

# **A comprehensive and continuous pesticide screening during one growing season in five small Swiss streams**

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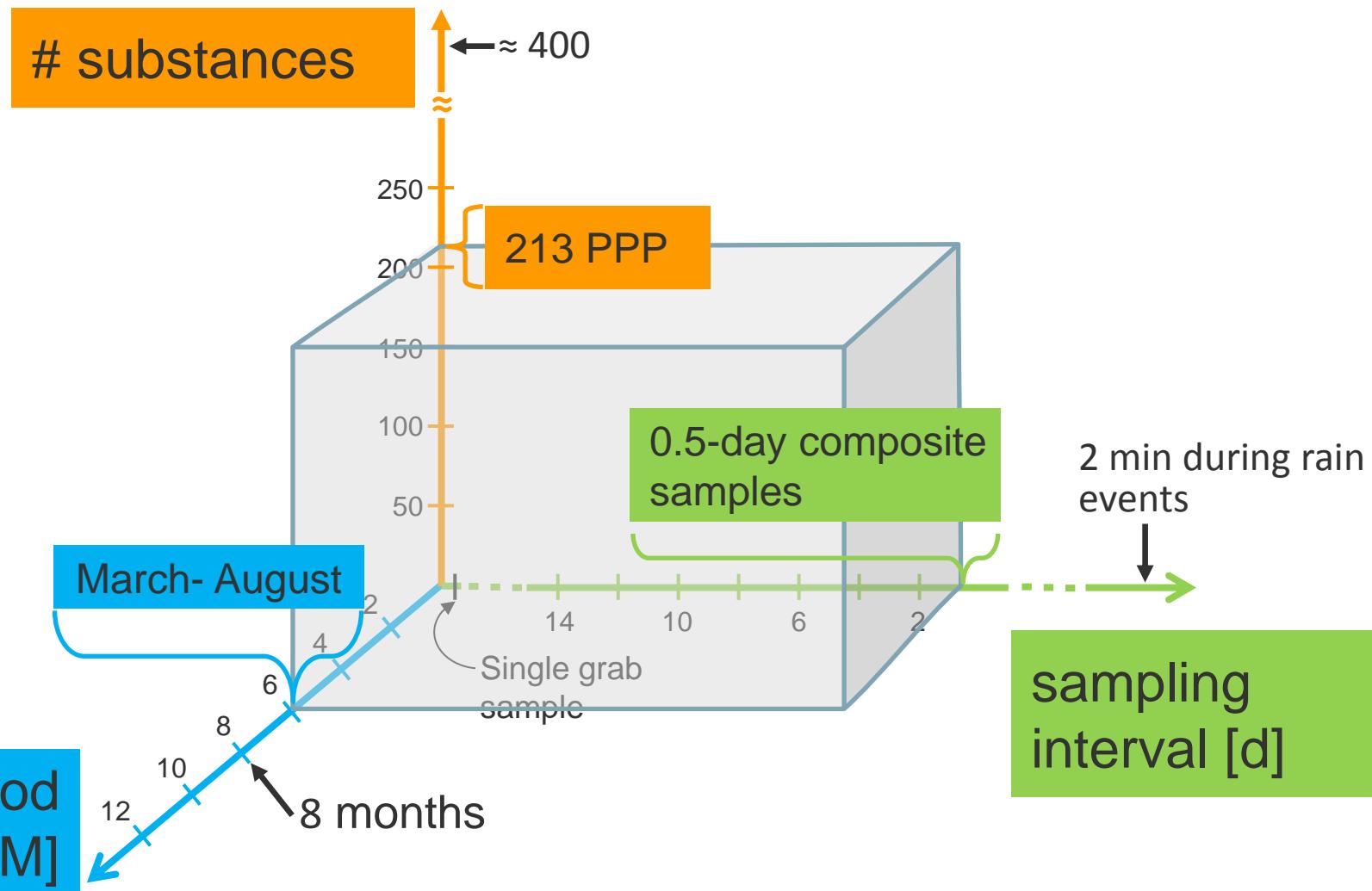
**Oekotoxzentrum:** Marion Junghans, Miriam Langer

