

# NIBIO STUDY SITE: Kråkstad river catchment (Norway)

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## HIGHLIGHTS & ISSUES 2021

### MARG activities

➤ MARG Kick off – January 2021



➤ 1st MARG Report

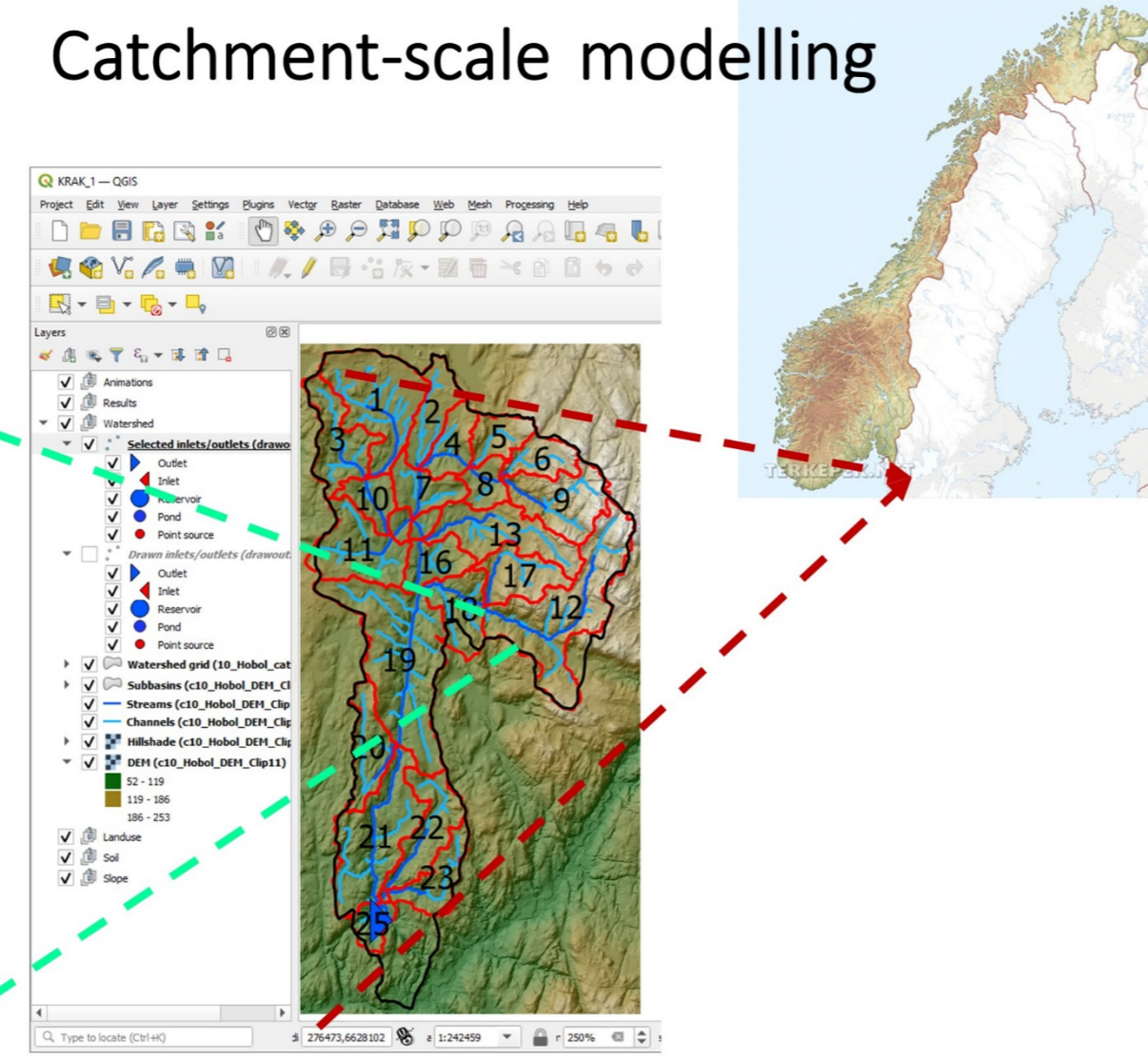


Measures considered by survey	Region		Overall ranking
	MORSA	PURA	
reduced tillage-no tillage in autumn	2	1	1
no tillage in the areas with high flood and/or erosion risk	1	3	2
drainage (including ditching)	3	2	3
erosion protection around manhole/pipe outlets	4	4	4
grass covered buffer zones	5	5	5
new trench ditches	6	6	6
grass cover in the areas with high flood and/or erosion risk	7	8	7
catch crops as a subculture	9	7	8
grassed waterways	8	10	9
reduced tillage - incl. direct sowing	11	9	10
maintenance/emptying of constructed wetland	10	11	11
establishing constructed wetland	12	12	12

### MODELLING (planning)

Field-scale modelling

Catchment-scale modelling



SWAP, HYDRUS

SWAT+

Cross-validation

### FIELD activities

➤ Getting to know the catchment



Photo: D.Krzeminska

➤ Looking for measures



Photo: A-G.B.Blankenberg

➤ Preparing for:

