



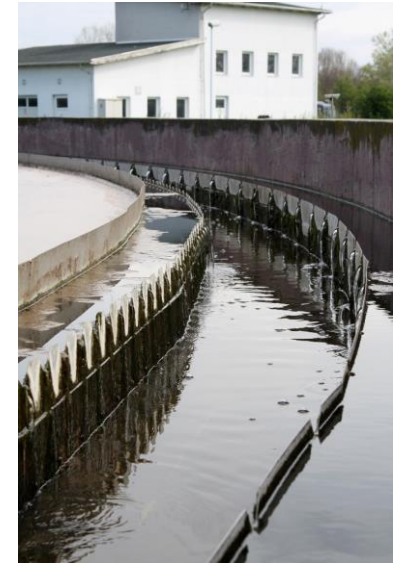
Microplastics in wastewater treatment plants: fate and removal

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Conference on Microplastics in drinking water – from source to tap
EUSDR PA4



Pollution or treatment?



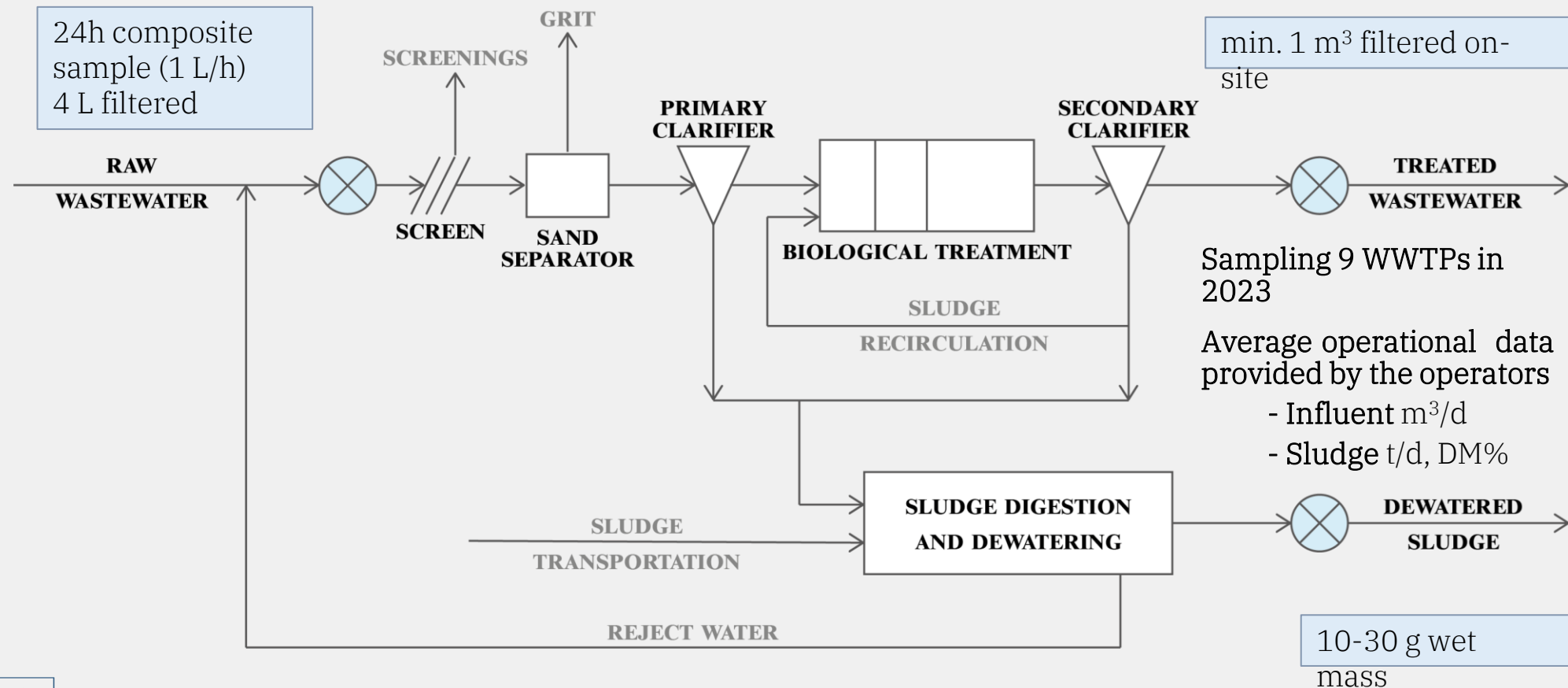
WWTPs are considered as one of the greatest contributors to the MP pollution of the environment.

Not designed for the removal MPs& MPs.

