Co organized by

Coalition Clean Baltic

EESTI VEEÜHING
ESTONIAN WATER ASSOCIATION

RIVER UNIVERSITY

HYDROLOGICAL MONITORING IN ESTONIA AND SOOMAA

11–15 July 2022

Halliste river, credit, Ilmar Roosmaa, www.Soomaa.com

Jana Põldnurk

Estonian Environment Agency

Funded by Life

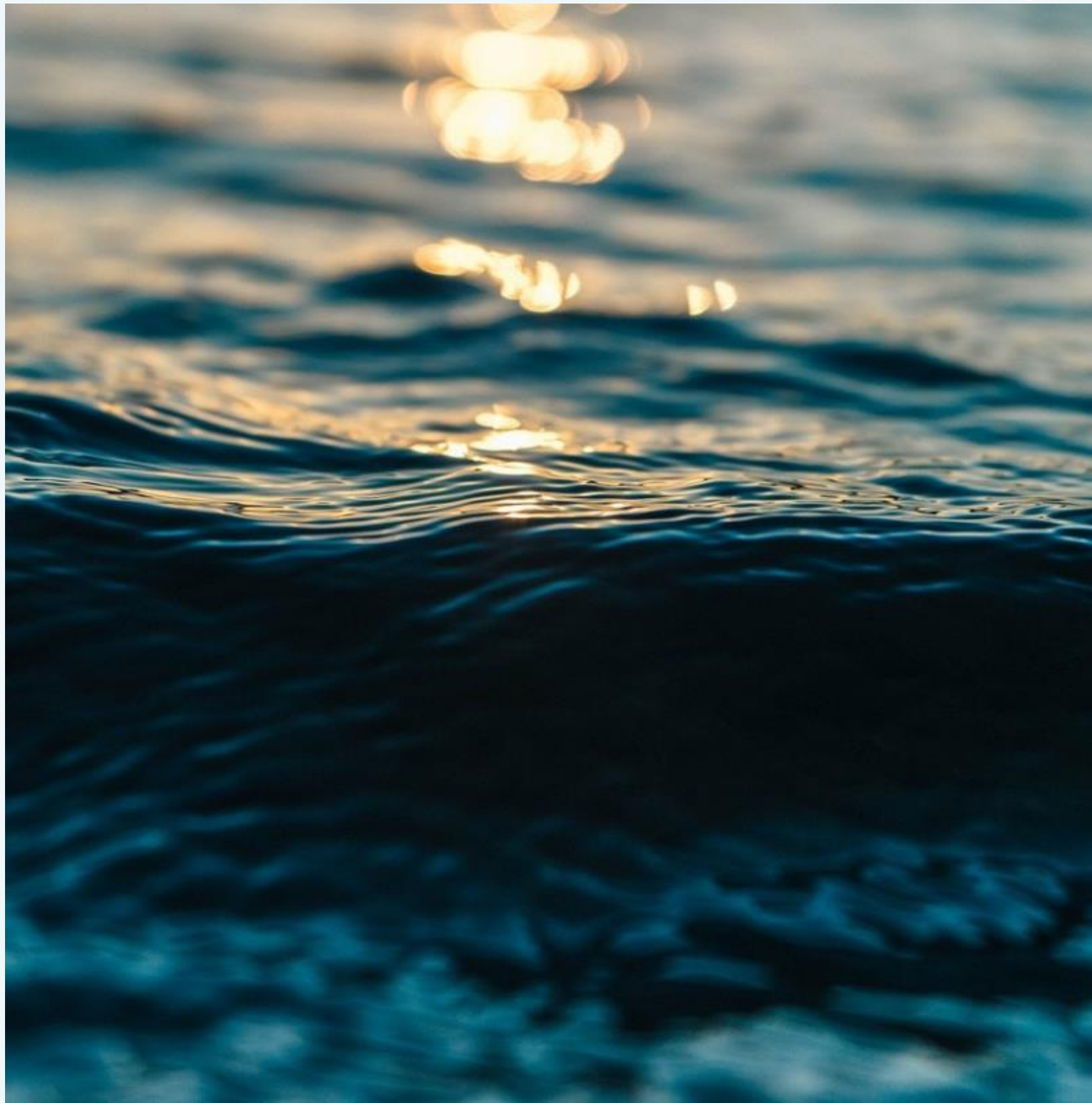
Hydrological monitoring

Hydrological monitoring involves

- observing and recording water levels on coastal sea and inland water bodies,
- rivers' discharge gauging and
- registering background information such as water and air temperature, river weed and ice conditions.

The aim of the hydrological monitoring is

- to provide the overview of the quantitative water resource and
- reliable long term data for prognoses, warnings and
- probability calculations.



Hydrological monitoring network

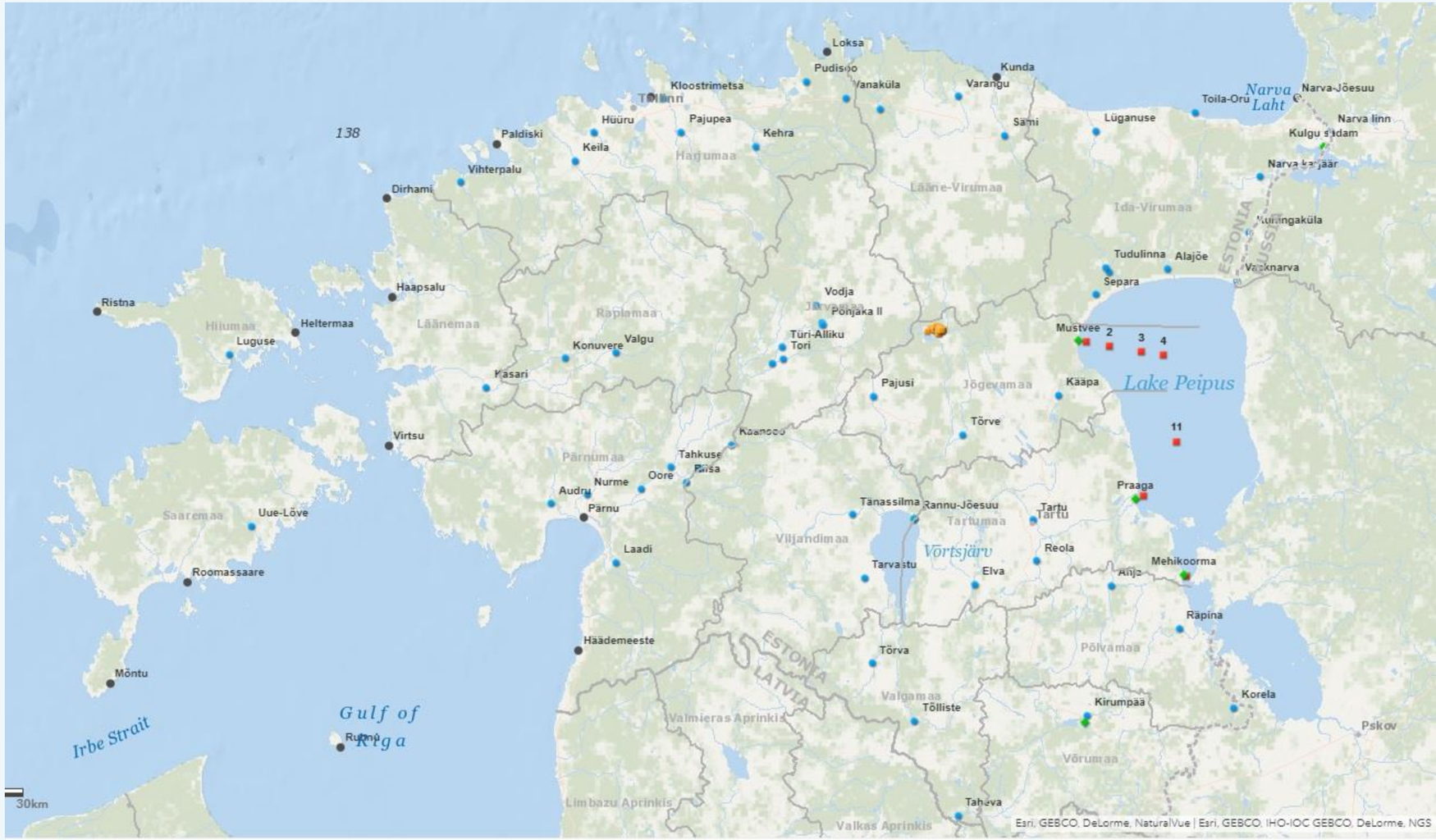
55 discharge stations on rivers

7 water level stations on lakes and water reservoirs

15 coastal sea water level stations

1 wetland station

Lake Peipus monitoring marks and multifunctional buoy stations



Hydrological measurements

Water level, water and air temperature from automatic stations once in an hour, from most of the stations also precipitation

Control measurements of water level and temperature 20+ times a year

Discharge gaugings 20+ times a year, in 5 stations stationary automatic flow meters