- flow and water quality monitoring

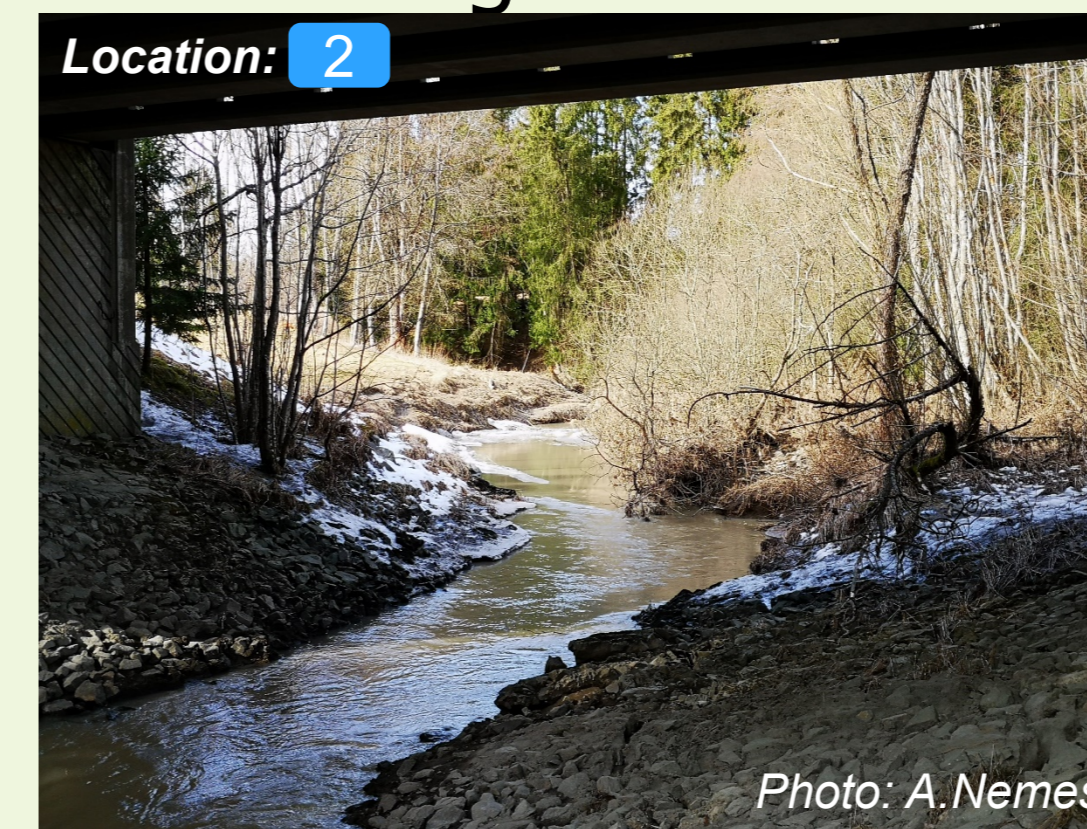