**FOEN:** Manuel Kunz

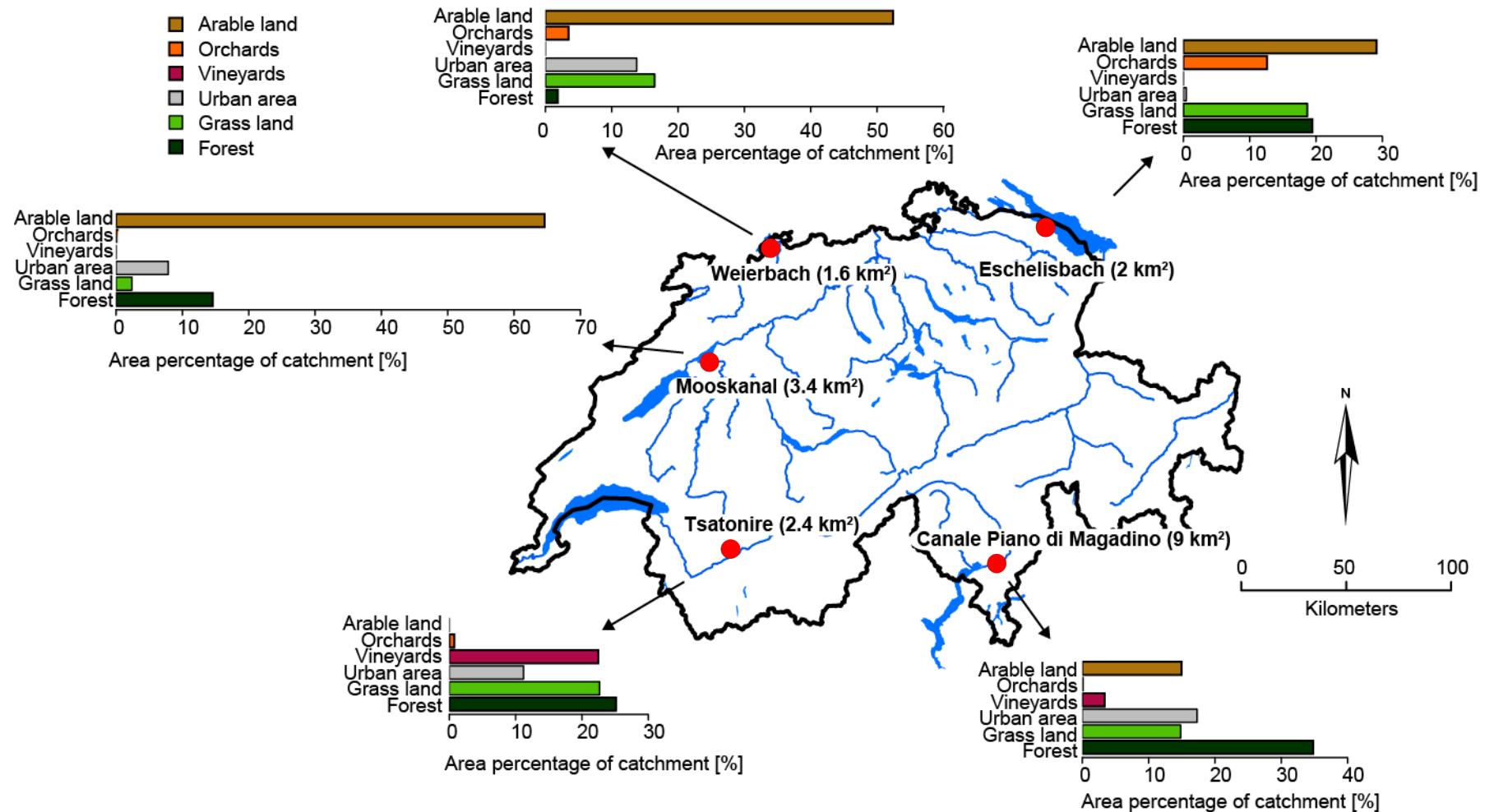
**Cantons:** BE, BL, TG, TI, VS

**VSA:** Tobias Doppler, Irene Wittmer

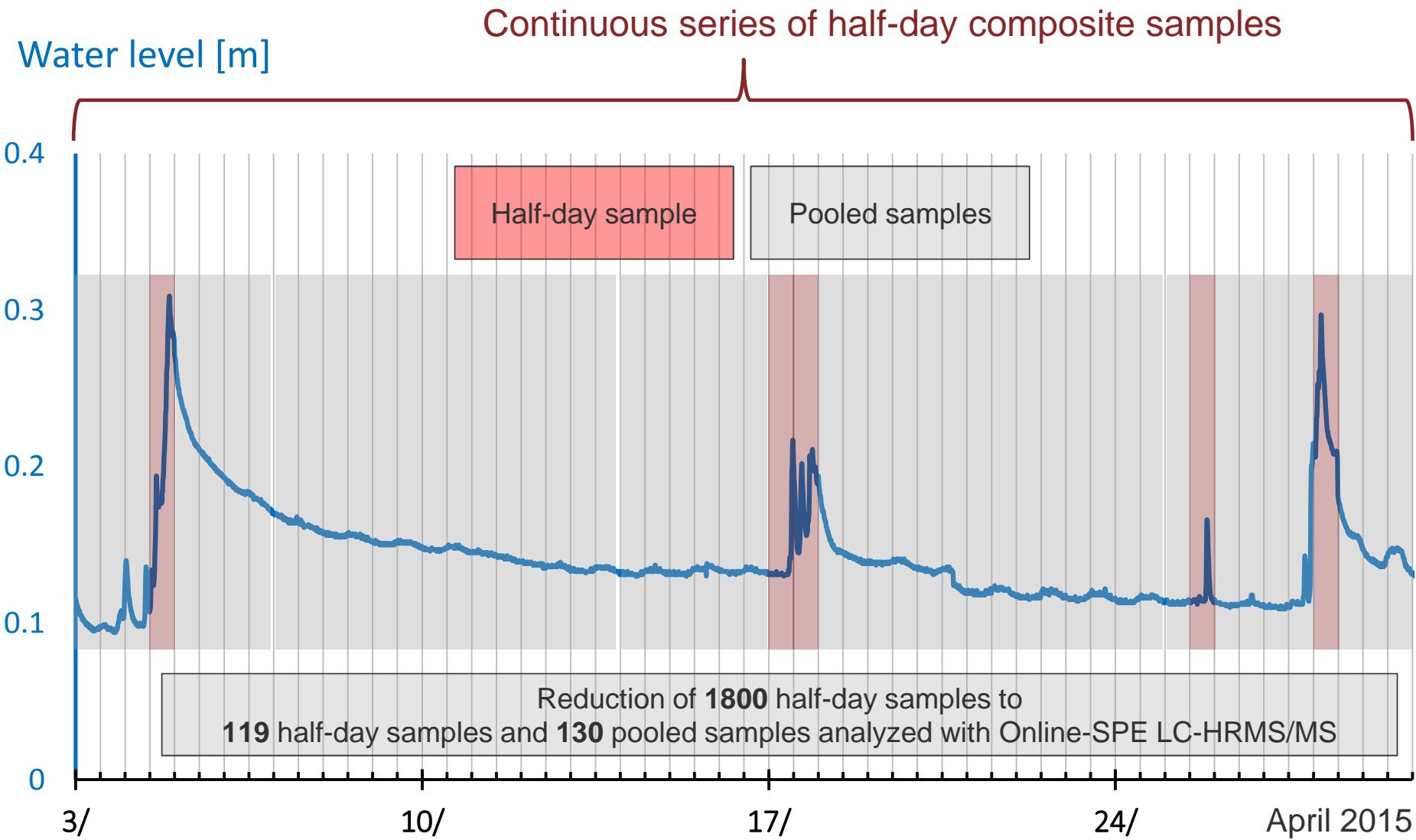
Getting closer to exposure relevant for aquatic organisms in small streams