Ice conditions and thickness registration in winter

Weed registration in summer

Remote monitoring cameras in 17 stations

Hydrological measurements

Hydrological measurements

Remote monitoring cameras, drones

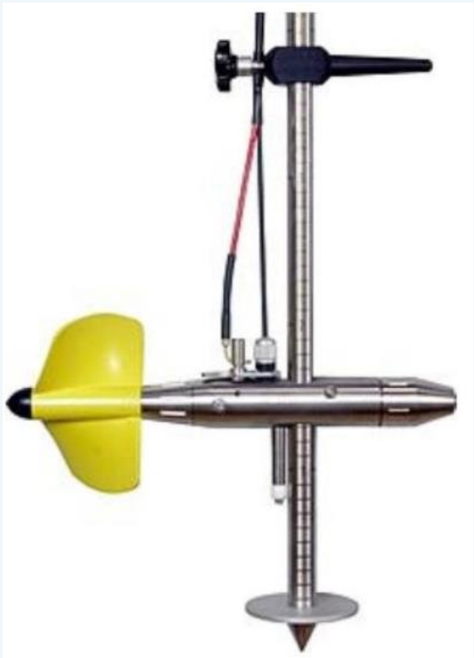
- Weed growing in summer
- Ice conditions in winter
- State of the river
- Flow blockages up and downstream
- Flood areas

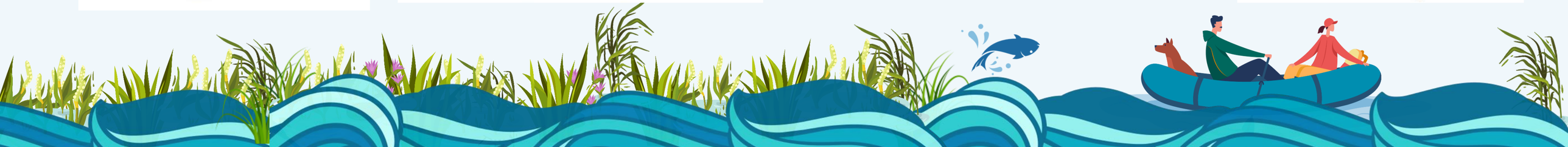
Measurement methods

Mean section – propeller and acoustic

Area velocity – acoustic profiler

Stationary – acoustic

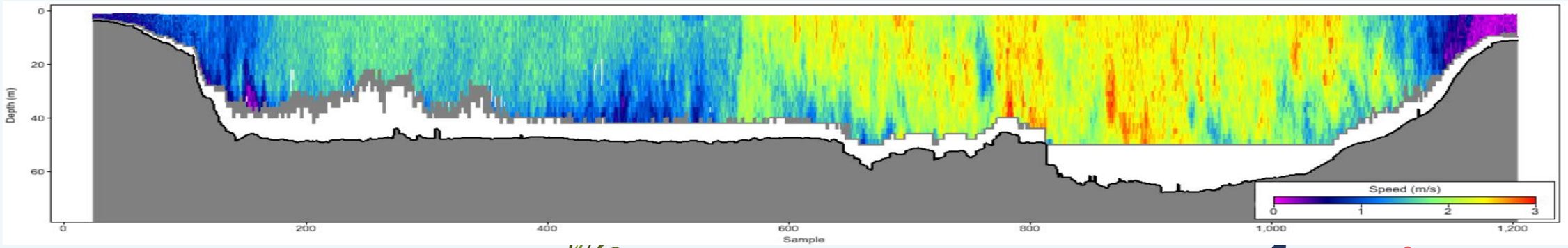


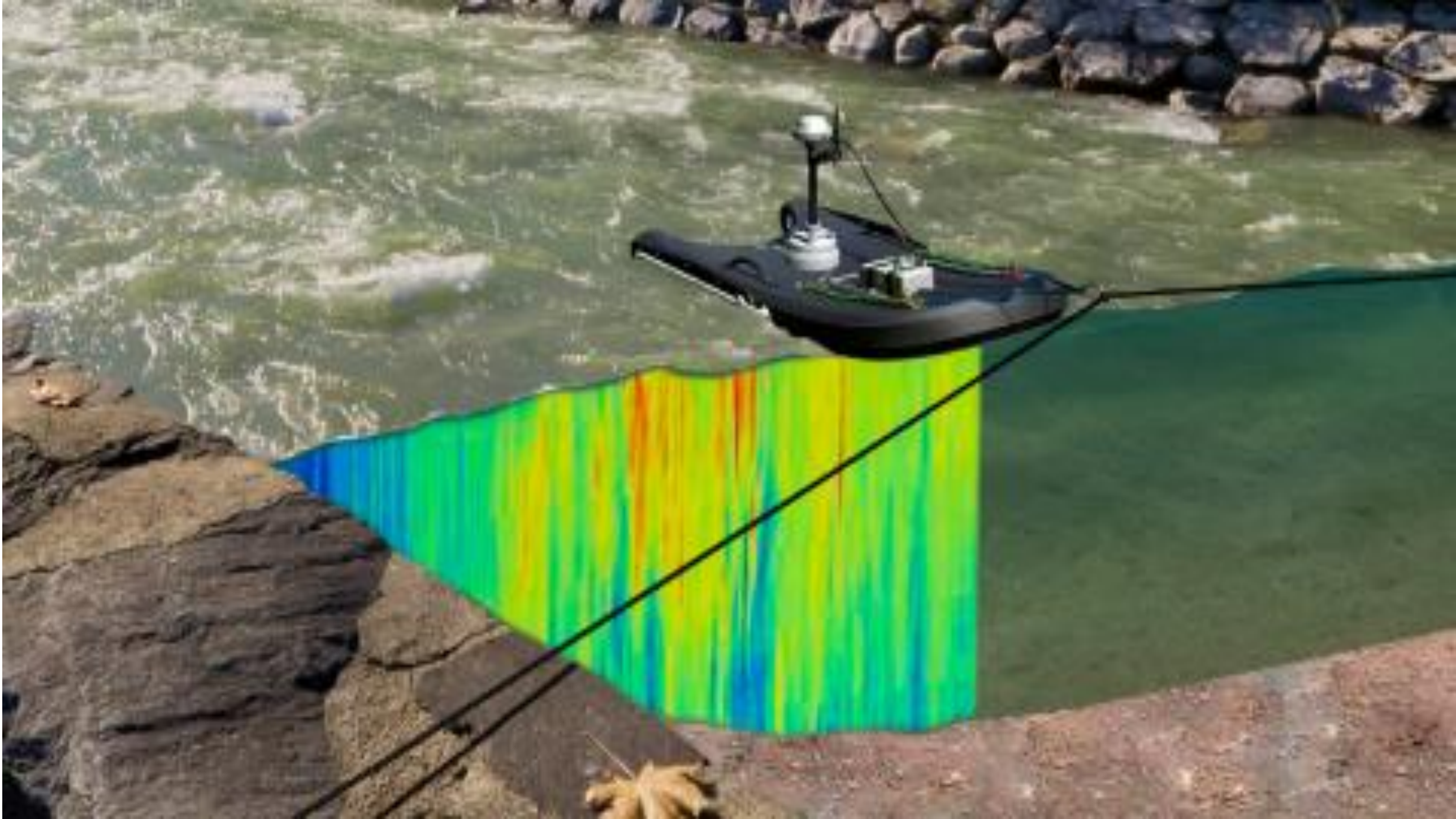


The Doppler effect

… or Doppler shift is the change in frequency of a wave in relation to an observer who is moving relative to the wave source. It is named after the Austrian physicist Christian Doppler, who described the phenomenon in 1842.

A common example of Doppler shift is the change of pitch heard when a vehicle sounding a horn approaches and recedes from an observer. Compared to the emitted frequency, the received frequency is higher during the approach, identical at the instant of passing by, and lower during the recession.





HYDROLOGICAL MONITORING IN SOOMAA

Those years the national hydrological monitoring is celebrating 100 years of action in many stations

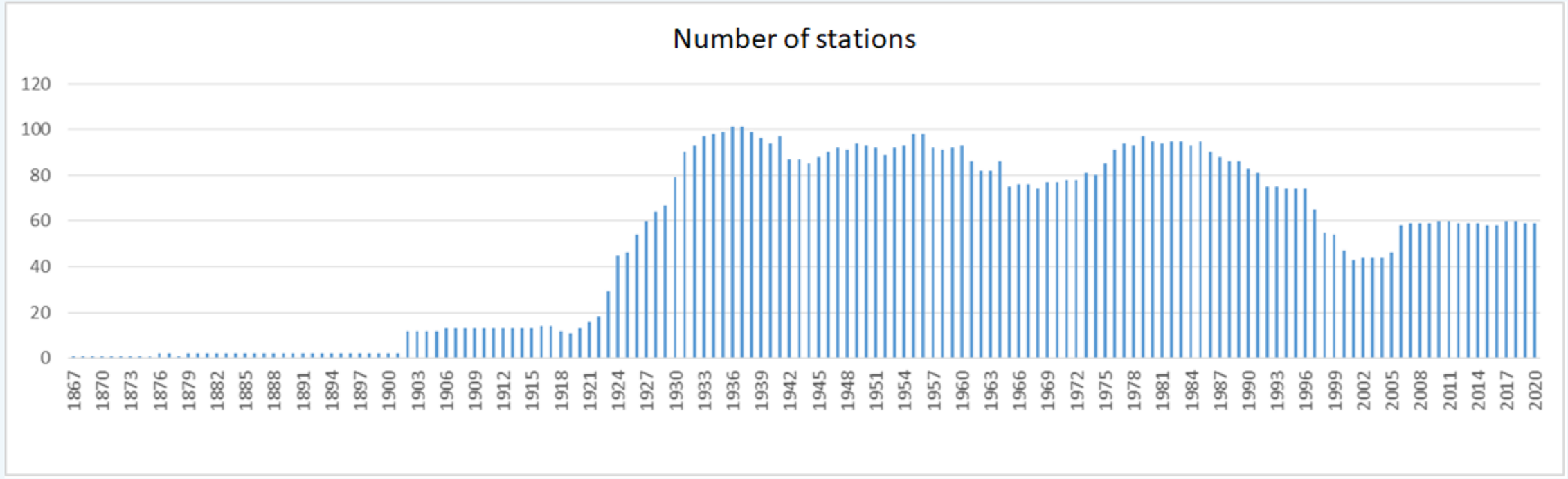
Estonian hydrological monitoring has long history.