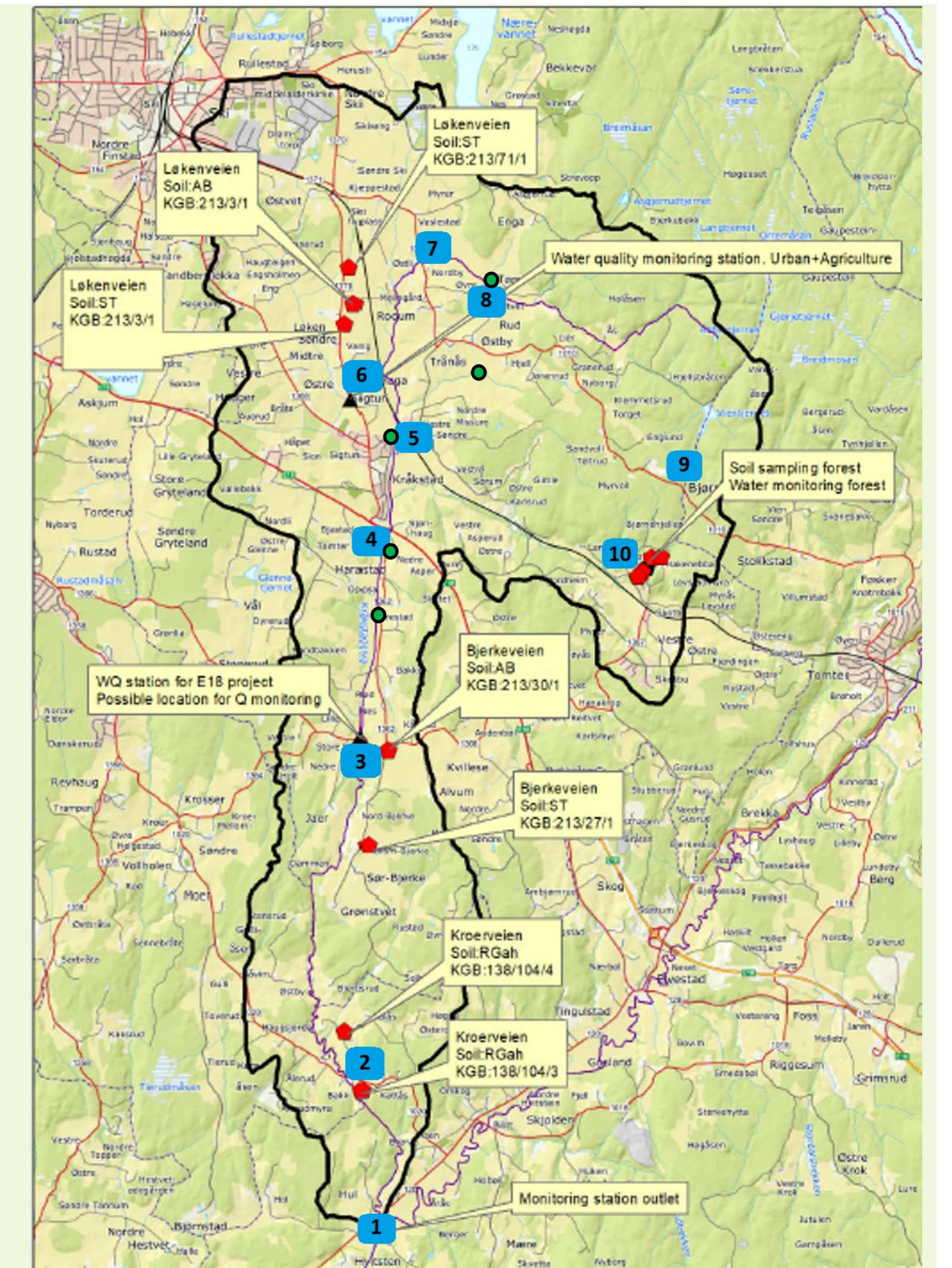


