

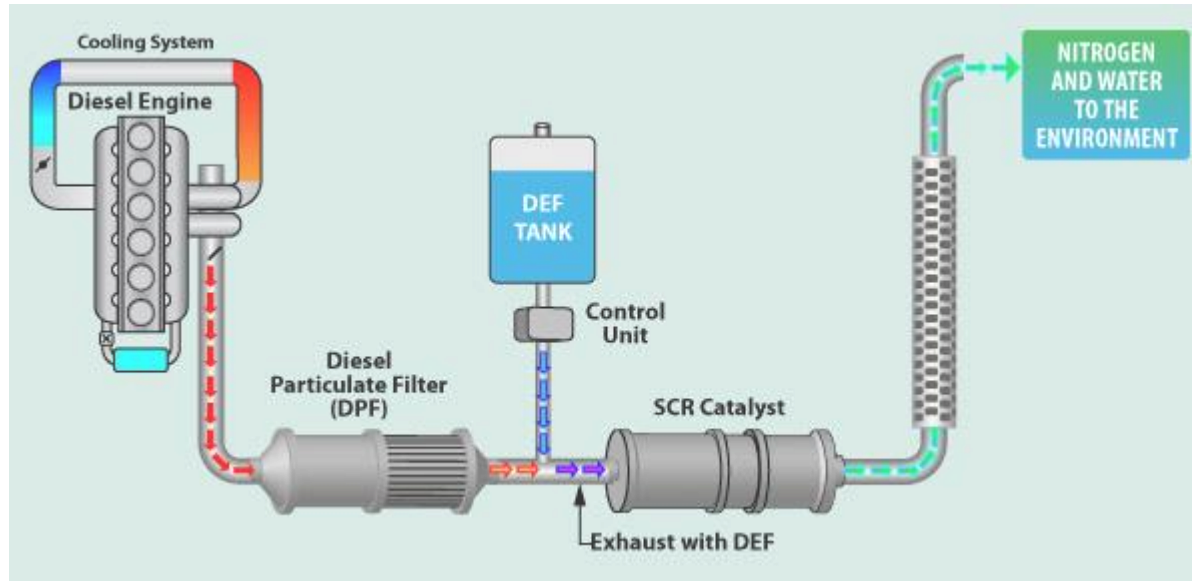


BETWEEN SKY  
AND  
SEA

Diesel Exhaust Fluid  
Innovative stormwater treatment trials for  
high ammoniacal nitrogen  
concentrations

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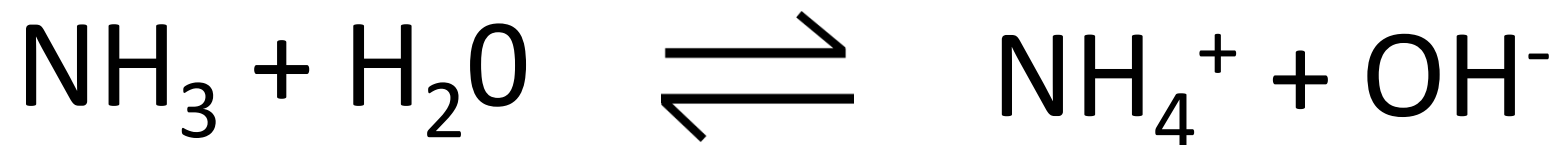
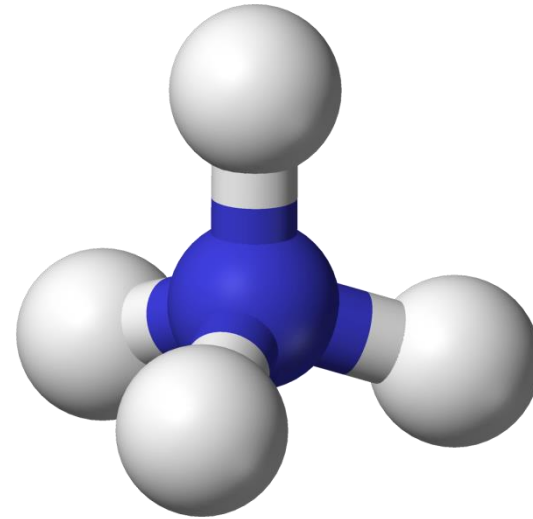
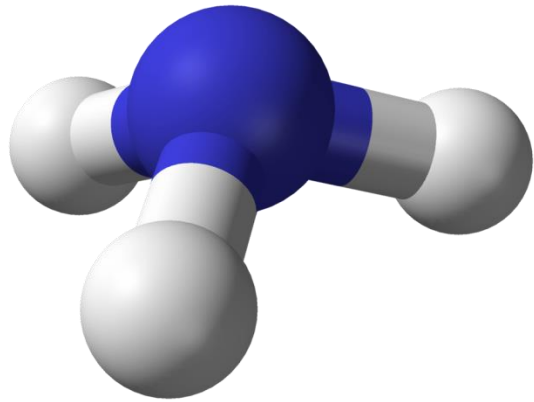
# Diesel Exhaust Fluid – What is it?







