Lake Vesijärvi

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Catchment area of Lake Vesijärvi

- Naturaly productive and fertile

- Total area 509 km^2

-houses outside the local sewer system:

  - 1300 summer cottages
  - 2600 residential buildings

- Cultivated area 9600 ha (field % 24)

- Location between two Salpausselkä Ridges

- Population > 100 000

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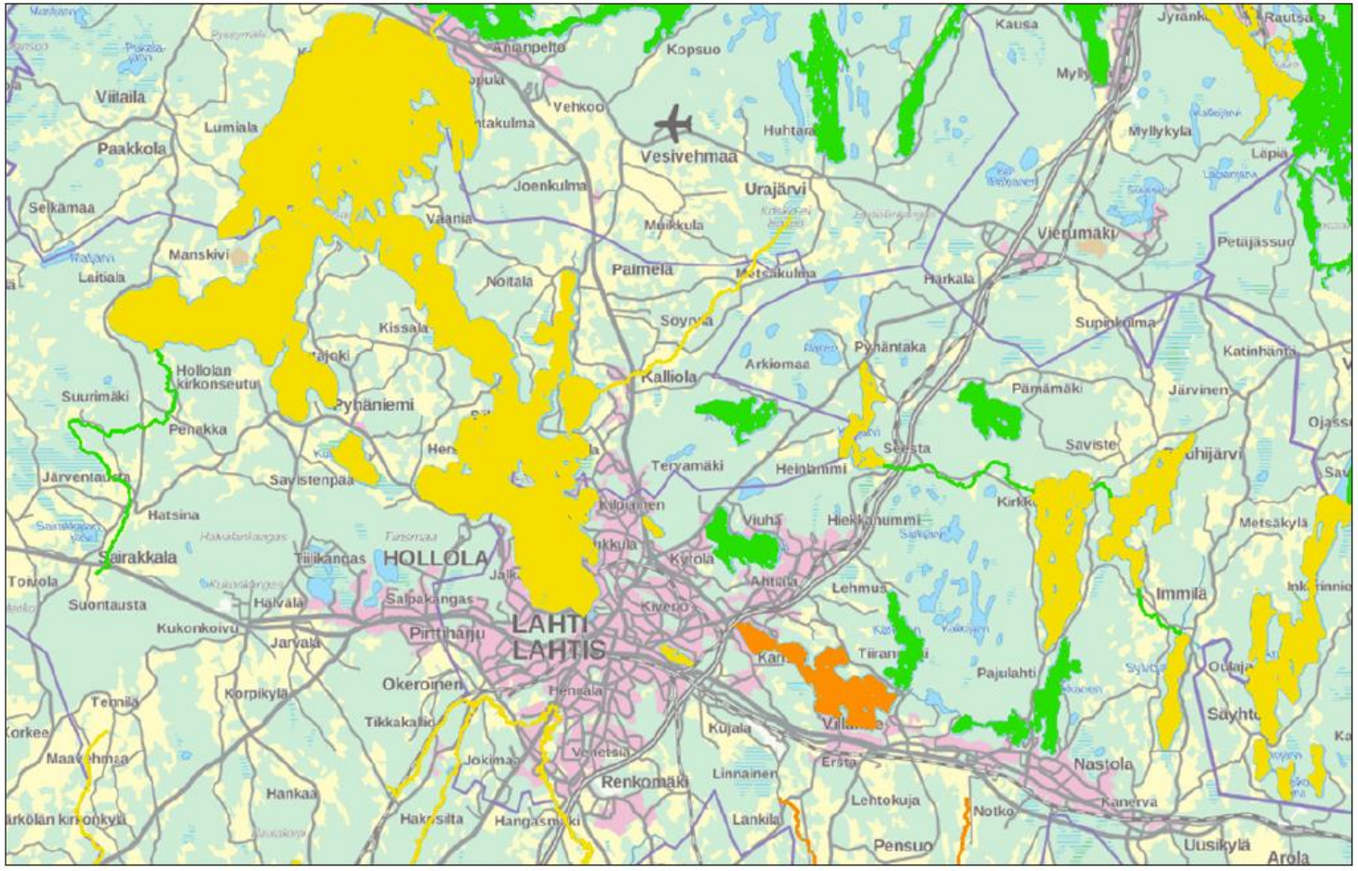
Lake Vesijärvi

