

Groundwater monitoring principles in Latvia

Jekaterina Demidko

Senior environmental quality assessment expert

Project online meeting on development of WP2 and WP3 activities

September 29th, Online meeting



Interreg
Estonia-Latvia
European Regional Development Fund

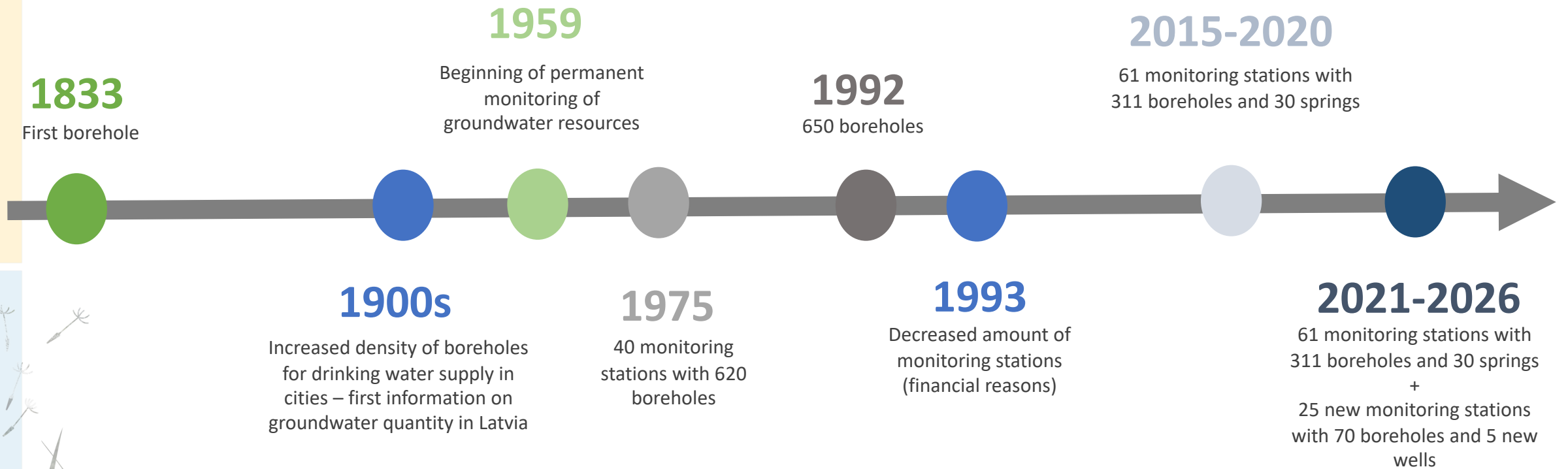


EUROPEAN UNION

WaterAct

Joint actions for more efficient management
of common groundwater resources

History of groundwater monitoring



Groundwater monitoring network (1)

Groundwater observation purposes:

- assessment of quantitative and qualitative status
- assessment of pressures and impacts from different pollution sources
- development of River Basin Management Plans
- assessment of the effectiveness of the water protection measures taken

Legislation defining the monitoring network:

- Water Framework Directive 2000/60/EK Article 8, Paragraph 1
- Groundwater directive 2006/118/EK;
- Nitrate directive 91/676/EK Article 5, Paragraphe 6
- Guidance documents N°.15, N°.16, N°.26



Groundwater monitoring network (2)

Monitoring network specification:

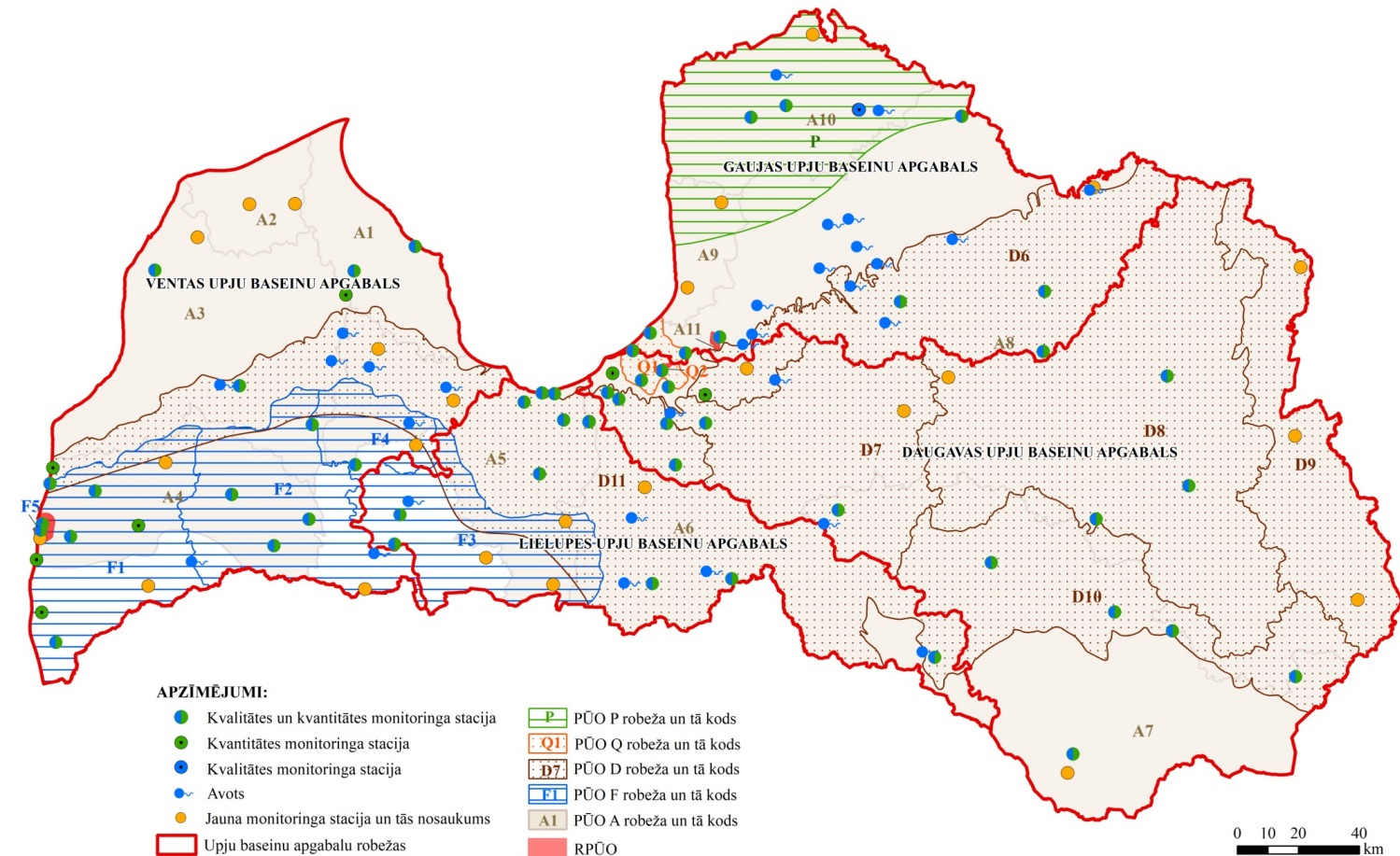
- covers whole territory of Latvia, providing observations in all aquifers of active water exchange zones, focusing on aquifers used in water supply;
- the highest density of monitoring stations is in Rīga, Jūrmala and Liepāja, where the consumption of groundwater is higher, as well as the number of potential pollution sources;
- observation stations consist of several boreholes arranged in one assembly;
- some wells are equipped with filters at different depths, some stations observe fluctuations in levels of Quaternary aquifer and its chemical quality



