

Dam removal in Finland

Jukka Jormola

Landscape Architect

Finnish Environment Institute SYKE

European Centre for River Restoration ECRR

jjormola@gmail.com

AMBER National Workshop

20.3. 2019 Vilnius

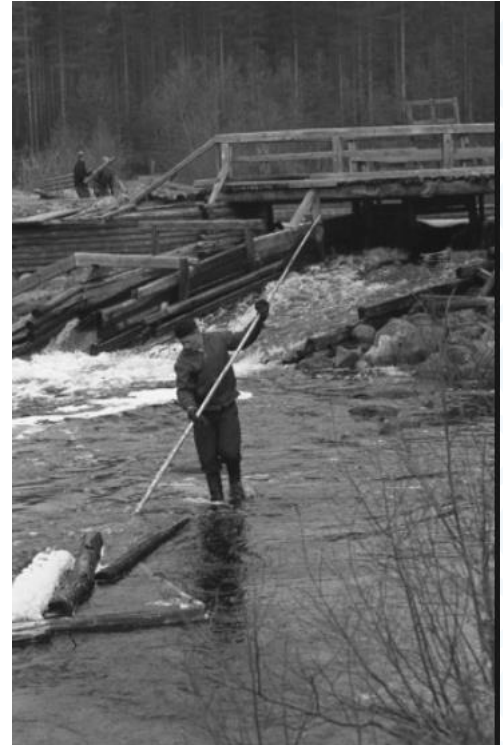


Themes

- 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

Old log floating dams, in use until 1970's

Were used for increasing discharges temporarily in small streams



SYKE

Removing structures and restoration of log floating routes has been a big effort for river restoration in Finland -timber floating in rivers stopped until 1980

- Some have been preserved for historical reasons
- Most have been restored for fishery in several phases



Flour and saw mills, factories

R. Hammonjoki, partial removal

- Can have cultural values
- Problems if changed to be micro hydro power plants
- Permits can be old and without effective fish passes



Patakoski rapid, Paimionjoki river

- Remnants of the mill have been preserved in the restoration of the rapid



Photo: Urjanhai

Koskenkyläkoski saw mill dam 1993

- Parts of the dam were preserved for cultural history
- 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 habitats for sea trout were 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 (center back)



Towards upstream from the former dam site

Fish passes at historical structures R.Teuronjoki

- Can be needed if the dam has cultural value and cannot be removed
- Nature-like fish passes should preferred, work for all species
- Example: Old linen fiber factory, nature-like fish pass 2003