## Ammoniacal nitrogen – A stormwater contaminant



Aquatic life is sensitive to Ammonia (NH<sub>3</sub>)

# Ammoniacal nitrogen – A stormwater contaminant

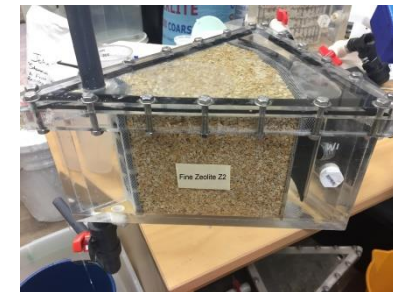
Regulatory body	Trigger value
USEPA acute exposure (1 hour avg / 3 yrs)	17 mg/L
USEPA chronic exposure (30 day avg / 3 years)	1.9 mg/L
ANZECC (ambient upland river)	0.021 mg/L
ANZECC (ambient lowland river)	0.01 mg/L
Easton et al. (2015) Oil-water separator effluent	38-132 mg/L

# Test program – 3 stages

1. Adsorption capacity

2. Rate of adsorption

3. Horizontal flow column tests

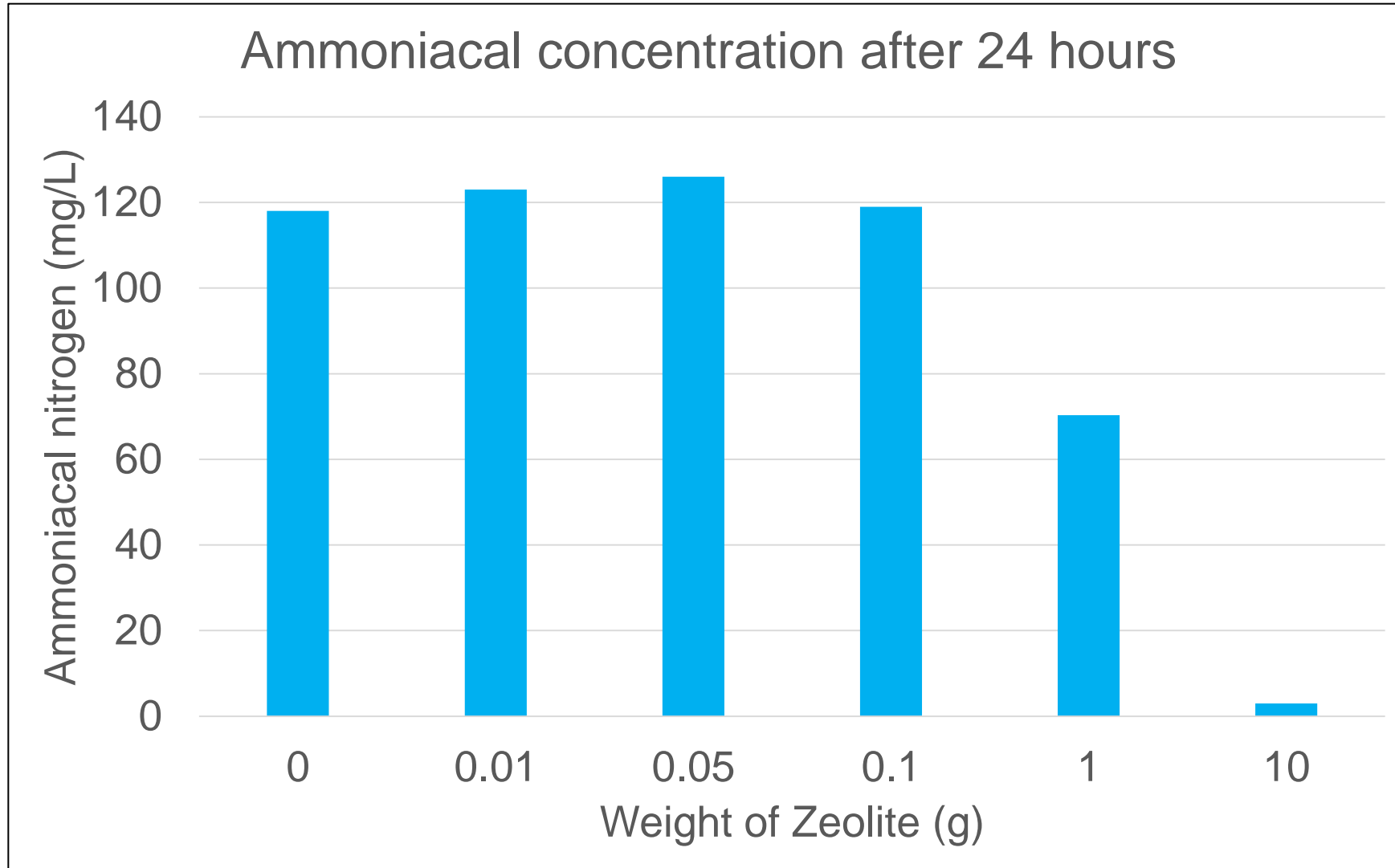




# Stage 1 - Adsorption capacity

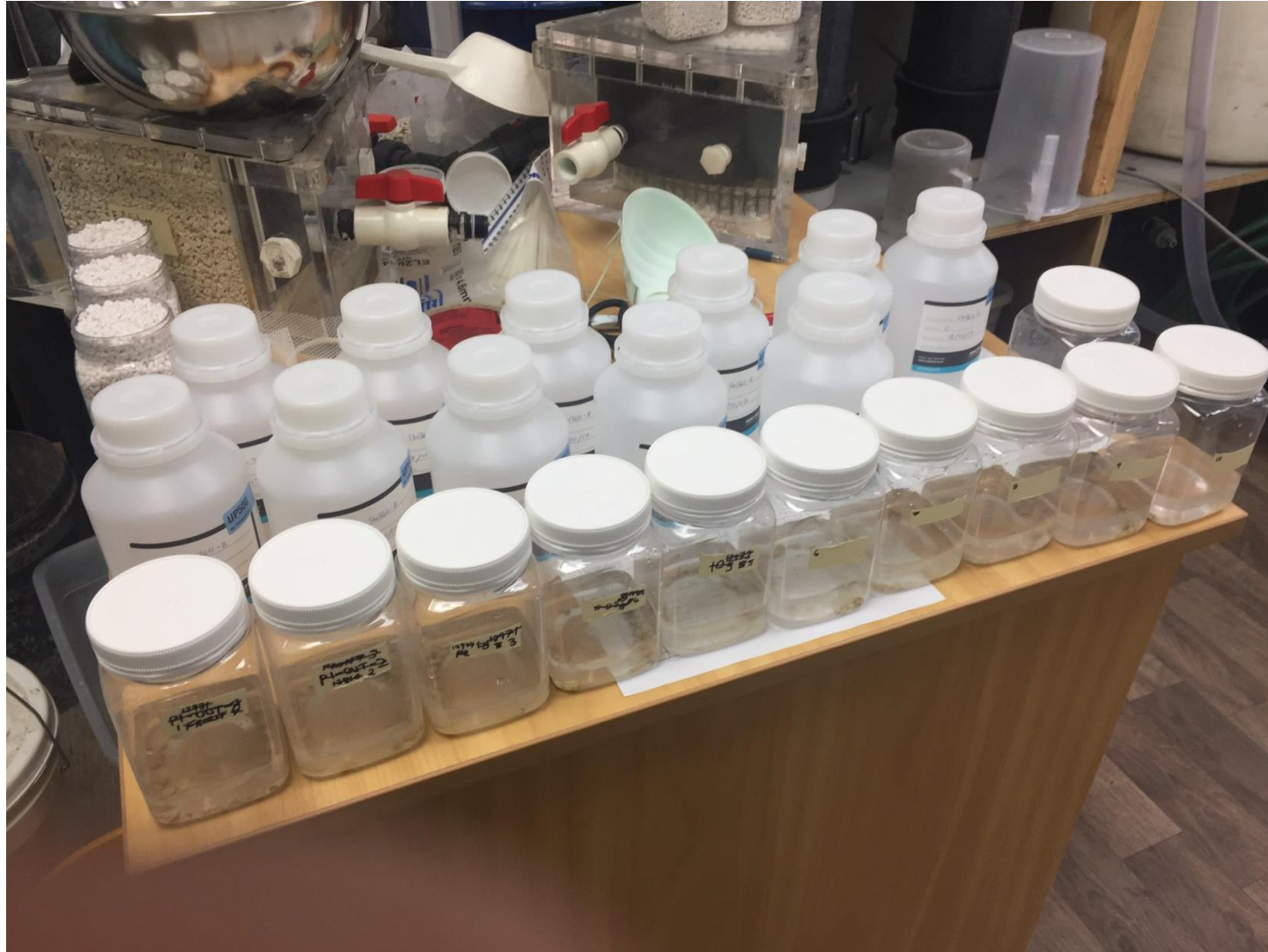


