Dam removal in Finland
Reasons, goals, status and social perspective

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International seminar on dam removal

22.-23. 5. 2019 Pärnu, Estonia

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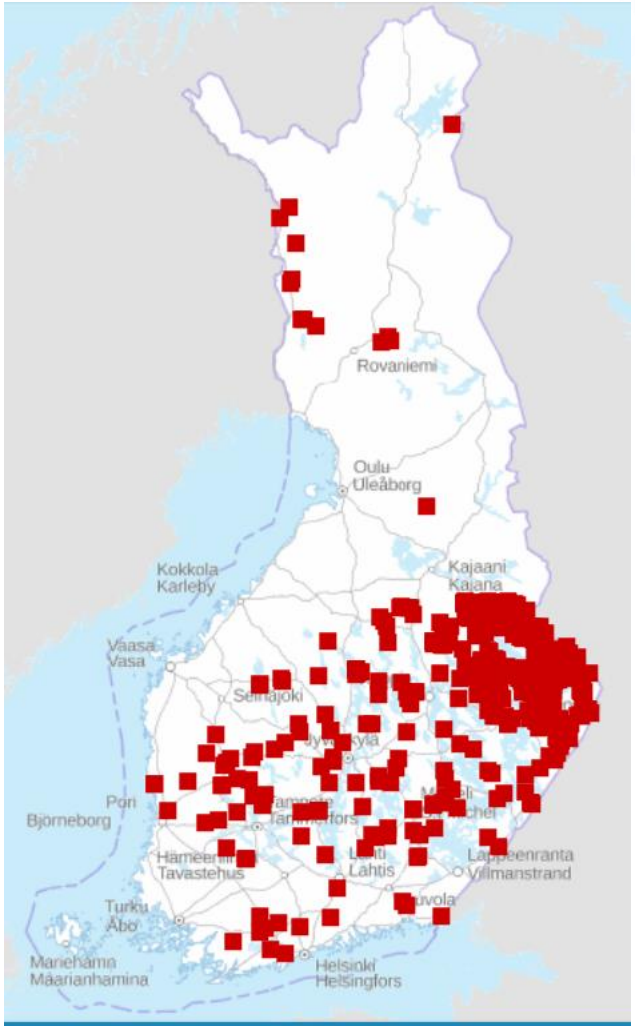
Themes

- Obsolete dam/barrier removals and modifications
- Log floating dams
- Old flour and saw mills, factories
- Regulation dams
- Hydro power: Decommissioning of existing power plants
- Fish passes and new habitats
- Culverts

Dam removal cases

- 500 recorded
- Uneven regional data



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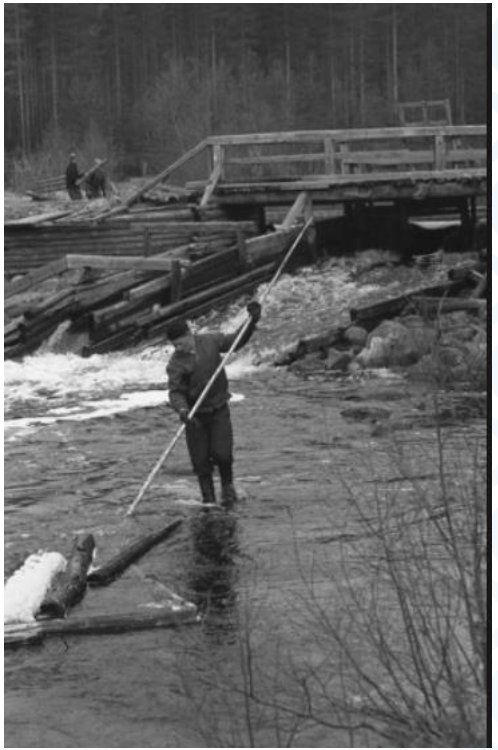
Old log floating dams, in use until 1970's

Were used for increasing discharges temporarily in spring



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Removing structures and restoration of log floating routes was the start of river restoration in Finland

- Timber floating in rivers stopped until 1980 - some have been preserved for historical reasons
- Most have been restrored for fishery

Kolkku.fi

Flour and saw mills, factories

- Always question of preserving memories of history, how much to leave?
- Biggest problems if have been changed to be micro hydro power plants
- Permits can be old and without effective fish passes

R. Hammonjoki, partial removal

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Patakoski rapid, Paimionjoki river