Photo: A.Nemes



- soil sampling - ◆
- soil moisture monitoring - ◆
- water sampling - ■
- fun 😊



Photo: C.Farkas

## DETAILED DESCRIPTION OF 2 NSWRM

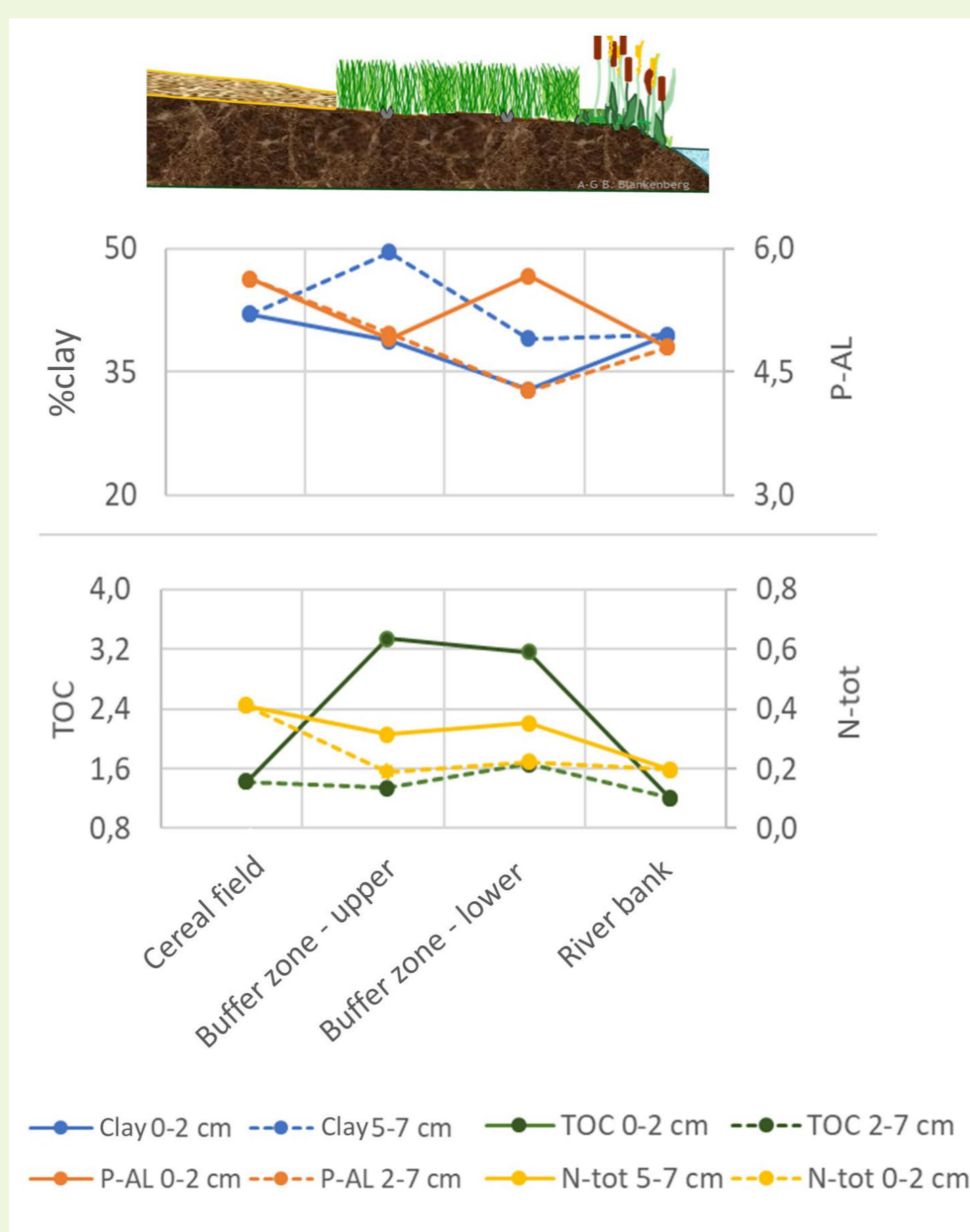
### Buffer zones



Photo: A-G. Blankenberg

Effectiveness of buffer zones, based on the BUFFERKLIMA field experiments (Krzeminska et al 2020):

