Spring monitoring - citizen science approach

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Interreg Estonia-Latvia
European Regional Development Fund
EUROPEAN UNION

WaterAct
Joint actions for more efficient management of common groundwater resources

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Why?

Interreg EstLat program project Est-Lat155„**Joint actions for more efficient management of common groundwater resources (WaterAct)**“

WP3 AT3.2 - Establishment of voluntary spring monitoring

- **Spring voluntary monitoring** will be introduced to general public as the overall awareness of groundwater protection is low.
- **Easy to understand guide how to carry out voluntary spring monitoring** will be developed.
- **Web application** will be developed by TU to gather the data online.
- Best cost-effective measures **how to carry out spring monitoring by non-experts** and **how to engage public** will be tested.

Why use springs in groundwater monitoring?

Advantages for springs being included into national groundwater monitoring networks:

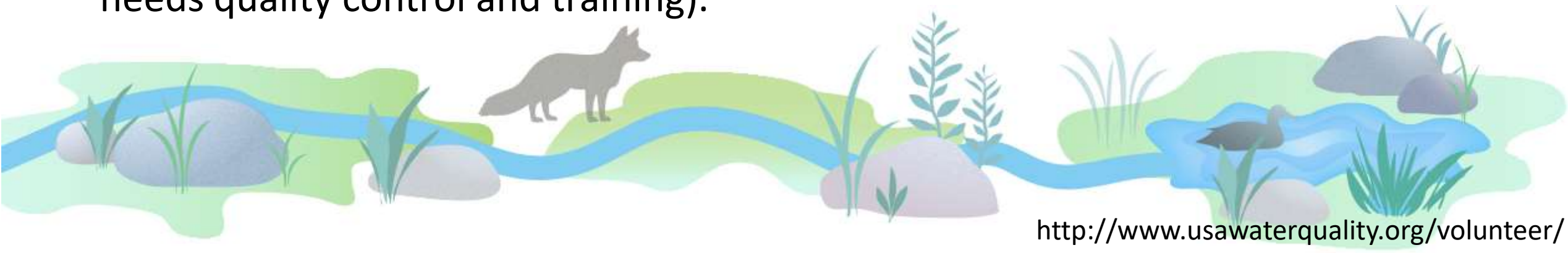
- there are **no installation or maintenance costs**
- sampling **does not require time consuming water pumping** compared to wells and boreholes.

Obstacles to use springs as representative monitoring points:

- Water **quality can be seasonally changing,** thus in the beginning they need to be screened with higher resolution to identify appropriate sampling frequency.

Why citizen science (volunteer monitoring)?

- **Increases the awareness** of and interest in local water quality issues.
- **Helps to educate** - through monitoring, volunteers learn how the quality of water is affected by our actions and how we can protect water resources.
- Volunteer water quality monitoring is a **great tool for youth environmental education.**
- Obtains **long-term data or new data** on waterbodies that otherwise may go unmonitored.
- Water quality data collection by volunteers is **time and cost efficient**.
- **Research shows, that volunteer water quality monitoring data is credible** (but needs quality control and training).



http://www.usawaterquality.org/volunteer/

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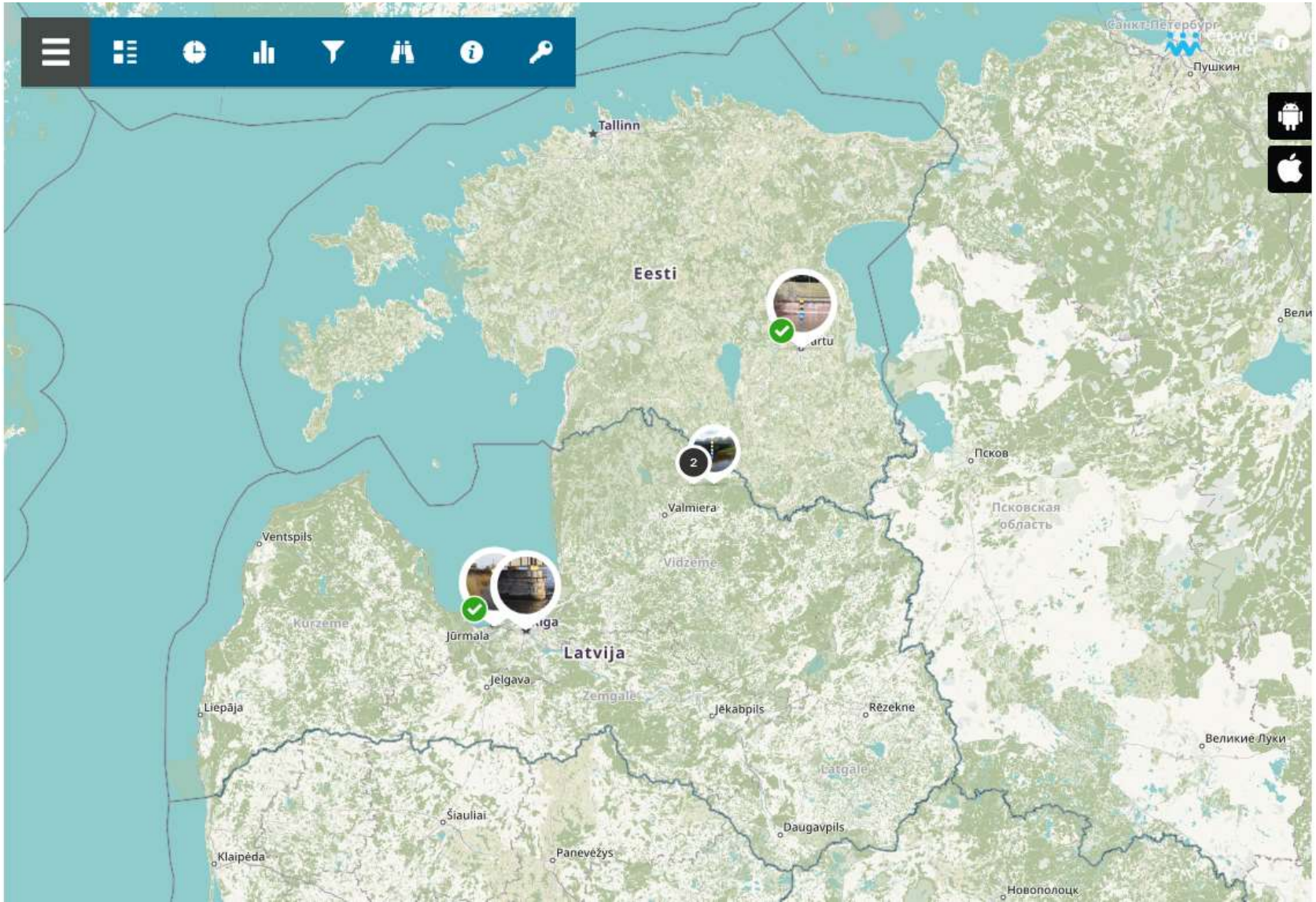
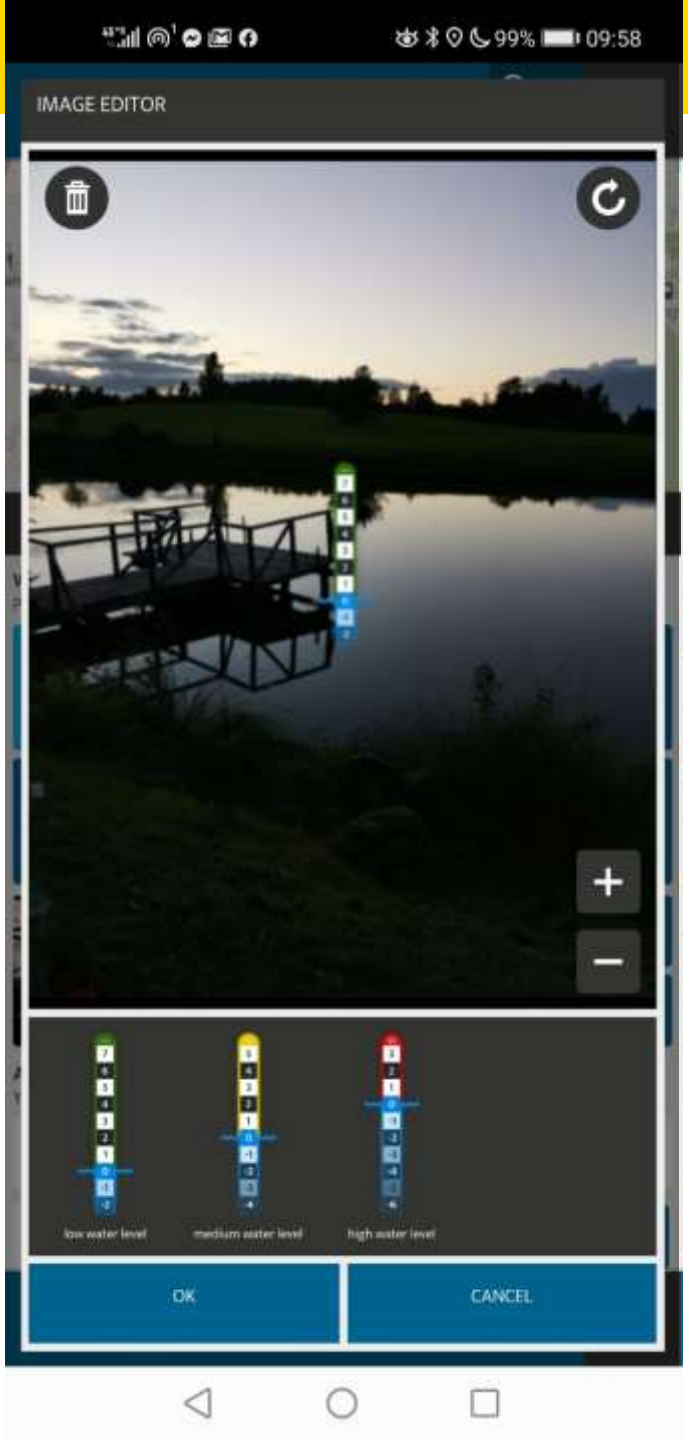
Good practices around the world?