Designed for the removal of macronutrients (C, N, P).

But what is truly happening in WWTPs?

Sampling – Bird's eye view

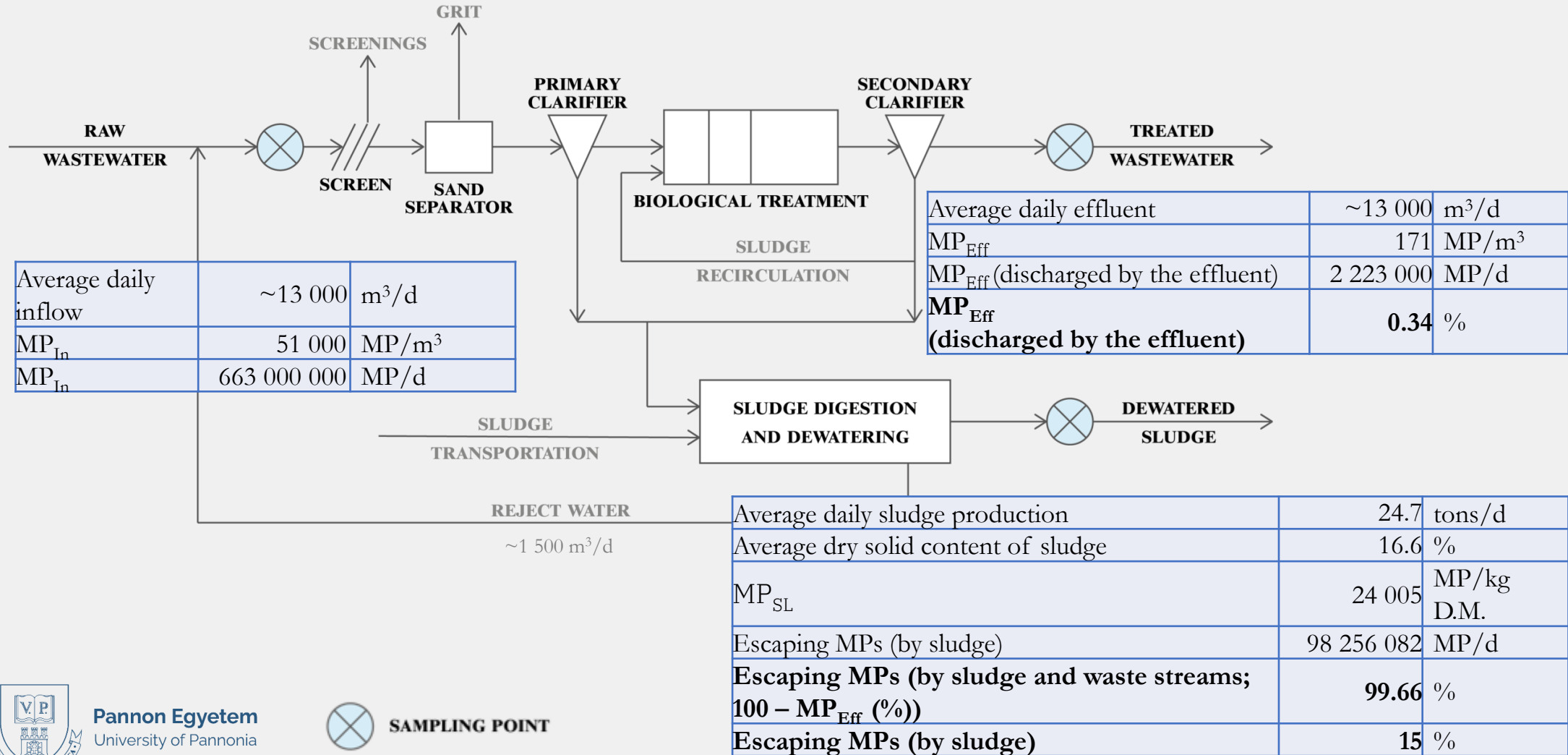


Sampling 9 WWTPs in 2023

Average operational data provided by the operators

- Influent m³/d
- Sludge t/d, DM%

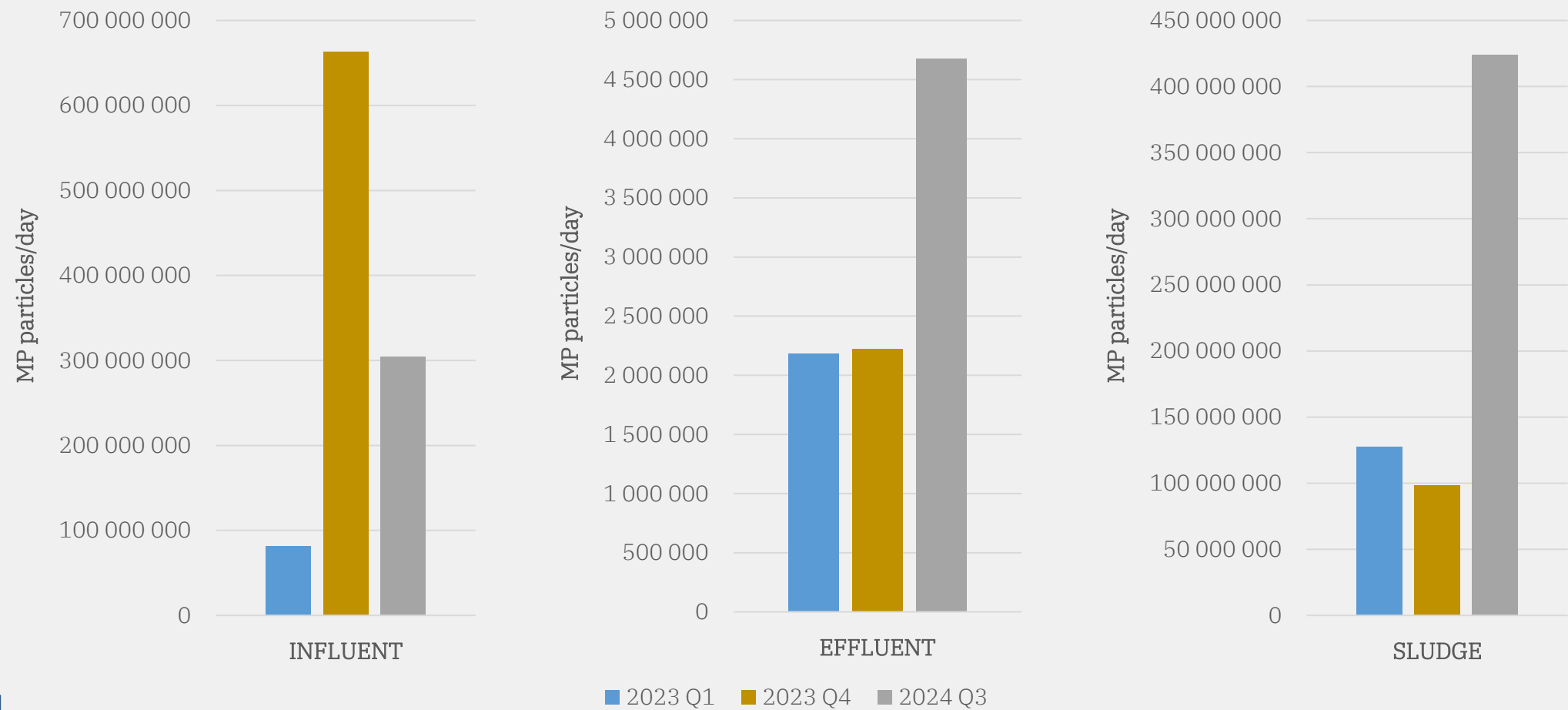
Particle-based MP balance



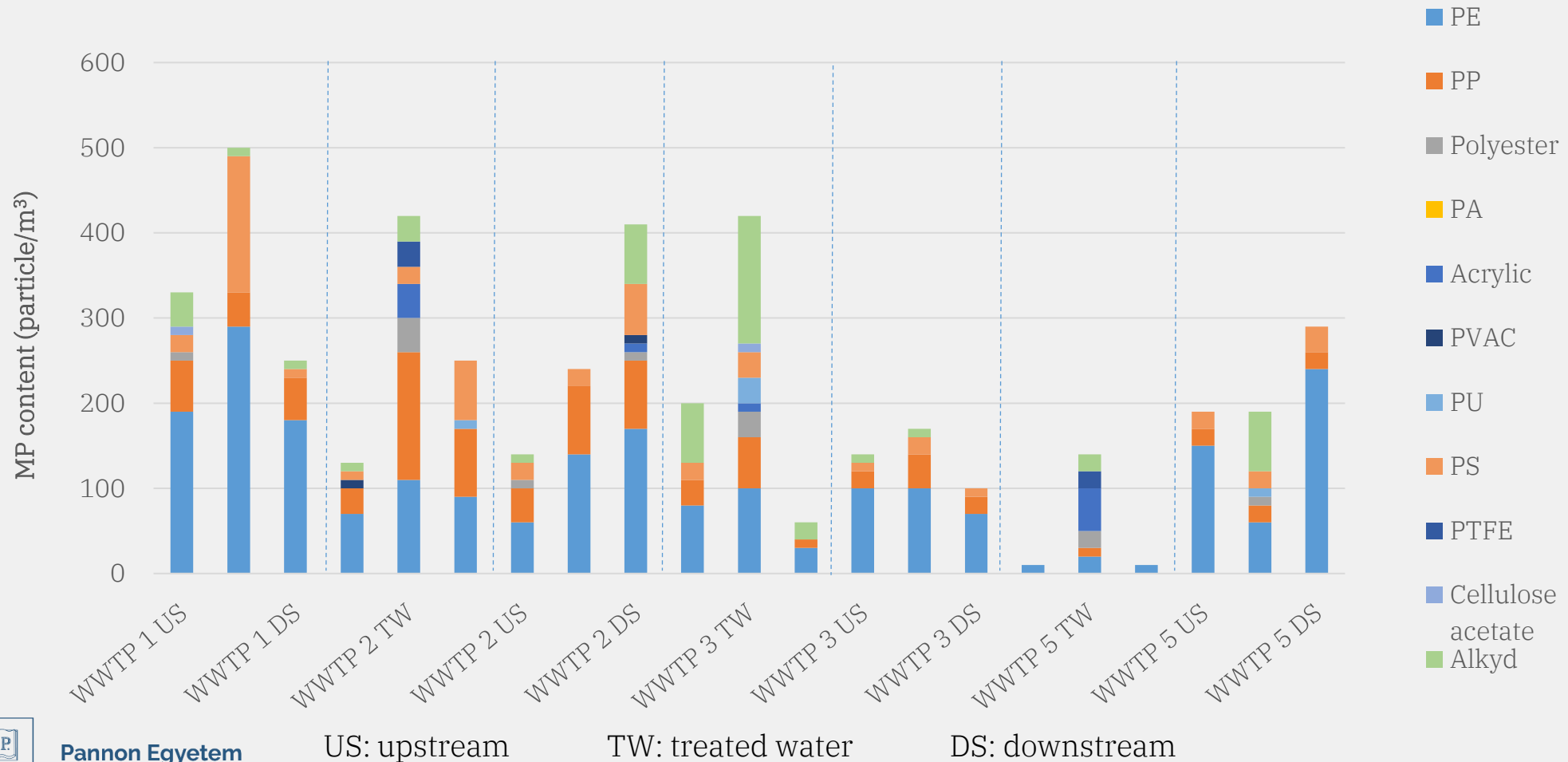
Particle-based MP balance

ID	Q avg 2022	MPin	MPeff	MP into recipient	MP into sludge and waste	MP in sludge	MP into sludge
	m ³ / d	p/m ³	p/m ³			p/ g d.m.	
WWTP1	830	169 500	183	0,11%	99,89%	165	25%
	830	32 250	277	0,86%	99,14%	95	74%
WWTP2	9 021	21 250	134	0,63%	99,37%	27	9%
