



Standardizing MRV for Peatland Restoration Projects: Status-quo and future prospects

Conference: Earth observation for monitoring, reporting
and verification of carbon removals 2025



What to measure? And what are the options?

- Carbon vs. other ecosystem services
- Direct vs. proxy
- In-situ vs. remote
- Baseline vs. project scenario

Also dependent on type and status of peatland...

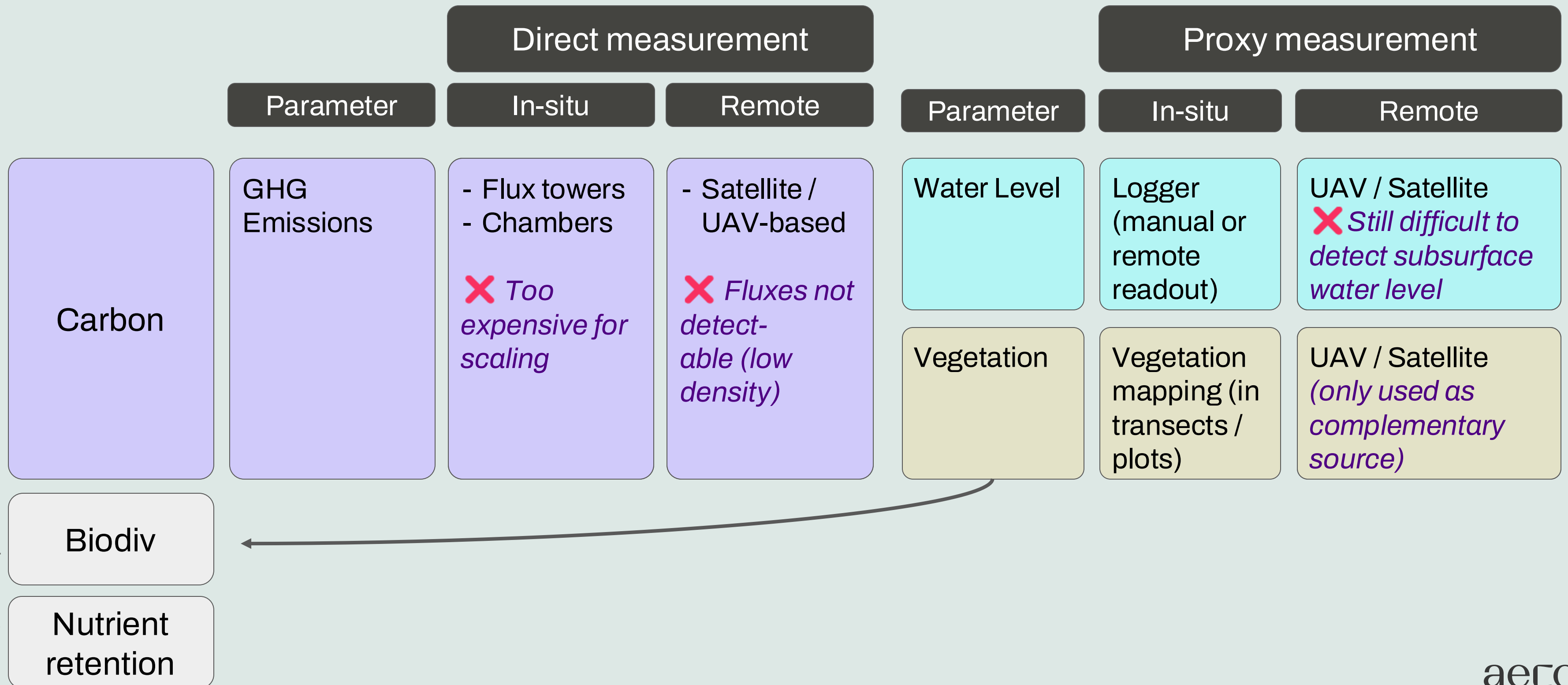
What to measure? And what are the options?

		Direct measurement	
	Parameter	In-situ	Remote
Carbon	GHG Emissions	<ul style="list-style-type: none">- Flux towers- Chambers <p>✗ <i>Too expensive for scaling</i></p>	<ul style="list-style-type: none">- Satellite / UAV-based <p>✗ <i>Fluxes not detectable (low density)</i></p>

What to measure? And what are the options?