Good practice from Europe

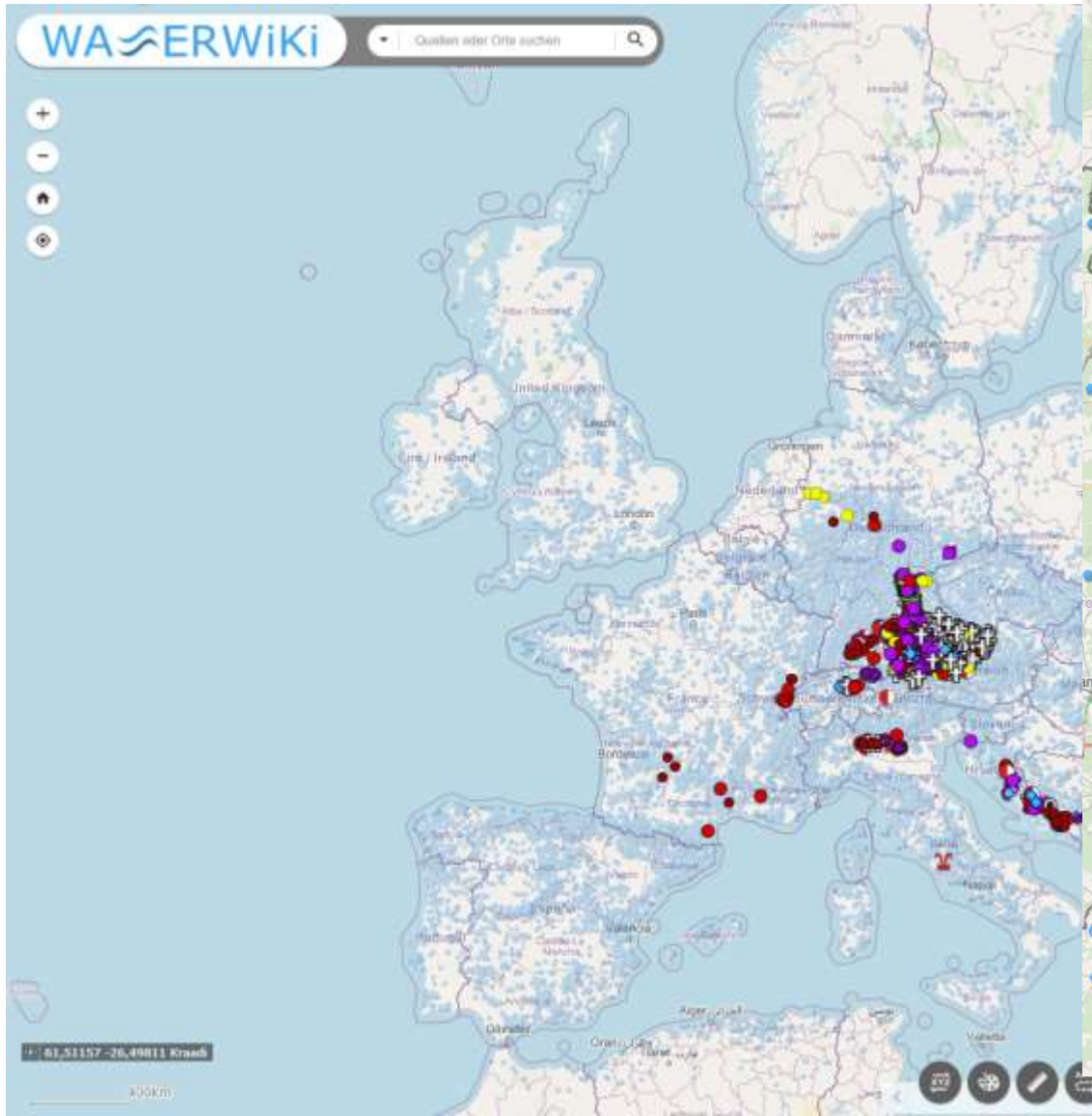
Crowd Water – https://crowdwater.ch/

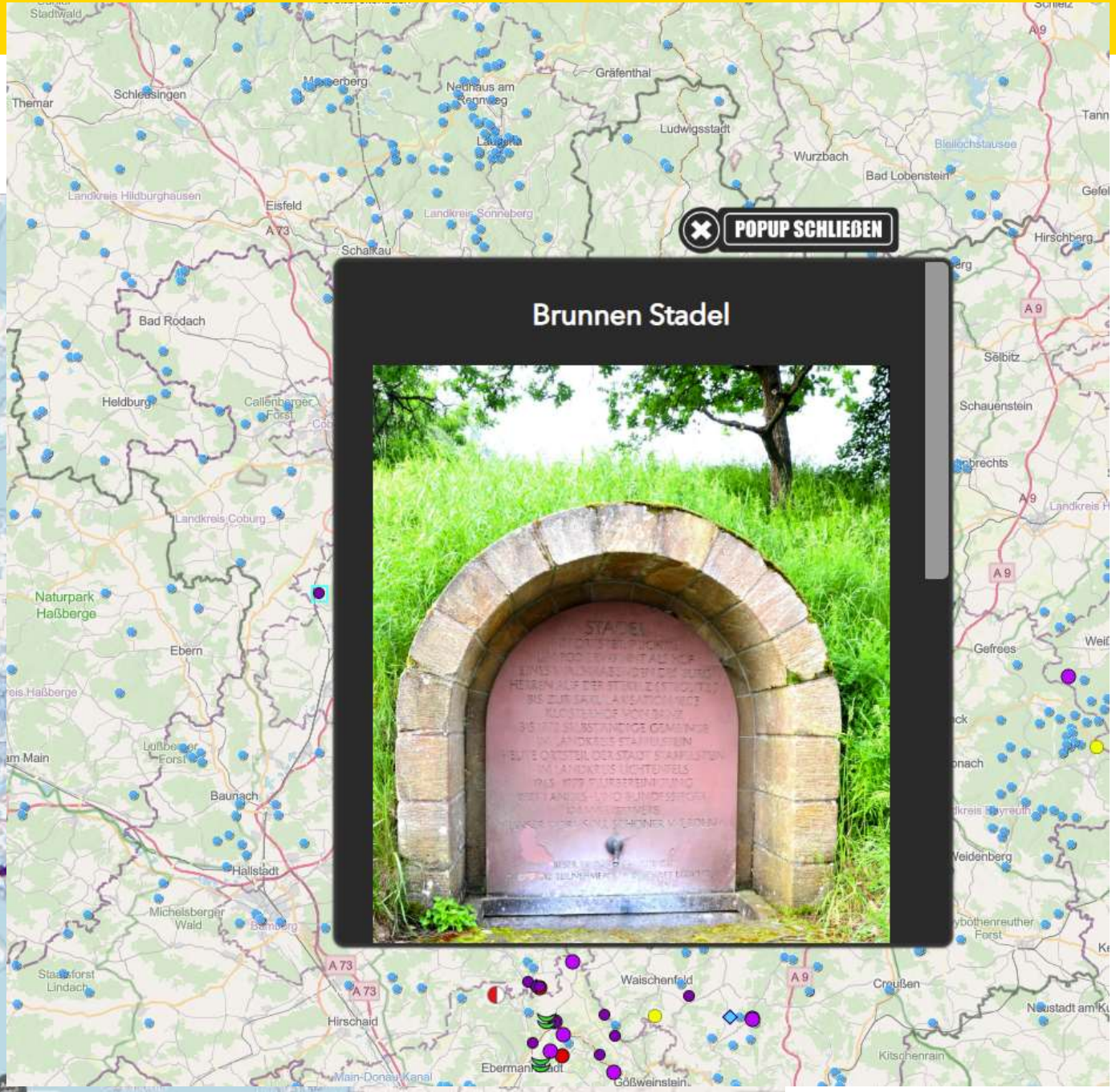




Wasserwiki

Spring database from Germany – https://wasserwiki.eu/

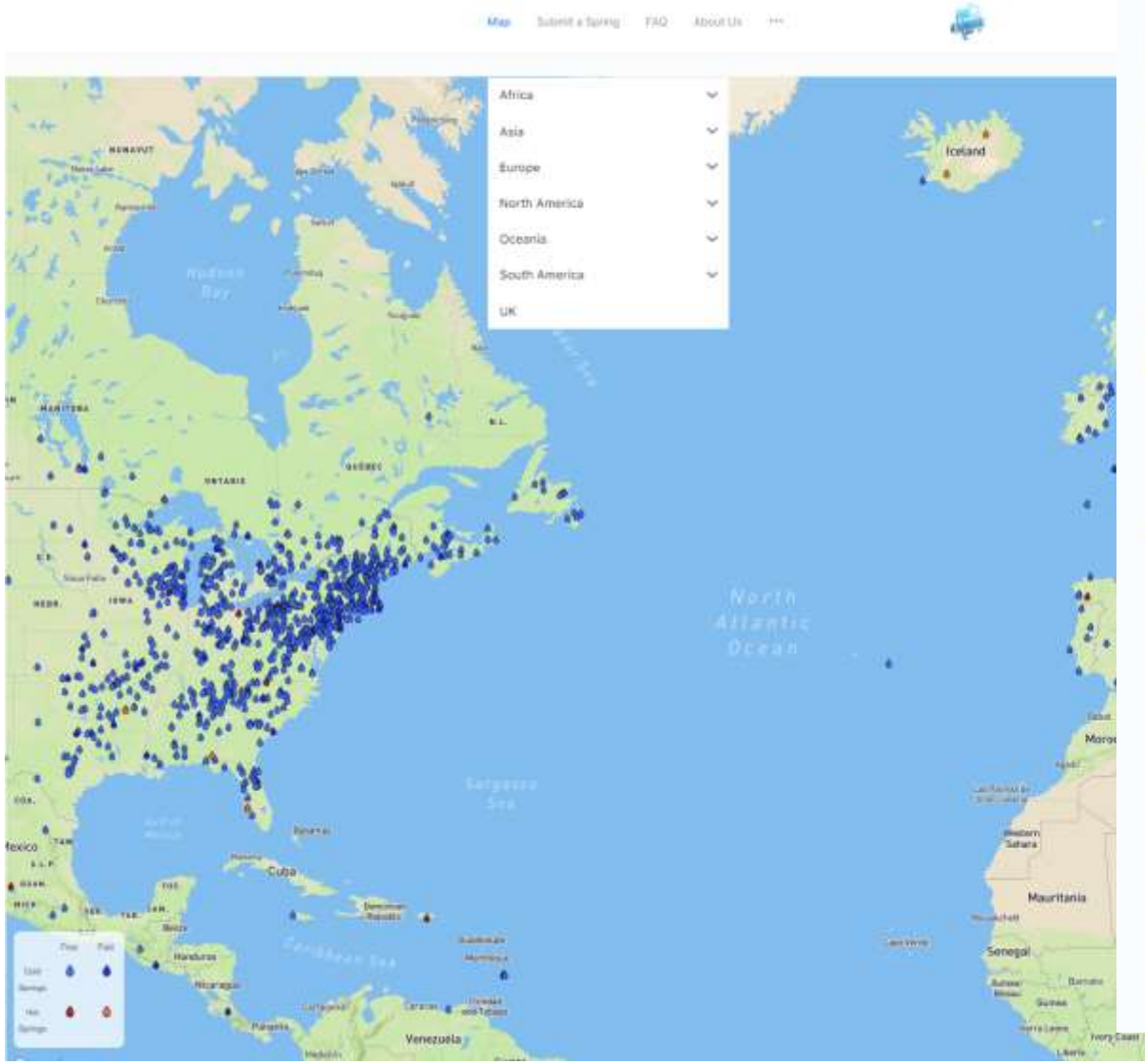




Find a spring

US based spring mapping tool –

https://findaspring.com/



Koljaku allikas, Võsu, Lääne-Virumaa, Estonia

Details | Activity | Water Test Results | Spring Ratings | Upload Media | Description Improvements

Tweet Like

Category: Estonia, View All

Directions: 59.557251,25.99391 Copy GPS

Description

Free access spring below a hill near a major road crossing.