	9 021	85 000	147	0,17%	99,83%	116	9%
WWTP3	10 617	31 500	219	0,70%	99,30%	33	25%
WWTP4	12 090	116 000	151	0,13%	99,87%	95	25%
WWTP5	12 894	6 250	168	2,69%	97,31%	24	15%
	12 894	51 000	171	0,34%	99,66%		
	12 894	23 440	360	1.54%	98.46%		
WWTP6	19 148	169 250	242	0,14%	99,86%	50	9%
WWTP7	34 000	36 000	234	0,65%	99,35%		
WWTP8	42 899	51 000	231	0,45%	99,55%		
WWTP9	128 705	47 500	180	0,38%	99,62%		
AVERAGE		64 611	207	0,68%	99,32%	76	24%
MIN		6 250	134	0,11%	97,31%	24	9%
MAX		169 500	360	2,69%	99,89%	165	74%

Particle-based MP balance in WWTP₅ (122,373 PE)



How does it affect the water body?



Conclusions

On the horns of a dilemma

- Nutrient recovery vs. micropollutants & microplastics
- MP into treated effluent vs. sewage sludge
 - To farmland by irrigation or by sludge

Further steps

- More in-depth information
 - FTIR & Pyr-GC/MS
 - Detailed sampling with 13 sites inside a WWTP 3 repetitions
 - Calculating the MP removal of technological units
 - Focusing on the possible points for intervention

Individual & collective prevention

- Once inside, goes outside



Thank you for your attention!

Development of multiparametric testing systems for analysing the environmental impacts of microplastics

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We would like to say special thanks to all the WWTPs leader and operator staff who made our work possible.