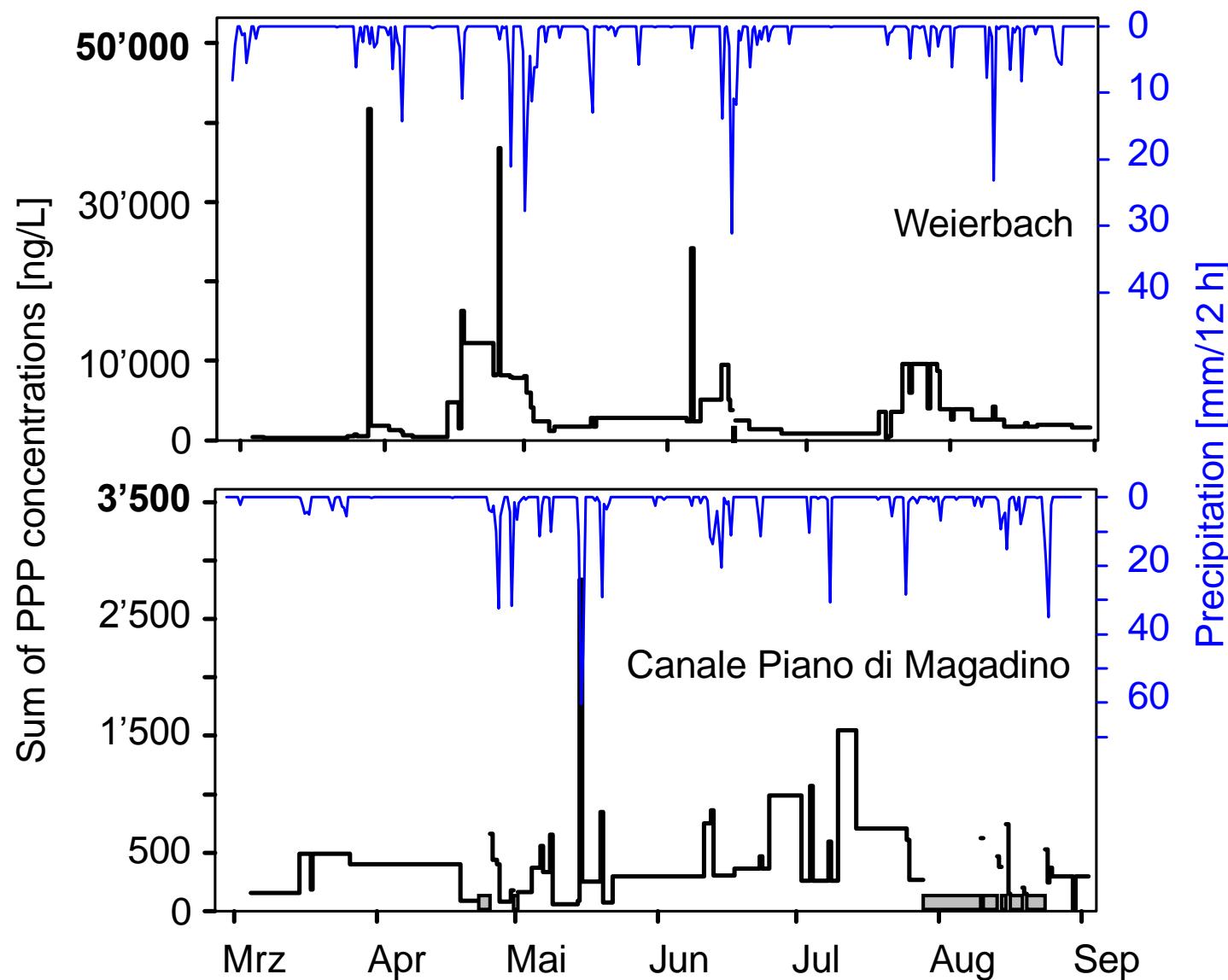
# Location of 5 Small Streams



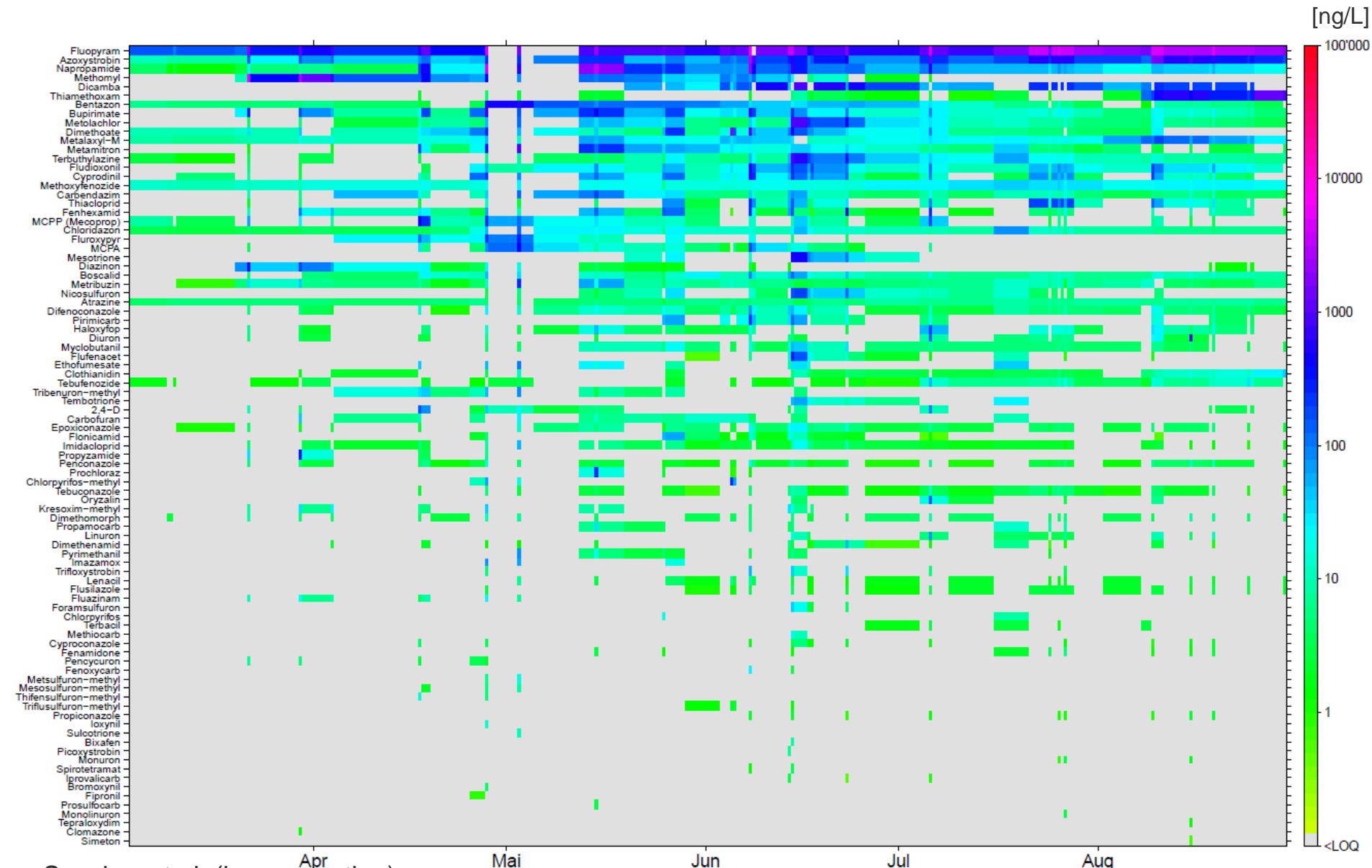
# Sample Selection on the Example of the Weierbach