	Direct measurement			Proxy measurement		
	Parameter	In-situ	Remote	Parameter	In-situ	Remote
Carbon	GHG Emissions	- Flux towers - Chambers ✗ Too expensive for scaling	- Satellite / UAV-based ✗ Fluxes not detectable (low density)	Water Level	Logger (manual or remote readout)	UAV / Satellite ✗ Still difficult to detect subsurface water level
				Vegetation	Vegetation mapping (in transects / plots)	UAV / Satellite <i>(only used as complementary source)</i>

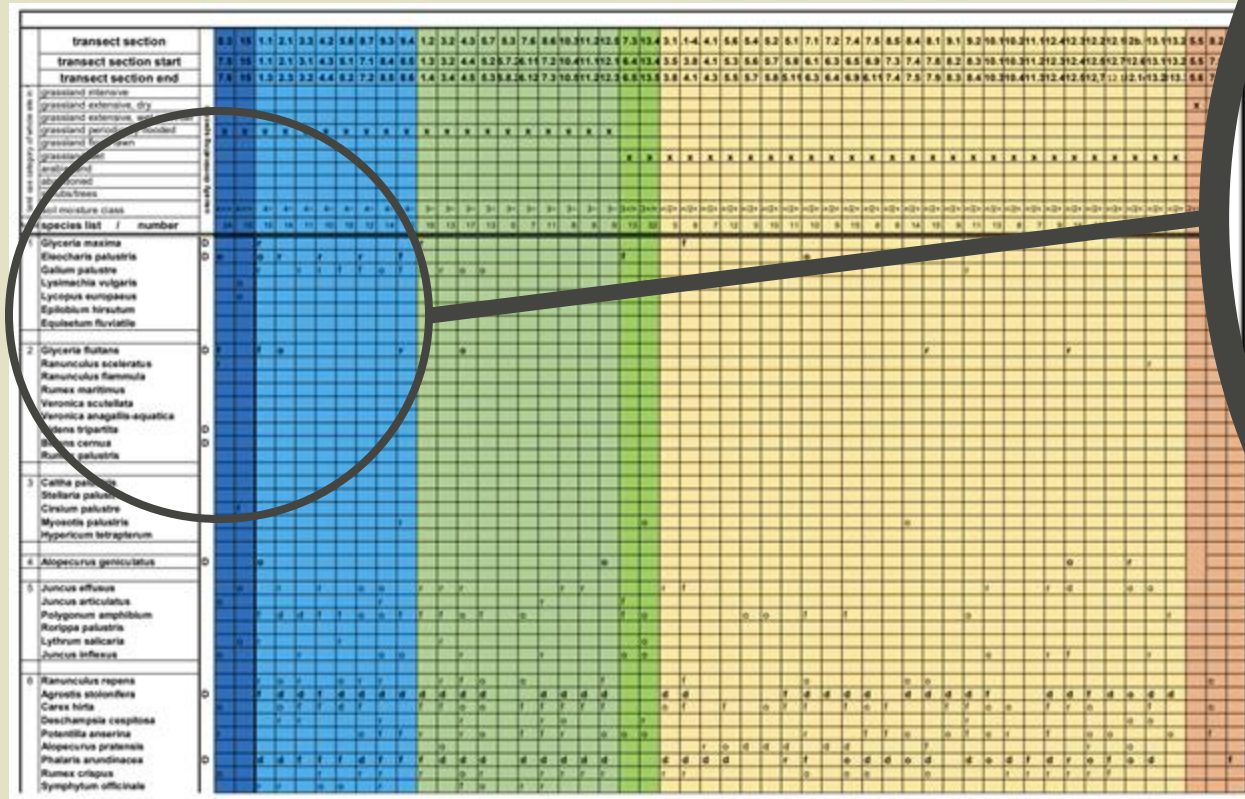
What to measure? And what are the options?