The first station was opened in 1867 in Tartu, and same year the highest water level was registered at river Emajõgi – 373 cm above the zero line, a record still unbreakable.

In the beginning years of new Estonian Republic, the importance of water resouce anda overview about it was well understood, thus the stationary network of hydrological monitorind stations was established step by step.

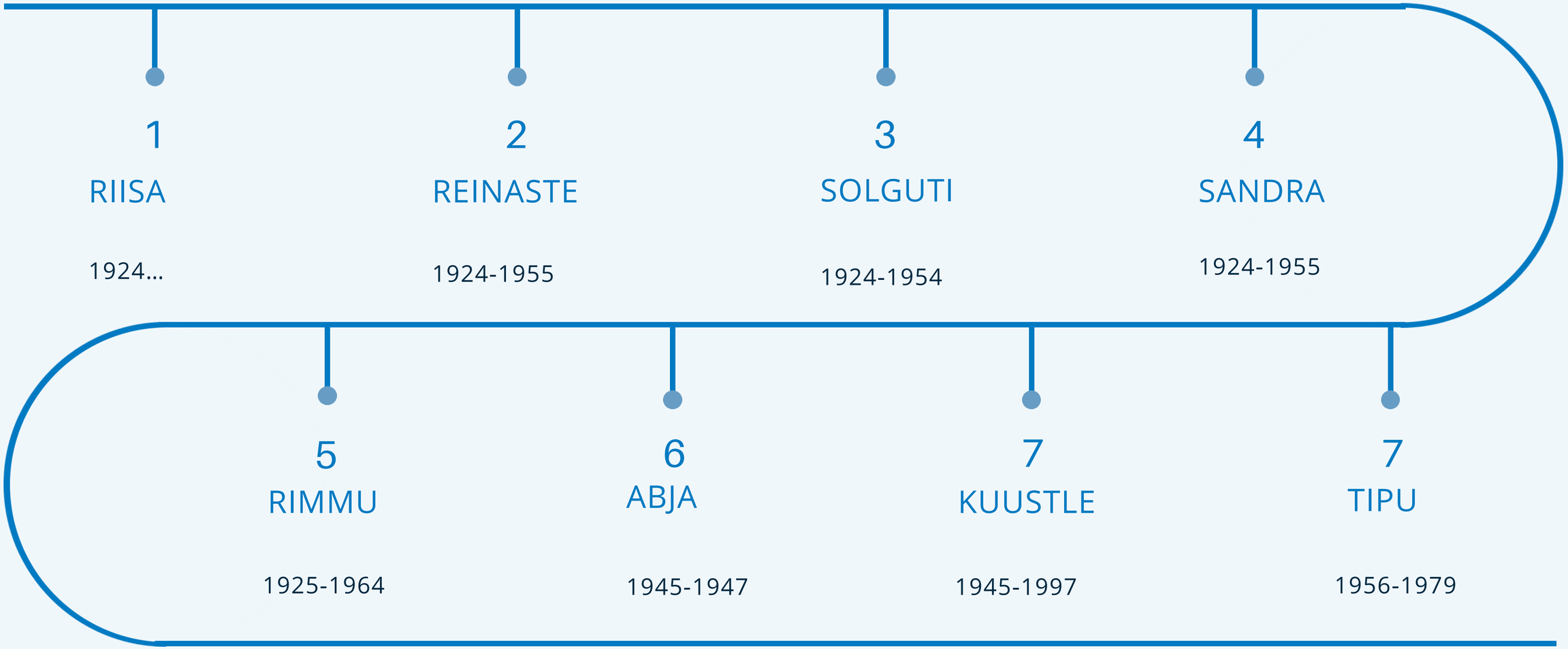
The first stations were opened along rinver Narva, but Soomaa, as a unique area with its forestry and „fifth season“ was also in focus.

Hydrological network today and in past



Riisa and stations upstream

Riisa is the last station on river Halliste from where the waters exit Soomaa



Riisa and stations upstream

Riisa – River Halliste

Sandra – River Lemmjõgi

Solguti – River Raudna

Rimmu – River Kõpu

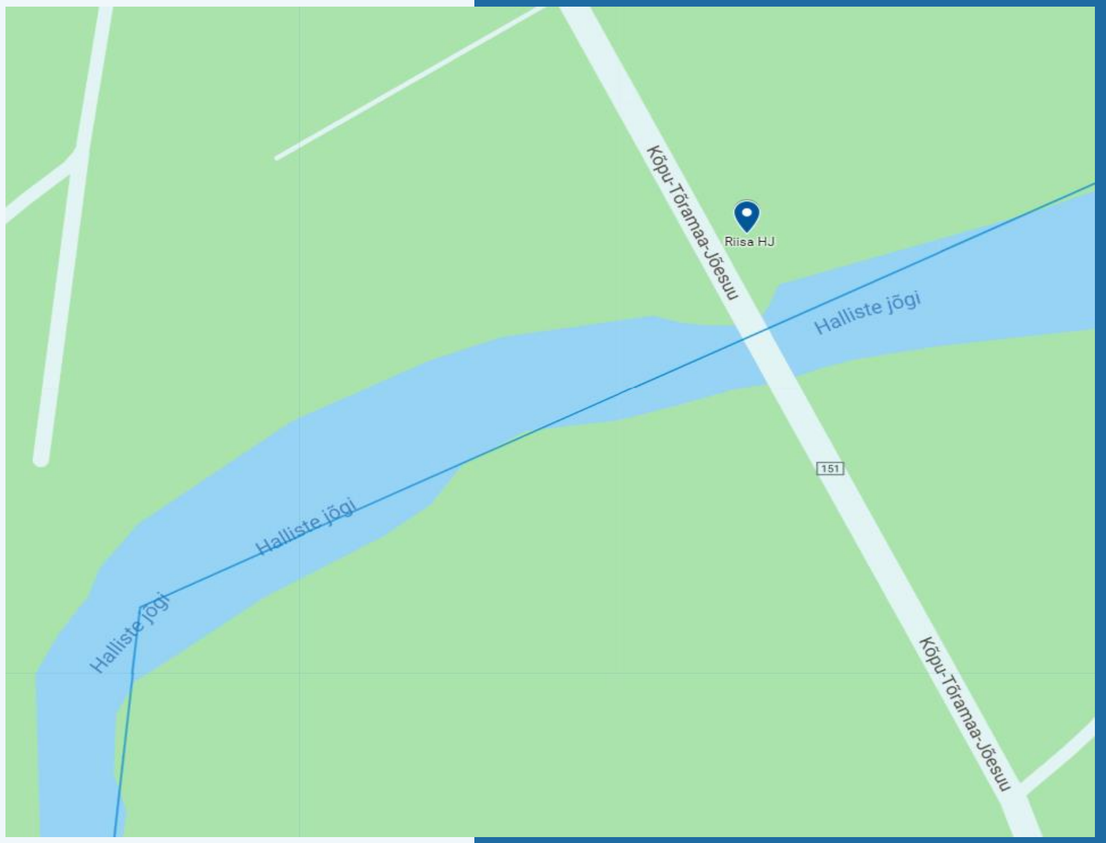
Tipu – River Halliste

Reinaste – River Halliste

Abja – River Halliste

Kuustle – Pöögna stream

RIVER UNIVERSITY 2022



RIISA STATION

River Halliste	Väinamere-Liivi gulf basin
Catchment area	1880 km2
Distance from mouth	5,5 km
Coordinates	58°28’47” N 24°59’40” E
	6482597.1X 558010.1Y
Location	Pärnu county, Tori parish, Riisa village

.