Catchment area	514 km^2
Surface area	108 km^2
Length	25 km
Maximum depth	42 m
Mean depth	6.09 m
Mean retention period	5.4 years
Mean flow rate	3.9 m^3/s
Volume	654 375 000 m^3
Shoreline	227.31 km
Level (of the sea level)	81.4 m

Ecological status (EU Water Framework Directive)



high

good

mod

poor

bad

Lake Vesijärvi in a nutshell: A long history of pollution and partial recovery

- Industrialisation around the lake 1869
- Pulp mill 1903
- Discharge of municipal sewage 1908
- Toxic algal blooms in 1900s (cattle, fish, bird deaths)
- Rapid increase of population after WW II
- The most polluted lake in Finland in the 1970s and 1980s
- Toxic red algae bloom in early 1980s
- Diversion of sewage, domestic 1976, industry 1980
- Strict pollution control and law enforcement since 1980s
- Artificial aeration 1979-84 and again 2007–
- Biomanipulation and comprehensive management 1984-94 and again 2003–

Stop eutrophication

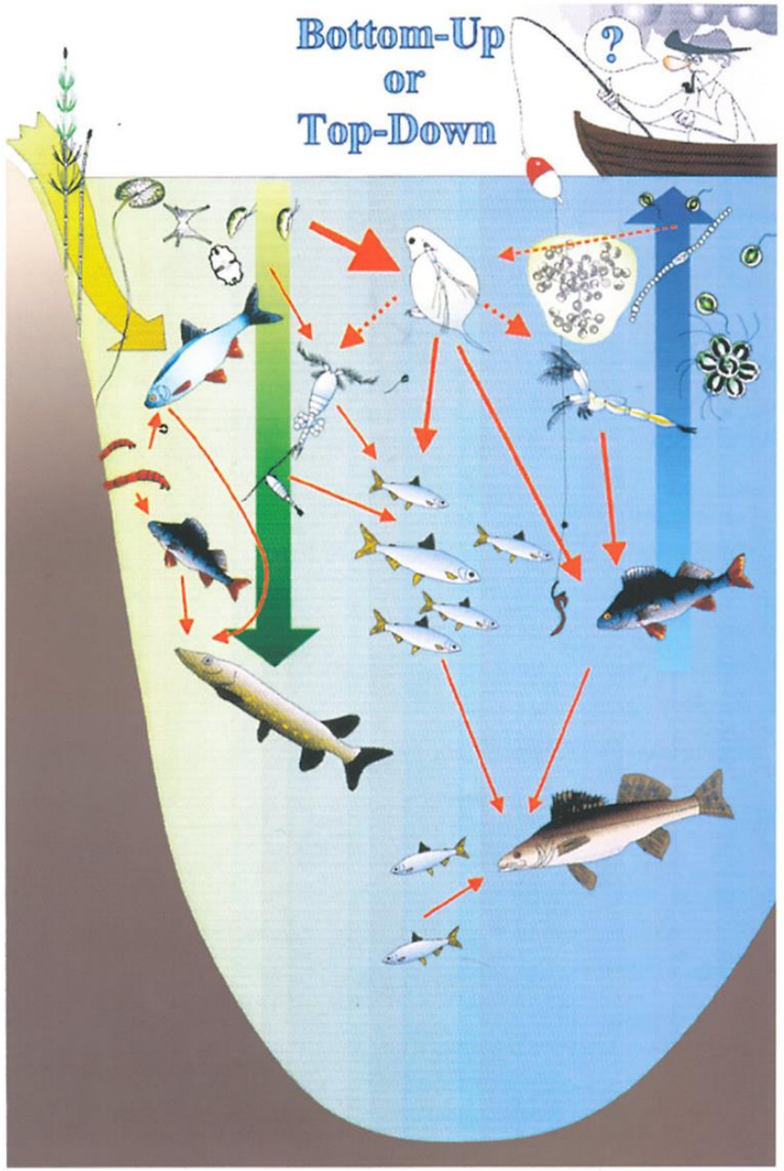
The improvement of water quality use is possible by decreasing **external loading**:

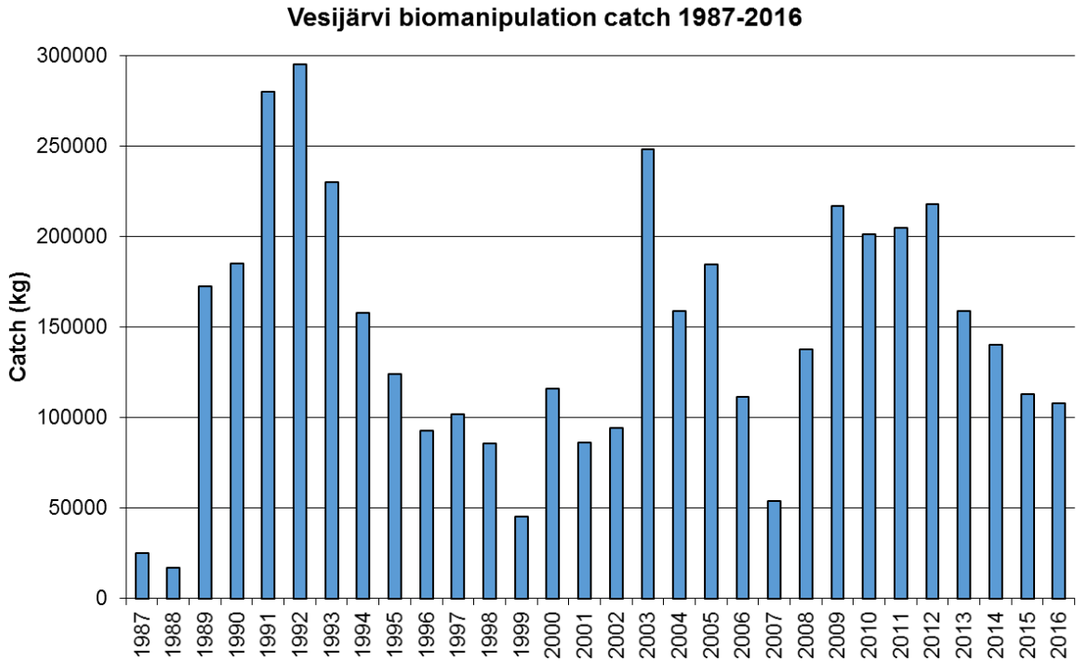
- Buffer zones
- Sedimentation ponds
- Chemical dosing
- Constructed wetlands

… and **internal loading**:

- Biomanipulation
- i.e. management fishing and fish stocking
- Lake aeration
- Sediment treatment