BZ with:	Effectives (measured)			Slope stability effect (modelled)
	SS	P	N	
Grass	40-100%	40-95%	25-90%	Limited
Shrubs	40-100%	40-95%	25-90%	Moderate
Trees	No overland flow observed			Significant



Reference:  
Blankenberg A-G.B., Paruch A.M., Paruch L., Deelstra J., Haarstad K. 2016. Nutrients Tracking and Removal in Constructed Wetlands Treating Catchment Runoff in Norway. In: Vymazal J. (eds) Natural and Constructed Wetlands. Springer, Cham. [https://doi.org/10.1007/978-3-319-38927-1\\_2](https://doi.org/10.1007/978-3-319-38927-1_2)  
Beckman M. and Veidal A. 2020. Kornproducenters motivasjon for vannmiljøtiltak; Spørreundersøkelse i Østfold og Akershus. NIBIO Rapport 6 (82) 2020.  
Krzeminska D., Blankenberg A-G.B., Bae F., Nemes A., Skarbøvik E. 2020. Renseeffekt og kanterrosjon i kantsoner med forskjellig vegetasjonstype. NIBIO Report 6(30)2020  
Krzeminska D., Blankenberg A-G.B., Bechmann M., Deelstra J. 2021. Effekt av fangdam i et endret klima - 20 års erfaring med overvåking av fangdam i Skuterudbekken. NIBIO report 7(101)2021.

### Constructed wetlands

Typical elements of constructed wetland (CW) in Norway (Blankenberg et al. 2016.):

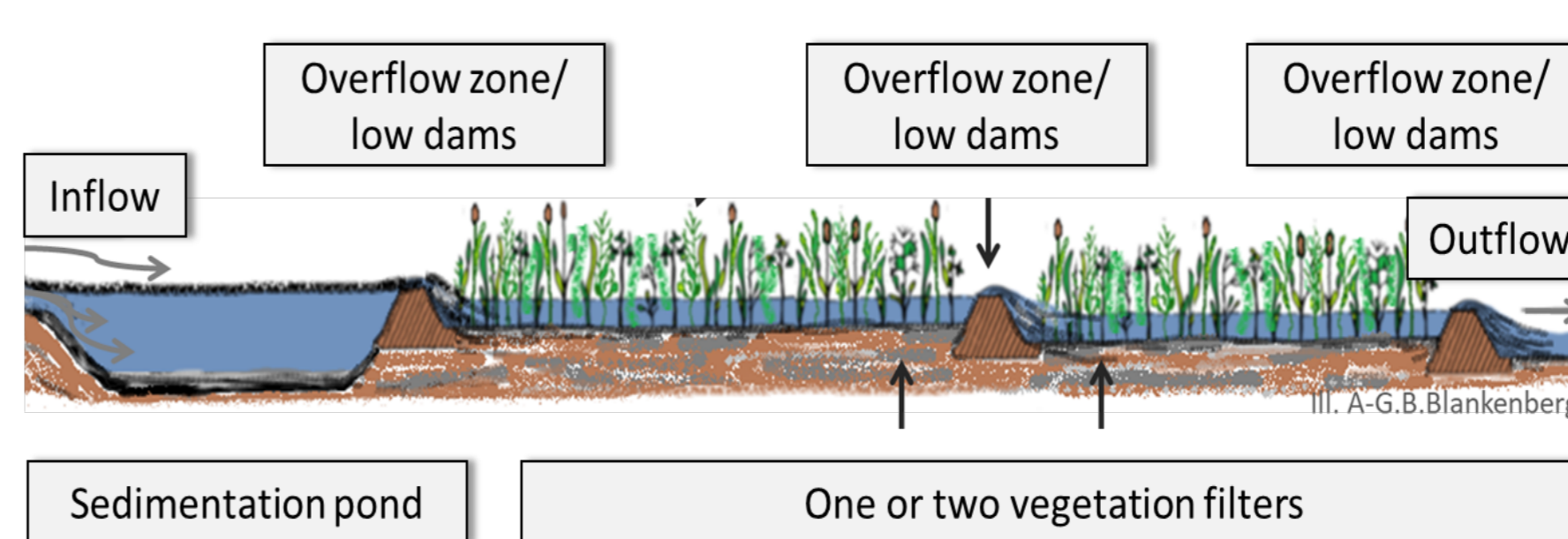


Photo: A-G. Blankenberg

Effectiveness of constructed wetland, based on Skuterud catchment (Krzeminska et al 2021):