RIISA STATION

Opened 23.06.1924

Contiuously working

Transition (200 m downstream) 01.01.1978

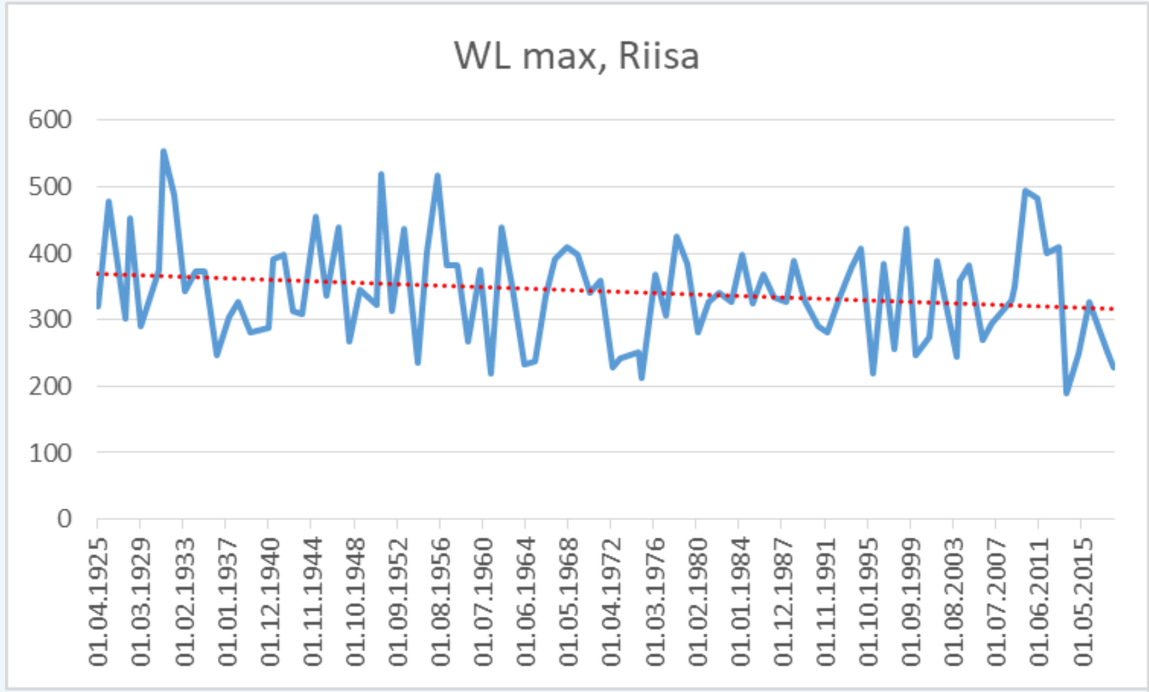
Automatisation 06.10.2006

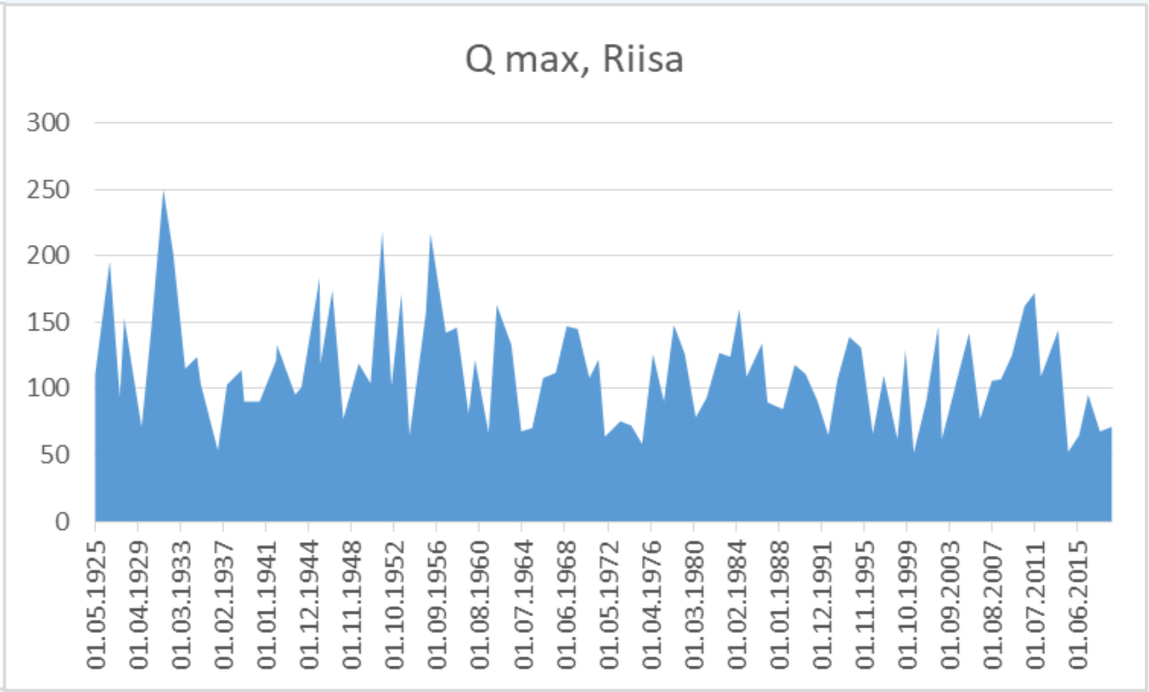
Solar panel 07.05.2014

Remote camera 18.06.2019

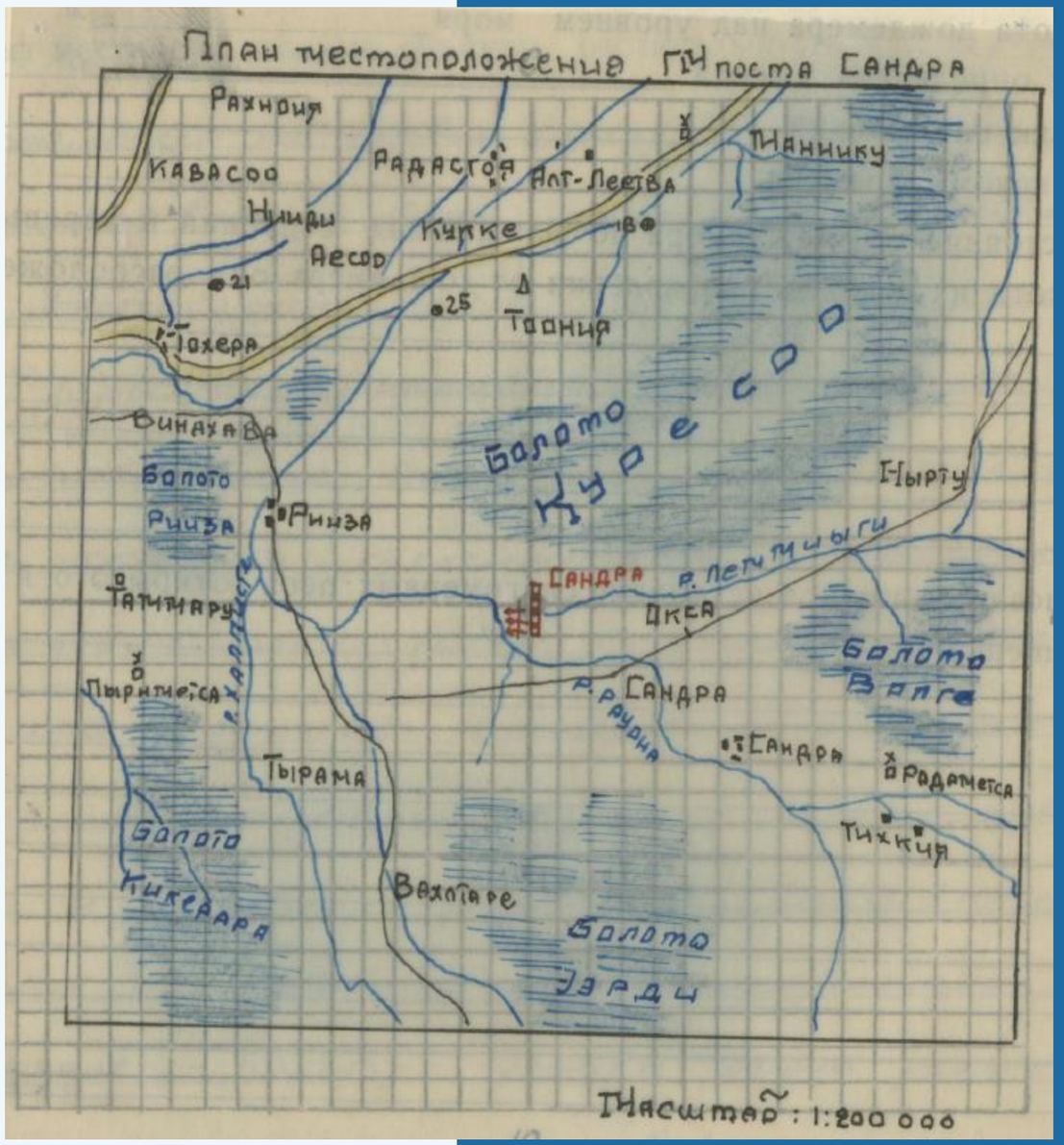
RIISA STATION

Abs MAX WL	25.04.1931 – 553 cm	Extremes from last century
Abs MAX Q	25.04.1931 – 250 m3/s	More water in winter months
Abs MIN WL	16.03.1942 – 7 cm	Less water in april and may
Abs MIN Q	01.06.1930 – 0,24 m3/s	High water earlier than before