Our approach - Baseline

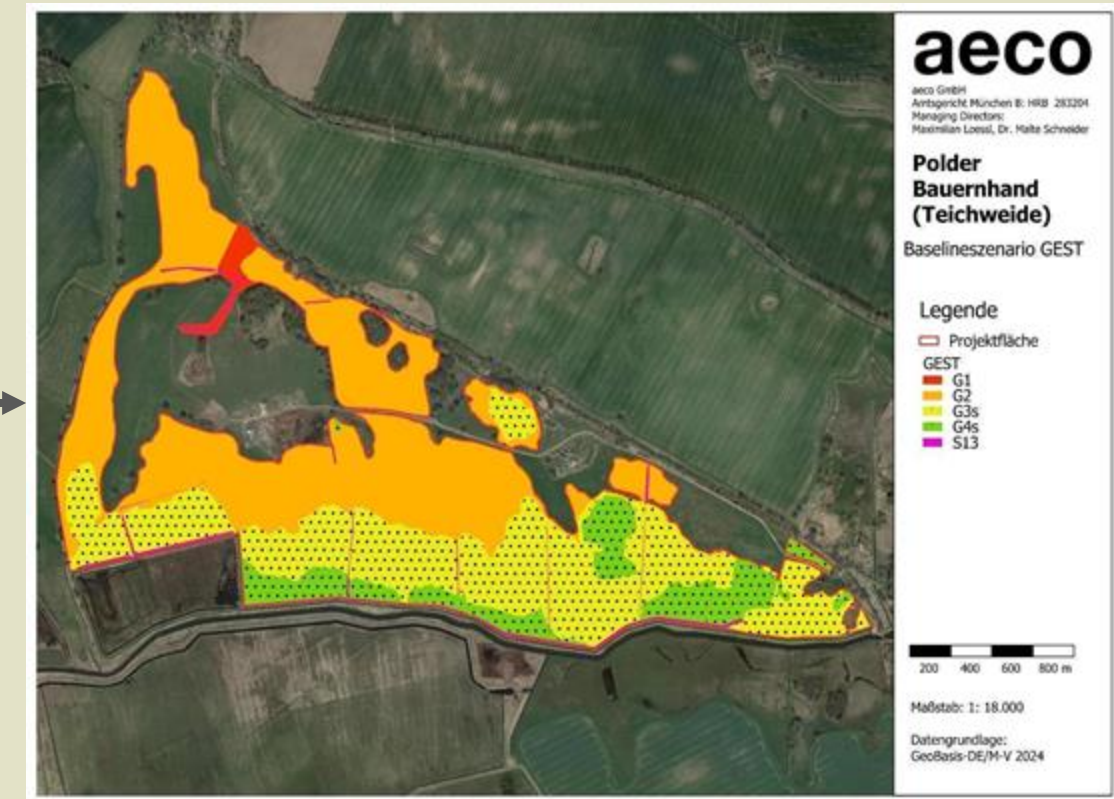
→ GEST approach via vegetation

Vegetation mapping



species list / number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Glyceria maxima		D														
Eleocharis palustris		D														
Galium palustre																
Lysimachia vulgaris																
Lycopus europaeus																
Epilobium hirsutum																
Equisetum fluviatile																
2 Glyceria fluitans		D														
Ranunculus sceleratus		D														
Ranunculus flammula																
Rumex maritimus																
Veronica scutellata																
Veronica anagallis-aquatica																
Bidens tripartita		D														
Bidens cernua		D														
Rumex palustris																

Emission factor (GEST)



Our approach - Baseline

Projecting line data into spatial data



transect section	
transect section start	
transect section end	
grassland intermediate	
grassland extensive, dry	
grassland extensive, wet in wet	
grassland periodically flooded	
grassland flood plain	
grassland wet	
parallel and	
perpendicular	
inclined	
soil moisture class	
species list / number	
1	Glyceria maxima Eleocharis palustris Galium palustre Lysimachia vulgaris Lythrum europaeum Epilobium hirsutum Epilobium fluviatile
2	Glyceria fluitans Ranunculus sclaterii Ranunculus flammula Rumex maritimus Veronica scutellata Veronica sagittalis-aquatica Sidaea crispata Sidaea cernua Rumex palustris
3	Cattha palustris Stellaria palustris Cirsium palustre Myosotis palustris Hypericum tetrapetrum
4	Alnus incana
5	Juncus effusus Juncus articulatus Polygonum amphibium Rorippa palustris Lythrum salicaria Juncus effusus
6	Ranunculus repens Agrostis stolonifera Carex hirsuta Deschampsia cespitosa Potentilla anserina Alnus incana Phalaris amabilis Rumex crispus Symphytum officinale

EST)

aeco
aeco GmbH
Anfangstraße München 8 | HRB 283294
Managing Directors:
Maximilian Lenzel, Dr. Holte Schneider