- Only basements of the mill have been preserved in the restoration of the rapid

Photo: Urjanhai

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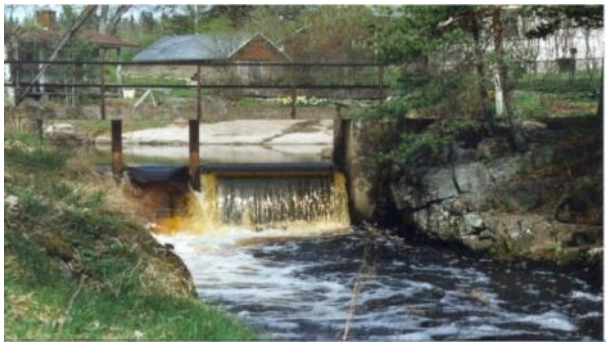
Koskenkylänkoski saw mill dam 1993

- Sides of the dam were preserved
- Water level above was maintained by a nature-like submerged weir
- Sea trout habitat, sport fishing

Restoration of rapids after dam removal
River Vaalimaanjoki 2012

- Stones are placed back after demolition of the mill dam
- Fish habitat for sea trout was created



Before

Modification of a saw mill dam

River Vaalimaanjoki 2015

- Before: The dam was crossing and blocking the river
- After: A longitudinal weir and fish ramp fish migration were constructed
- Water intake to the saw mill was preserved (still principally usable)
- Sea trout migration and reproduction are now possible

Towards the former dam site downstream

From the dam site towars upstream

Modification of existing powerplant site

Kellokoski, River Keravanjoki 2018-2019

- A fish ramp was constructed at the site of the former dammed river
- New channel to lead part of the water to the old powerplant
- Technical fish pass section downstream

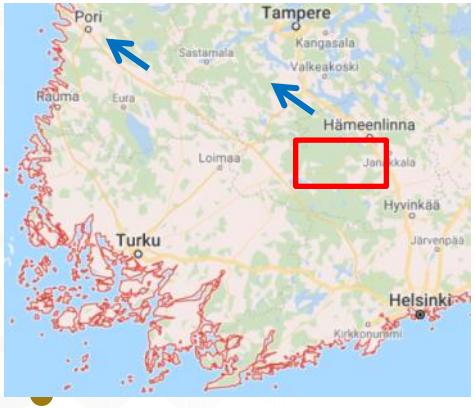
Fish passes at historical stuctures R.Teuronjoki

- Can be needed if the dam has cultural value and cannnot be removed
- Nature-like fish passes should preferred, work for all species
- Example: Old linen fiber factory, nature-like fish pass 2003

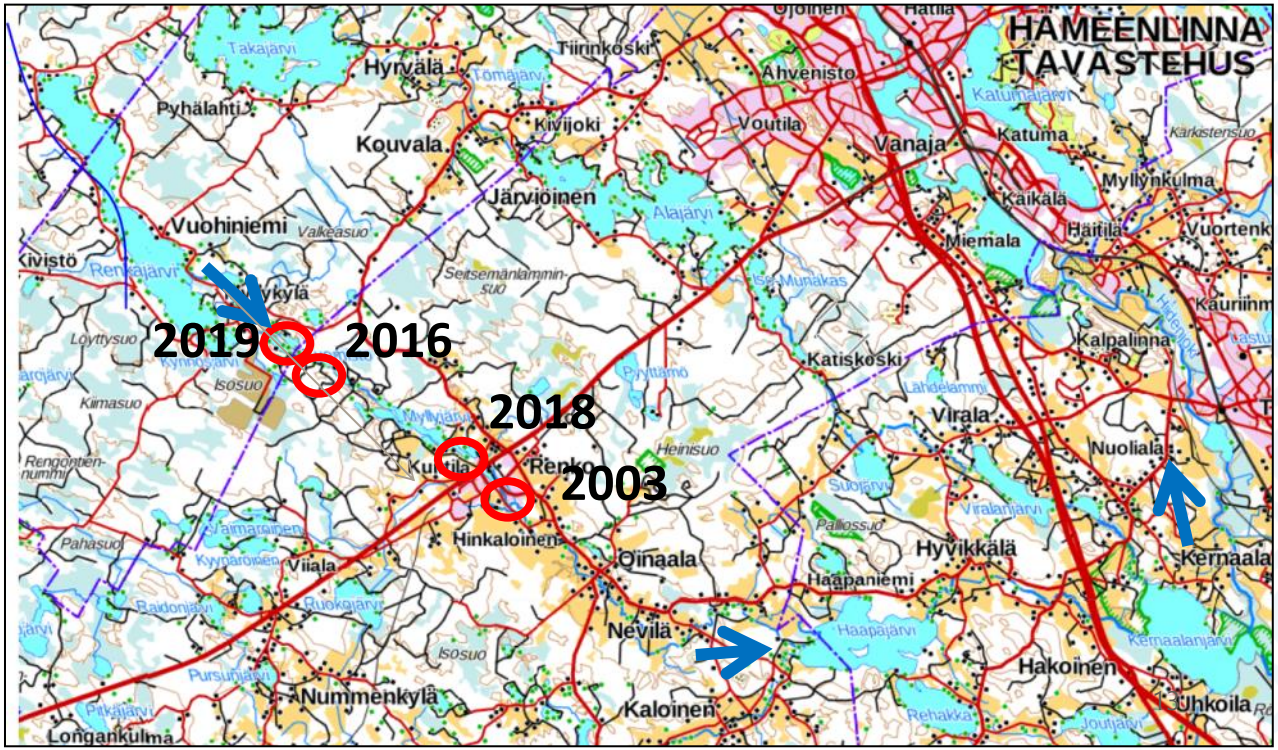
Removal and modification of small dams at a total river section