RIISA STATION



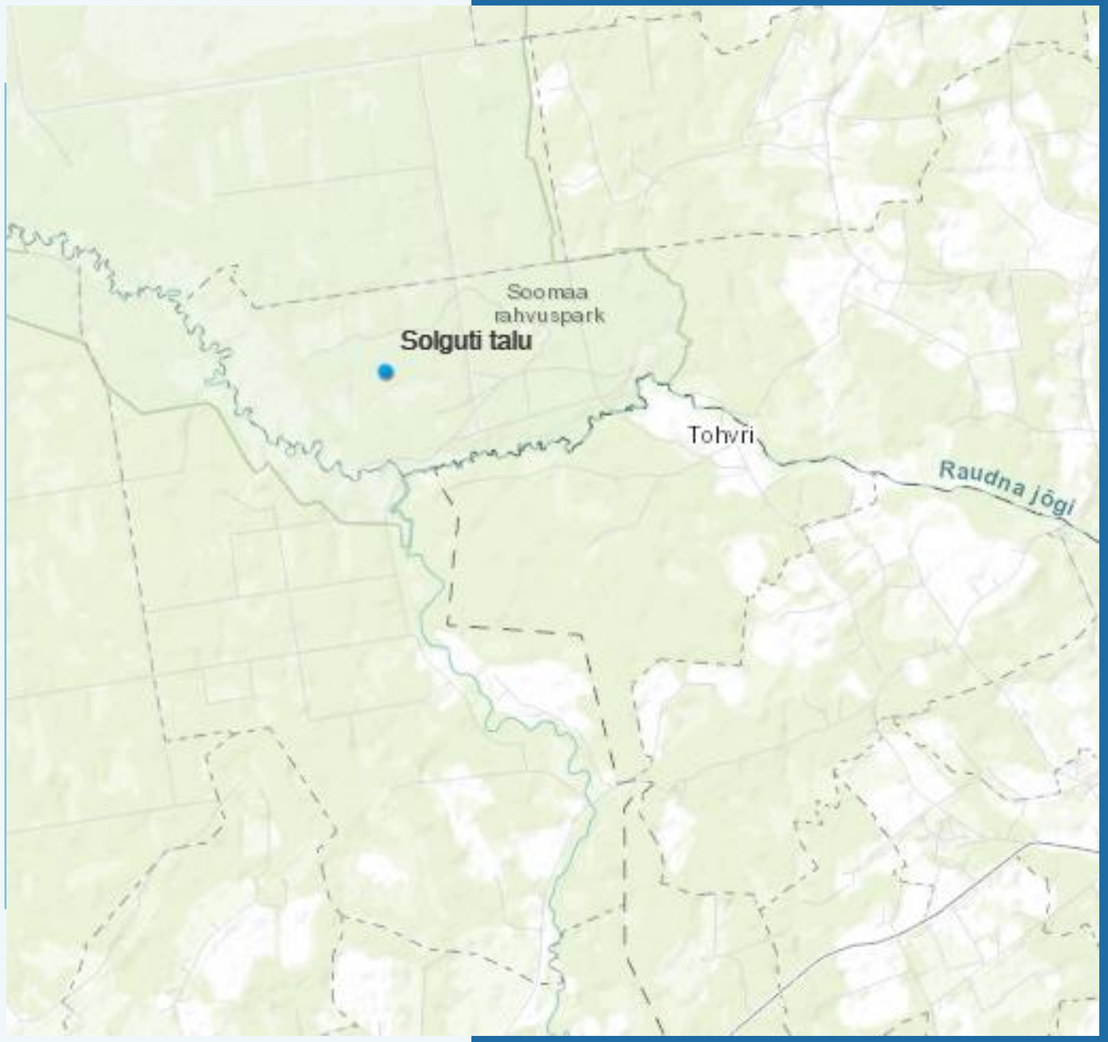
SANDRA STATION

River Lemmjõgi

Station was working 1924…1955

Break 1944…1945

SANDRA STATION



SOLGUTI STATION

River Raudna

Station was working 1924...1955

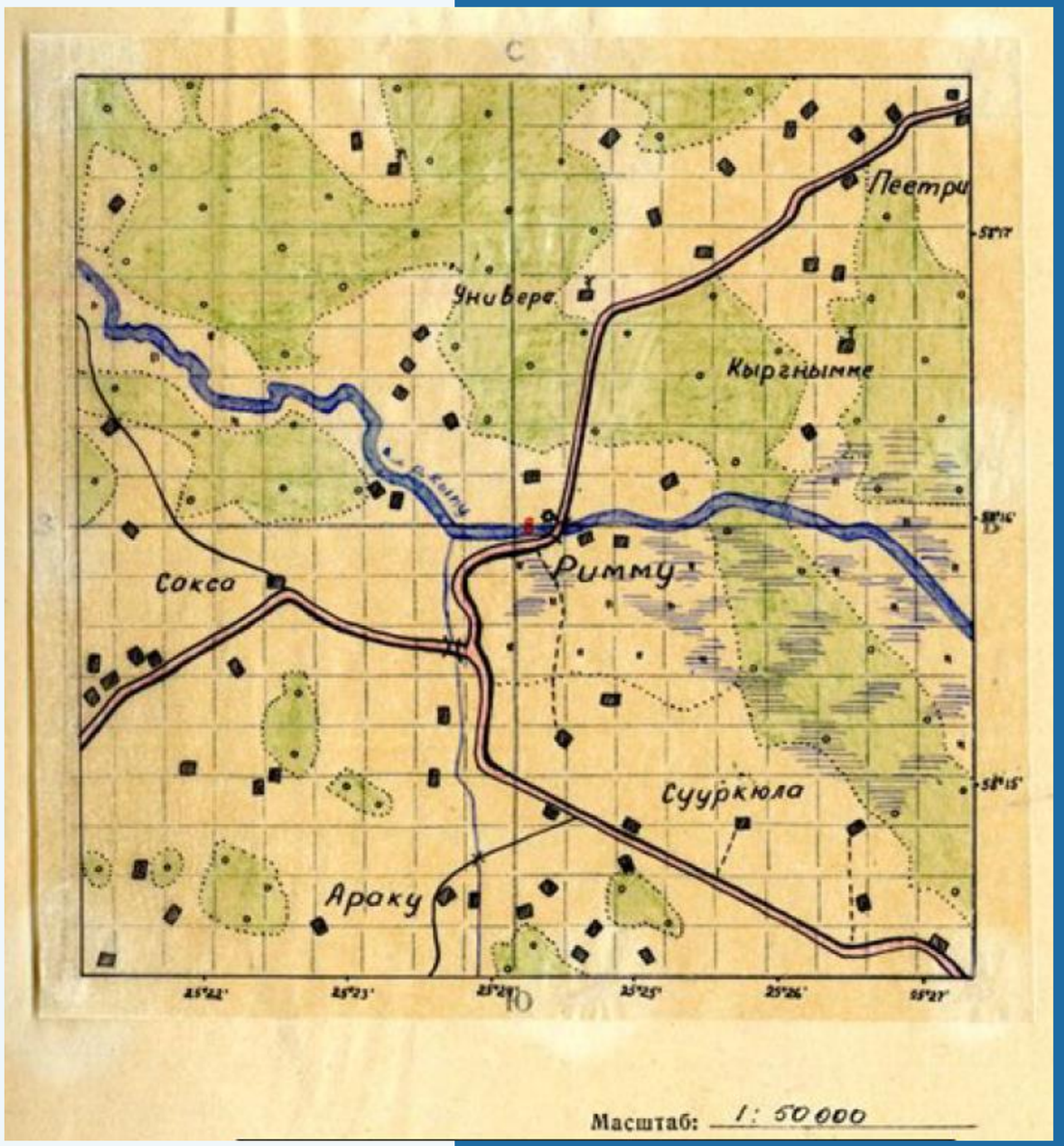
Break1944

SOLGUTI STATION

Vooluhulga möötmine - sügis 1947.a.

Suurvesi üleval pool veemöötjat suvi 1949.a.