# Stage 1 - Adsorption capacity

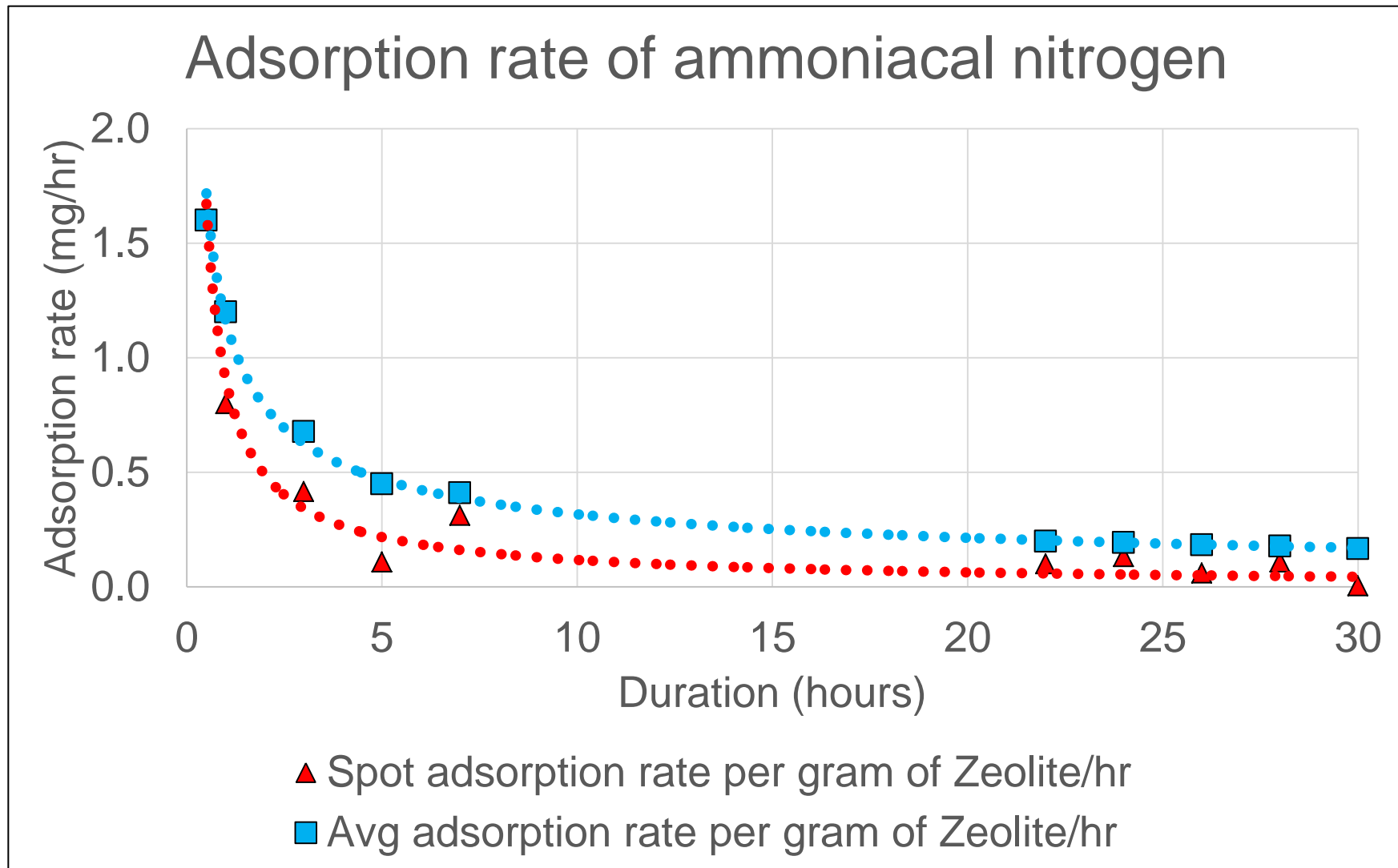




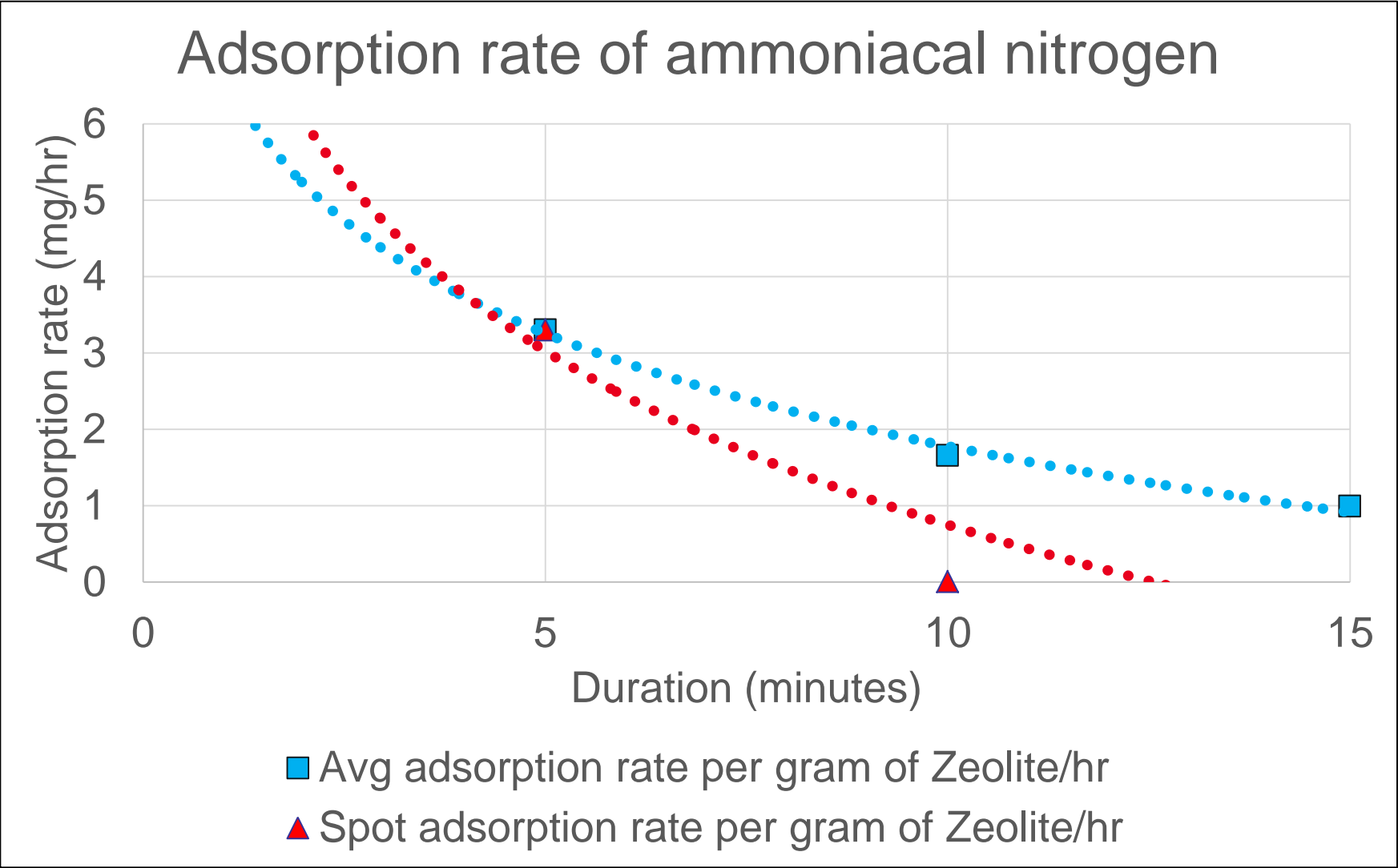
## Stage 2 - Rate of adsorption



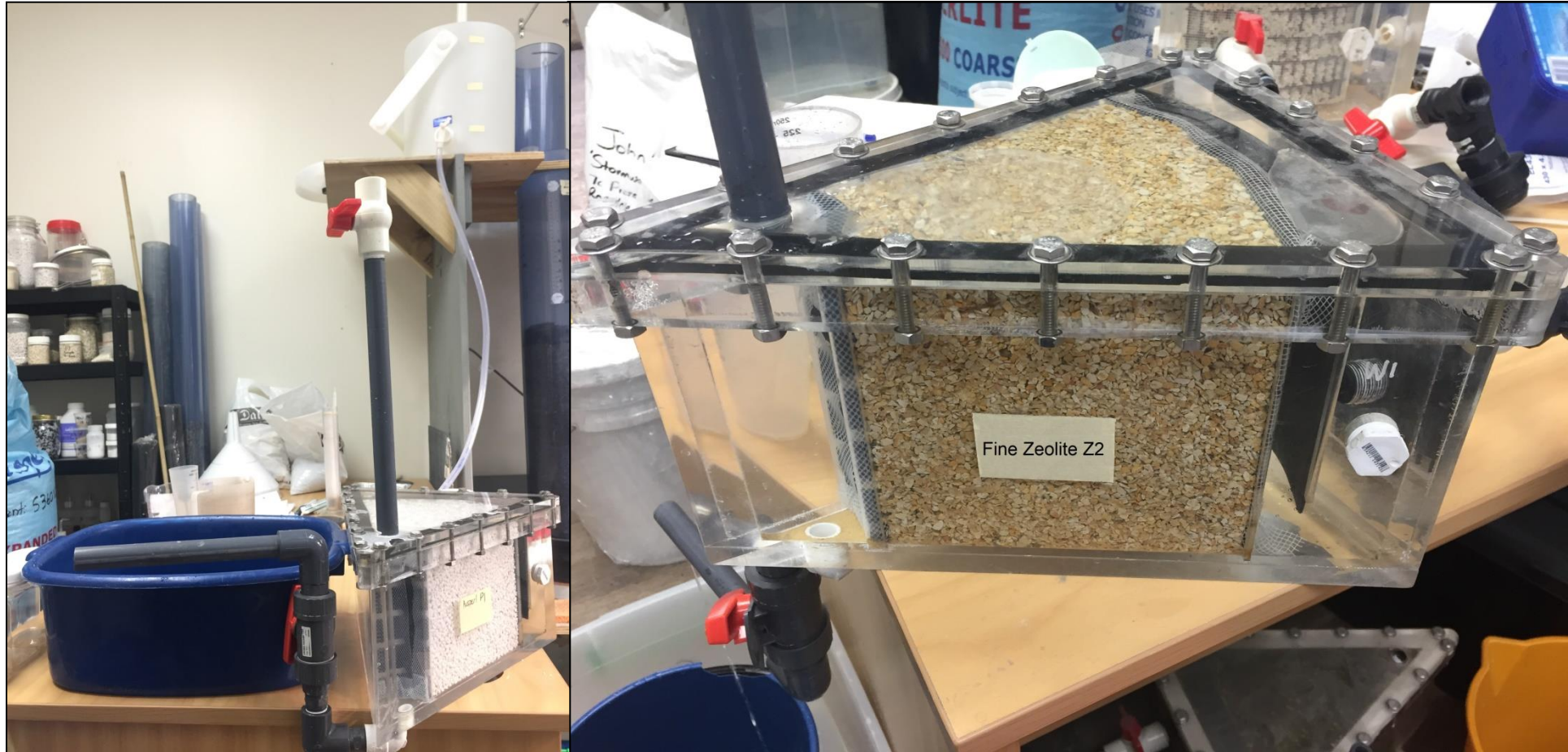
## Stage 2 - Rate of adsorption (0-30 hours)