	Retention of		
	particles	phosphorus	nitrogen
Min.	-41%	-44%	-3%
Max.	65%	47%	10%
Average	36%	19%	3%

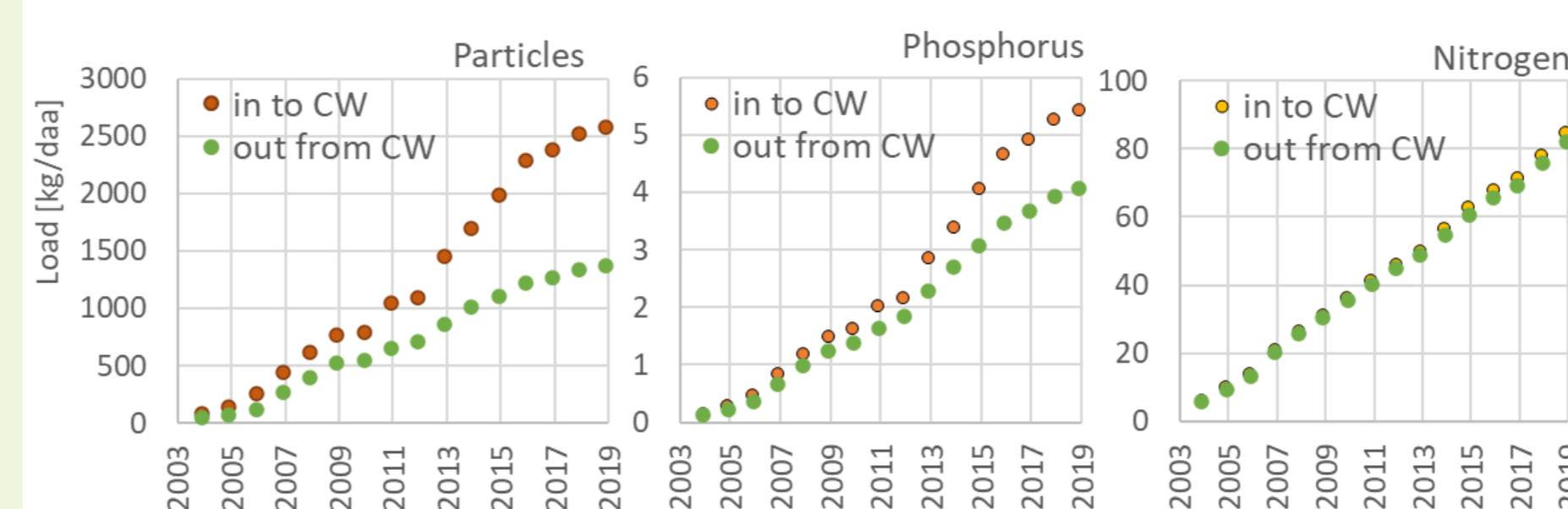


Photo: A-G. Blankenberg



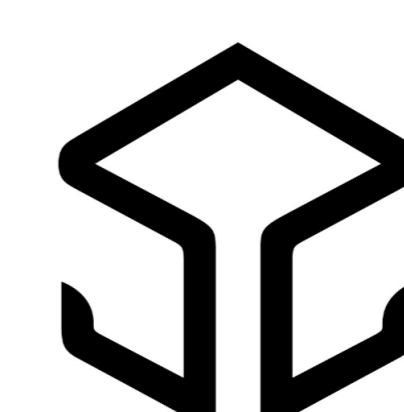
Photo: A-G. Blankenberg



Photo: A-G. Blankenberg



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