Groundwaterbody quantitative status assessment

Andres Marandi

Geological Survey of Estonia

Interreg Estonia-Latvia
European Regional Development Fund

EUROPEAN UNION

WaterAct

Joint actions for more efficient management of common groundwater resources

What is a quantitative status?

Quantitative status is defined through groundwater level in WFD (Annex V, 2.1.2)

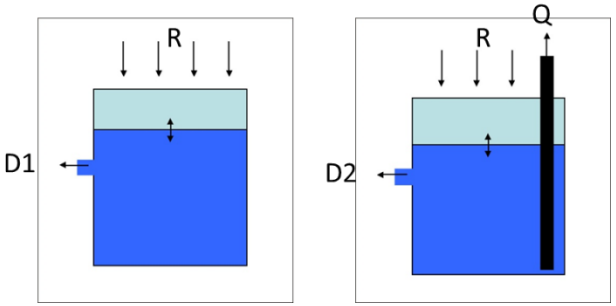
Elements	Good status
Groundwater level	The level of groundwater in the groundwater body is such that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction. Accordingly, the level of groundwater is not subject to anthropogenic alterations such as would result in: — failure to achieve the environmental objectives specified under Article 4 for associated surface waters, — any significant diminution in the status of such waters, — any significant damage to terrestrial ecosystems which depend directly on the groundwater body, and alterations to flow direction resulting from level changes may occur temporarily, or continuously in a spatially limited area, but such reversals do not cause saltwater or other intrusion, and do not indicate a sustained and clearly identified anthropogenically induced trend in flow direction likely to result in such intrusions.

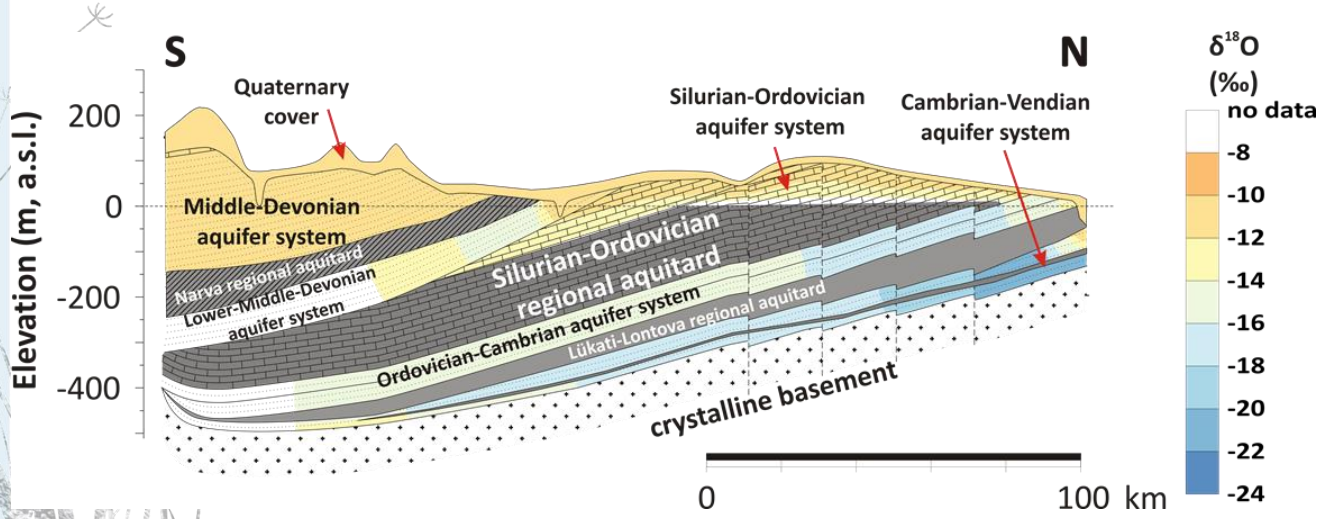
Quantitative status is an expression of the degree to which a body of groundwater is affected by direct and indirect abstractions.

What is groundwater resource?