Nearest Address

Koljaku küla

Directions from Nearest Address

Situates exactly at the crossing of the Rakvere highway and Palmse road, when moving from the direction of Võsu village.

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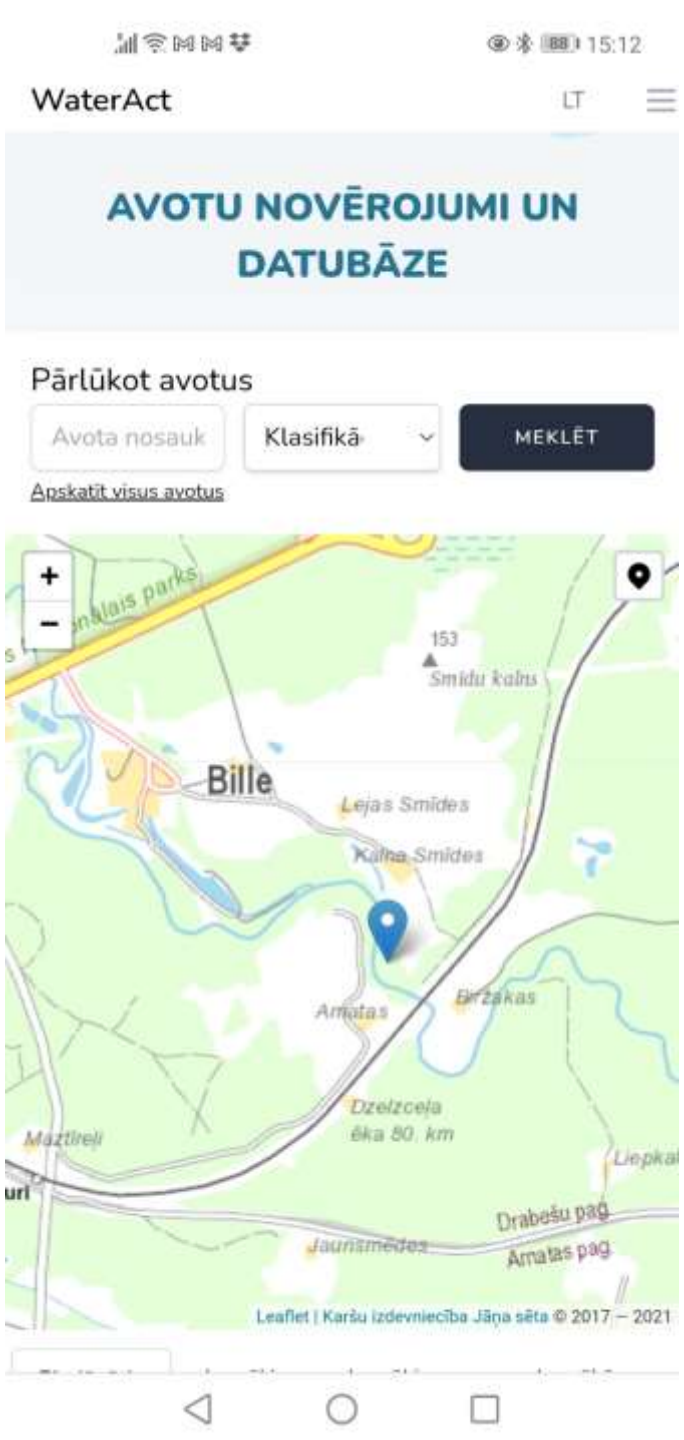
Estonia: https://allikad.info/
Latvia: https://avoti.info/

- allikad.info/avoti.info is browser based map application for finding, describing, observing and measuring of the springs.
- 5 language – English, Estonian, Latvian, Russian, French.
- All springs from government databases are already there. Users can check the correctness of information, upload pictures and make observations (describe, measure etc).
- Without user account you can see springs, add information and observations. For adding new springs or observations one must register.
- New and revised spring will end up in governmental databases.
- When adding new spring, all location information (coordinates, country, local municipality) will come automatically from map.
- At first all springs will have status „Submitted“and will get status „Confirmed“ only after rechecking by other users or administrator.



https://allikad.info/
https://avoti.info/

- Different maps for Estonia (Landborad) and Latvia (Jāņa sētas).
- In Estonia it is possible to use Orthophoto and Relief shaded map.
- When adding new spring, all location information (coordinates, country, local municipality) will come automatically from map.
- At first all springs will have status „Submitted“ („Kinnitamata“/„Iesniegts“) and will get status „Confirmed“ („Kinnitatud“/„Apstiprināts“) only after rechecking by other users or administrator.

LET'S MAP THE SPRINGS TOGETHER!
allikad.info

Spring monitoring manual for volunteers

Authors: J. Terasmaa, M. Vainu, O. Koit,
K. Sisask, P. Abreldaal, L. Puusepp

Web application:
allikad.info

Contents

Download the spring monitoring manual for volunteers!

Lejupielādēt avotu monitoringa rokasgrāmatu!

Lae alla allikate vabatahtliku seire juhend!

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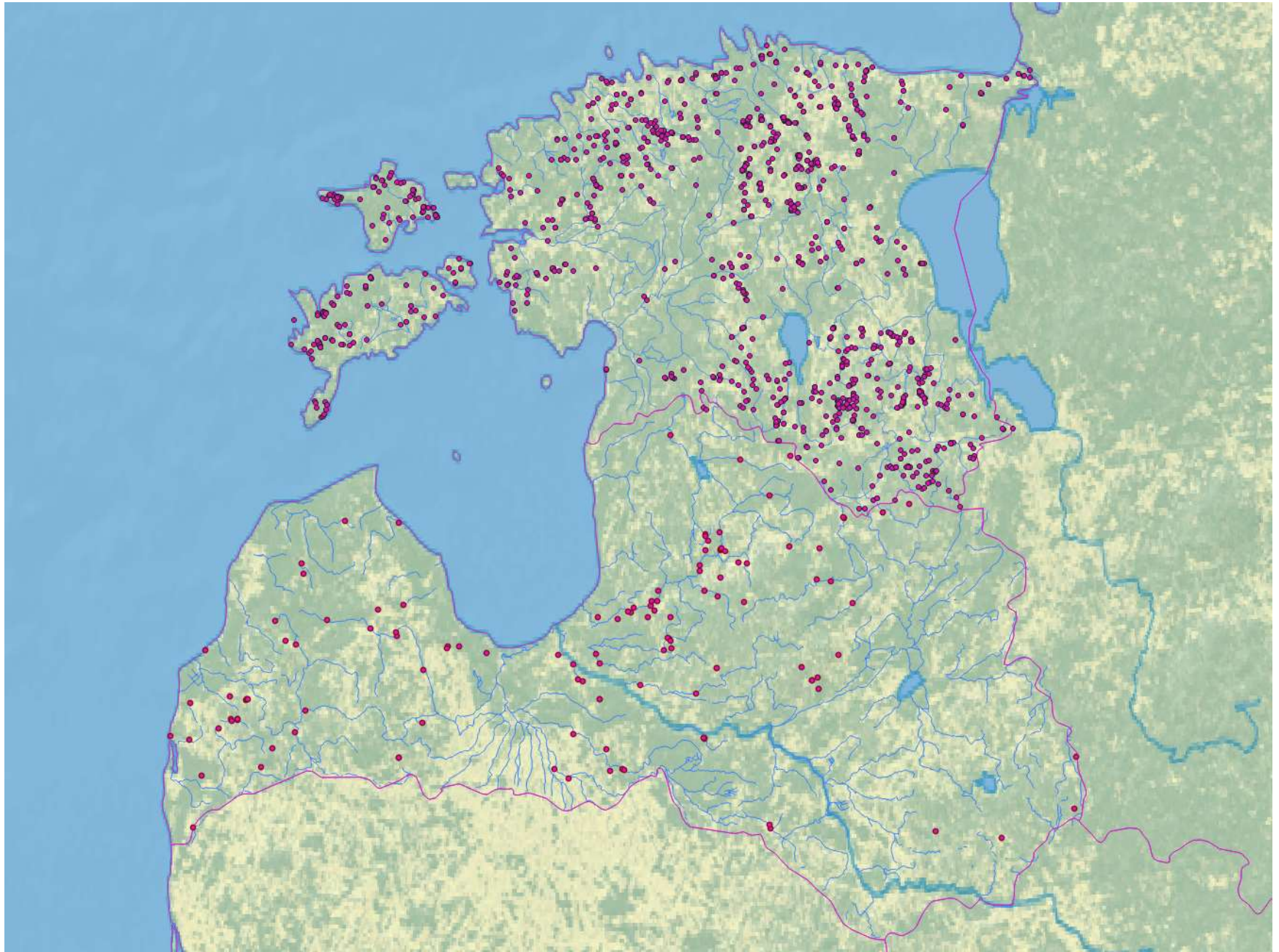
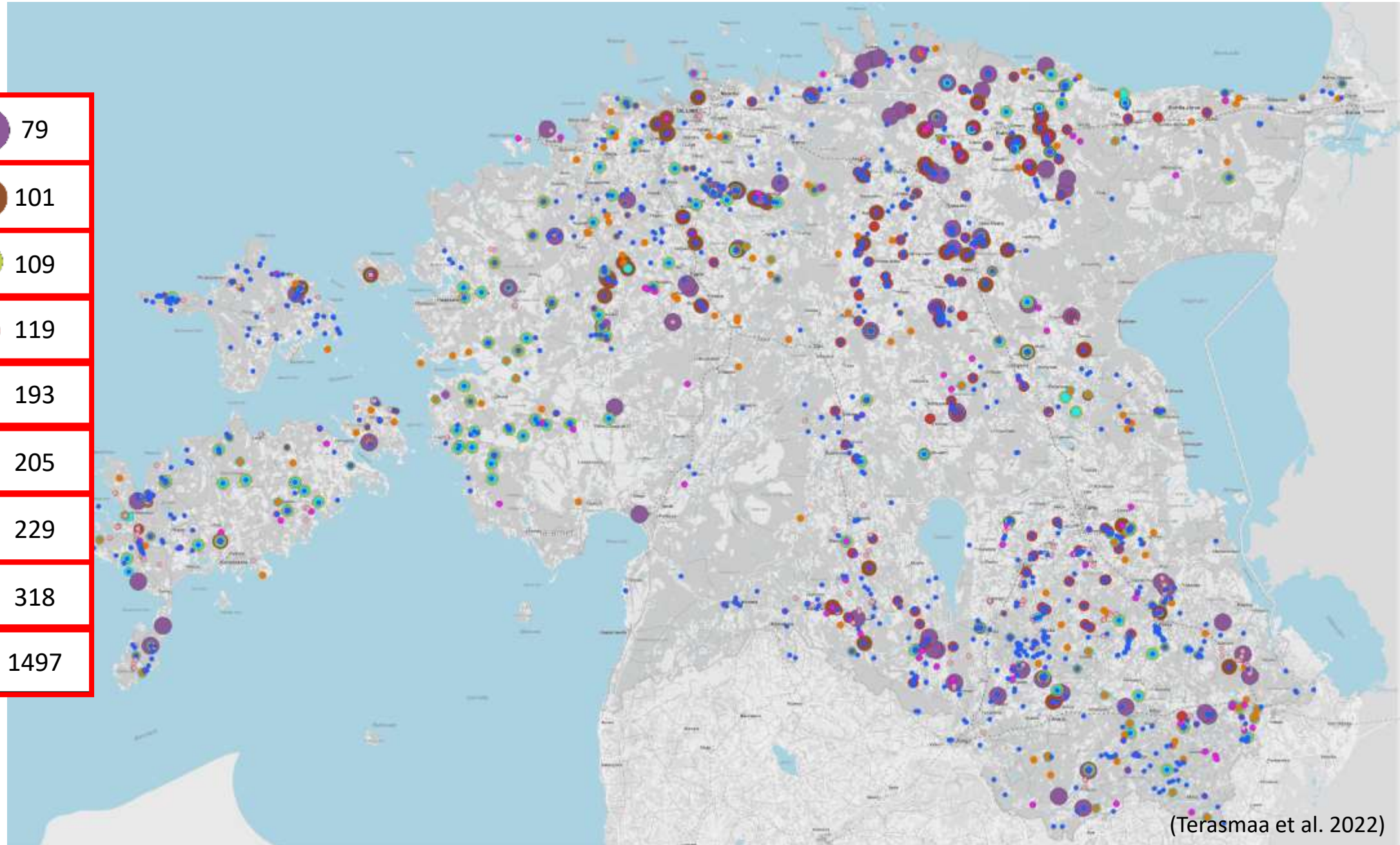
Starting point