# Stage 2 - Rate of adsorption (0-15 minutes)

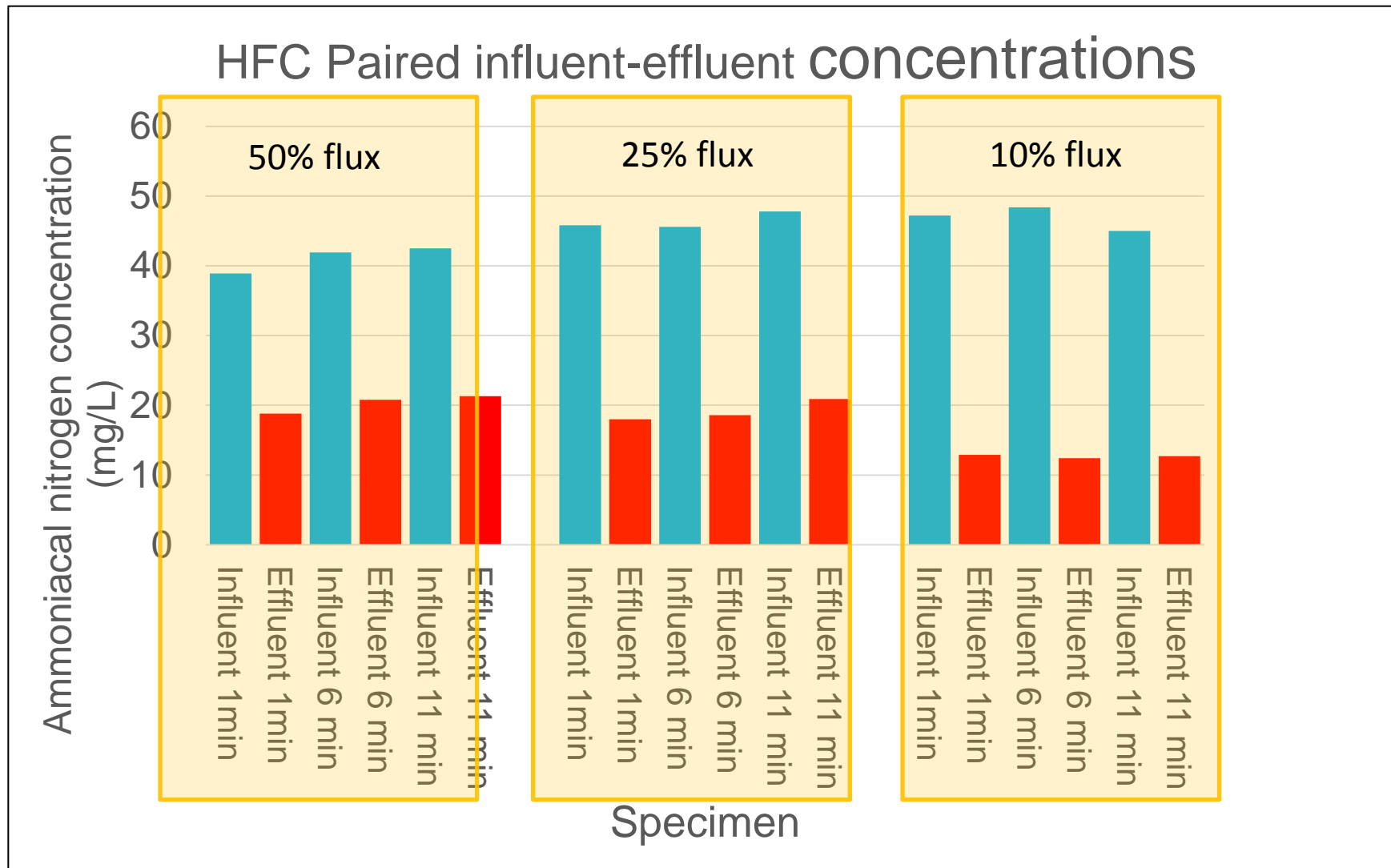


## Stage 3 – Horizontal flow column tests

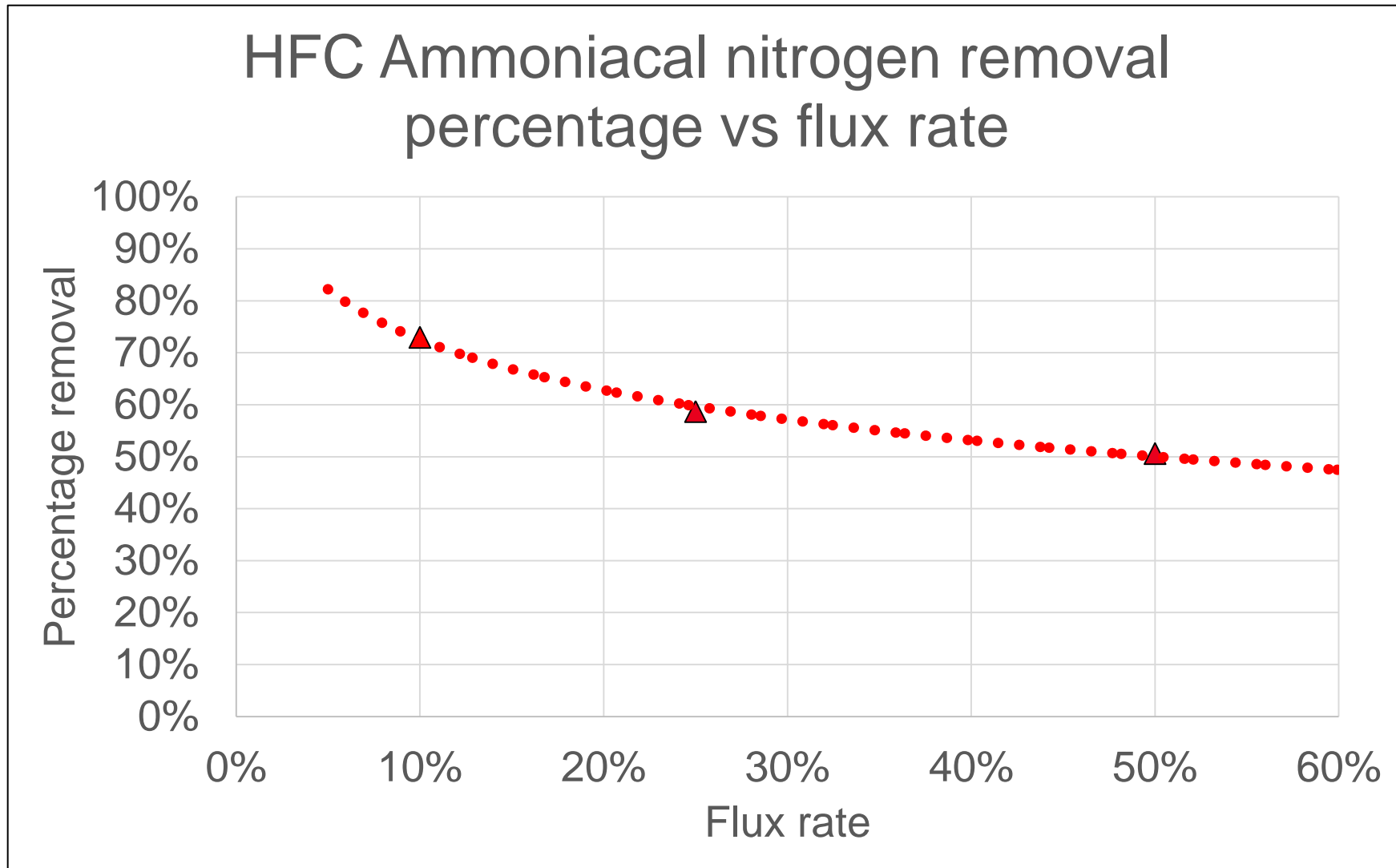




# Stage 3 – Horizontal flow column tests



## Stage 3 – Horizontal