# High Concentration Peaks, High Variance



# Comprehensive View on Eschelisbach



## Environmental Quality Standards (EQS)

- Acute and Chronic EQS based on exotoxicological data
- Chronic EQS compared to 14 d time weighted averages (twa)
- acute EQS to measured concentrations
- $RQ = \frac{C}{EQS}$        $RQ > 1 \rightarrow$  Risk for sensitive organisms
- **32** different PPP exceeding EQS (from a total of 128 detected compounds)

# Comparison with Quality Standards

# of half-days with single substance concentrations > **acute** and chronic QS

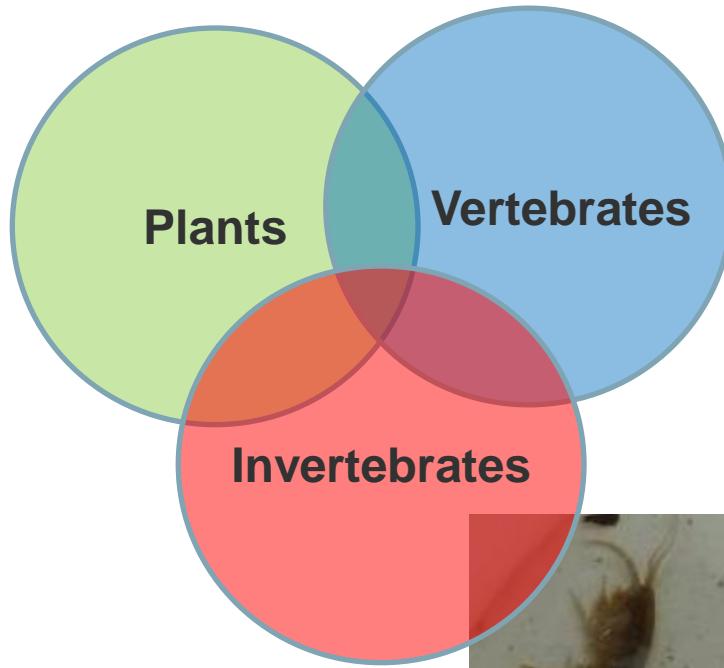
	Mooskanal		Weierbach		Eschelis-bach		Canale P. di M.		Tsatonire	
	Ac.	Chr.	Ac.	Chr.	Ac.	Chr.	Ac.	Chr.	Ac.	Chr.
Herbicide	0	140	64	868	7	112	0	28	134	420
Fungicide	0	0	35	168	25	140	0	0	17	56
Insecticide	19	84	39	476	61	504	0	0	2	168
% of time $\geq 1$ exceedances	6	43	24	92	22	92	0	10	41	86

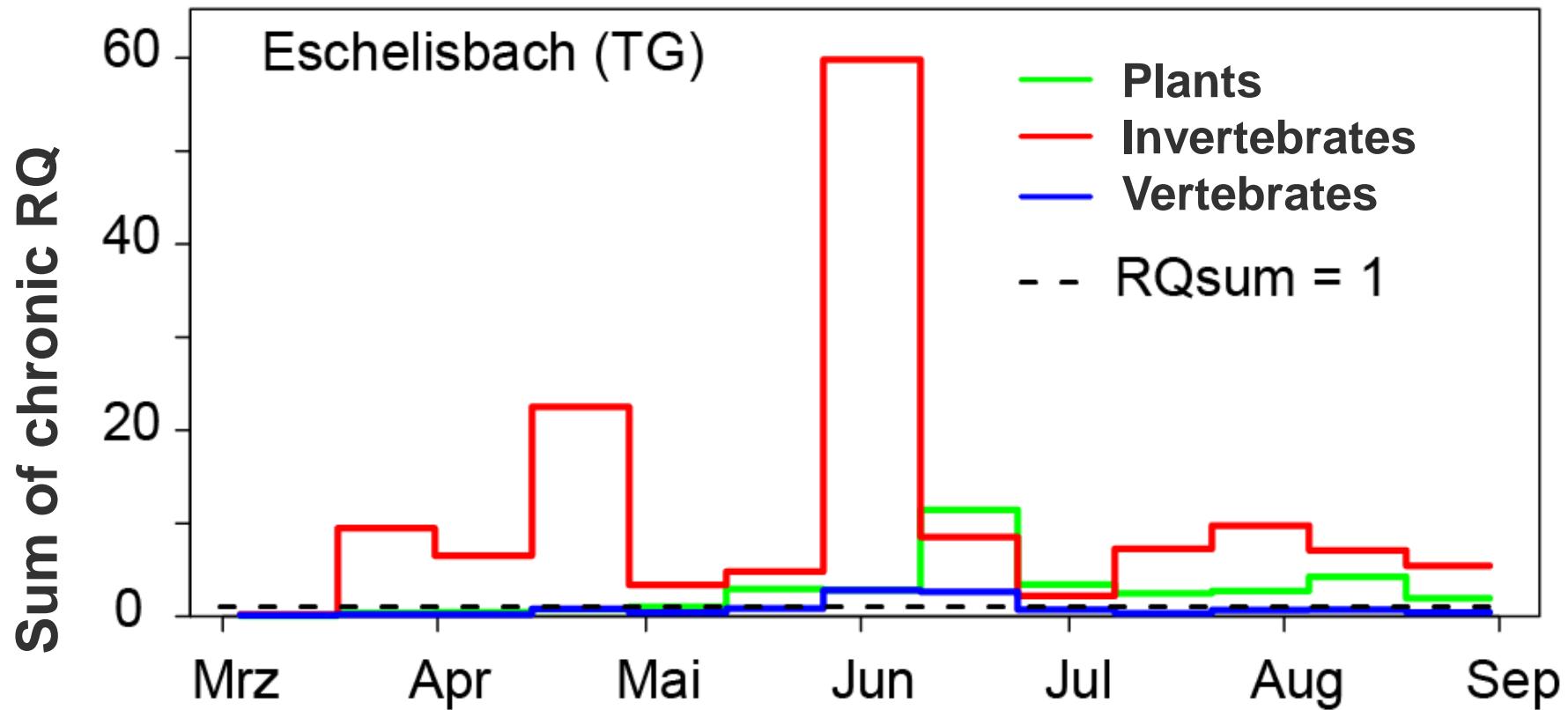
- Acute EQS-exceedances not only due to higher time resolution, because with 14-d time weighted averages 8 a.s. > acute QS