SOLGUTI STATION



RIMMU STATION

River Kõpu

Station was working 1924...1964

Break 1933, 1944

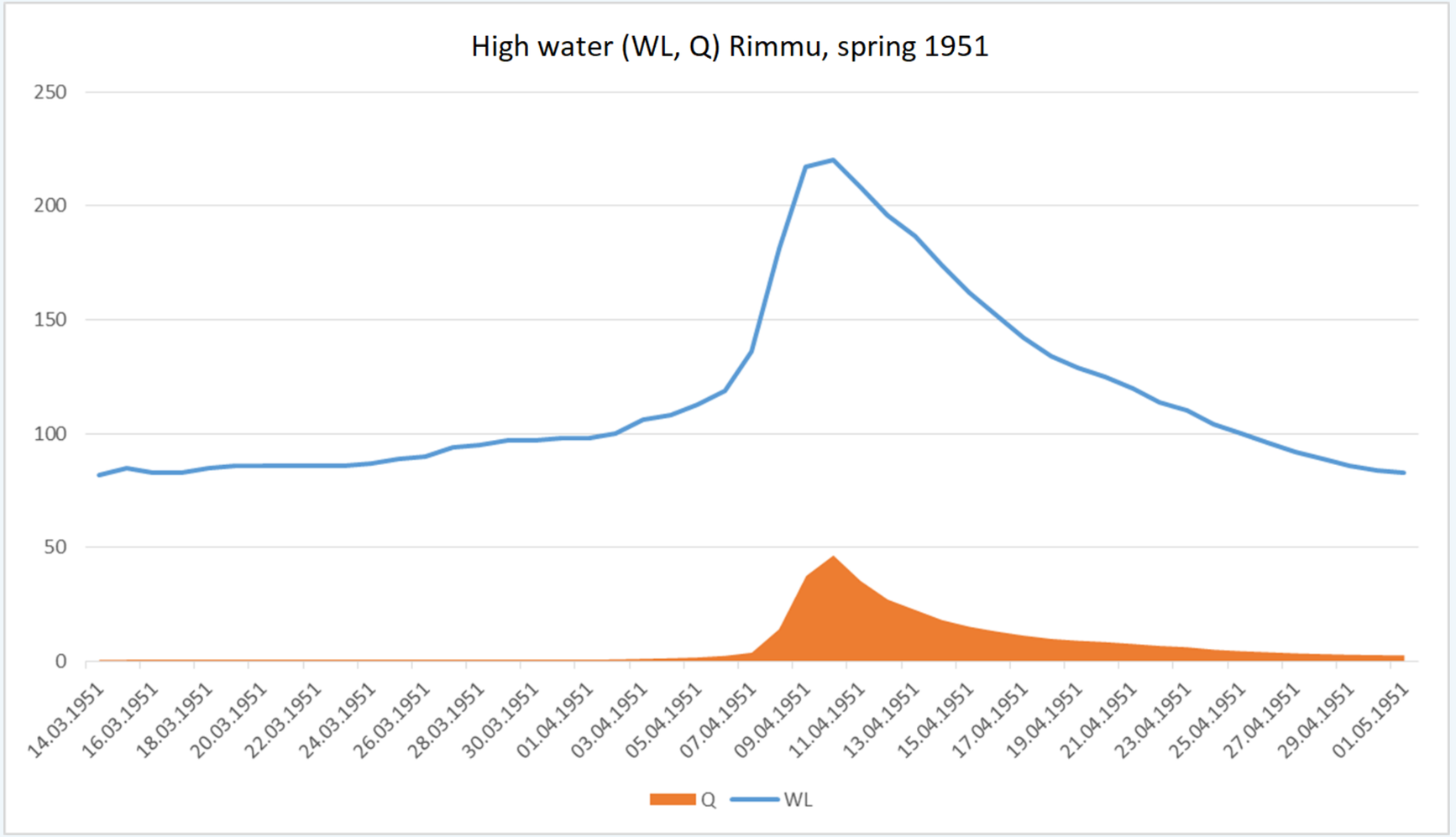
RIMMU STATION

Abs MAX WL: 220 cm

11.04.1932, 10.04.1951

Abs MAX Q: 46,6 m3/s

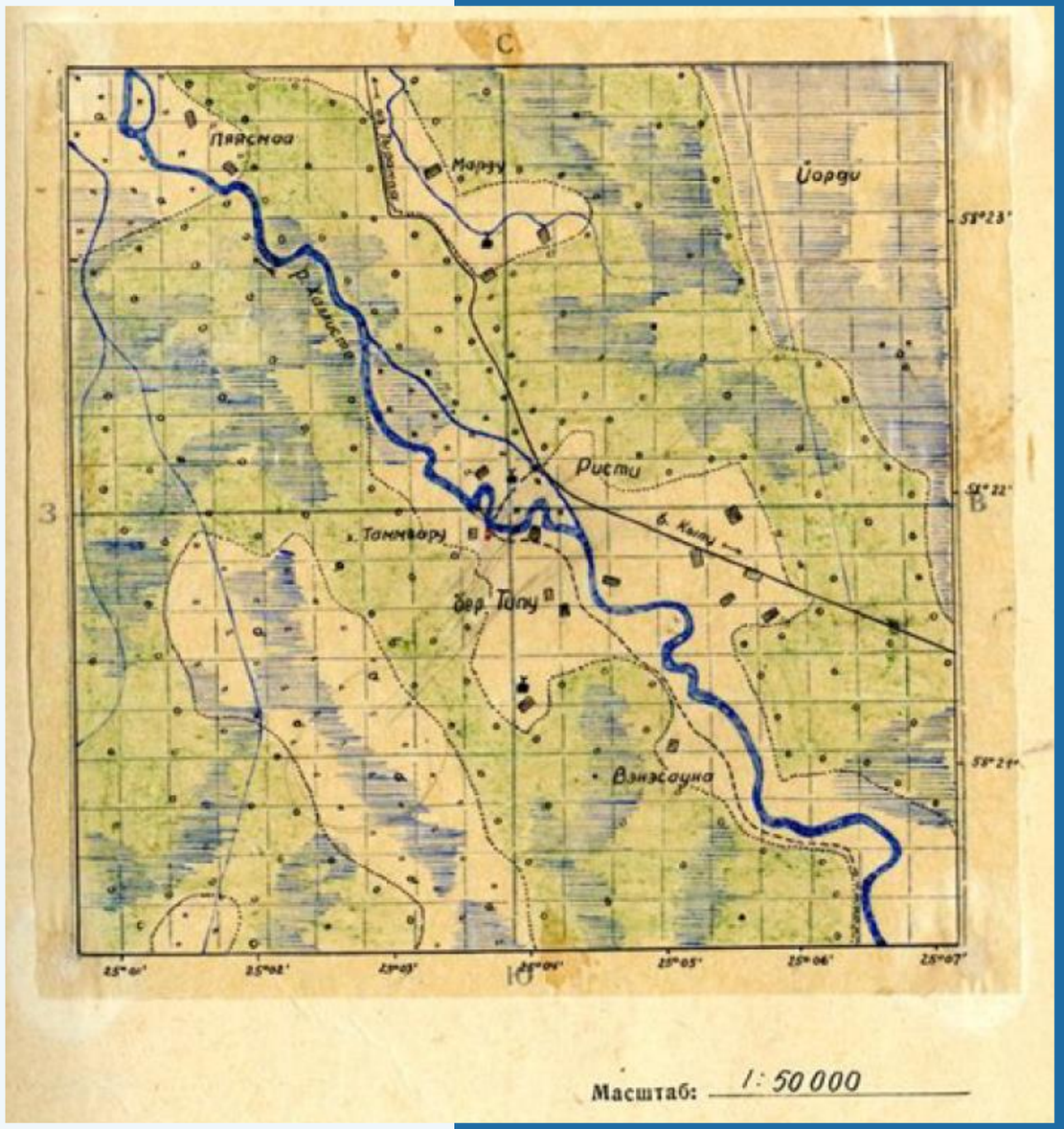
10.04.1951



RIMMU STATION

Vooluhulga mõõtmine hüdrom.prof. nr. 1 – talv 1949.a.

Vaade.isekirjutaja putkale 27/XII 53.a.



