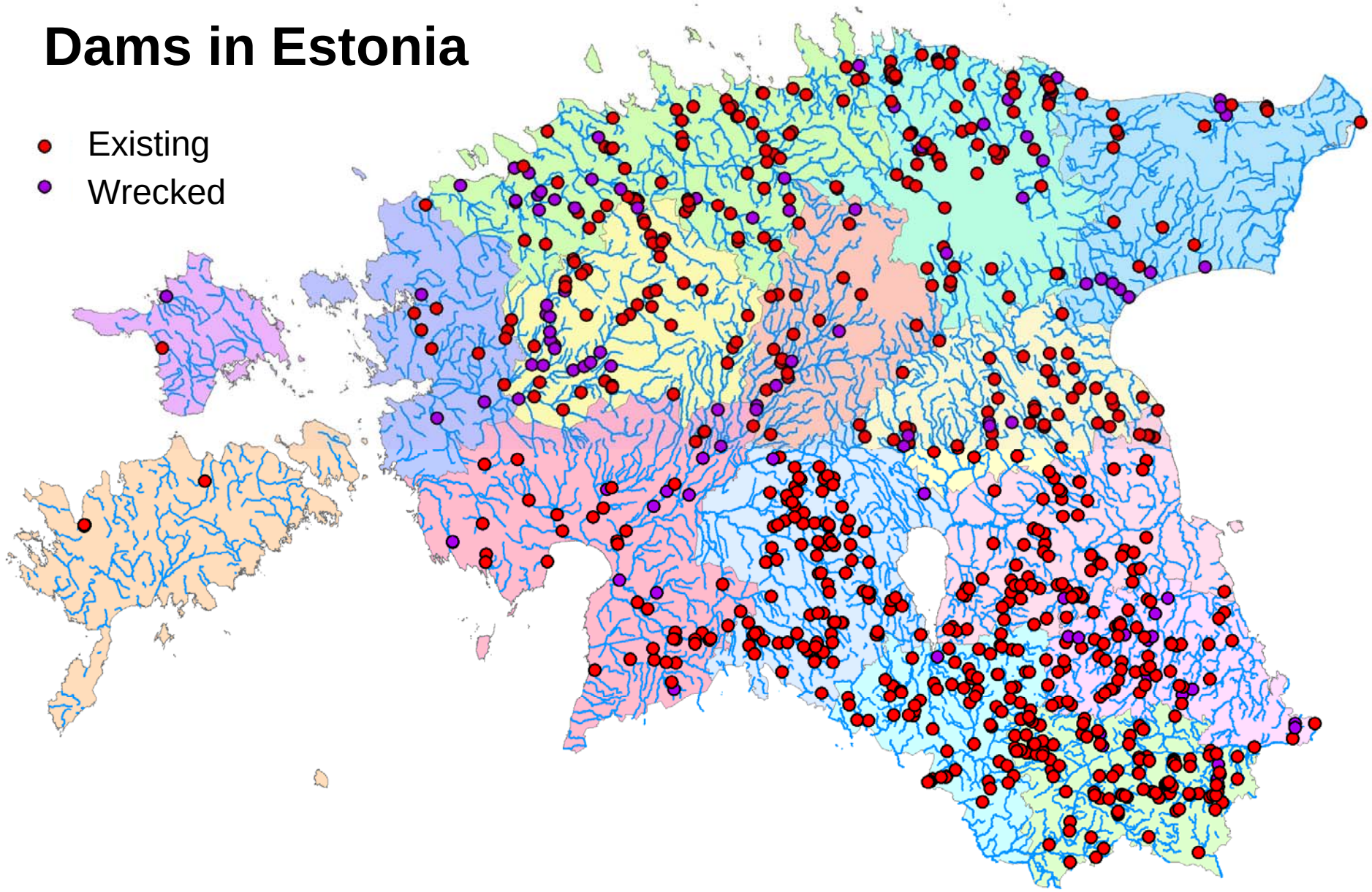
Comparison before and after restoration

Restoration of artificial channel

Artificial rapids

Dams in Estonia

- Existing
- Wrecked



Impact of damming

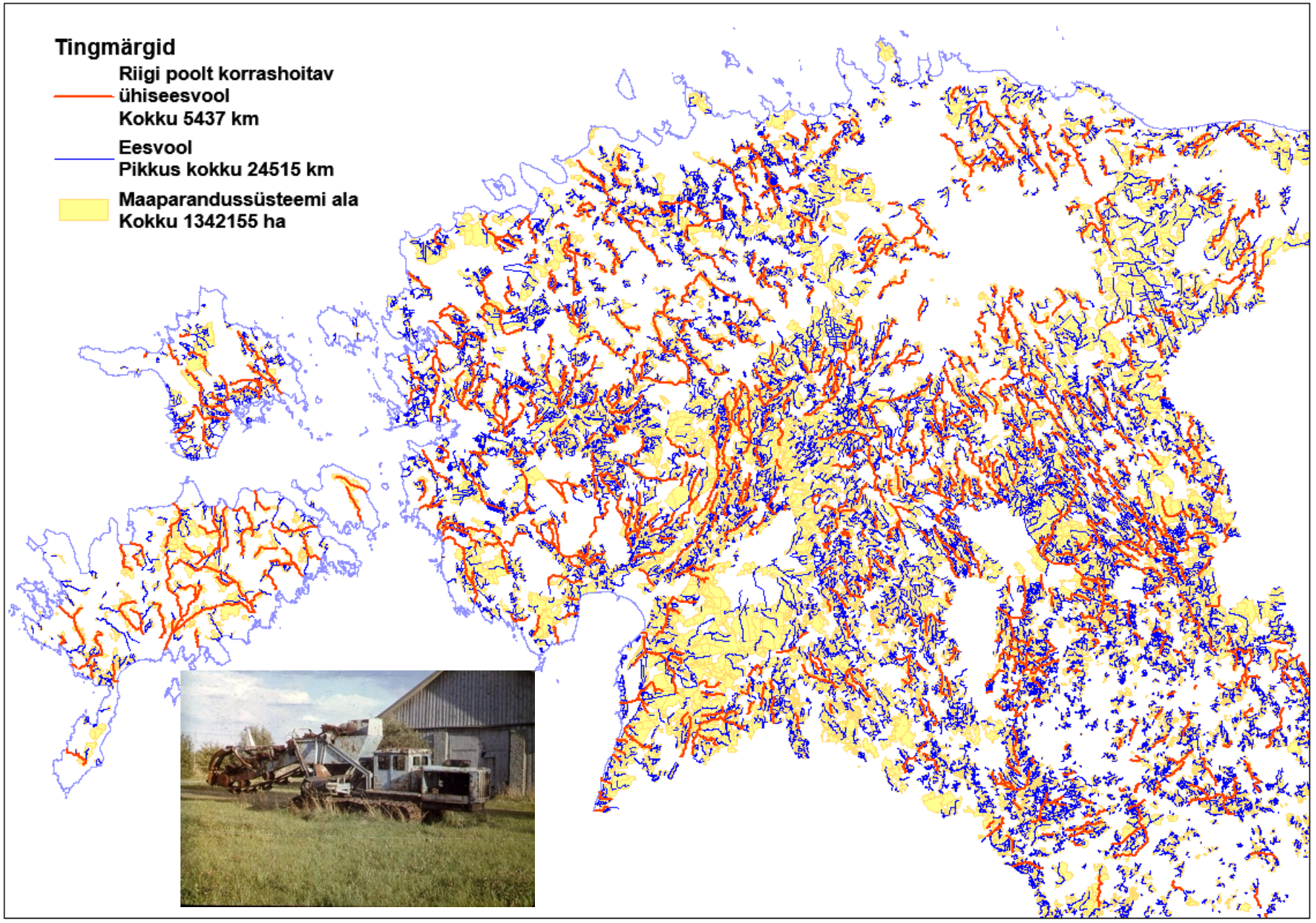
Impact	**Salmon rivers**	**Other rivers**
No	No dams	No dams
Weak	Dams with fishpasses	Fishpasses by water legislation
Moderate	Dams with fishpasses but these do not always function due to low runoff	Dams with fishpasses but these do not always function due to low runoff
Strong	50 % dams no fishpasses or beaver dams more than 1 per 2 km	50 % dams no fishpasses or beaver dams more than 1 per 1 km