Biomanipulation & management fishing

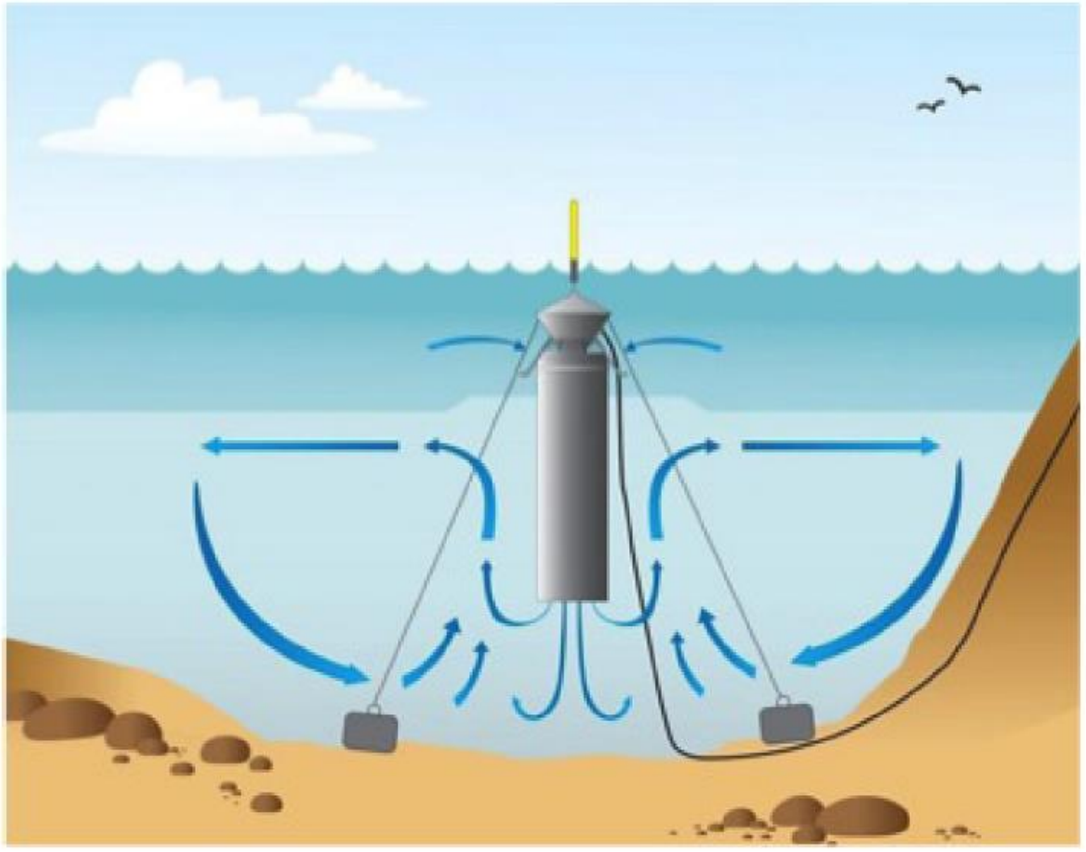




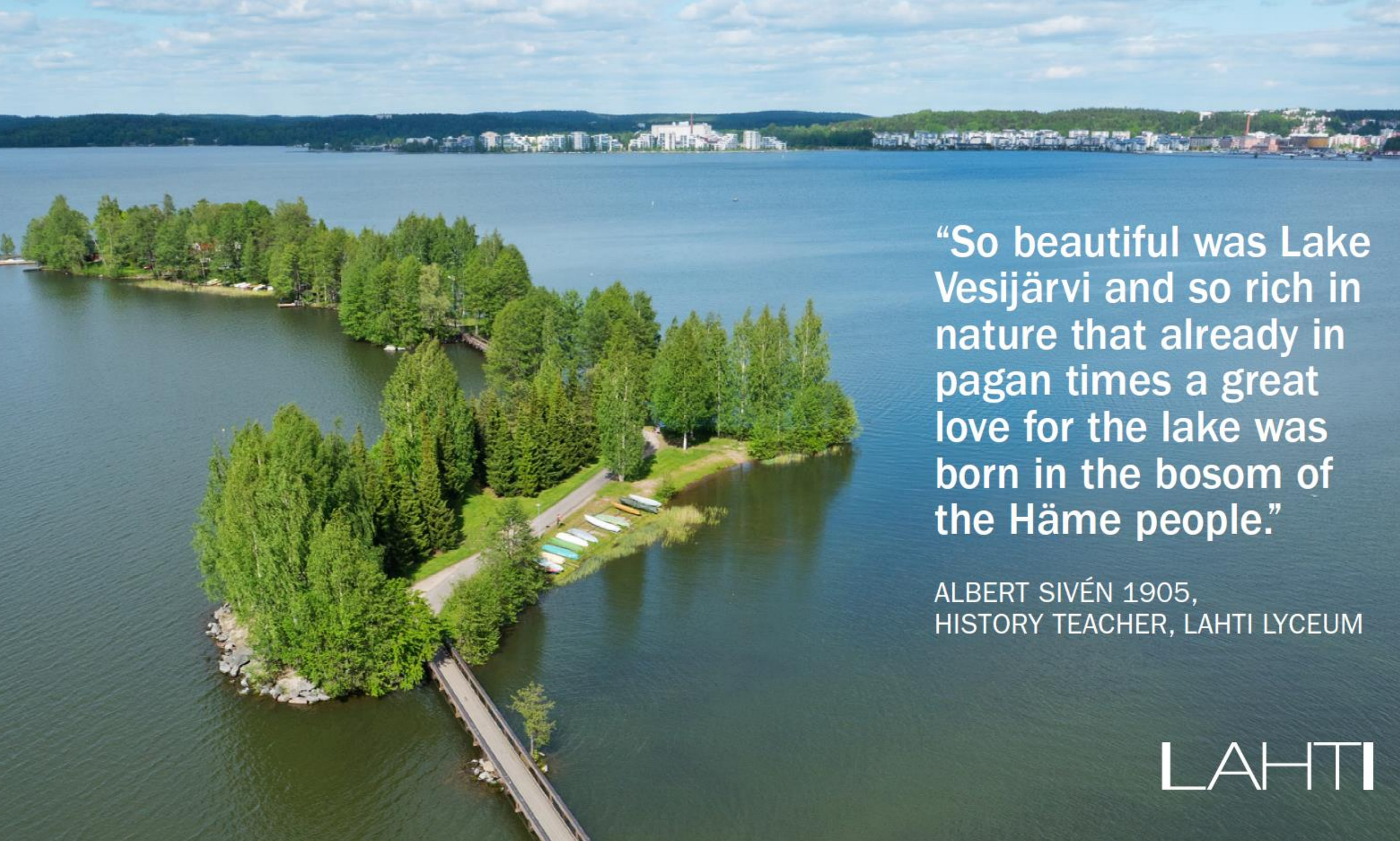
Fish research and fisheries management

- Experimental trawling and echo-sounding to monitor pelagic fish stocks, especially smelt stock.
- Pike-perch research and fisheries management to improve predatory fish stocks