Polder Bauernhand (Teichweide)
Baselineszenario GEST

Legende

- Projektfläche
- GEST
- G1
- G2
- G3s
- G4s
- S13

Maßstab: 1: 18.000
Datengrundlage:
GeoBasis-DE/M-V 2024

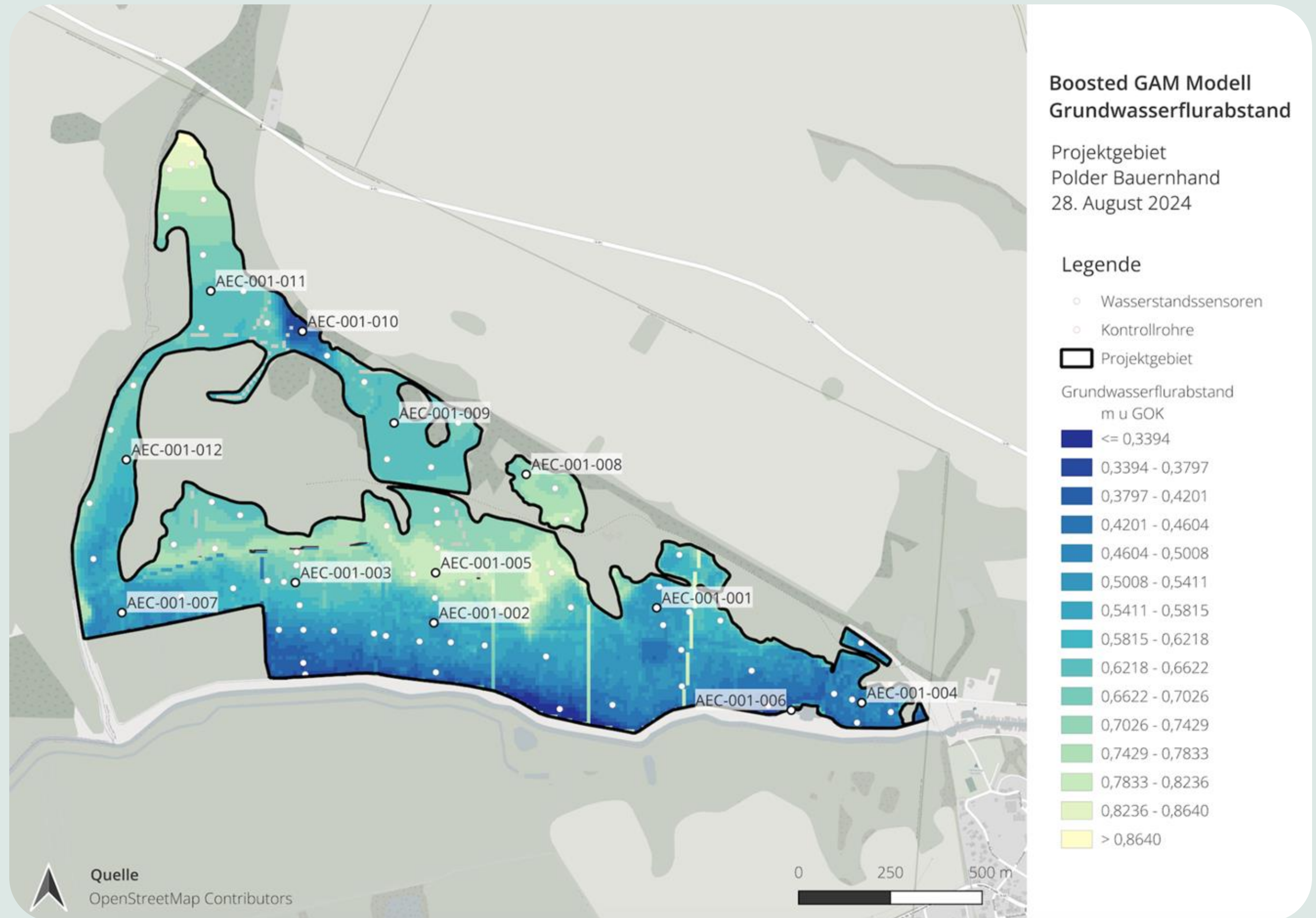
Basemap Imagery © Airbus, CNES/ Airbus, GeoBasis-DE/BKG

Our approach - Project scenario

In-situ water level measurement
that can be read out remotely



Projecting water level onto the entire site



Outlook

Baseline

Complement vegetation with other assessments

- Water level
 - Bring out remote readout water loggers quickly
 - Experiment with EO data on soil moisture
 - Unconventional indicators (mole hills etc)
- Subsidence

Improve proxy measurement

- Automation of extrapolation of vegetation data
- Automatic assessment of vegetation via UAV / EO
- Automatic estimation of water levels/regime based on in-house “mapping key” that additionally draws on unconventional features

Project Scenario

Direction

- P

Position

- T



**We do not expect being able to move to fully remote before 2030, maybe even later.
But we will try to improve efficiency/reduce amount of in-situ work**

Recommendation

Be aware that the cost and development time depends on required accuracy levels:

- Is all uncertainty/conservativeness burden attributed to single projects only or
- Can the burden be reduced by looking to balance out uncertainties at program level

Please strike a balance and try to move towards standardized baselines by 2030.

aeco

Let's get our hands dirty to make the planet clean again.

Get in touch

aeco GmbH
Pestalozzistr 6
80469 Munich
Germany

Managing Directors
Dr. Malte Schneider &
Maximilian Loessl

www.aeco.earth