Ruins of old dam as barrier for fish migration

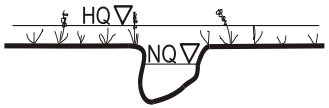
Ruins of old dam were open for fish migration

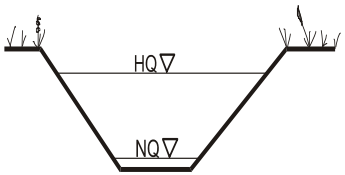
Fishpass on the Leevi River (catchment area 107 km^2)

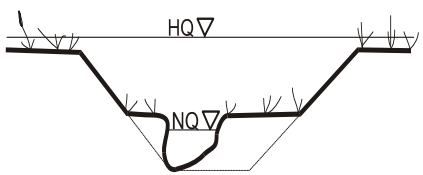
Ameliorated land – 35 % from total territory in Estonia

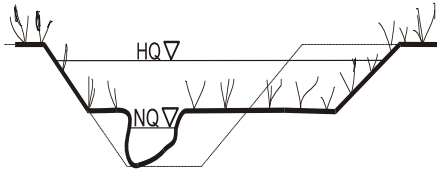


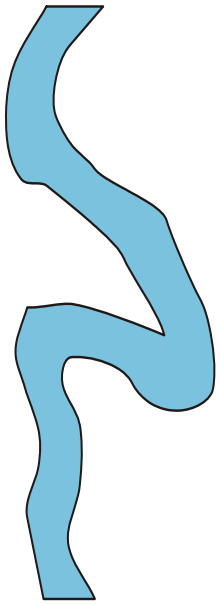
Sedimentation basins

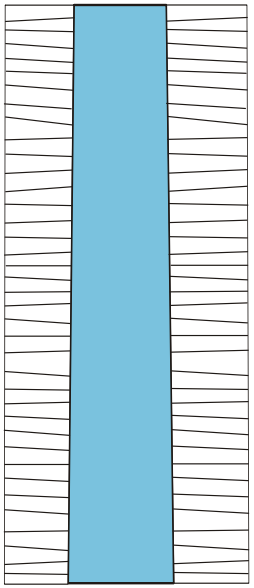


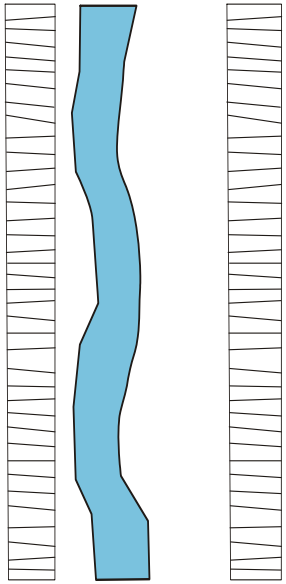


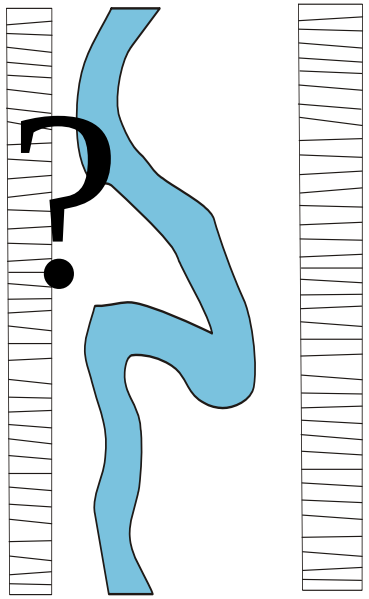












Natural

Excavated

Renaturalisation

Reexcavation

Principle difference of restoration activity

- **Passive scenario** – to facilitate natural “renaturalisation”
- **Active scenario** – use of different technical measures for achieve environmental purposes – ecological engineering
- During last 10 years have been carried out some projects under the general title “Technical assistance for improvement of ecological quality of watercourses”

In reality the diversity of very small riverbeds is better than determined by digital topographic data

Total number of **beaver dams** is much bigger than the number of antropogenic dams