flow column tests



# Conclusion

Zeolite can adsorb ammoniacal nitrogen

Ammoniacal nitrogen can be removed using a flow-based treatment method

Ammoniacal nitrogen concentrations in stormwater can be reduced considerably (73% removal at 10% flow rate)

## Future testing

- ▶ Repeat testing
- ▶ Breakthrough point
- ▶ Field trials

# Thank you

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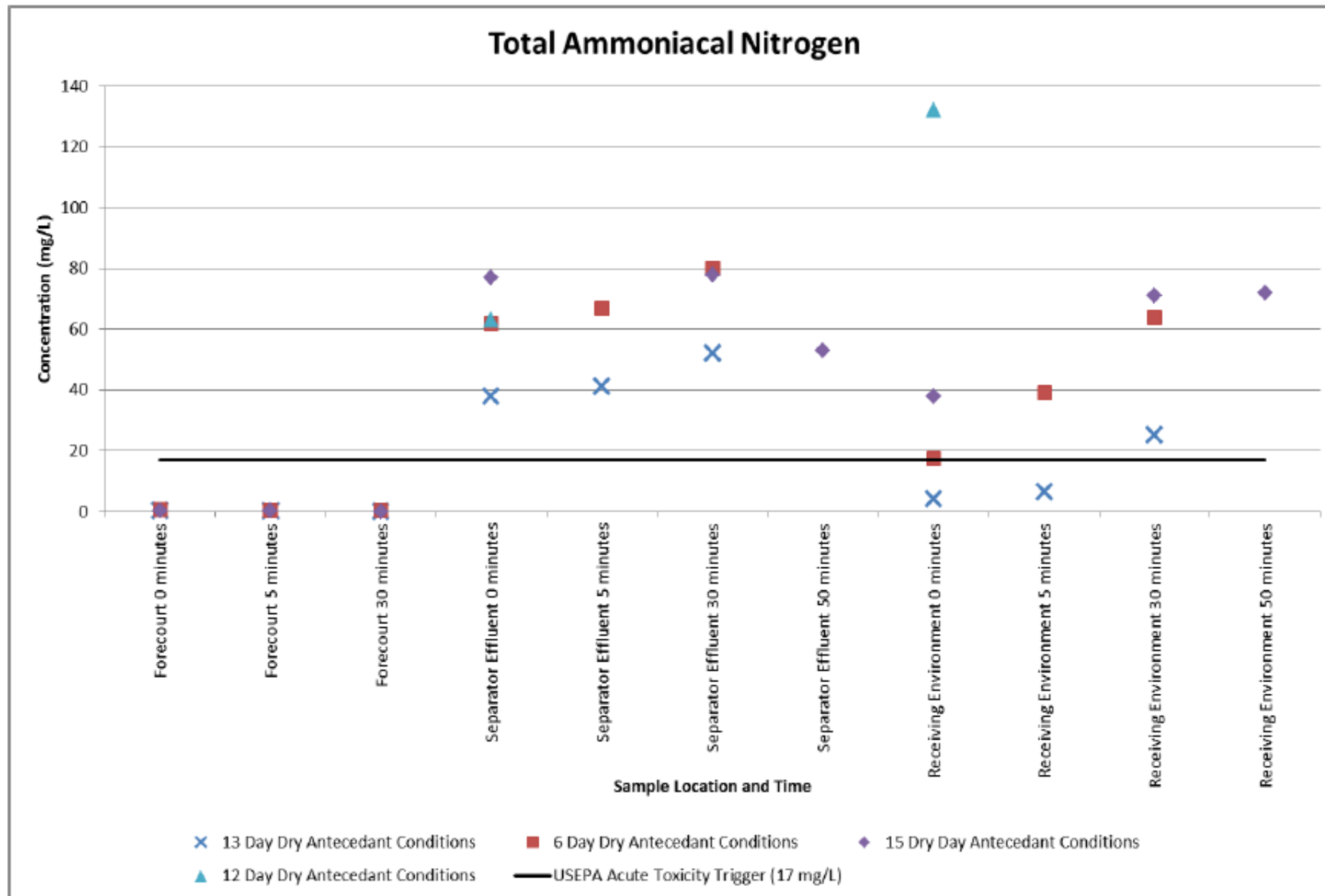


Figure 2. Total Ammoniacal Nitrogen.