TIPU STATION

River Halliste

Station was working 1956...1979

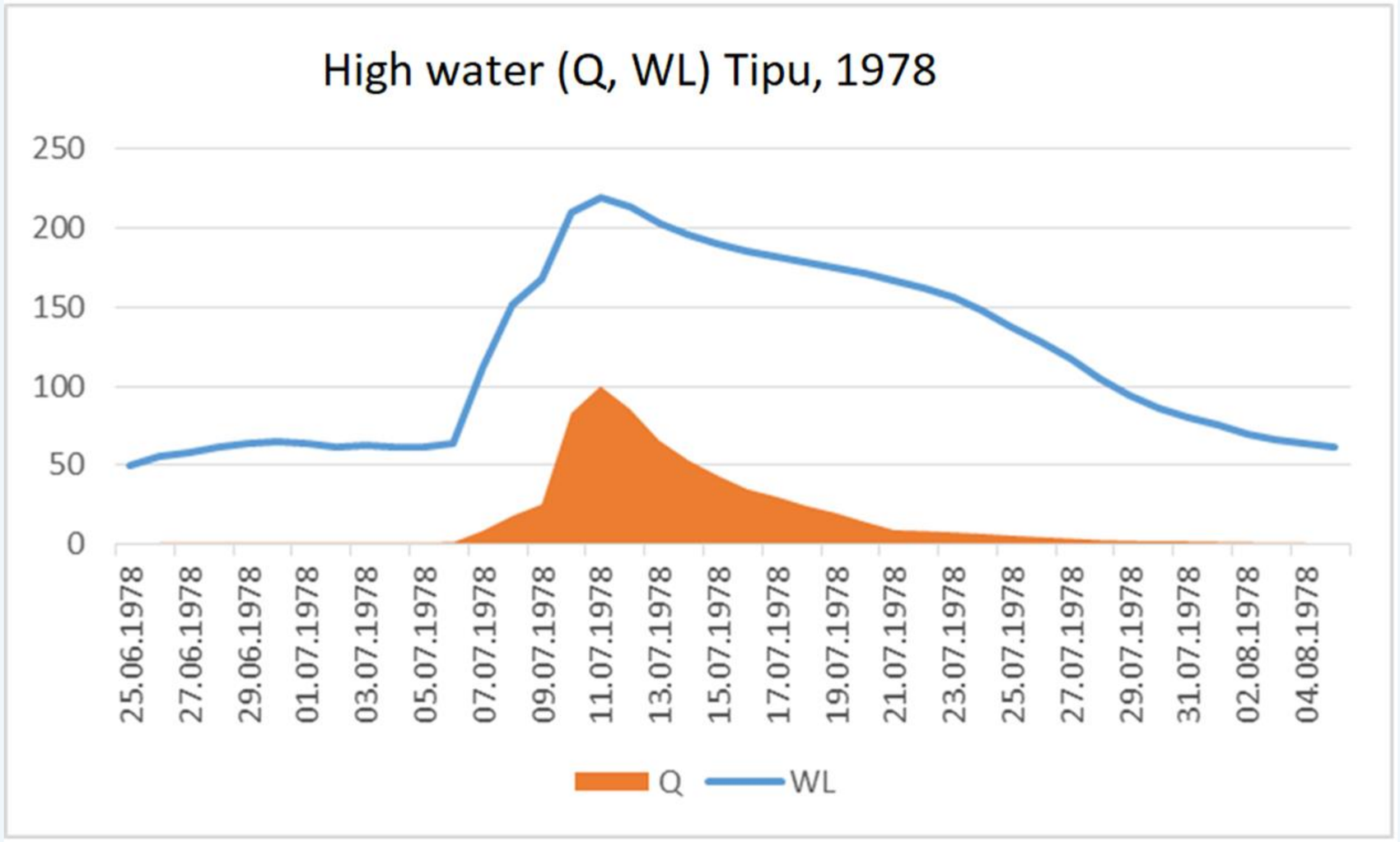
TIPU STATION

Abs MAX WL: 219 cm

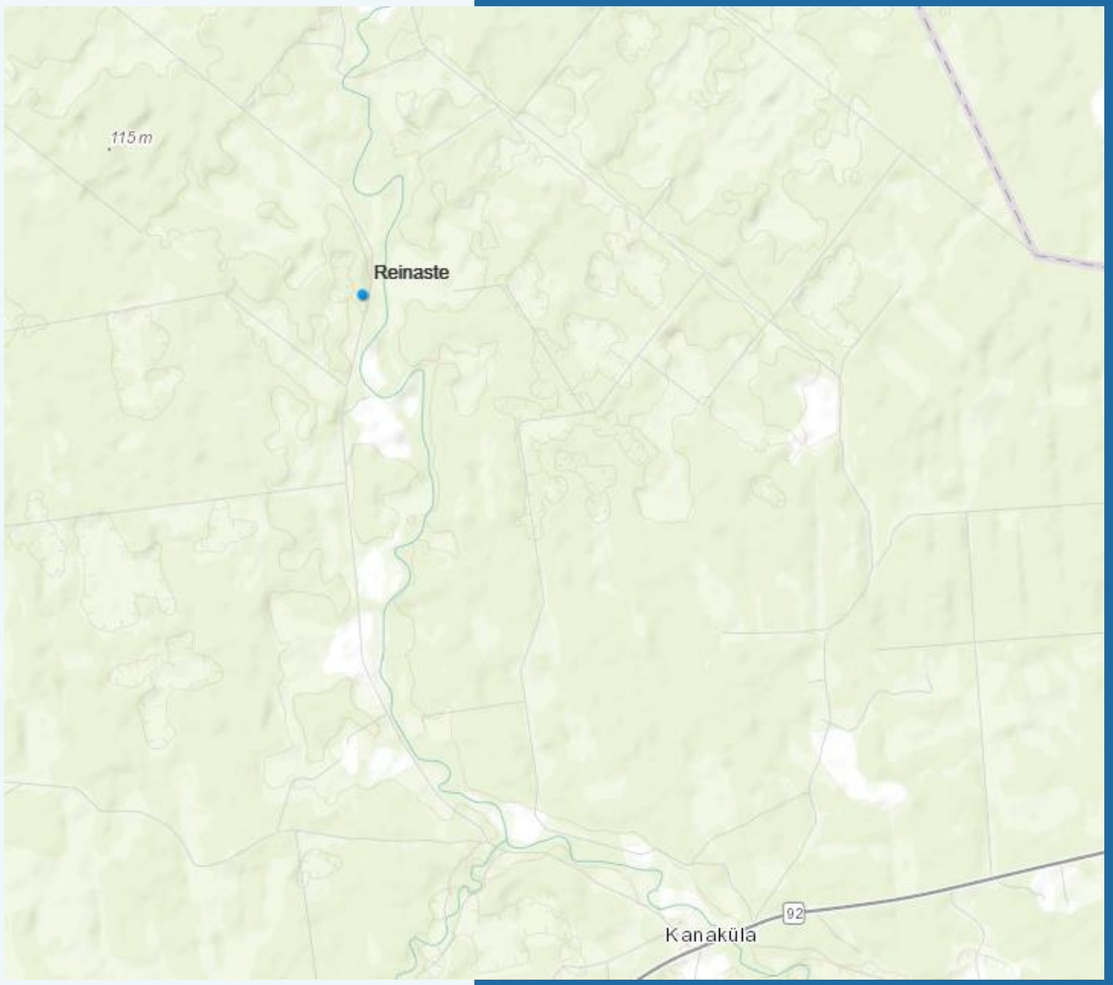
11.**07**.1978

Abs MAX Q: 100 m3/s

11.**07**.1978



TIPU STATION



REINASTE STATION

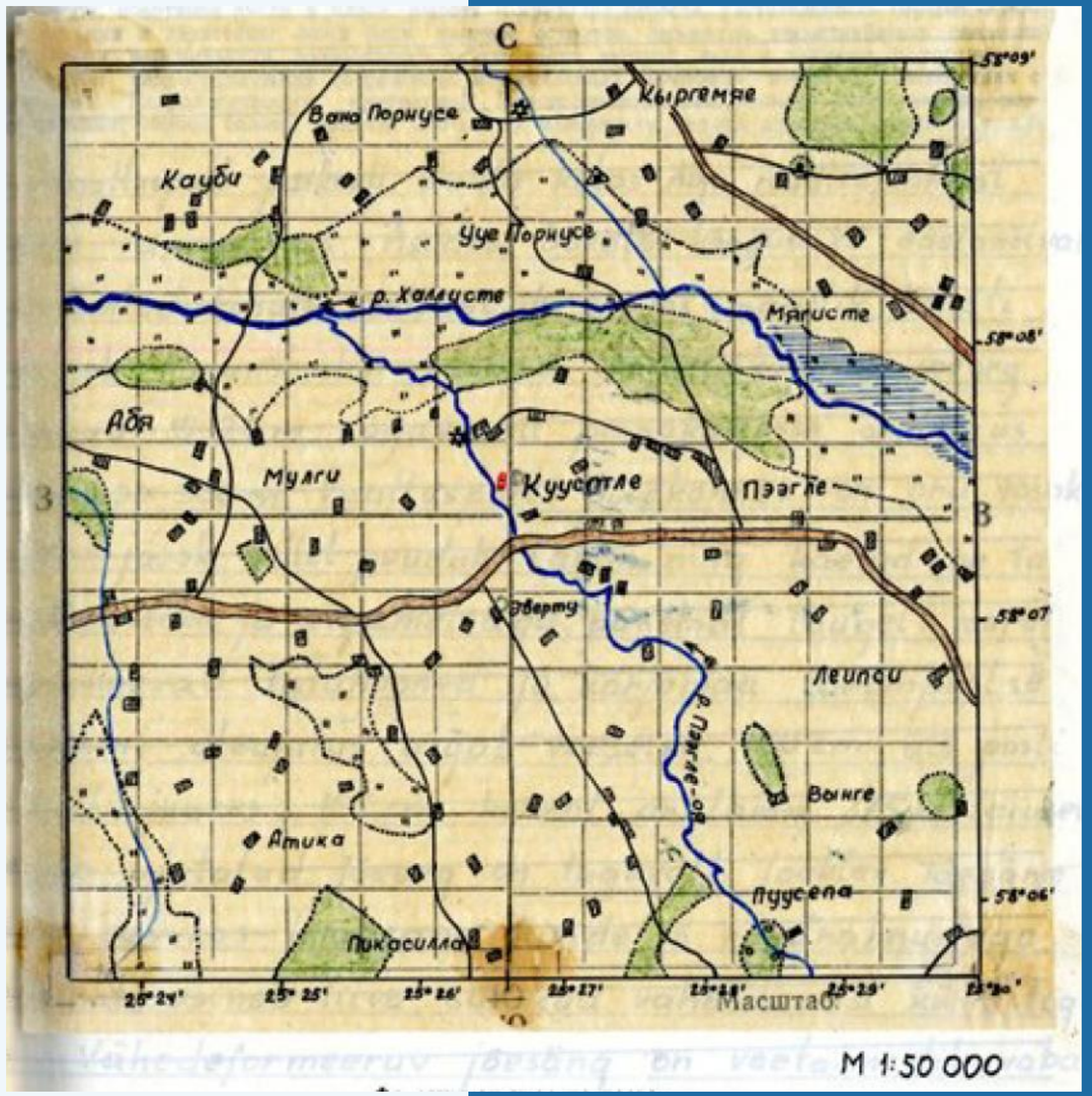
River Halliste

Station was working 1924...1944

Break 1936-1941

Technical passport not found

Photos not found



KUUSTLE STATION

Pöögle stream

Station was working 1945...1997

KUUSTLE STATION

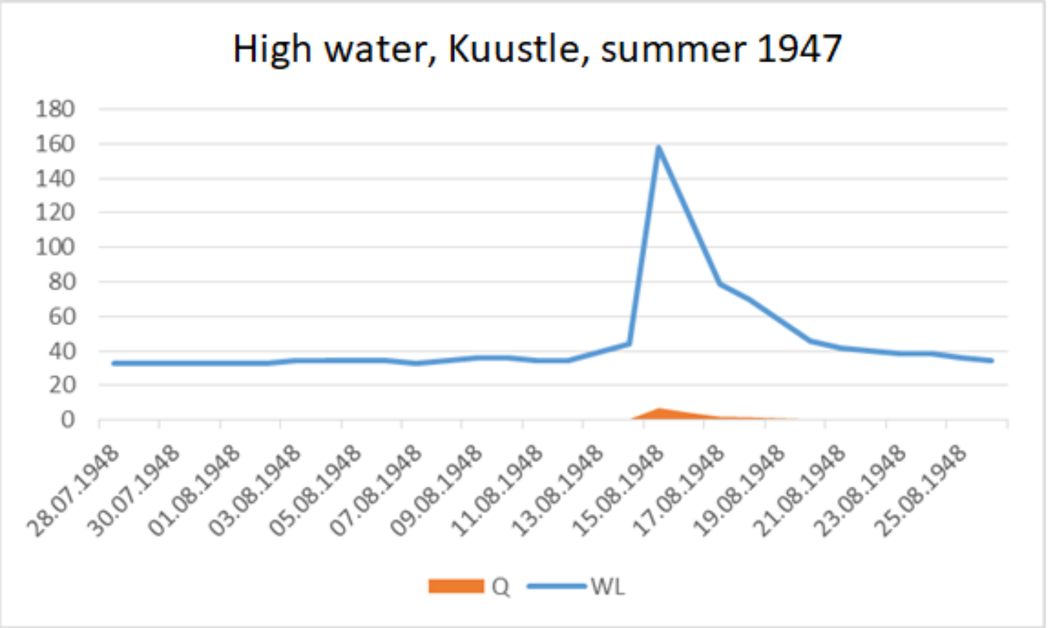
Abs MAX WL: 158 cm

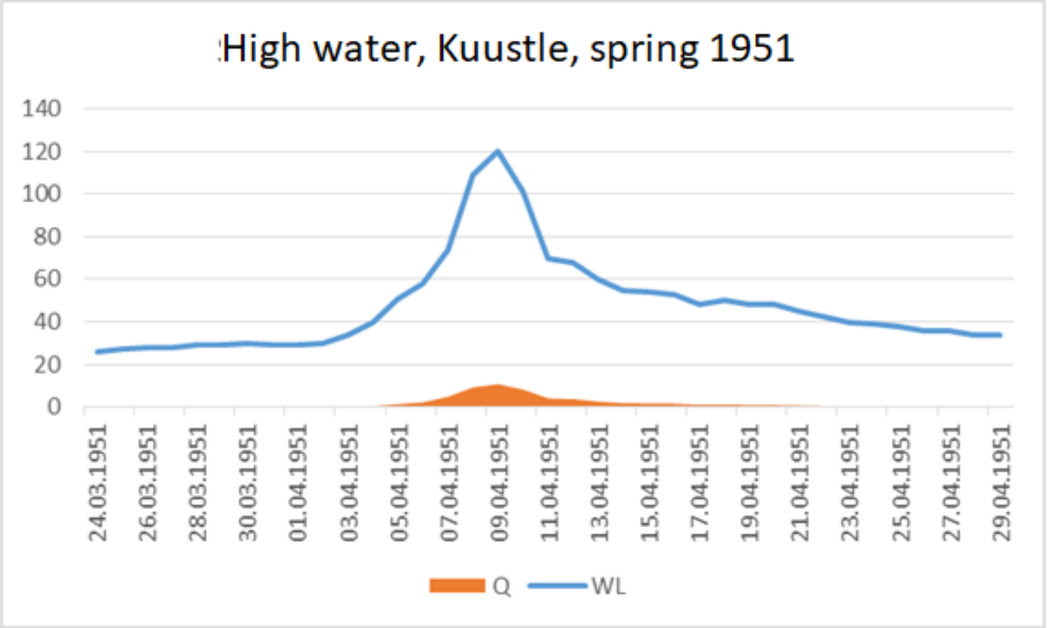
15.**08**.1948