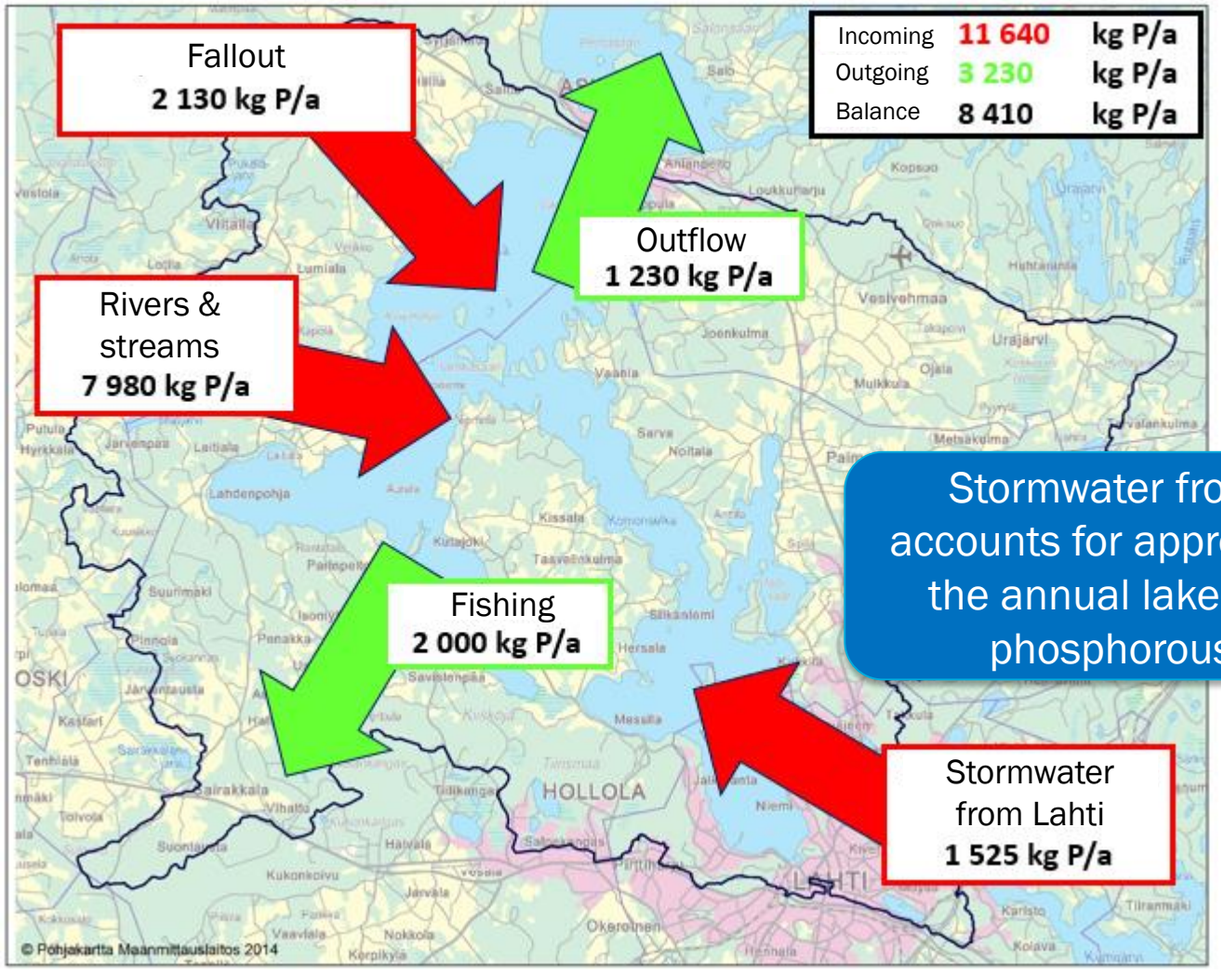
Oxygenation



Mixox-oxygenator in operation in a lake.