# Risks for Different Groups of Organisms

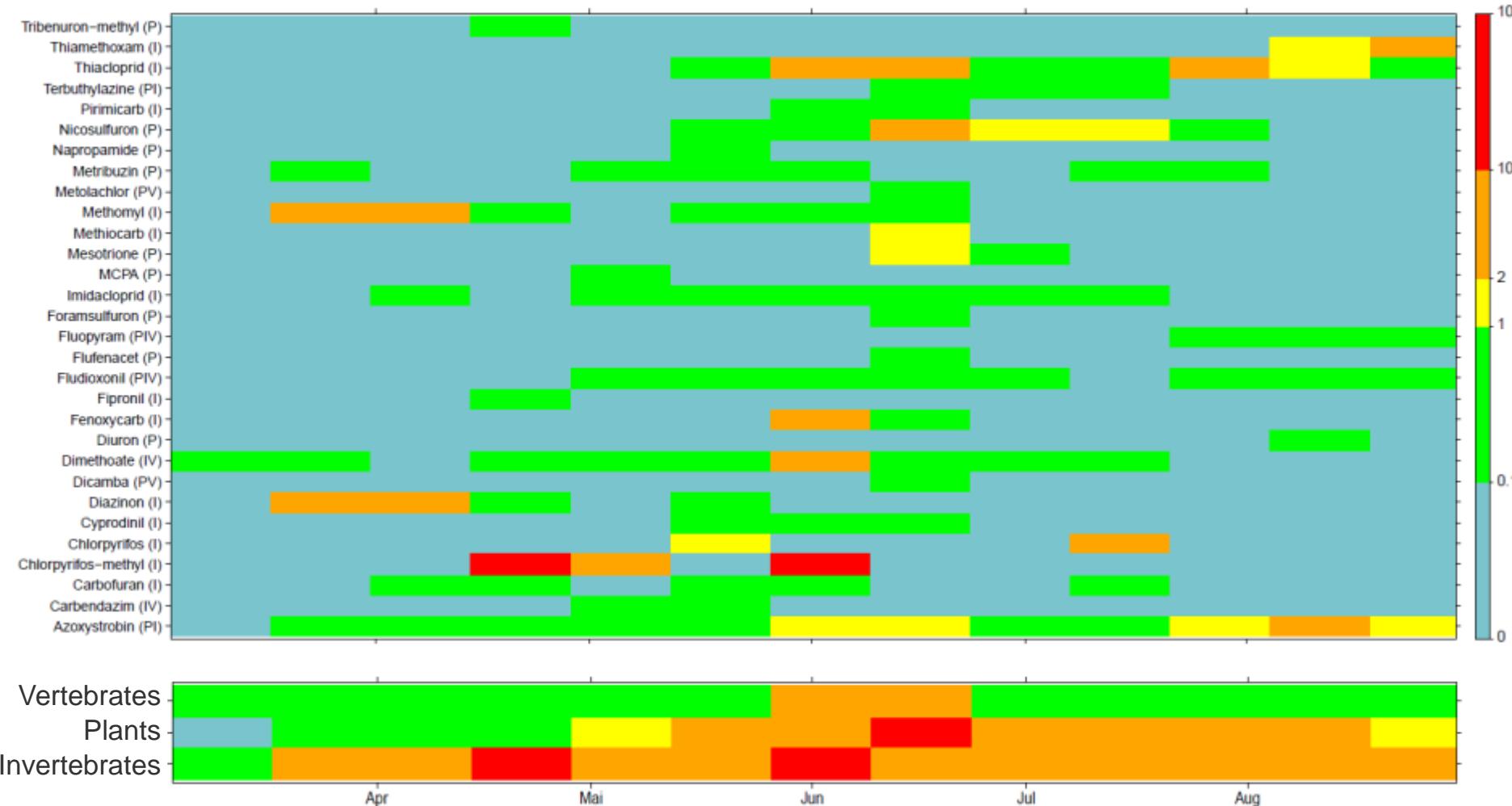
Classification of substances by primarily affected group of organisms  
(i.e., trophic level)