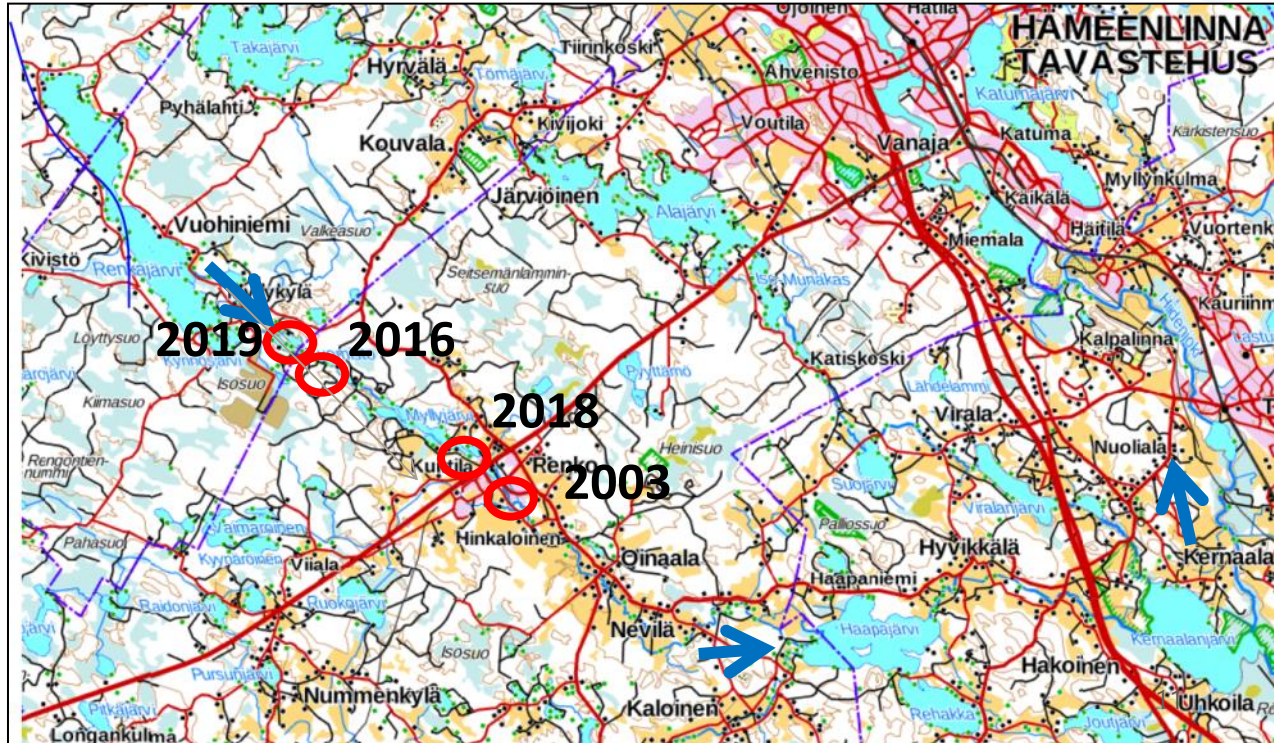


Removal and modification of small dams at a total river basin Renkajoki river 2003...2019

- 24 km, several lakes



→ Flow direction



Old saw mill dam at Renko village

- Restored for fish 2003, no remnants of the dam



Modification of the highest dam 2016

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



- A rapid for fish migration was constructed



After 2016 video still

- New dam head upstream

video still



Kuittilankoski mill dam

- Modified for fish 2018



- The level of the rapid downstream was raised
- Remnants of the mill were preserved



- The rapid was restored for trout reproduction



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



Last modification of the dam upstream 2019



Before



After 03/2019

Connection is established to the big lake above

Before



After
03/2019



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)



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



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

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 is still promoted, but it causes big problems for migrative fish, does not help for regulation of energy need
- Demands in 2019 from the EU Commission to renew permits and to apply ecological flows, makes small hydro power more unrentable
- Vantaa Energy (a big company in Helsinki region) sold their small powerplant in eastern Finland, will be decommissioned
- Jyväskylä Energy (central Finland) decided to stop their power plant
 - Jyväskylä city wants a new rapid for fish and recreation

Decommissioning 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, discharge 1-2 m³/s
- Serves as fish pass and habitat for trout



Lahnasenkoski dam, River Hiitolanjoki 2019-2020

- Decision of the highest court: fish pass must be constructed
- Vantaa Energy sold the power plant in 2017
- The dam will be partly demolished, planning ongoing
- Helps the revival of Ladoga lake salmon



River Tourujoki power plant, Jyväskylä city

- The city wants to revive the ancient trout stock and promote recreation and tourism
- The municipal power company gave up their former idea of PR by renewable energy
- A new rapid with 13 m elevation will be constructed 2020-2021

Ramboll

Flood channel today



- New rapid, direction downstream

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



Naturel-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



Culverts

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



Conclusions

- Removal of obsolete dams should be promoted more in the next round of River Basin Management Plans – continuity of rivers
- Good solutions to combine the interest for preserving cultural heritage – partial removal, dam modifications, show the change of attitudes
- Small hydro power is losing its position as renewable energy
- New demands of fish passes and flows decrease its rentability
- Municipal river policy – from energy production to ecology and recreation
- Remaining hydro power: permit renewals are needed to enable full continuity with environmental flows, bypass channels and compensative habitats
- Culverts can become ecological corridors