Groundwater resources after Mandel & Shiftan (1981) :

1. Live (seasonal);
2. Dead (historical time);
3. Irreversible (storage);
4. Local (flow in porous media).





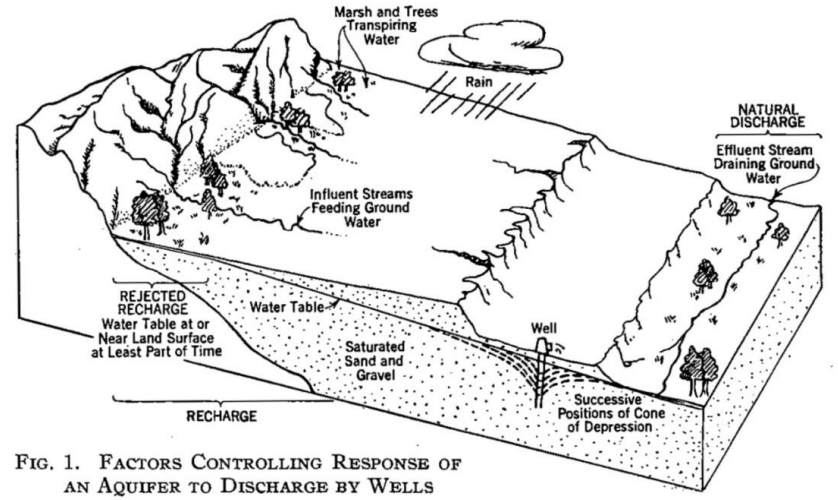


FIG. 1. FACTORS CONTROLLING RESPONSE OF AN AQUIFER TO DISCHARGE BY WELLS

Theis, C., V. The source of water derived from wells: Essential factors controlling the response of an aquifer to development. Civil Engineering, 1940, Vol 10, No. 5, May, 277–280

Why the Groundwater Q status is assessed?

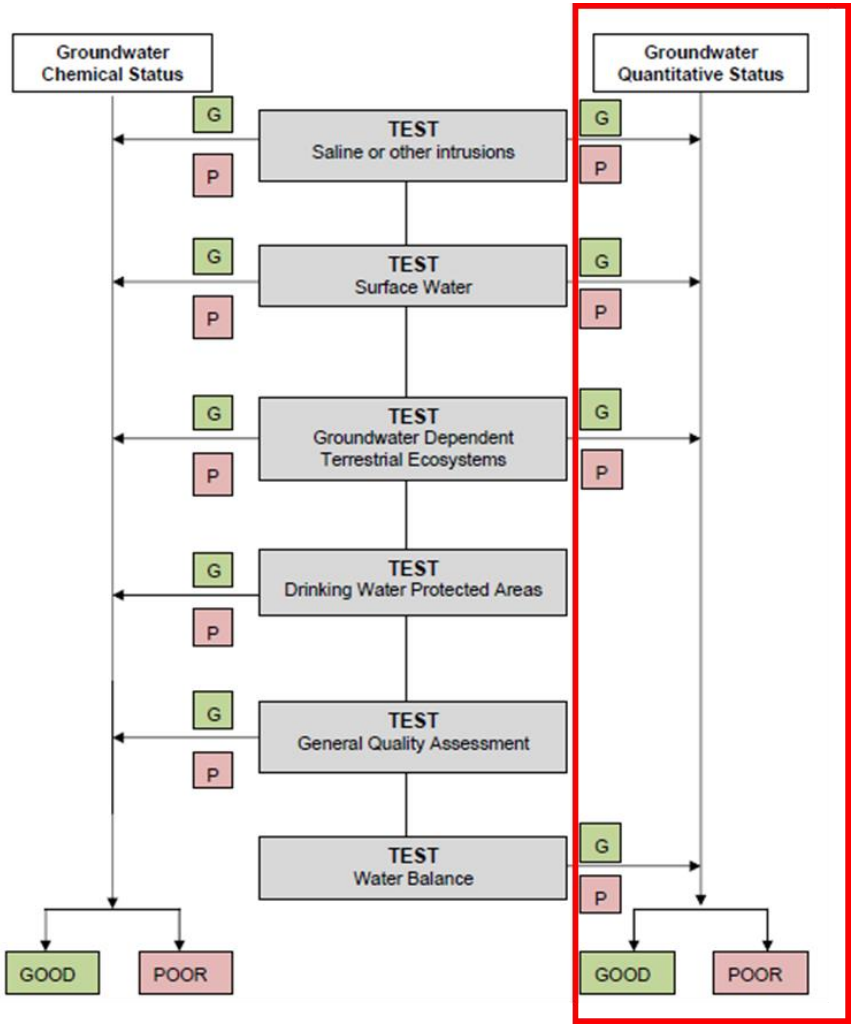
- **Source-Pathway-Receptor (SPR) model**
- **What is the risk of not meeting the environmental objectives of the WFD?**