For each sample RQs are summed according to the classification



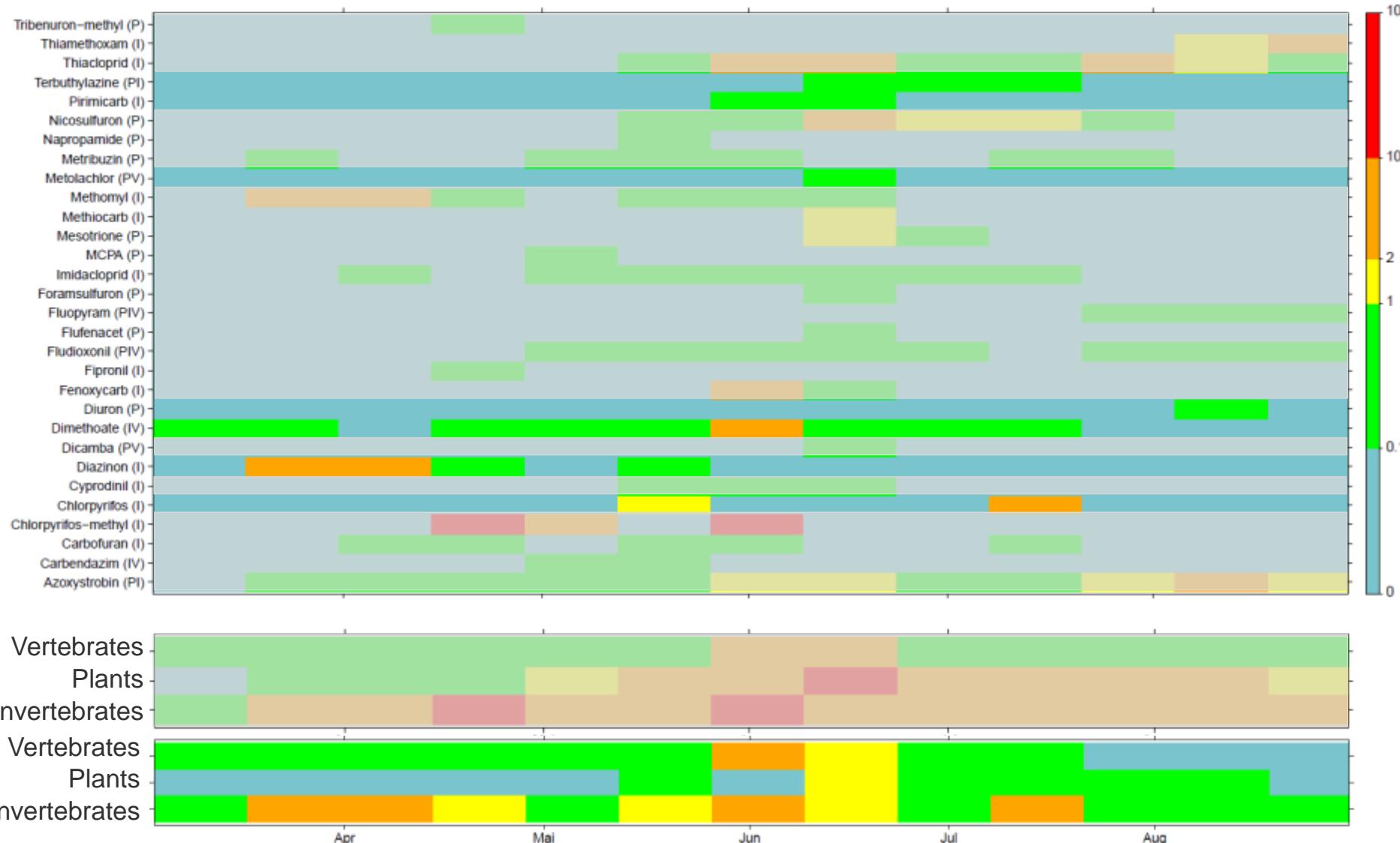


# Eschelisbach: Active ingredients with RQ > 0.1



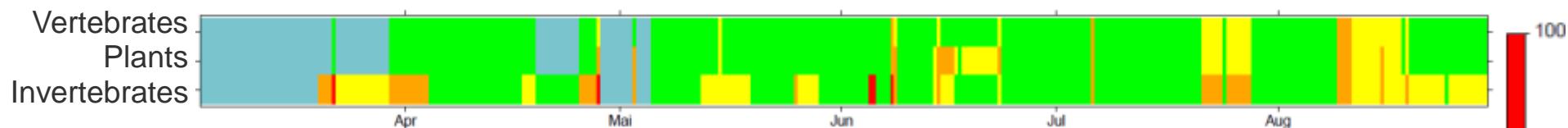
Different Perspectives: Active ingredient (< 1% of measurements with exceedance)  
vs.  
stream (92% of time with elevated risk)

# "Historic" View (2005-2012)

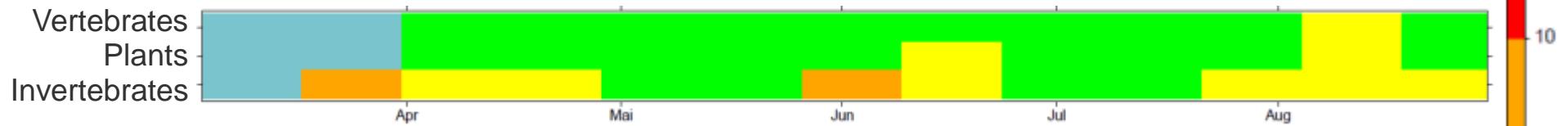


# Scenarios for Acute Risk Quotients

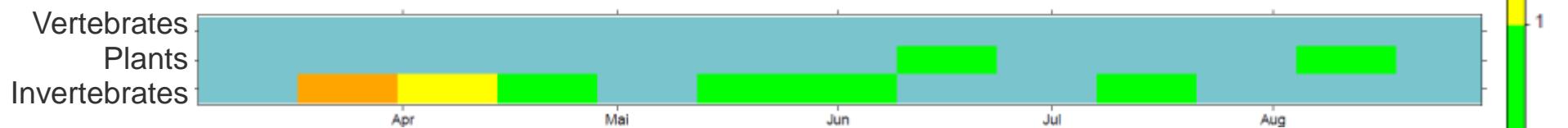
## All active ingredients (89 compounds)