Renkajoki river 2003…2019

- 24 km, several lakes



→ Flow direction



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Old saw mill dam at Renko village

- Restored for fish 2003, no remnants of the dam left

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Modification of the highest dam 2016

Video still: https://www.vanajavesi.fi/renkajoen-kunnostus

Before

- A rapid for fish migration was constructed
- Part of the dam was preserved as pedestrian bridge

After, 2016 video still

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- New dam head upstream

video still

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Kuittilankoski mill dam

- Modified for fish 2018

- Before

Suvi Mäkelä

After, 12/2018

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- The level of the rapid downstream was raised
- Rather big part of the mill basements were preserved

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- The rapid was restored for trout reproduction

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- New nature-like weir head
- No regulation of the lake is needed anymore

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Last modification of the dam upstream 2019

Before

After 03/2019

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Connection is established to the big lake above

Before

After
03/2019

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Results of the new continuity at Renkajoki river basin

- Natural reproduction and migration of brown trout is now possible
- Expectations for rising value for fishing
- WFD- classification of the river and lakes is rising to high (until now ”only” good, one-out all-out principle)

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Useless regulation dams for water supply
River Raisionjoki 2019-2020

- Several dams will be replaced by nature-like weirs and constructed rapids

Photos: Pöyry

Landscape Architecture

Marko Väyrynen

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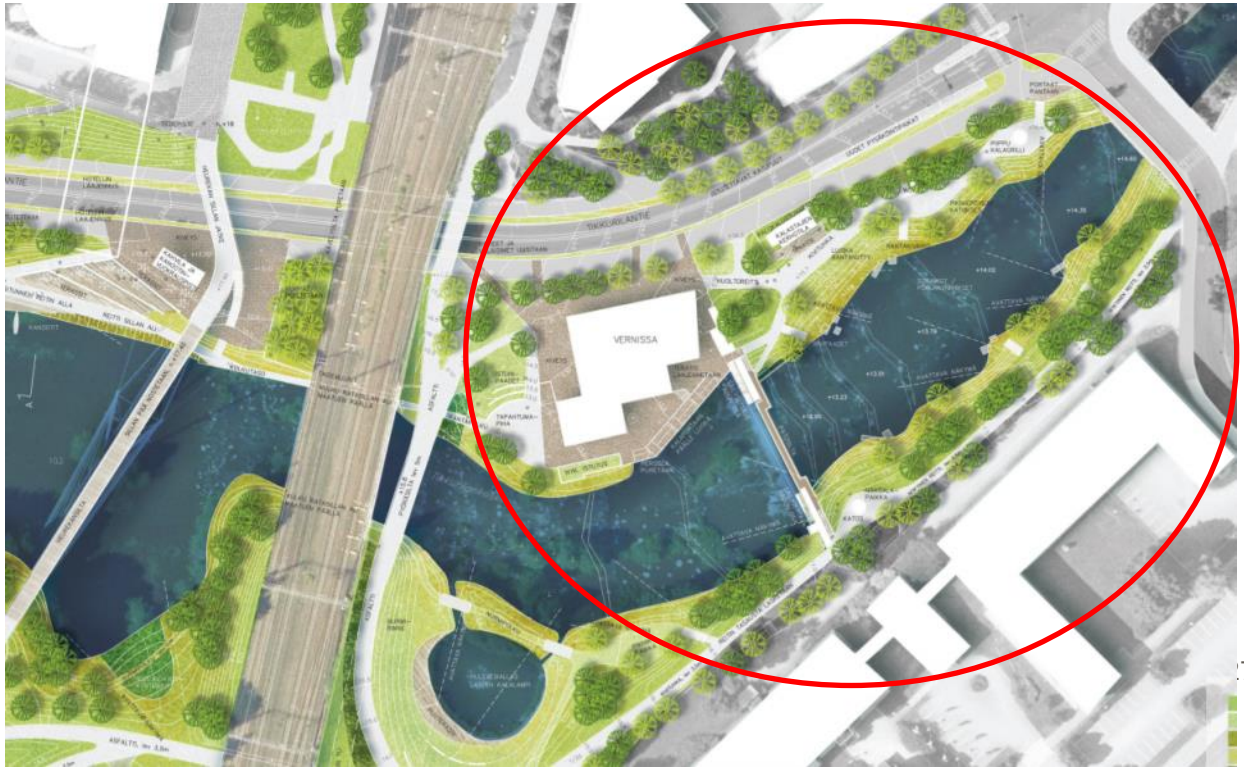
Tikkurilankoski dam, Vantaa city, removal 2019