Initial database – 1486 springs from Estonia, 123 springs from Latvia



Other spring databases in Estonia



(Terasmaa et al. 2022)












Meeting with schools

Water sampling

Discharge measurements

Foto: Helje Laasik

Loodusesõpradele on hästi teada Järvamaal Norra külas asuv Oostriku Suurallikas, sellest saab alguse Oostriku jõgi. Vähem tuntud allikad saab nüüd uue veebirakenduse abil kaardile lisada

Kanname

Eesti allikad kaardile!

Eestis on riiklikes registrites kirjas pisut üle 1400 allika. Möödunud sajandi esimesel poolel loendati ja kirjeldati 4500 allikat, kuid enamik neist pole kaardile jõudnud. Hilisemal ajal on meie allikate arvuks pakutud isegi kuni 15 000. Seega on meie teadmised allikatest ja nende asukohtadest üsna lünklikud. Veel vähem on teada Eesti allikavee kvaliteedi kohta.

2020. aastal alanud Eesti ja Läti ühisprojekti WaterAct raames on loodud veebipõhine allikavaatluste kaardirakendus allikad.info. Kui teate mõnd allikat, mis pole tähistatud ega hästi tuntud, siis on võimalik sellest teada anda. Selleks et lisada allikate andmebaasi uus läte või uued vaatlused, peab esmalt tegema endale kasutajakonto ja sisse logima. Samalt lehelt saab lugeda allikate kohta ja head nõu, mismoodi allikaid pildistada, hinnata allikavee omadusi ja mõõta vooluhulka.

Tallinna ülikooli ökoloogia keskus / Loodusajakiri

Kohila lätted kaardile

Kaardistame üheskoos allikad!

Allikad saab nautida kõikjal, ka Mustamäel

Давайте вместе отмечать родники на карте!

Kaardistame üheskoos allikad

Allikates on algus, meie elujõud ja lootus

Eesti Geoloog

Igaühest võib saada allikauurija!

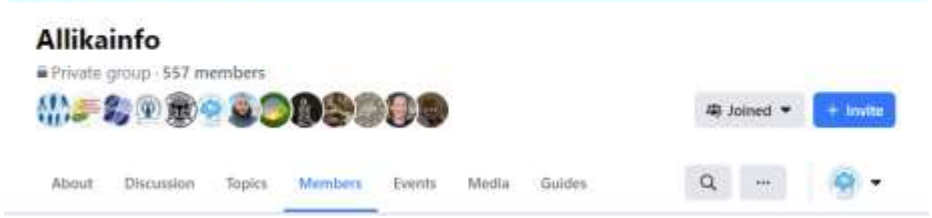
1 Mar 2021-12 Sep 2022

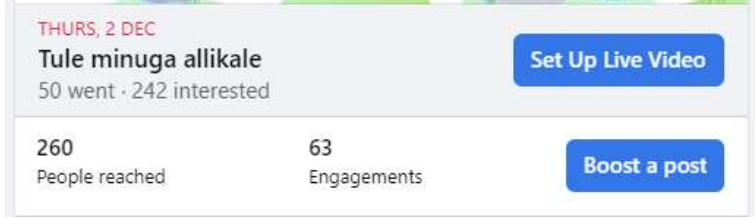
Facebook Page reach

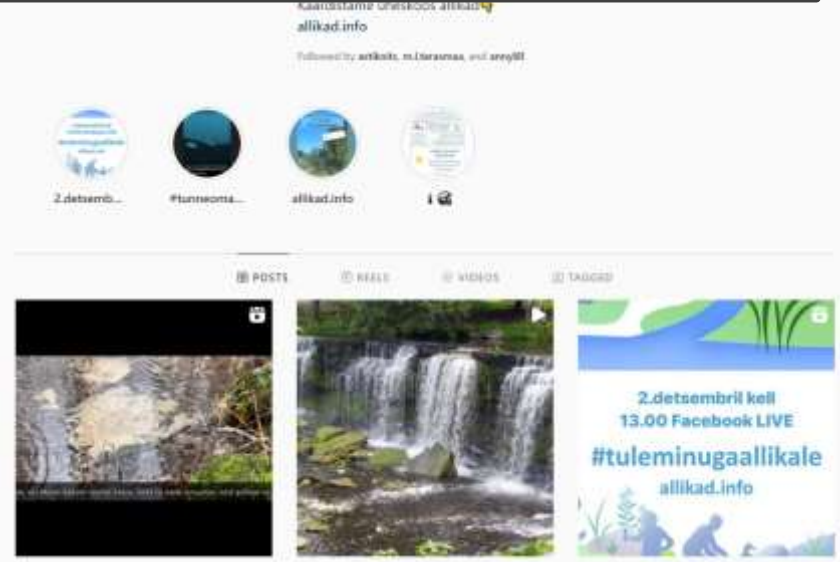
135,030 ↑ 6.8M%

Instagram reach

34,894 ↑ 116.2K%







Outcome

Results so far (as of 12.09.2022)

https://allikad.info/

Users: 218 (~30 from LV)
Springs: 2507 (899 new springs, 53 from LV)
Observations: 1609 (80 from LV)
Photos: 4530

- Facebook group **Allikainfo**: https://www.facebook.com/groups/allikainfo (649 members)
- Facebook page **Kaardistame üheskoos allikad**: https://www.facebook.com/allikad.info (676 followers)
- Instagram **know.your.water**: https://www.instagram.com/know.your.water/ (182 followers)
- Youtube channel **Allikainfo**: https://www.youtube.com/channel/UCT28j3eISSLrJPpm_uANg-g

+ Five schools from Koiva are joined
+ GLOBE schools network
+ At least three school project about local springs
+ Several student thesis will focus on springs

- In november we gave to the Land-Board 217 new spring locations, 48 locations corrections and 10 spring locations which are not springs.