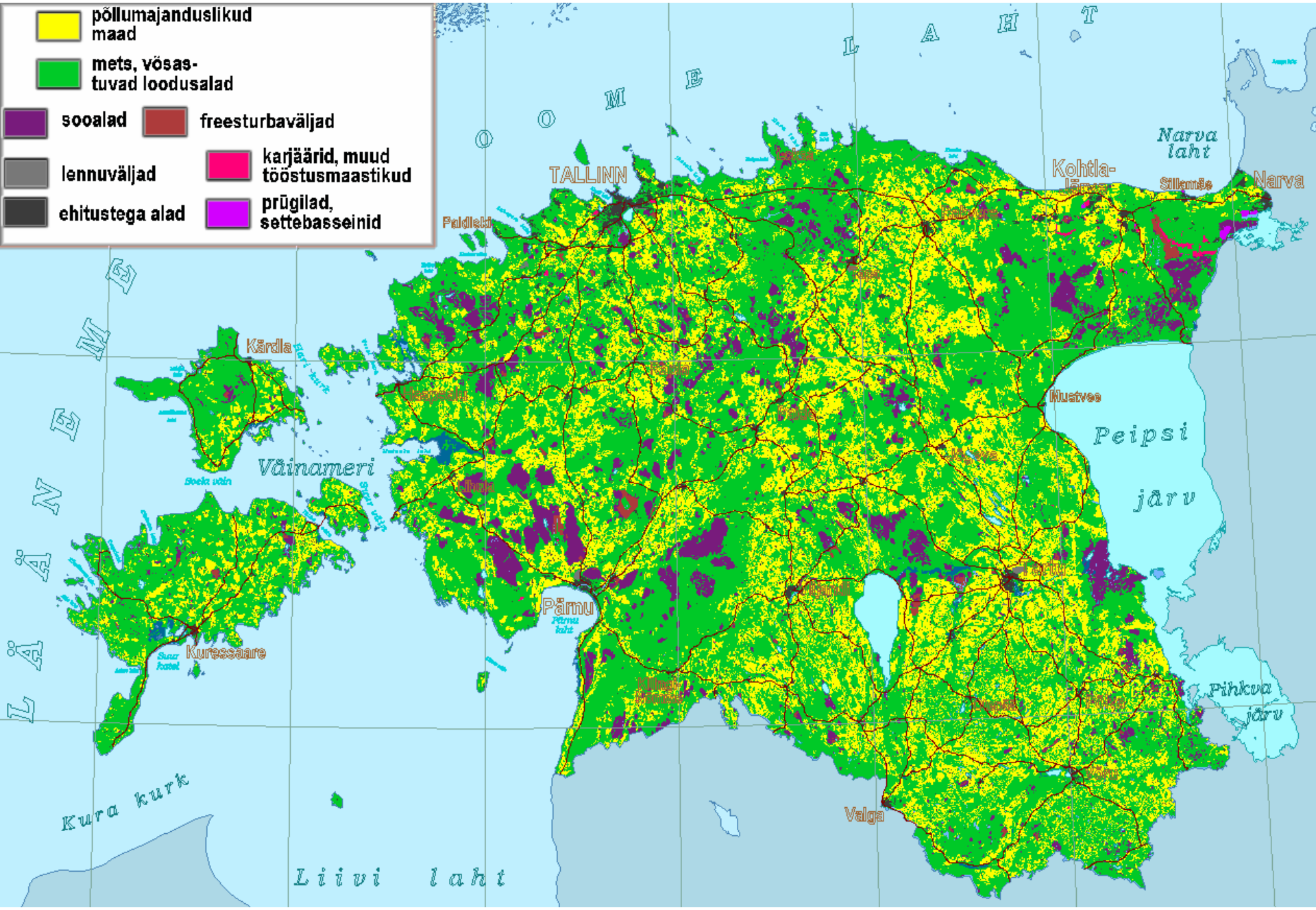
Beavers population in Estonia

20000
15000
10000
5000
0

1975
1980
1985
1990
1995
2000

Beavers ponds and lakes

Welcome to visit the restorated Estonian rivers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mets, võsas-tuvad loodusalad
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lennuväljad
karjäärid, muud tööstusmaastikud
ehitustega alad
prügilad, settebasseinid
TALLINN
Narva laht
Narva
Kohtla-
Sillamäe
Paldiski
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Pihkva
järu
Valga
Kura kurk
Liivi laht