## Same but with 2-week composite samples



## Historic view (28 most frequently measured) with 2 –week composite samples

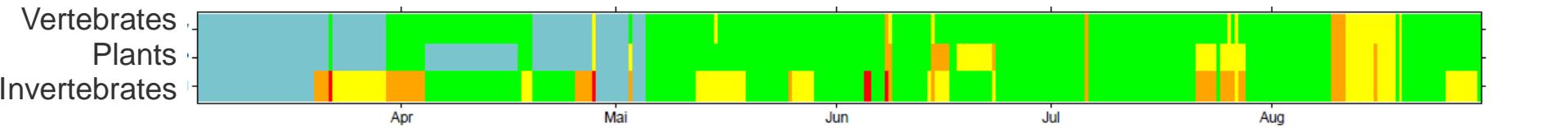


## WFD with 2-week composite samples (3 PPP detected)

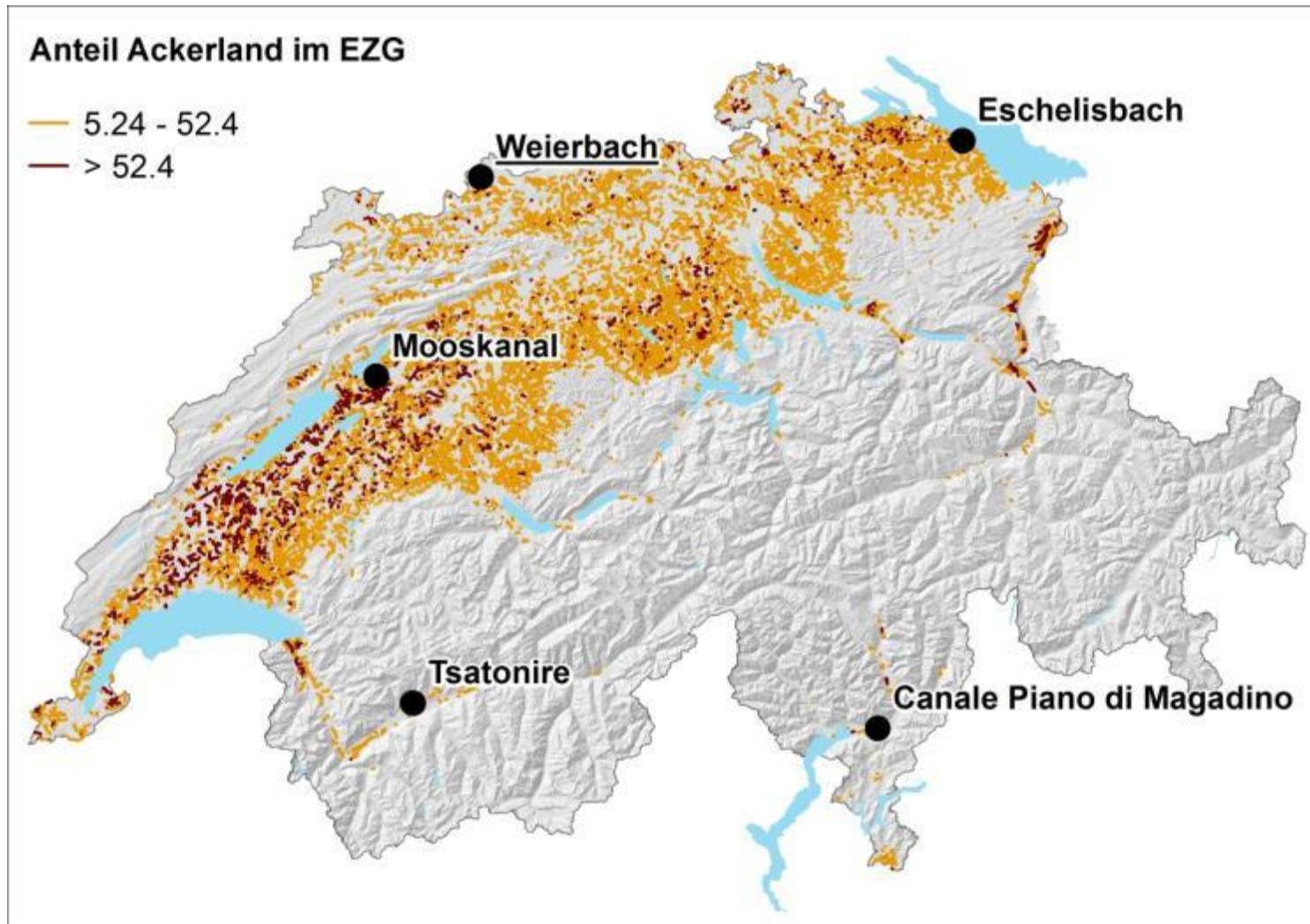


## Substance Selection by Guideline for diffuse sources (38 a.s.)

Wittmer, Stamm, Singer, Junghans 2014: Beurteilungskonzept für Mikroverunreinigungen aus diffusen Einträgen



# Relevance for Swiss River Network



# Conclusion

- Large variety of a.s. and high concentration peaks in small streams
- Chronic EQS exceeded in all examined streams, in some cases almost during entire monitoring campaign. Considerable variability among streams
- The pollution we «see» depends on the choice of substance AND the sampling strategy
- A suited monitoring strategy can provide ecotoxicologically relevant information and help to reduce the variability of PPP-monitoring data

## Acknowledgements

Special thanks to all colleagues from cantonal authorities and Federal Office of the Environment for funding.