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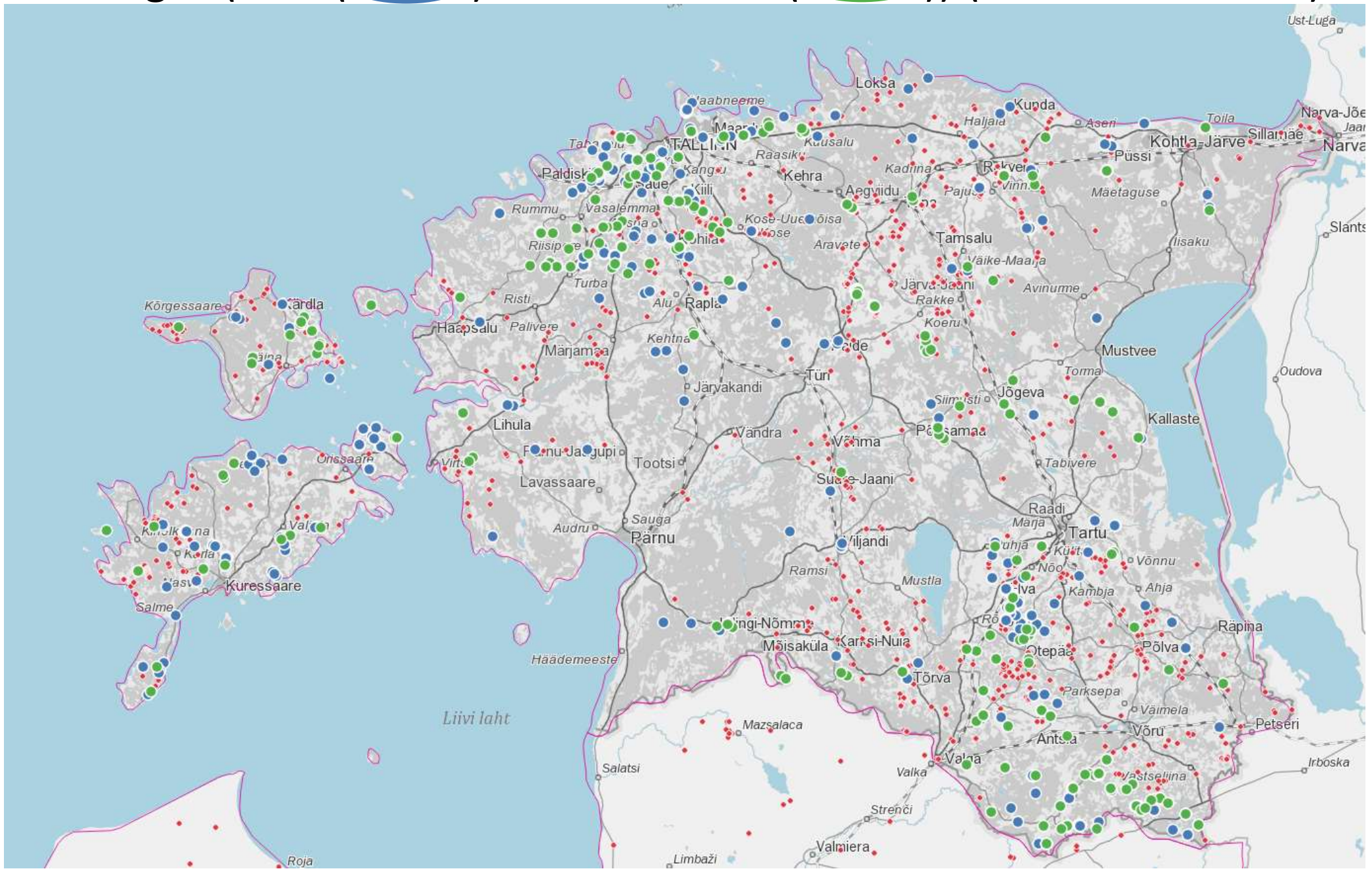
EE changes (new (n=584) and corrected (n=254)) (as of 31.05.2022)



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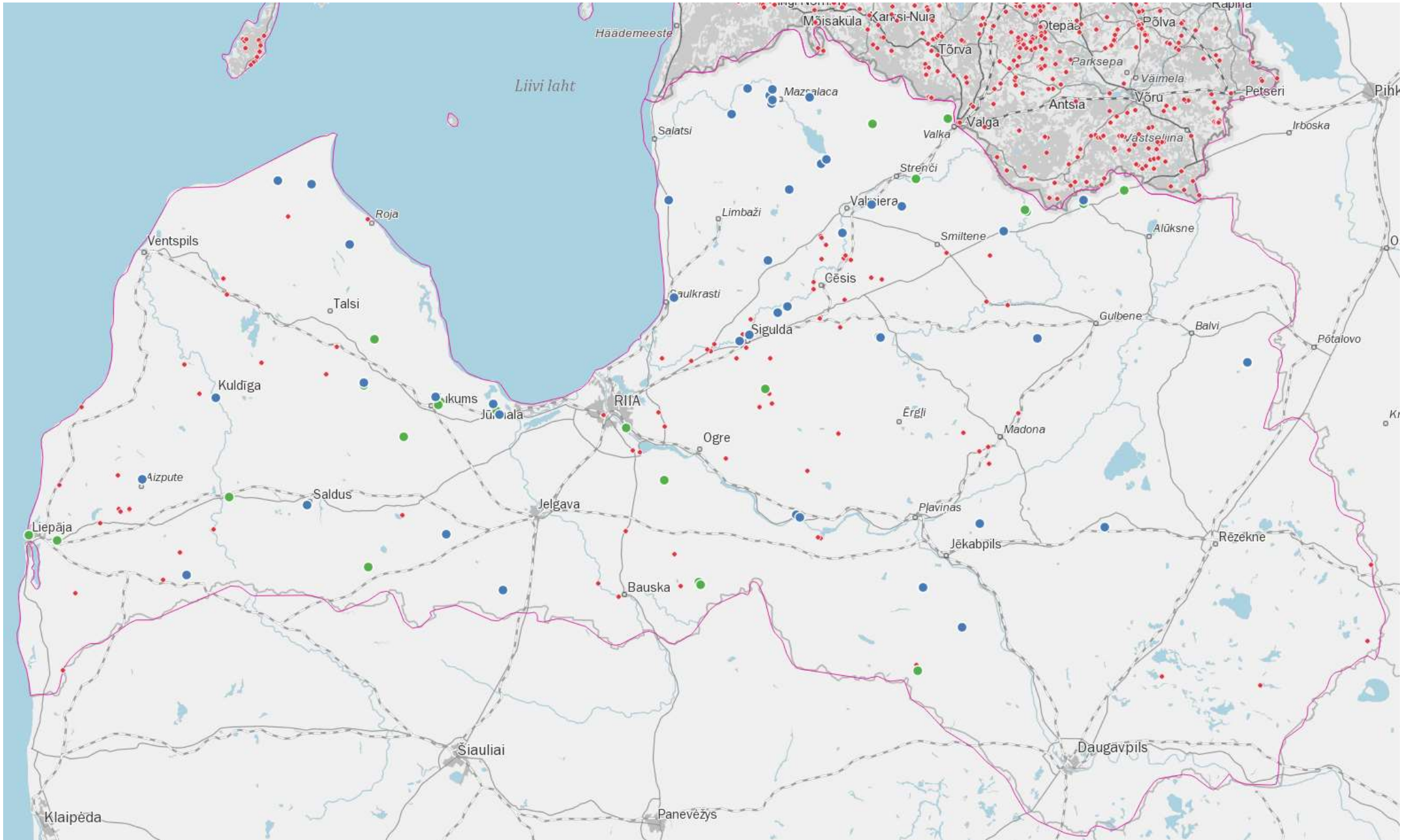
LV changes (new (n=53) and corrected (n=26)) (as of 12.09.2022)



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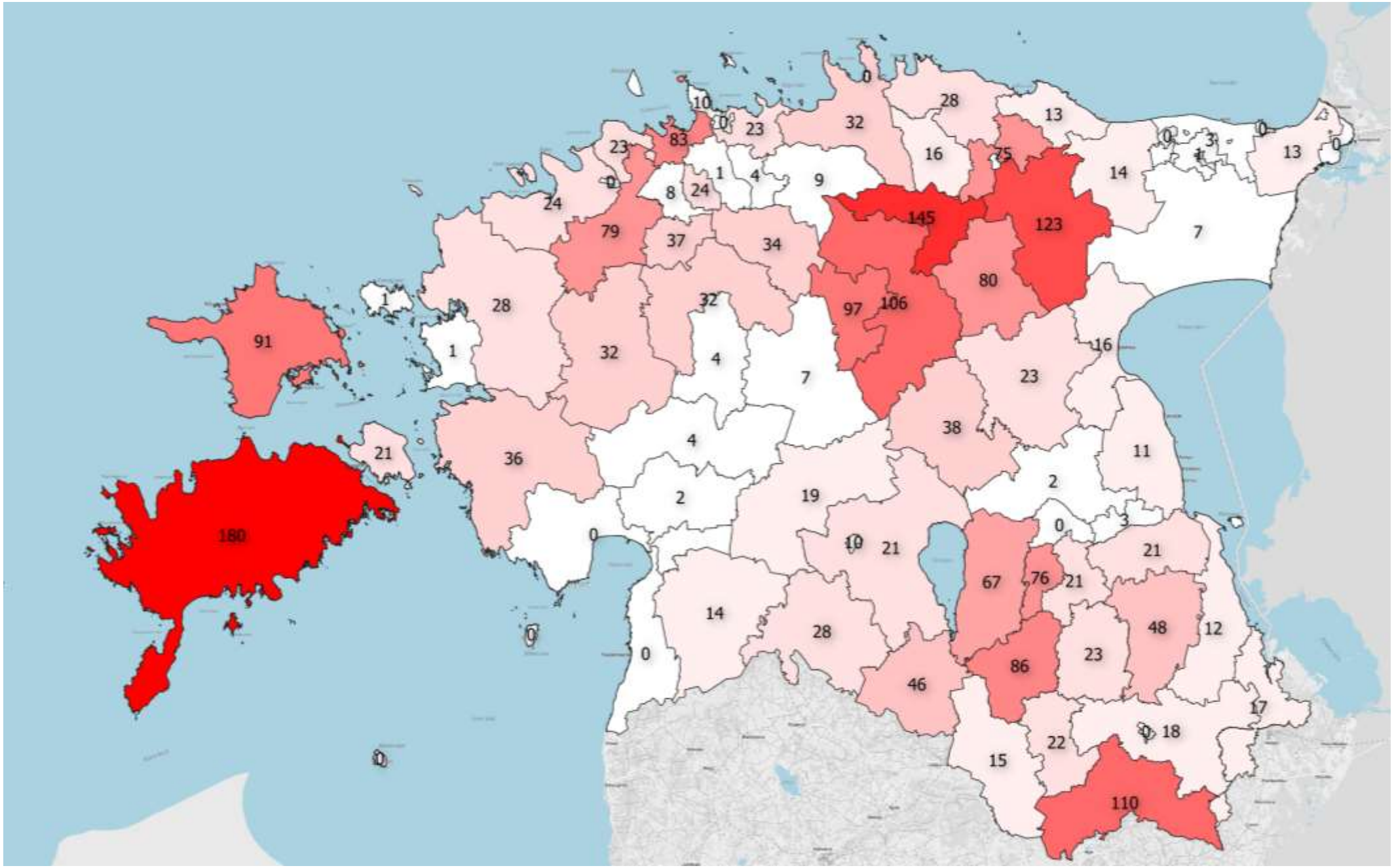
Springs by counties and local municipitalities in EE (as of 12.08.2022)



