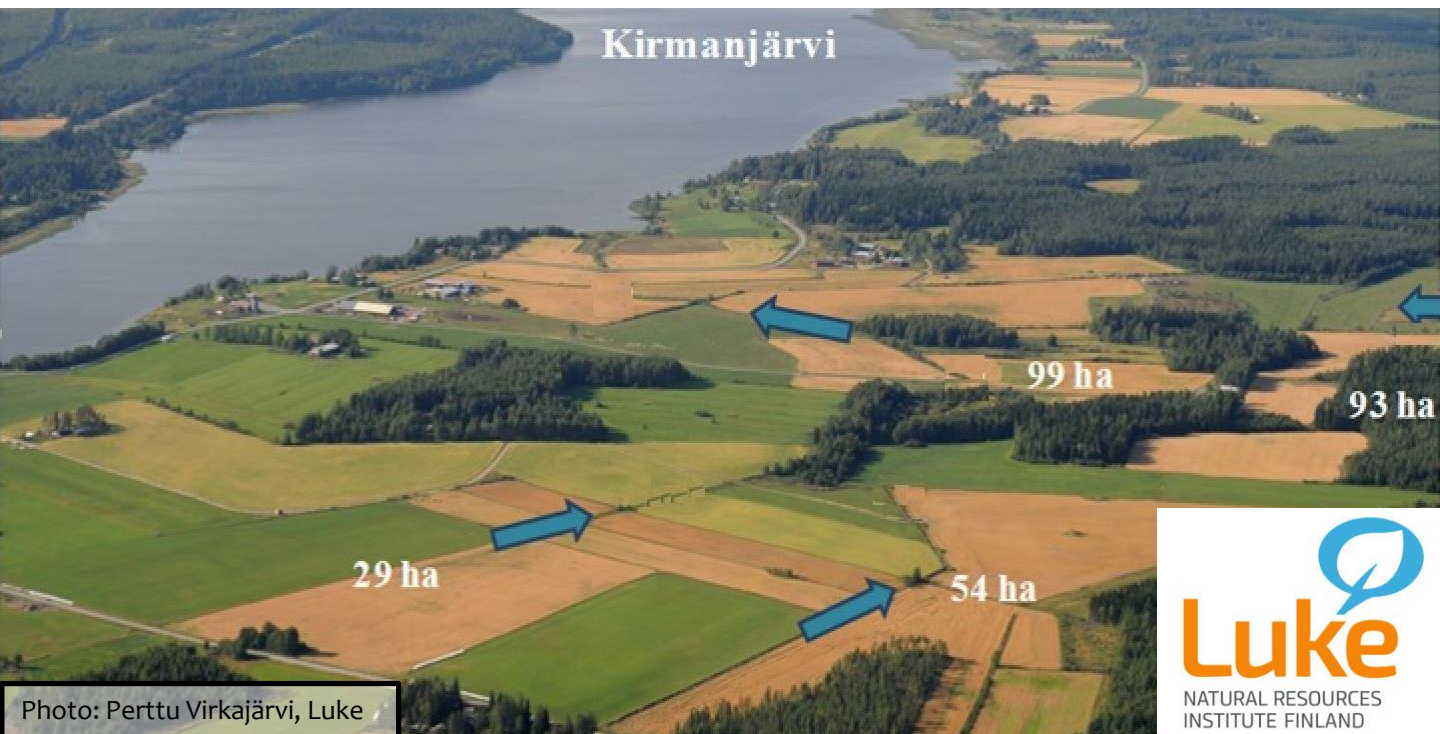


Nutrient monitoring network in Lake Kirmanjärvi catchment area



- ◆ In 2010 Natural Resources Institute Finland (Luke) Maaninka founded automatic and continuous nutrient loading monitoring network for catchment area of Lake Kirmanjärvi
- ◆ The catchment area of research 3,0 km²
 - Field 32 %
 - Forest 50 %
 - Swamp 18 %
 - Wetland 1,7 hectare (wetland/catchment area - ratio 1,7 %), restoration done by local hunting club
 - Predominant soil type sandy moraine, fields well-sorted fine mineral soil
- ◆ Most of the nutrient load is generated during the overflow caused by melting snow
- ◆ Flow rate and nutrient loads vary on an annual basis strongly depending on hydrological factors, which is why a reliable assessment of the load from the lawns will require an annual follow-up study.
- Five measurement points in nutrient monitoring network, Ruostepuro catchment area in North Savo, Iisalmi
- ◆ Measuring point in stream, descending to Lake Kirmanjärvi
- ◆ Measuring point below wetland
- ◆ Field-intensive monitoring area (field-% 100)
- ◆ Field and forest -intensive monitoring area (field-% 50, forest-% 50)
- ◆ Forest-intensive monitoring area (forest-% almost 100; also includes scattered settlement)

Nutrient monitoring network in Lake Kirmanjärvi catchment area



Photos: Mari Rätty, Luke



Measurement

- The monitoring network consists of a weather station and five different measuring points, each containing a programmable sampler (Liquiport 2000 RPT20 housed in a heat insulated sampling hut) and a flow meter equipment's with discharging data loggers.
- A surface cable has drawn to the measuring area, so electricity is supplied from the electricity grid.
- Sampling tubes in ditches can be kept unfrozen with heating cables
- In two measuring points, the flow rate is measured from the free flow channel or culvert by an acoustic ultrasonic flow meter (Starflow Ultrasonic Doppler Instrument Model 6526, measuring frequency 15 min) and at three measuring points it is calculated from the V- measuring weir (STS DL / N Series 70, 1 h) based on water level altitude data. The pressure sensors are installed approximately 1.5 m away from the V-measuring weir
- Water sample analysis: total phosphorus, soluble phosphorus, solids, total nitrogen, nitrate nitrogen, ammonium nitrogen, dissolved organic carbon, soluble calcium, pH and electrical conductivity
- Samples are taken every 2 to 5 days and all samples are delivered to the laboratory for analysis. Samples are stored in cold (+4) before analysis.

A measuring weir

- Measuring weirs are simple and cheap methods to determine the flow in small open channels. The most simple unit is a panel which makes a port for the actual water flow.
A combination of measuring weir and a pressure sensor
- A pressure sensor cannot determine any water flow itself, but when this equipment is connected with a measuring weir it is a useful method. This kind of measurement combination is moreover quite cheap and easy to use. Some examples: Aplisens SGE-25- pressure sensor is able to measure pressure difference at 1 – 500 m depths.

MORE INFORMATION

Mari Rätty, Natural Resources Institute Finland, Maaninka
Email: mari.ratty@luke.fi
<https://www.luke.fi/en/>
<https://www.luke.fi/en/natural-resources/agriculture/grass-production/>



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