(summertime flash flood)

Abs MAX Q: 10,8 m3/s

09.04.1951





KUUSTLE STATION

KUUSTLE STATION

Isekirjutaja putka XI 1955.a.

Vaade kontrolllävele jõe vasakult kaldalt peale kap.remonti 1955.a.

Summary

1924 was a good year to Estonian national hydrology, 5 new stations were opened

1931 was a year of absolute maximum waterlevels, both in Soomaa and elsewhere in Estonia

1951 was a year of absolute maximum discharges

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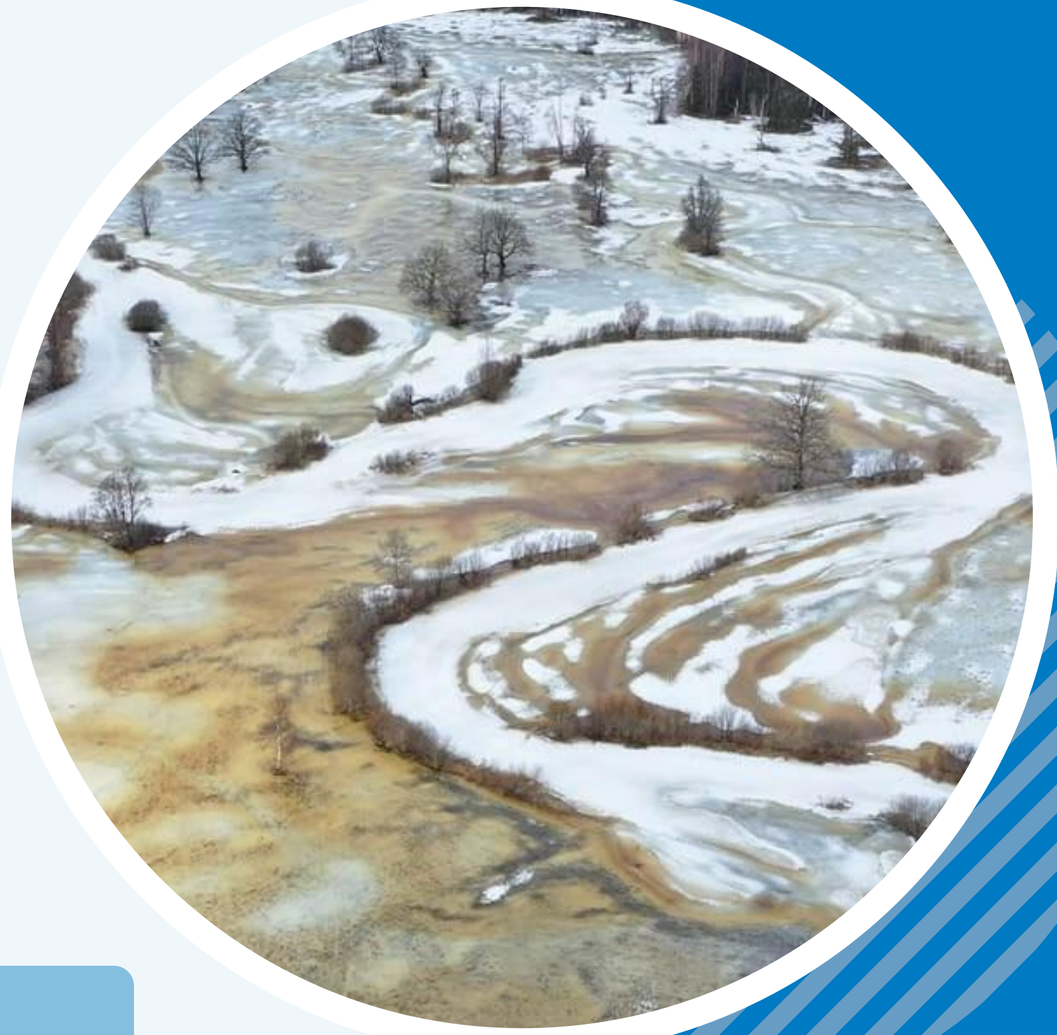
EESTI VEEÜHING
ESTONIAN WATER ASSOCIATION

WATER IS LIFE!



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