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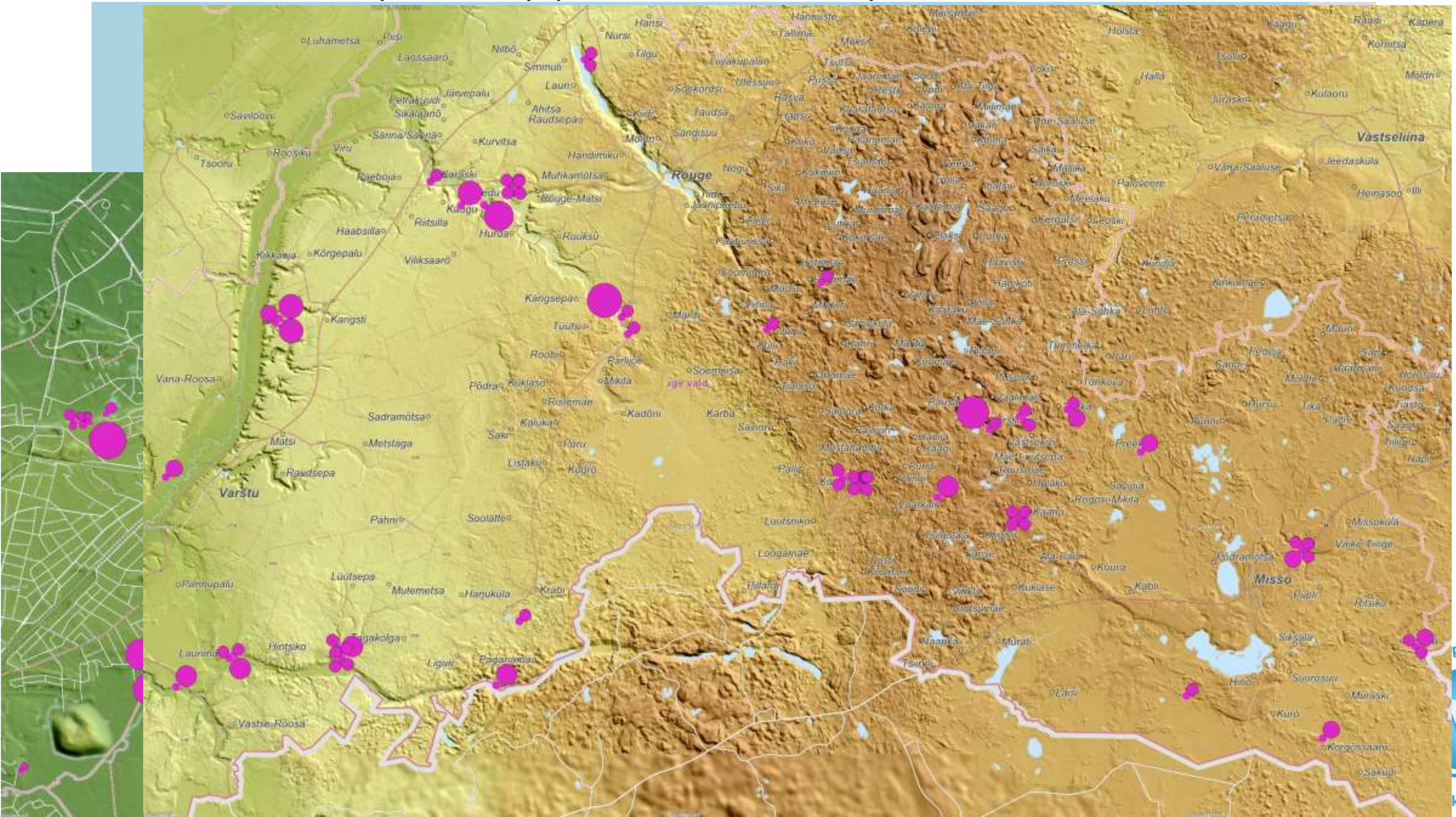
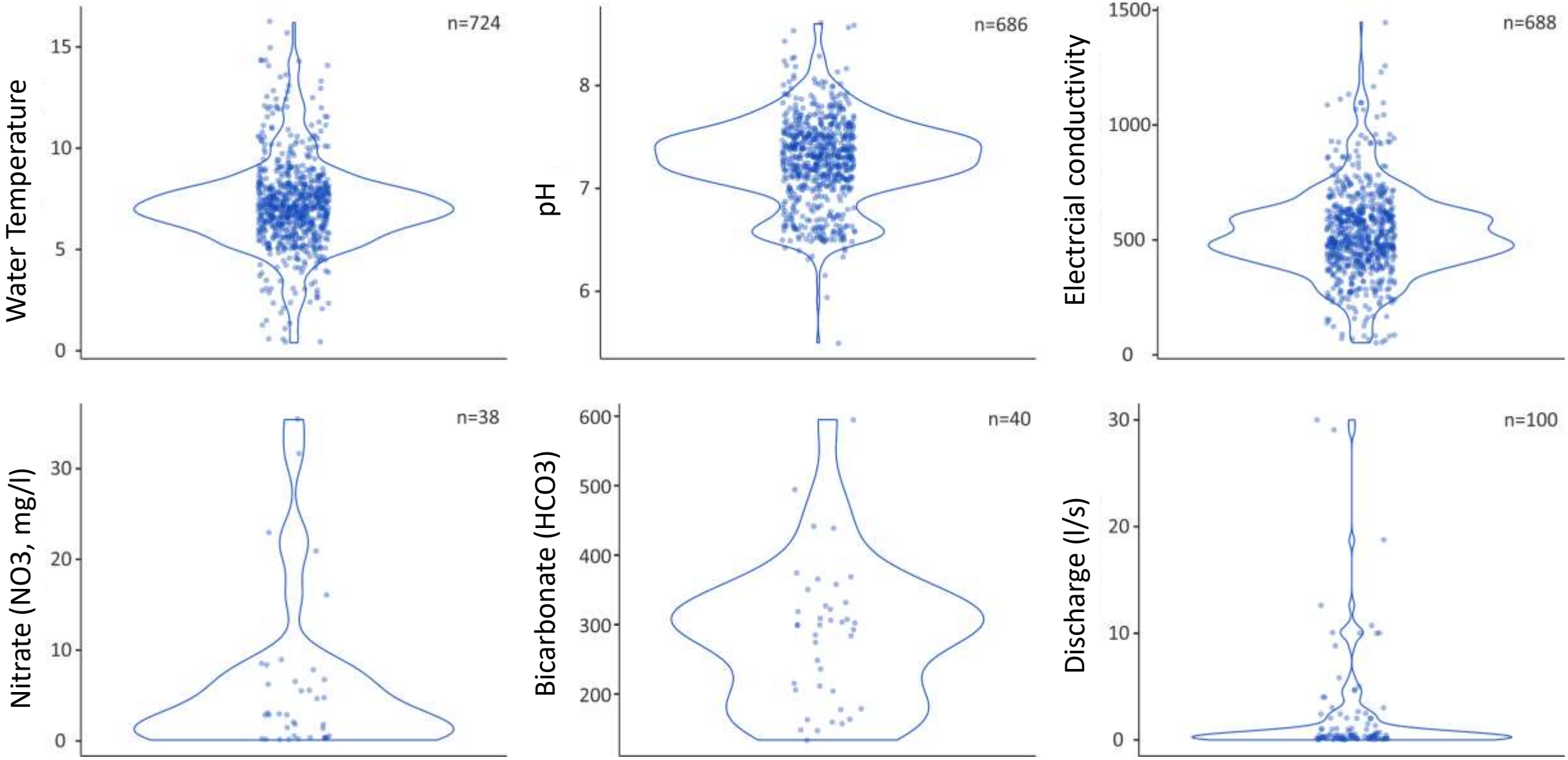
EE observations (n=1053) (as of 31.05.2022)



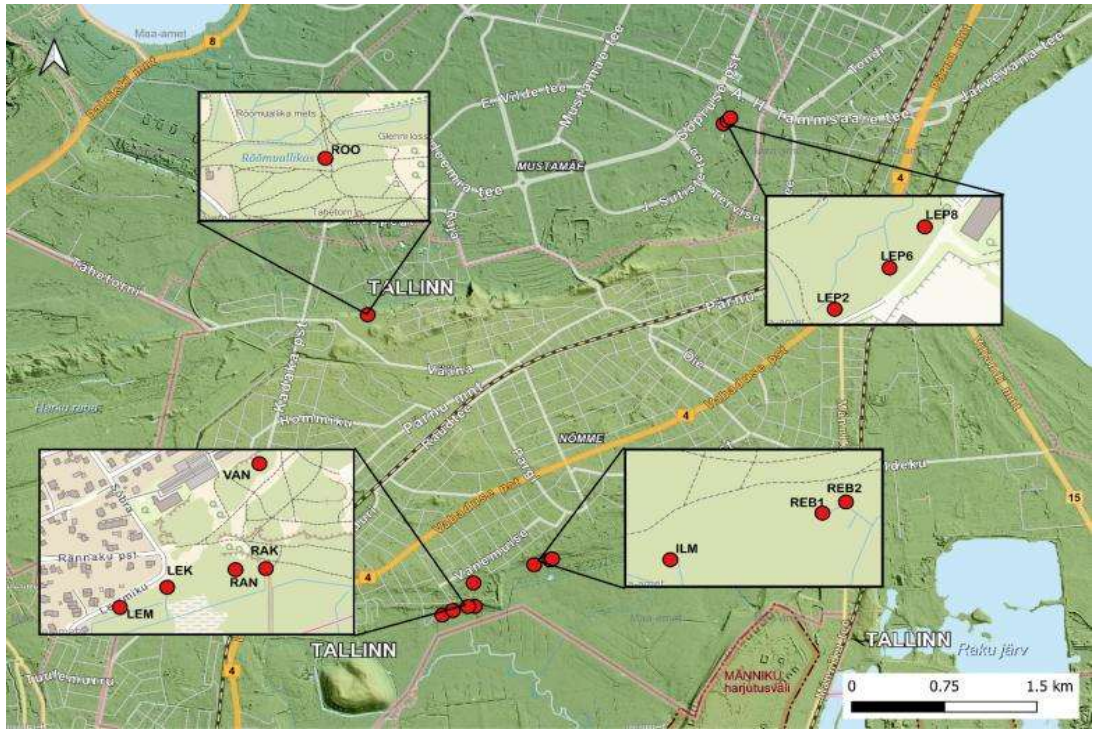
Observations (n=1053) (as of 31.05.2022)