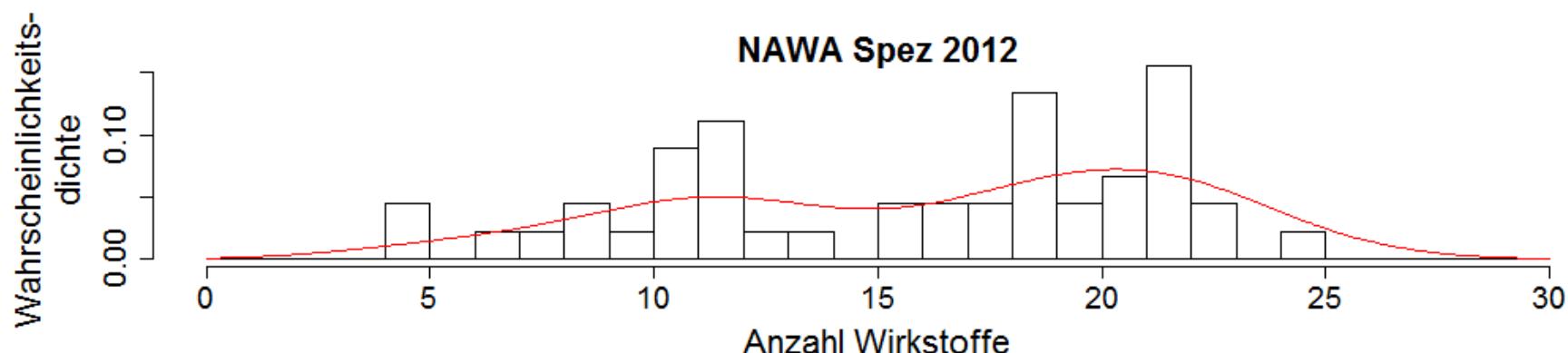
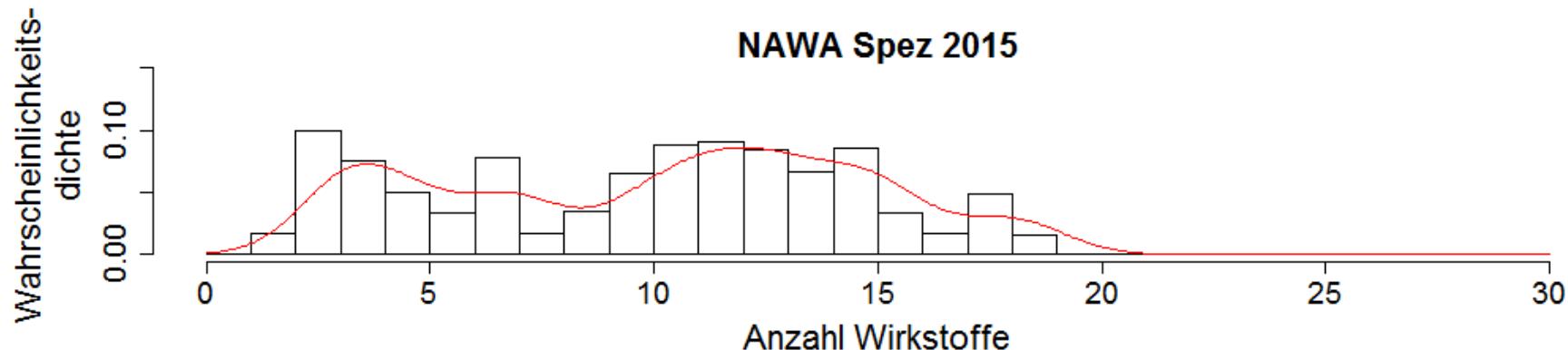
Photograph: Kim Jae-Sun

Thank you for your attention!

# Additional Slides

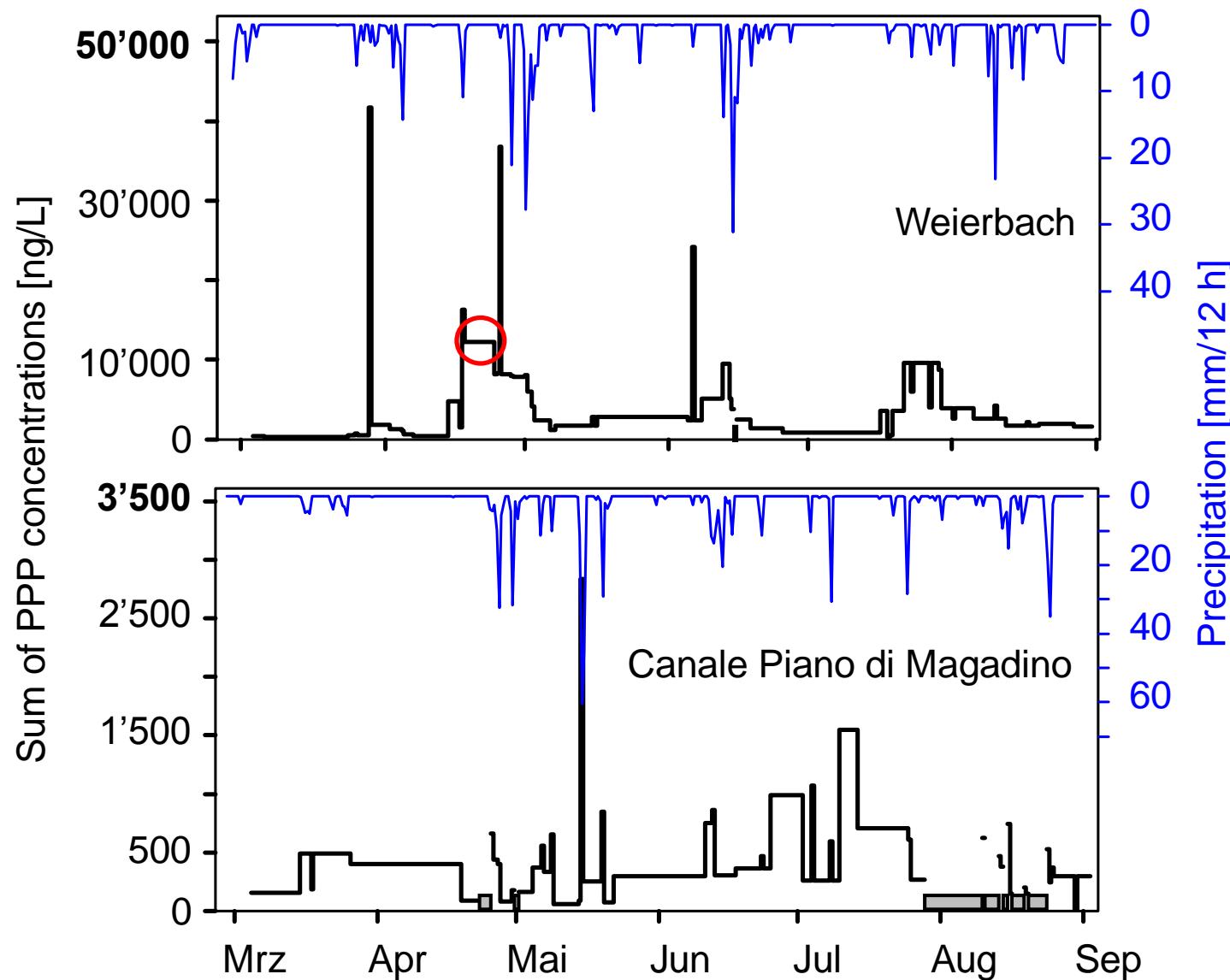
# Small vs. medium sized streams

Number of active ingredients required to cover 90% of sum of concentrations



- NAWA Spez 2015:  $\approx 10$  a.i
- NAWA Spez 2012:  $\approx 15$  a.s.
- RÜS ?

# High Concentration Peaks, High Variance



# Occasionally Elevated Concentrations without Rain Event