1. Resource - water use for water supply, Industry, agriculture;
2. Trouble - water drainage by mines or ohter developments;
3. Groundwater as a receptor (drinking water);
4. Surface water as a receptor;
5. Terrestial ecosystems as a receptor;

Groundwater Q-status assessment

1. 4 tests for Q-status;
2. In WFD:

"Available groundwater resource means the long-term annual average rate of overall recharge of the body of groundwater less the long-term annual rate of flow required to achieve the ecological quality objectives for associated surface waters specified under Article 4, to avoid any significant diminution in the ecological status of such waters and to avoid any significant damage to associated terrestrial ecosystems."

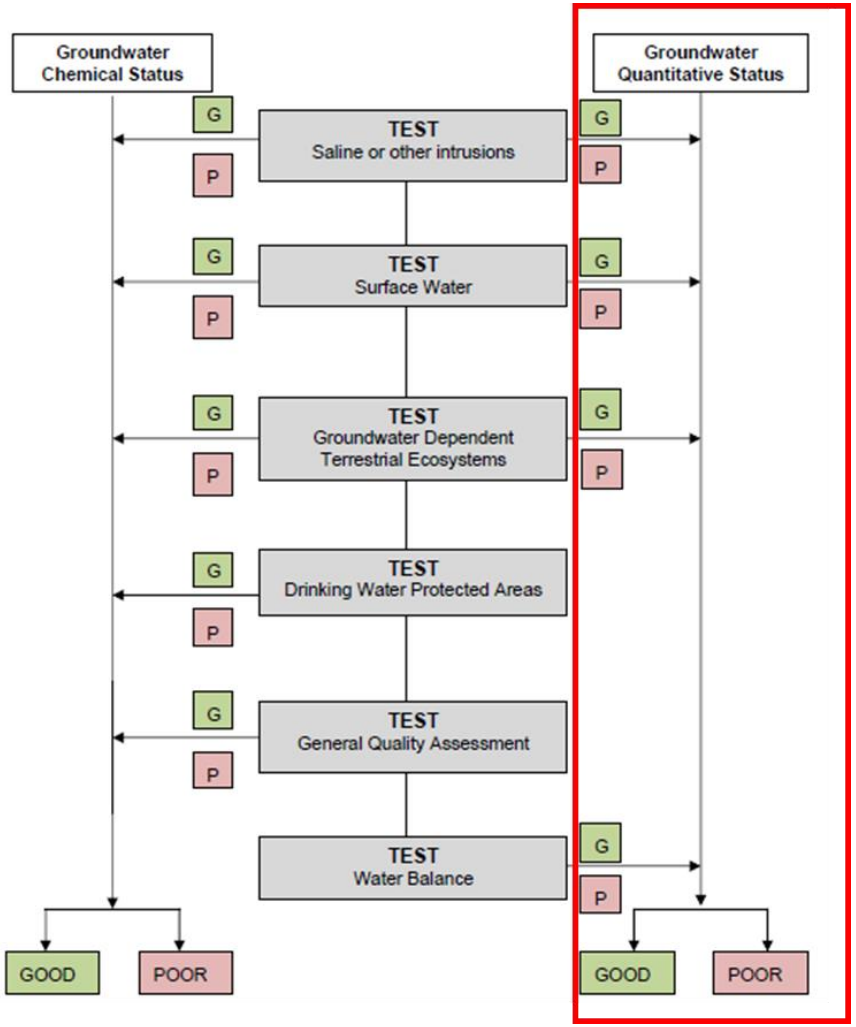


Groundwater Q-status assessment

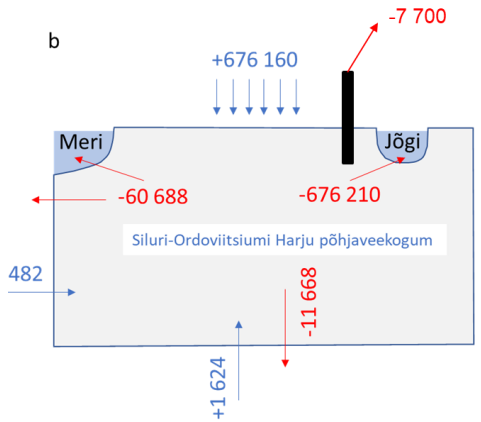
1. 4 tests for Q-status;
2. Tierred approach
3. In WFD:

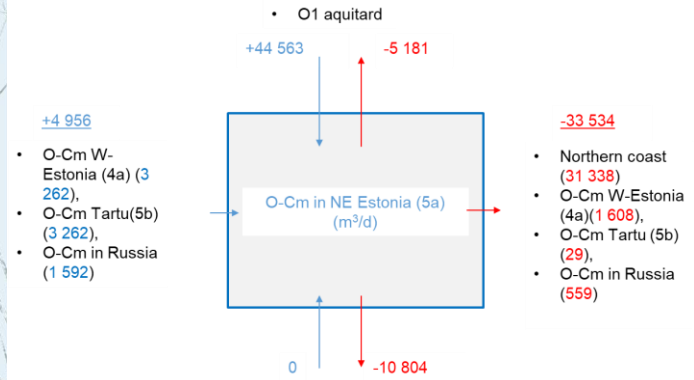
"Available groundwater resource means the long-term annual average rate of overall recharge of the body of groundwater less the long-term annual rate of flow required to achieve the ecological quality objectives for associated surface waters specified under Article 4, to avoid any significant diminution in the ecological status of such waters and to avoid any significant damage to associated terrestrial ecosystems."