- Dam for old linen oil press, value for local history (paint factory)
- The city decided partial removal, restoration for sea trout

Promotes recreation in the city centre

Value of Tikkurilankoski rapid for Vantaa city

- Essential part of the city centre
- Landscape architecture competition 2018

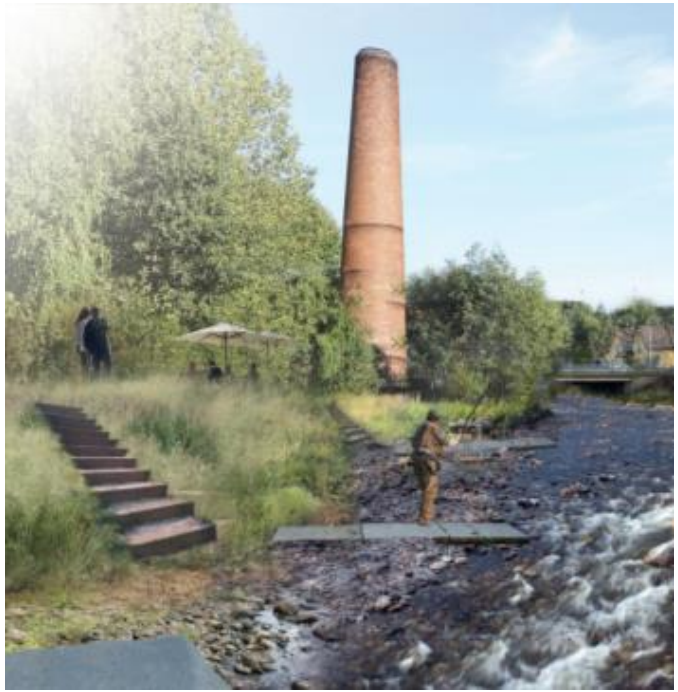


Visions of the river

LOCI landscape architects

Idea of a drop carpet and light show instead of the dam

LOCI landscape architects



Water power in Finland

- 57 big water power plants > 10 MW, produce > 90% of water power
- 83 small water power plants 1-10 MW
- 67 mini water power plants < 1 MW
- Small hydro power causes big problems for migrative fish, does not help for regulation of energy need
- Demands in 2019 form the EU Commission to renew permits and to apply ecological flows, makes small hydro power more unrentable

Decomissioning of hydro power

Sågarsfors, River Siuntionjoki 2006

- The small hydro power plant was bought by a group of private people
- The dam was partly removed

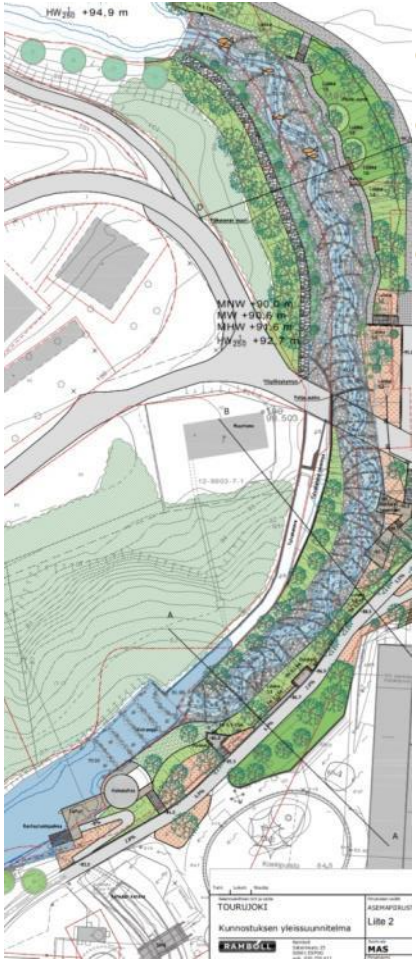
Mikko Koivurinta

- The rapid under the former inundated area was restored for fish
- A bypass channel for the steep rapid was constructed, dishcarge 1-2 m3/s
- Serves as fish pass and habitat for trout