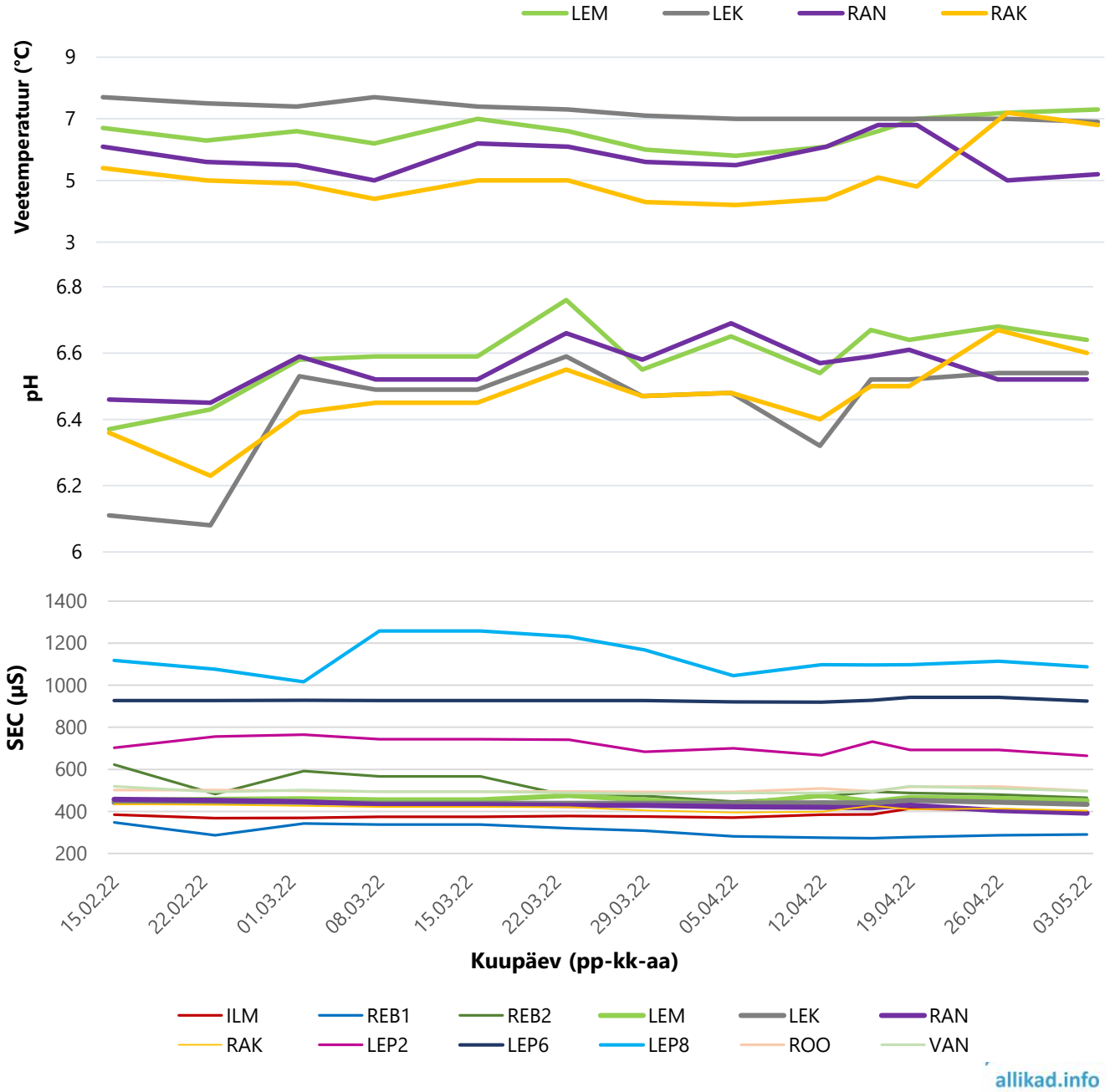
	Water Temperature	Air temperature	pH	Electrcial conductivity	Total Dissolved Solids	Nitrate (NO3)	Bicarbonate (HCO3)	Redox Potential	Dissolved Oxygen (%)	Discharge
Mean	7.13	6.21	7.27	525	311	5.94	285	143.5	44.53	2.3
Median	7	4.25	7.3	510	314	2.79	299	146.5	39.75	0.4
Mode	7	2	7.3	439	231	0.13	300	147	28.4	0.1
Range	15.8	42	3.1	1439	907	35.3	461	458.3	109.5	30
Minimum	0.4	-11	5.5	7.41	34	0.12	134	-98.3	0.5	0.01
Maximum	16.2	31	8.6	1447	941	35.42	595	360	110	30
Count	724	426	685	689	641	38	40	48	30	100

Observations (n=1053) (as of 31.05.2022)



Spring monitoring (Ess, H. bachelor thesis, 2022)





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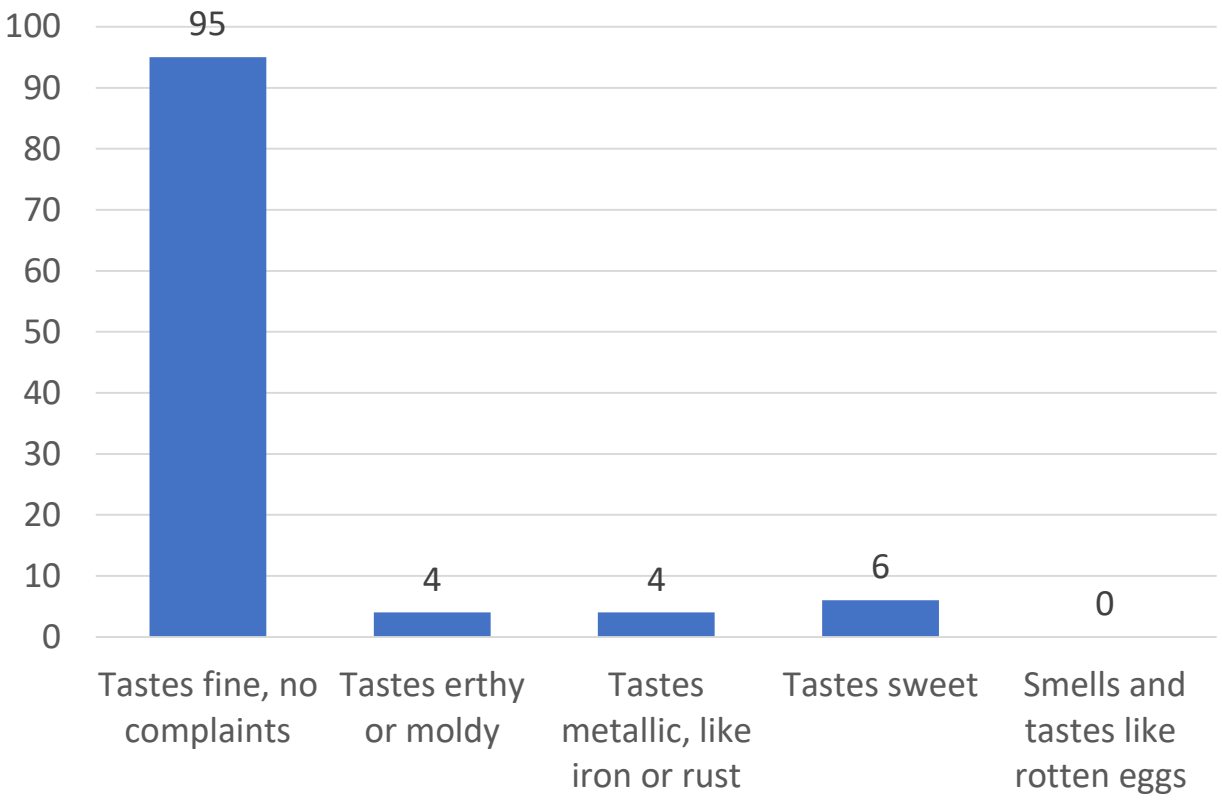
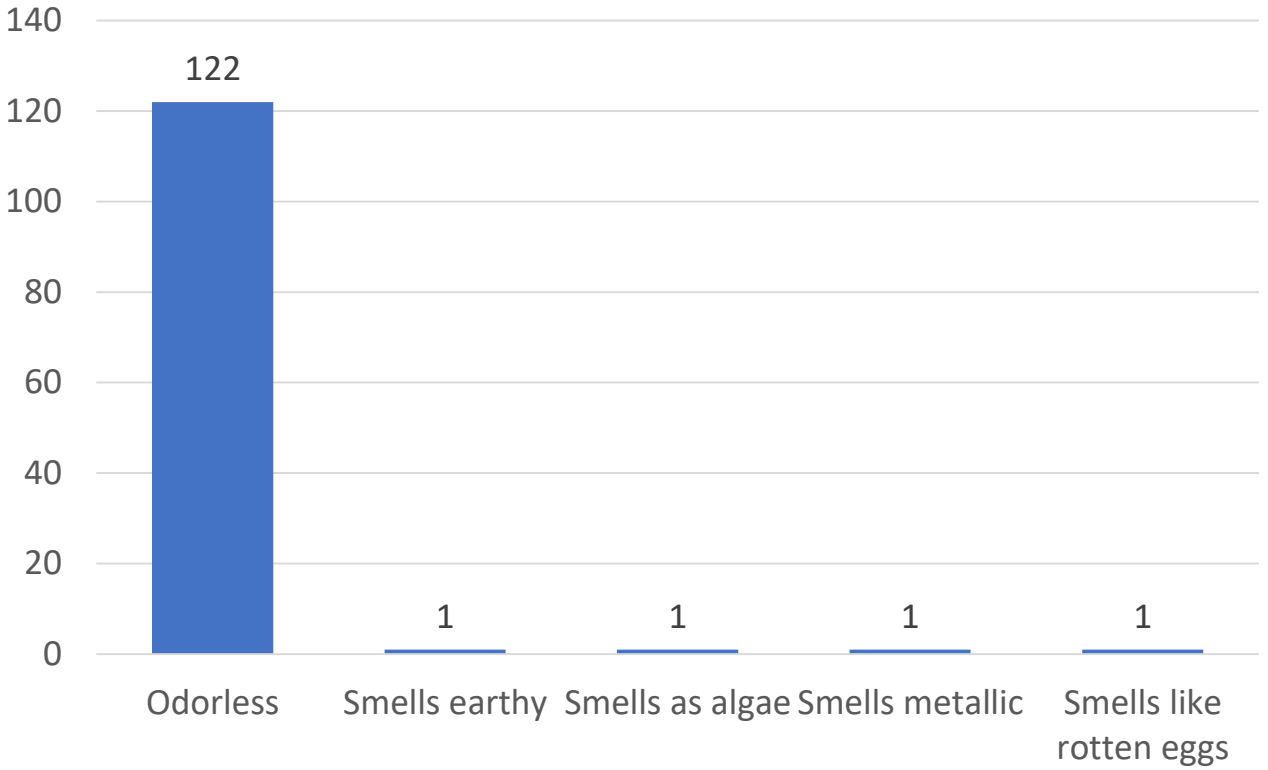
Water odor and taste descriptions (EE)