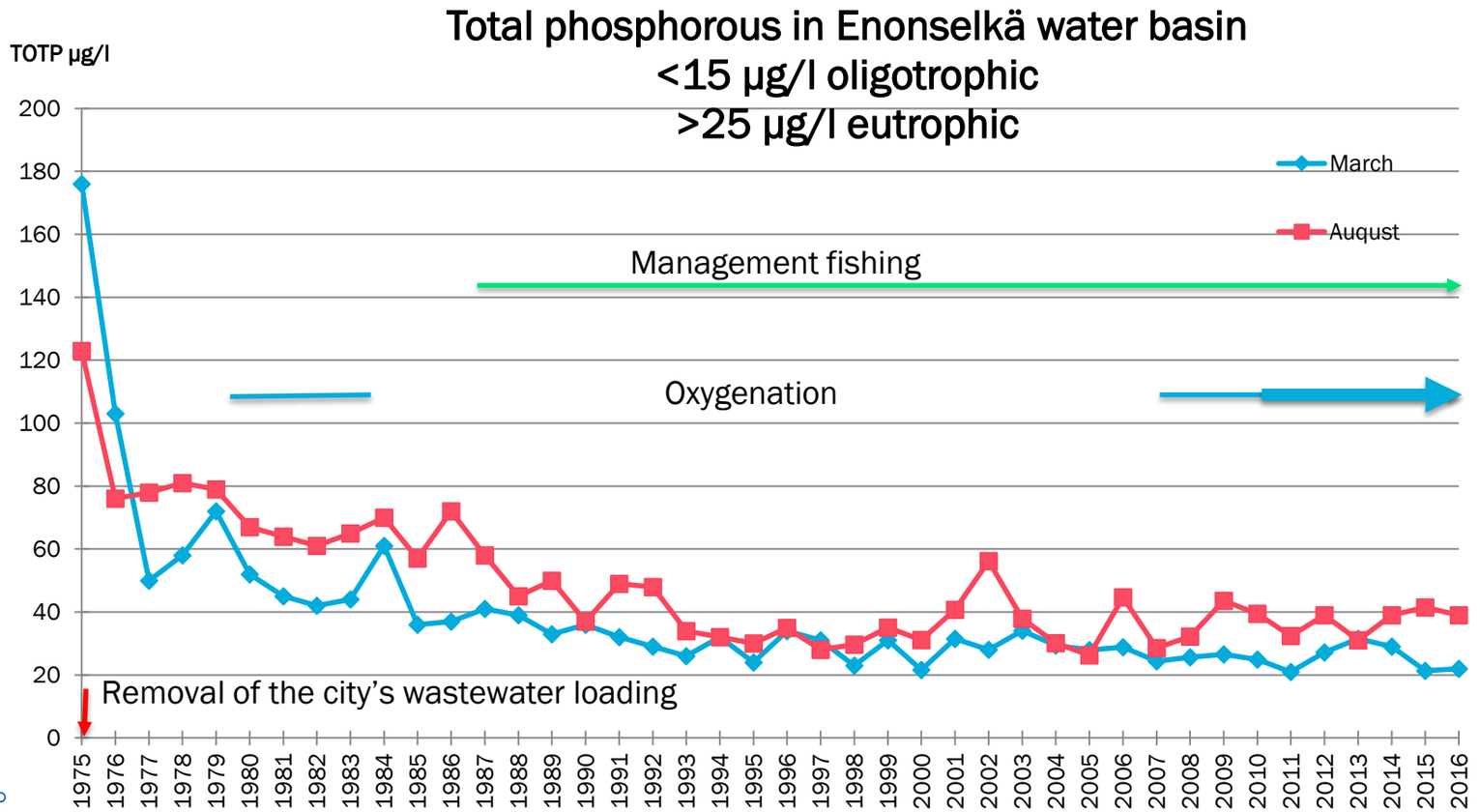

“So beautiful was Lake Vesijärvi and so rich in nature that already in pagan times a great love for the lake was born in the bosom of the Häme people.”
ALBERT SIVÉN 1905,
HISTORY TEACHER, LAHTI LYCEUM
LAHTI

Lake Vesijärvi phosphorous budget



Järveläinen et al. 2016

Volume weighed tot. P concentrations (µg/l) in March and August
(annual values are means of over 20 measurements)



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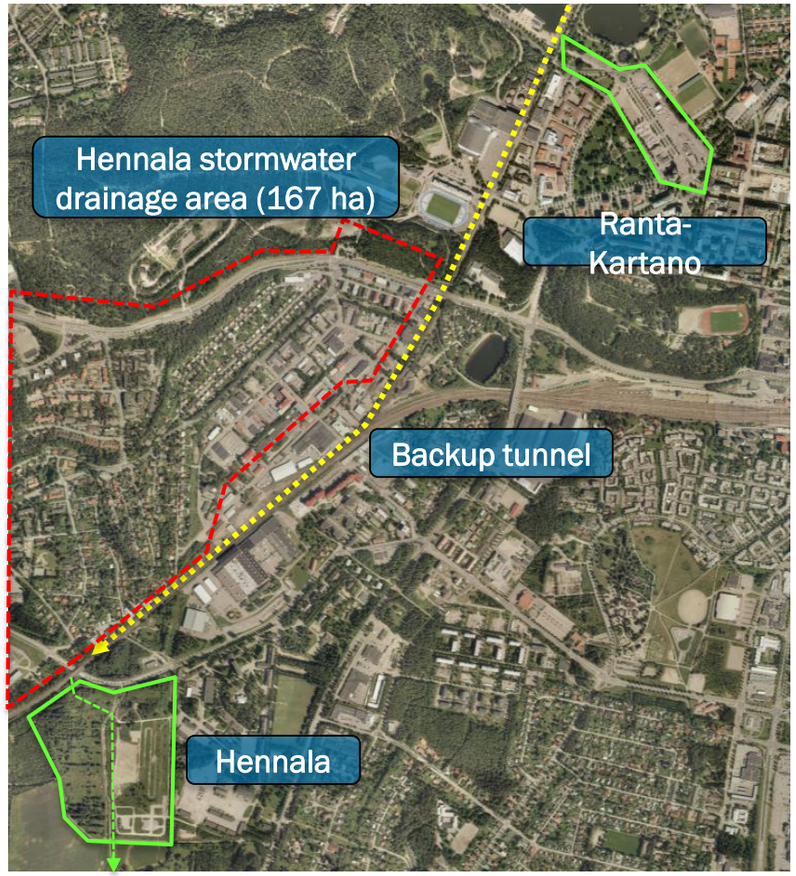
Stormwater project



- Western Hennala area site for a new residential area
- Purified water from the Kariniemi purification plant is discharged to the River Porvoonjoki
  - Tunnel runs under the city
  - New backup tunnel is being constructed
  - Possible utilization for rerouting of stormwater from the city center?
- Maximum flow 0.7 m^3/s
  - An increase of approx. 35 % in the volume of stormwater flowing through the Hennala area
  - Detention/storage capacity to accommodate increased volume before discharge in to Porvoonjoki river.
- If carried out, a 24 % reduction in the stormwater phosphorous load of the Enonselkä region

Thank you!

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