Lahnasenkoski dam, River Hiitolanjoki

- The dam will be demolished 2020-2021
- Vantaa Energy sold the power plant for a recreation association in 2017
- Helps the revival of Ladoga lake salmon
- Dicussions of buying two other power plants

River Tourujoki restoration, Jyväskylä city



- A new rapid with 13 m elevation will be constructed 2021-2022
- The municipal power company gave up their former idea of PR by renewable energy
- The city wants to revive the ancient trout stock and promote recreation

Ramboll

- New rapid, direction downstream

Illustration: Ramboll, General plan for the restoration of river Tourujoki, Jyväskylä

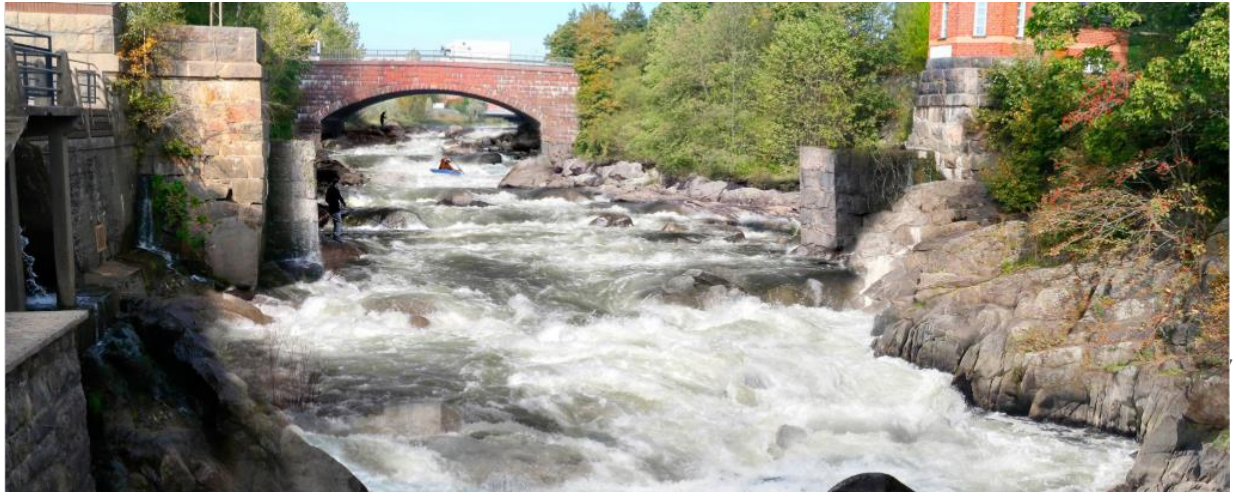
Initiative: Removal of the old city dam, Helsinki

Estuary of Vantaanjoki river

- Discssussion ongoing
- The powerplant has no permit
- Question, how strong will be the protection of cultural history against protection of wildlife

Present

Illustration



Initiative: Restoration of the rapids of Tampere city

Nature-like fish passes at power plants
Kissakoski 2012

- Good location of the entrance near to the dam
- Video monitoring 2017: 17 000 fish, 10 species (also weak swimmers)
- http://www.kymijoenvesijaymparisto.fi/wp-content/uploads/2014/05/Kissakoski-2017.pdf

Bypasses as compensative habitats Imatra city brook 2014

- New constructed habitat, touristic landscape
- Planning: MA-architects, SYKE
- Natural reproduction of trout, high density of juveniles

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Culverts

- Problem especially on forest roads (now for timber transport)
- Projects to promote inventory and measures: Metsähallitus (Board of forestry), ELY-Centres
- WWF, SYKE, Valonia
- New large culvert 09/2018, paved by stone
- First migrator: frog (!)
- Can become habitat for trout

Conclusions

- Small hydro power is losing its position as renewable energy
- Municipal river policy – from energy production to ecology and recreation
- Attitudes are changing towards river ecology
- Combining fish and cultural heritage – partial removal, dam modifications
  - Remnants show the change of attitudes
- Remaining hydro power: permit renewals are needed to enable full continuity with environmental flows, bypass channels and compensative habitats
- Culverts: design as ecological corridors

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