- In 81 cases water is described as odorless and with good taste
- In 6 cases water is described as odorless and taste sweet
- In 3 cases water is described as odorless and taste earthy or moldy
- In 1 case water is described as odorless and taste metallic
- In 1 case water is described smell as algae and taste fine
- In all other case only taste or smell is described

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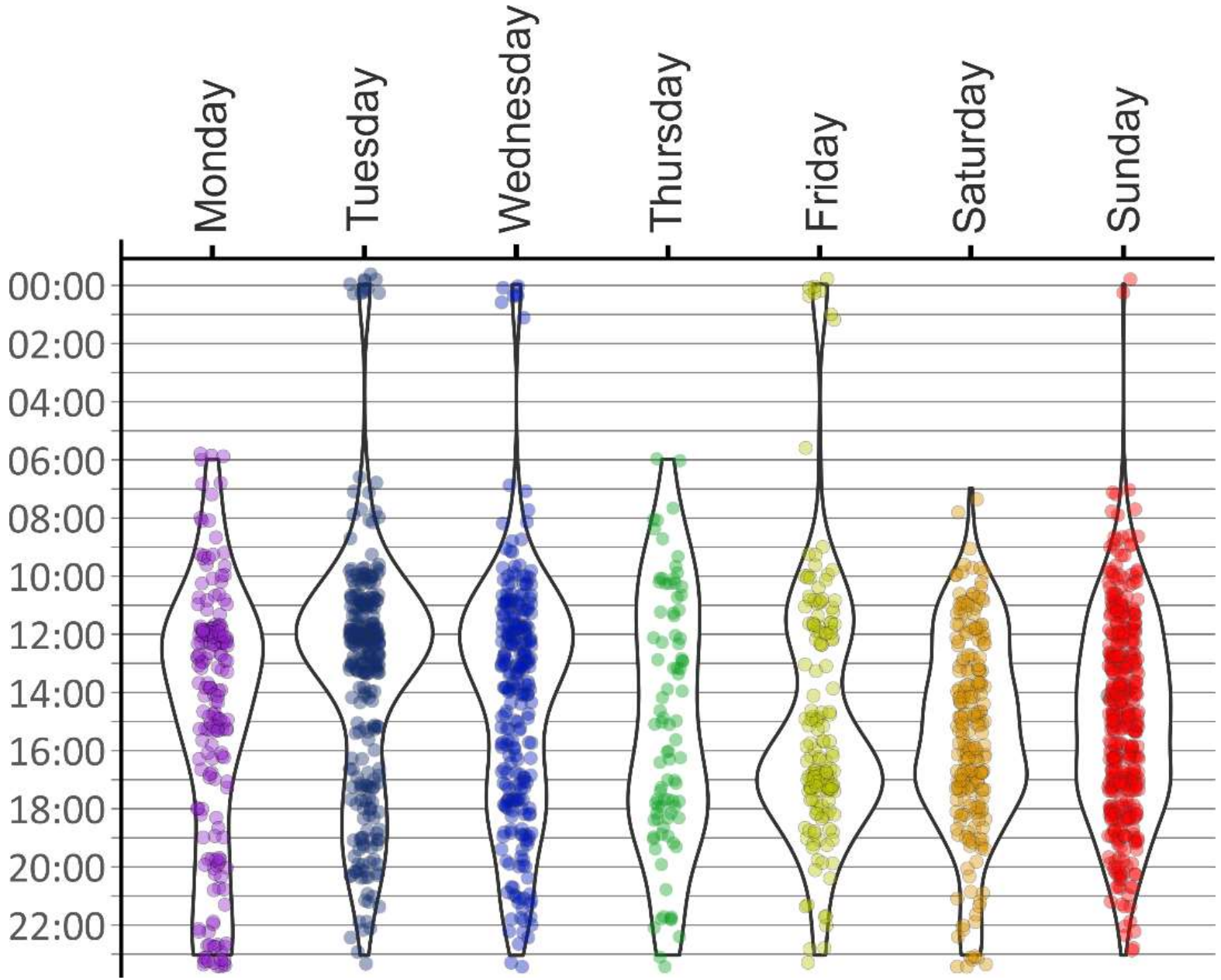
When people are submitting new information?



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What we learned?

- It works!
- We have 899 new springs, 1609 observations, 4530 photos.
- Data quality is generally good – only few cases with wrong submissions and mix-ups.
- Most effective way to get longer timeseries is trough the educational institutions – schools, universities etc.
- Activity of the regular volunteers is directly connected with campaigns (social media, newspapers, TV, radio etc).

Thank you!

allikad.info

bit.ly/WaterAct-project

bit.ly/WaterAct-Researchgate

JOIN -> https://www.facebook.com/groups/197231101712583/

LATVIJAS VIDES, ĢEOLOĢIJAS UN METEOROLOĢIJAS CENTRS

REPUBLIC OF ESTONIA MINISTRY OF THE ENVIRONMENT

Nature Conservation Agency Republic of Latvia

TALLINN UNIVERSITY

REPUBLIC OF ESTONIA ENVIRONMENT AGENCY

UNIVERSITY OF LATVIA

GEOLOGICAL SURVEY OF ESTONIA

VIDZEME THE ONLY WAY IS UP!

Interreg Estonia-Latvia European Regional Development Fund

EUROPEAN UNION

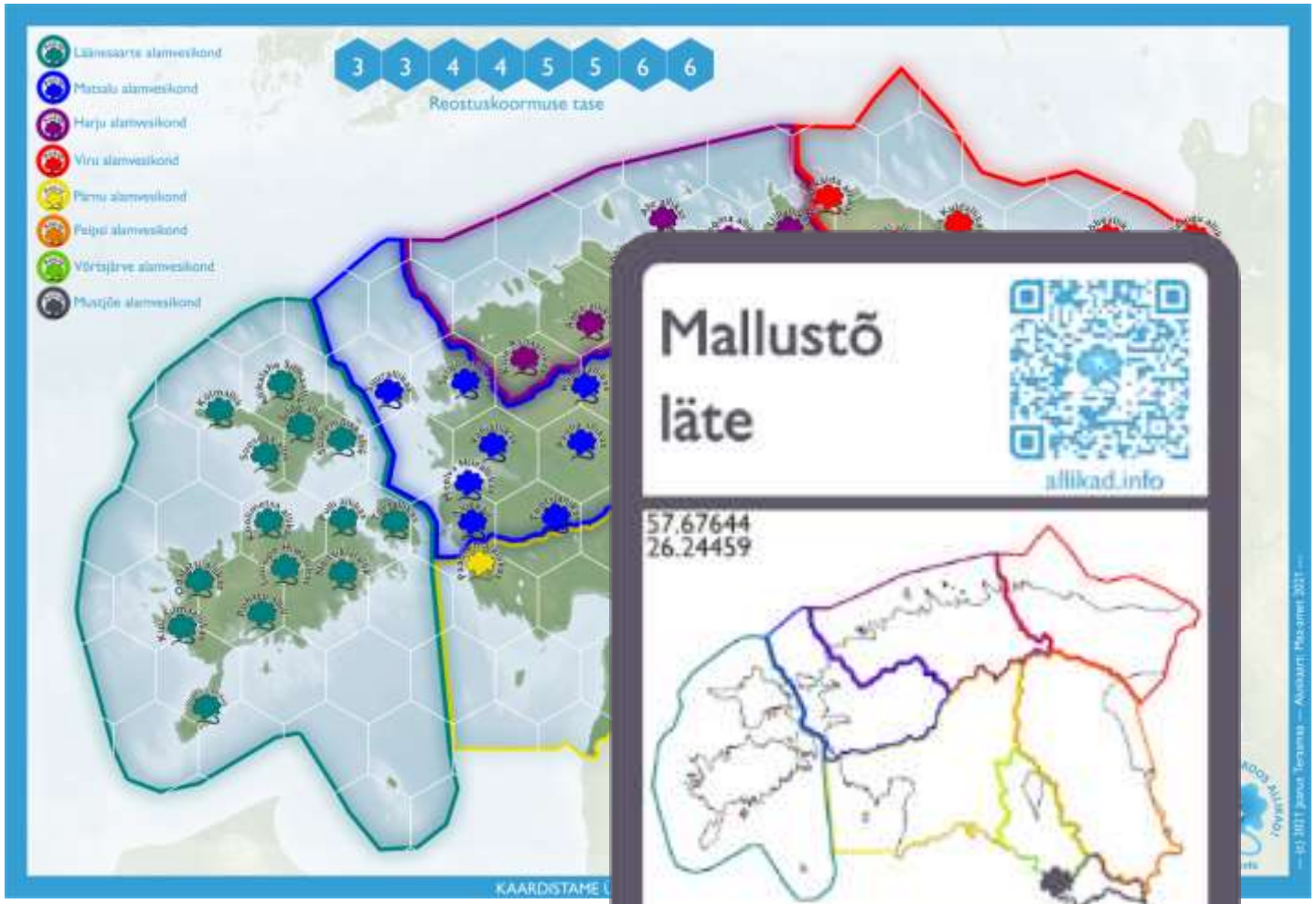
WaterAct

Joint actions for more efficient management of common groundwater resources

ÖKOLOOGIA KESKUS INSTITUTE OF ECOLOGY

SEEMIK - Research Group for Sustainability and Environmental Education

Co-op board game „Let's map the springs together!"



- 1 gameboard with Map and springs
- 92 spring discovery cards
- 92 spring pollution cards
- 8 bonus cards
- 8 disaster cards
- 8 role cards
- 6 game pieces
- 200 markers for spring status (70 green, 60 yellow, 40 orange, 30 red)
- 8 blue markers for riverbasins (sub-basins)
- 1 blue marker for pollution level
- 8 water research stations

Spring and their locations with coordinatest and link to the allikad.info database.