Groundwater monitoring network (3)

- Quantity monitoring – YES
- Quality monitoring – YES

Surveillance monitoring	
Basic (regional)	Yes
NO ₃ areas	Partly
Drinking water protected areas	Partly
GWTE areas	No
Aquatic ecosystem areas	No
Operational monitoring	



Monitoring frequency

Quantity monitoring

- **60 stations with 305 wells**
- 197 wells at 41 stations are equipped with automatic level meters that measure groundwater levels daily
- at other observation wells, water levels are measured manually from 1 to 4 times a year, depending on the task of the station

Quality monitoring

- **53 stations with 218 wells; 30 springs**
- monitoring cycle (survey frequency): from **1 times per year** to **1 time in 6 years**
- sampling frequency: from **4 times per year** to **once per year**

The survey frequency at monitoring points mainly decreases with the increase in the depth of the aquifer, as well as with the decrease in the degree of risk of surface contamination infiltration. At groundwater bodies at risk – at least once a year, regardless of depth!

In very well filtering Quaternary sediments and seasonal springs, as well as at monitoring points with $\text{NO}_3^- > 25 \text{ mg/l}$, the sampling frequency during the monitoring cycle may increase up to 4 times per year.

Quality monitoring measurements

Types	Parameters	Measurements area
Basic	Field measurements (t, pH, EVS, O ₂ , Eh, Fe _{tot})	Measured in all monitoring points.
	Key ions (Na, K, Ca, Mg, Cl, SO ₄ , HCO ₃ , Mn, P _{tot} , PO ₄ , total hardness)	
	Nitrogen compounds and their ionic forms (NH ₄ , NO ₂ , NO ₃ , N _{tot} , TOC, DOC, UV absorption, permanganate index)	
	Heavy metals (Cd, Pb, Ni, Hg, As)	
Additional	Pesticides	Mainly measured in springs, Quaternary wells and pre-Quaternary wells witch located in agricultural areas or nitrate sensitive area, or may partially characterize the agricultural load. Priority is not given to well protected and relatively protected monitoring points.
	Chemical pollutants	Mainly measured in springs, Quaternary wells and pre-Quaternary wells witch located in urban area or may partially characterize the urban load. Priority is not given to well protected and relatively protected monitoring points.

Laboratory

- **Laboratory name** – LEGMC
- **Laboratory accredited according to** – LVS EN ISO/IEC 17025-2005
- **National accreditation number** – LATAK-T-105-34-97
- **Water sampling according** – LVS ISO 5667-11, LVS ISO5667-14

Standardized analytical methods with appropriate method detection level (MDL) and quantification level (QL) values are used!

Well pumping, sampling, storage, transportation, standardized methods for water status analysis and monitoring in accordance with internal instructions, according to which the monitoring of groundwater quality and quantity is ensured.

Issues

- Establish a cross-border GW monitoring network based on existing monitoring site locations. **Cross-border monitoring points need to be identified!**
- Agree on the frequency of monitoring and common parameters. **The most relevant parameters will be obtained during implementation of WP2 A.T2.2.**
- Develop recommendations for transboundary groundwater monitoring.

NEXT steps?



- Thank you for the attention!



bit.ly/WaterAct-project



bit.ly/WaterAct-Researchgate



Interreg
Estonia-Latvia
European Regional Development Fund



EUROPEAN UNION

WaterAct

Joint actions for more efficient management
of common groundwater resources