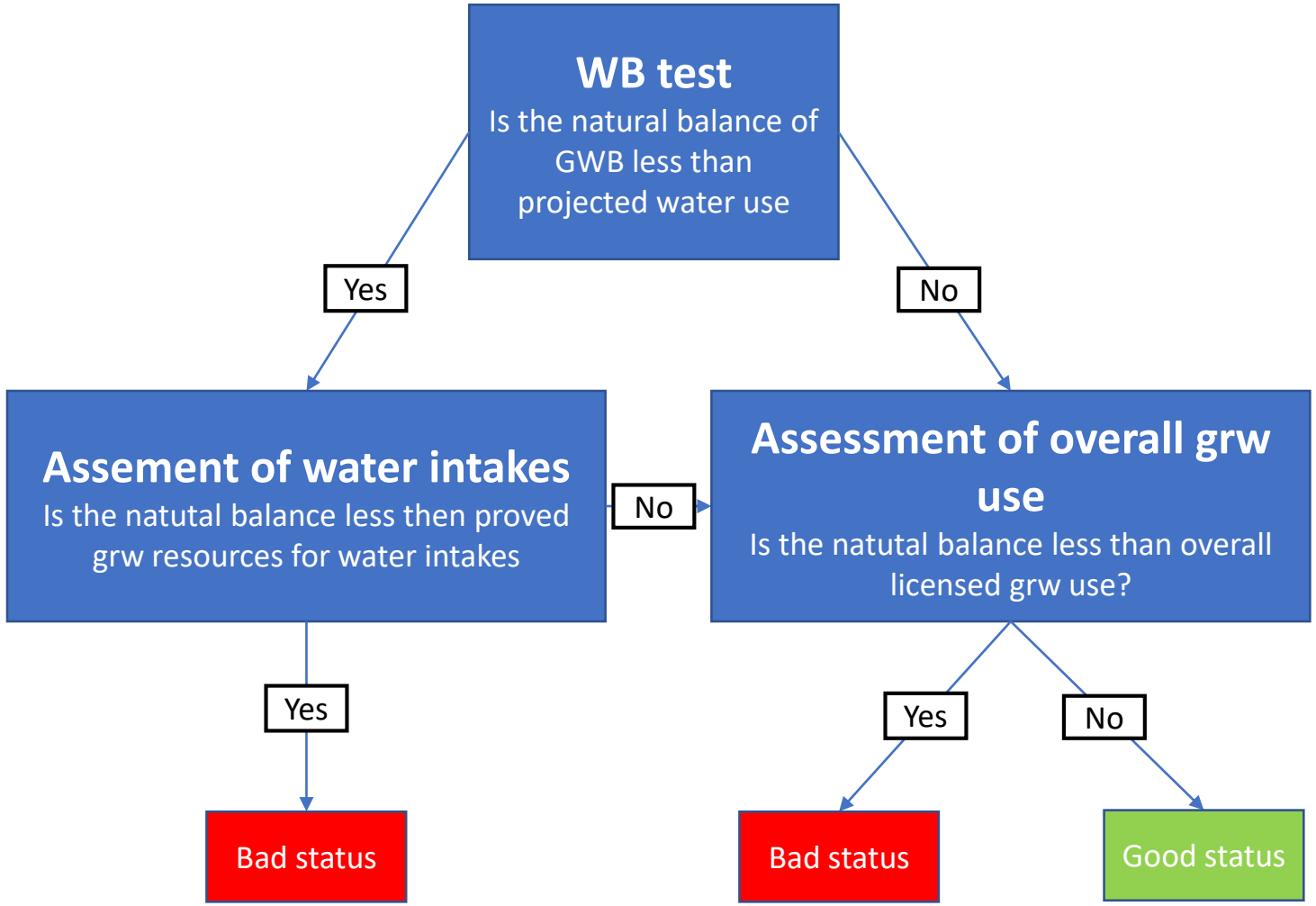
Start with water balance test



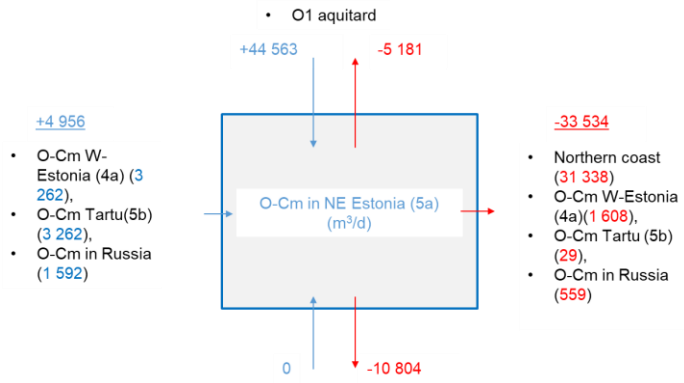
Water balance test

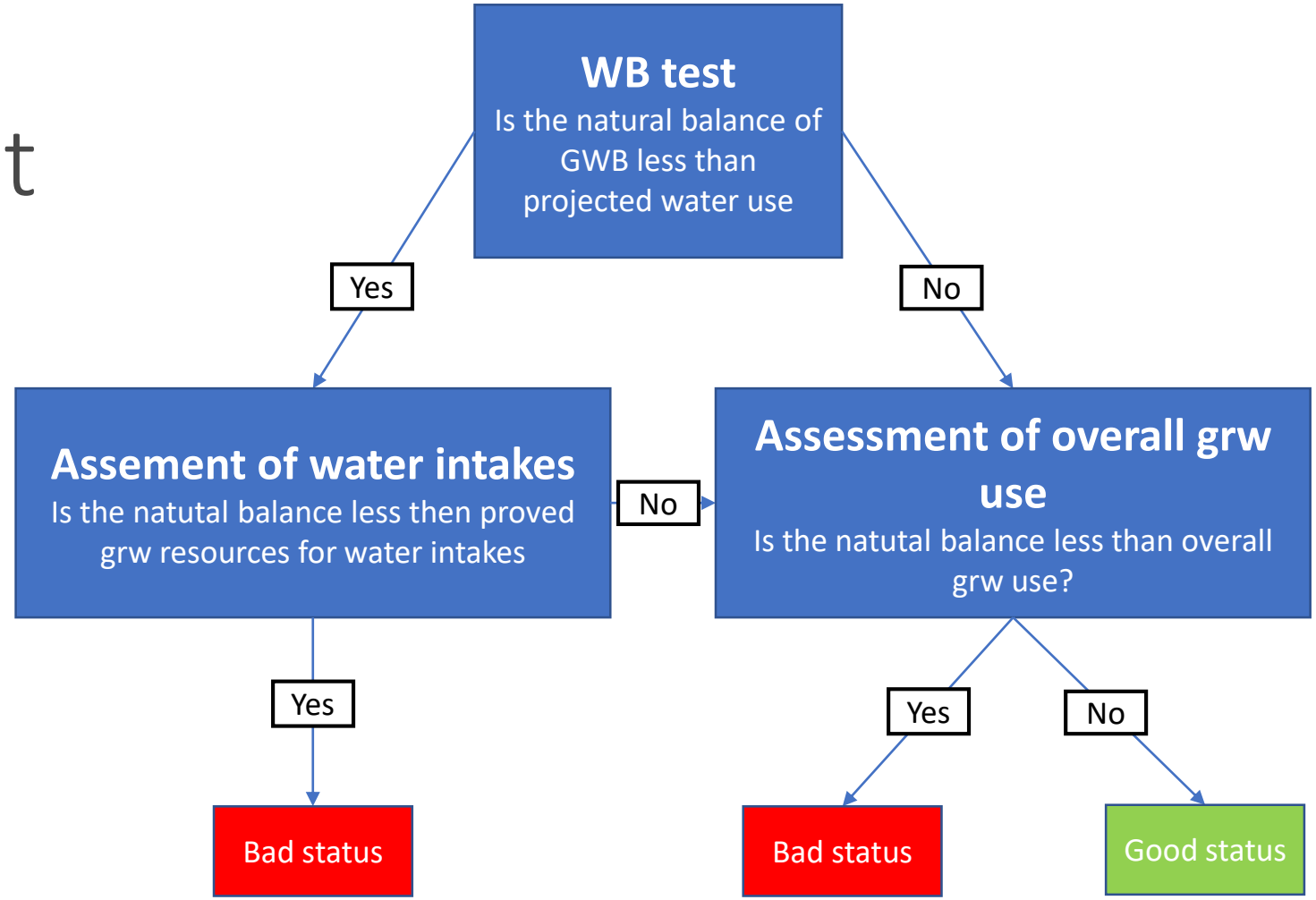






Water balance test





GWB No	Name	Water use in 2018	Natural Resources	Approved Resources
		m^3/d		
3	Cm-V	23209	25580	98500
7	O-E-Viru Oil-shale	413237	107903	5000
24	D2 - E-Estonia	11786	2228835	20435
28	Q-Meltsiveski	6044	5260	7500

Tests for seawater intrusion, surface water bodies and terrestial ecosystems

1. Local influenece - flow in porous media;
2. Input from assessment of surface water bodies/terrestial ecosystem is needed;
3. Monitoring network must be adapted;
4. Info of relevant quality/quantity parameters is needed.

Tests for seawater intrusion, surface water bodies and terrestial ecosystems

Next steps if any decrease in status of dependent systems is reported:

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1. Are the relevant threshold values set?

2. Are any relevant development close to:
   - sea
   - Surface water bodies
   - Terrestial ecosystems

3. Decrease in water levels in close monitoring wells?

4. Increase in substances in close monitoring wells?

- A Happy Assessment!

Andres Marandi

andres.Marandi@egt.ee

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LATVIJAS VIDES, ĢEOLOĢIJAS UN METEOROLOĢIJAS CENTRS

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Nature Conservation Agency Republic of Latvia

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REPUBLIC OF ESTONIA ENVIRONMENT AGENCY

UNIVERSITY OF LATVIA

GEOLOGICAL SURVEY OF ESTONIA

VIDZEME THE ONLY WAY IS UP!

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