

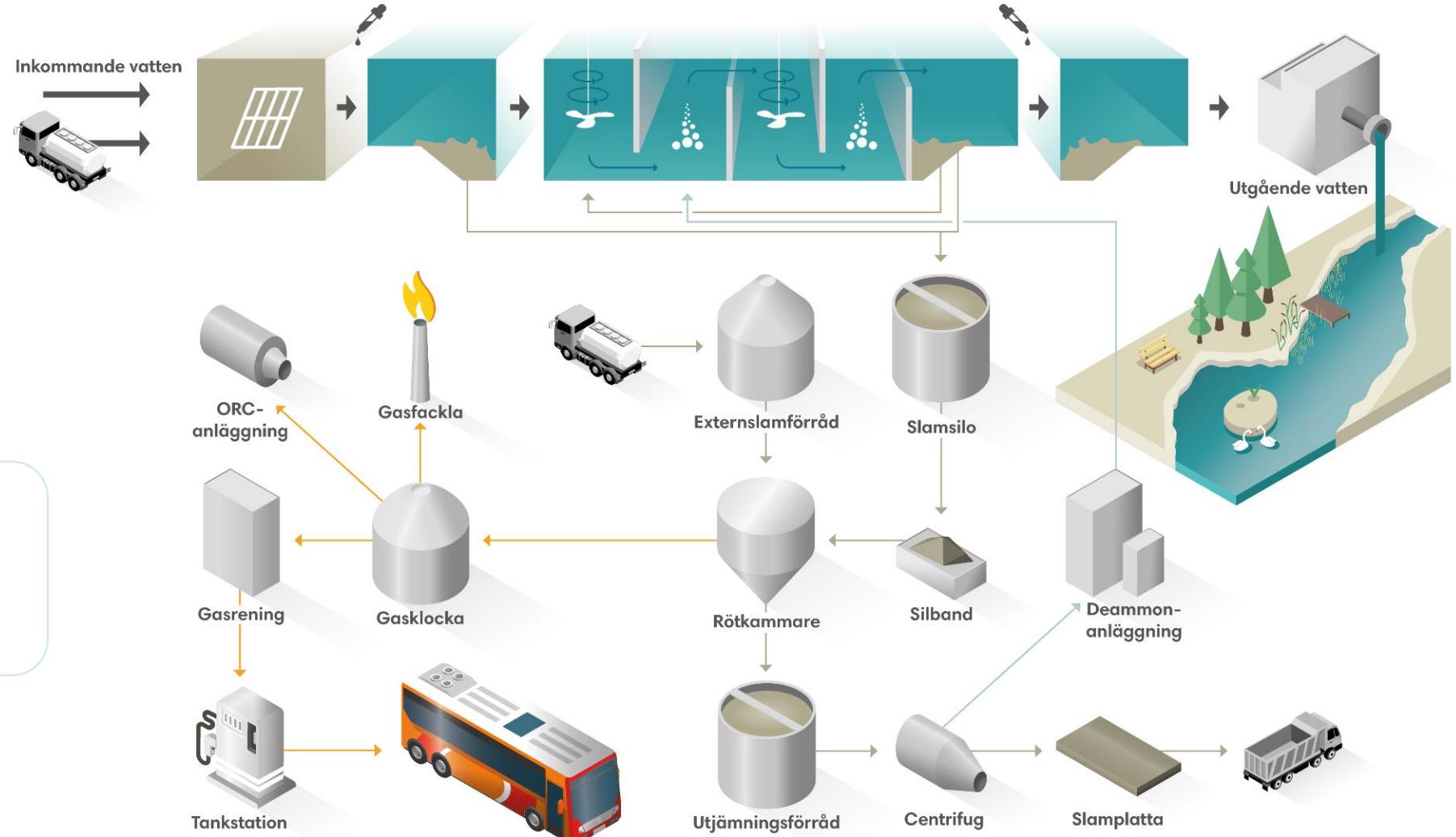


NODRA

Slottshagen WWTP

200 000 pe
2021: 166 000 pe
Future: 250 000 pe

Effluent requirements
Tot-P: 0.3 mg/L
Tot-N: 10 mg/L
BOD₇: 10 mg/L

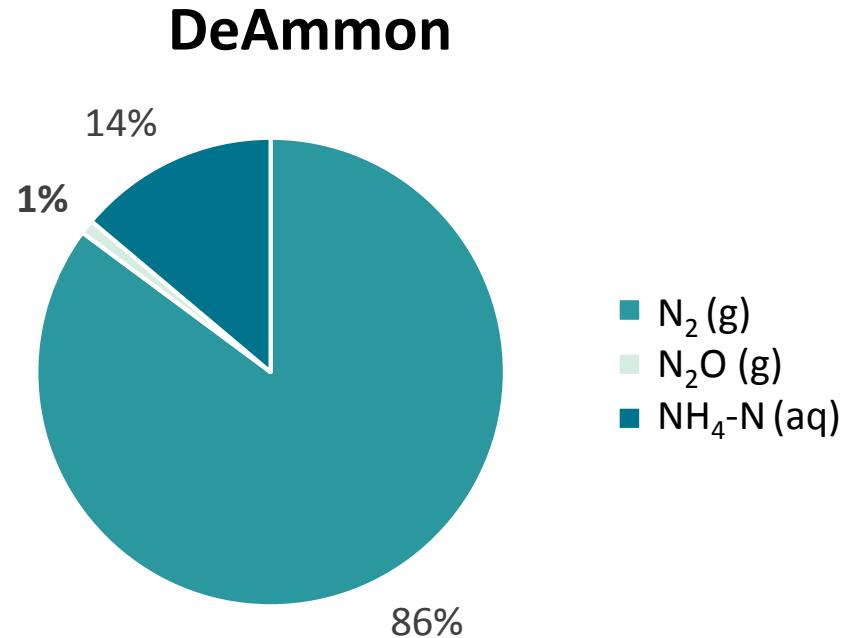
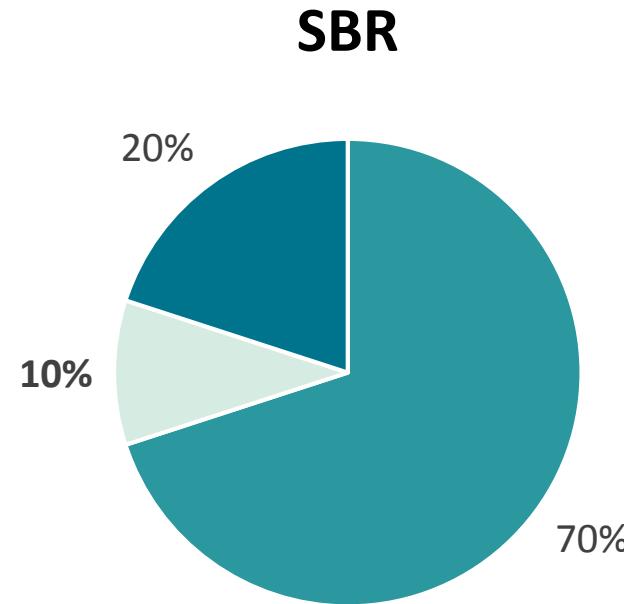


Reject water treatment - DeAmmon



- Operational from 2018
- Deammonification process with MBBR
- Intermittent aeration
- Reactor volume 1 000 m³

From SBR to DeAmmon: Minimizing Nitrous oxide (N_2O) emissions



Measurements from 2018

Reject water treatment - DeAmmon



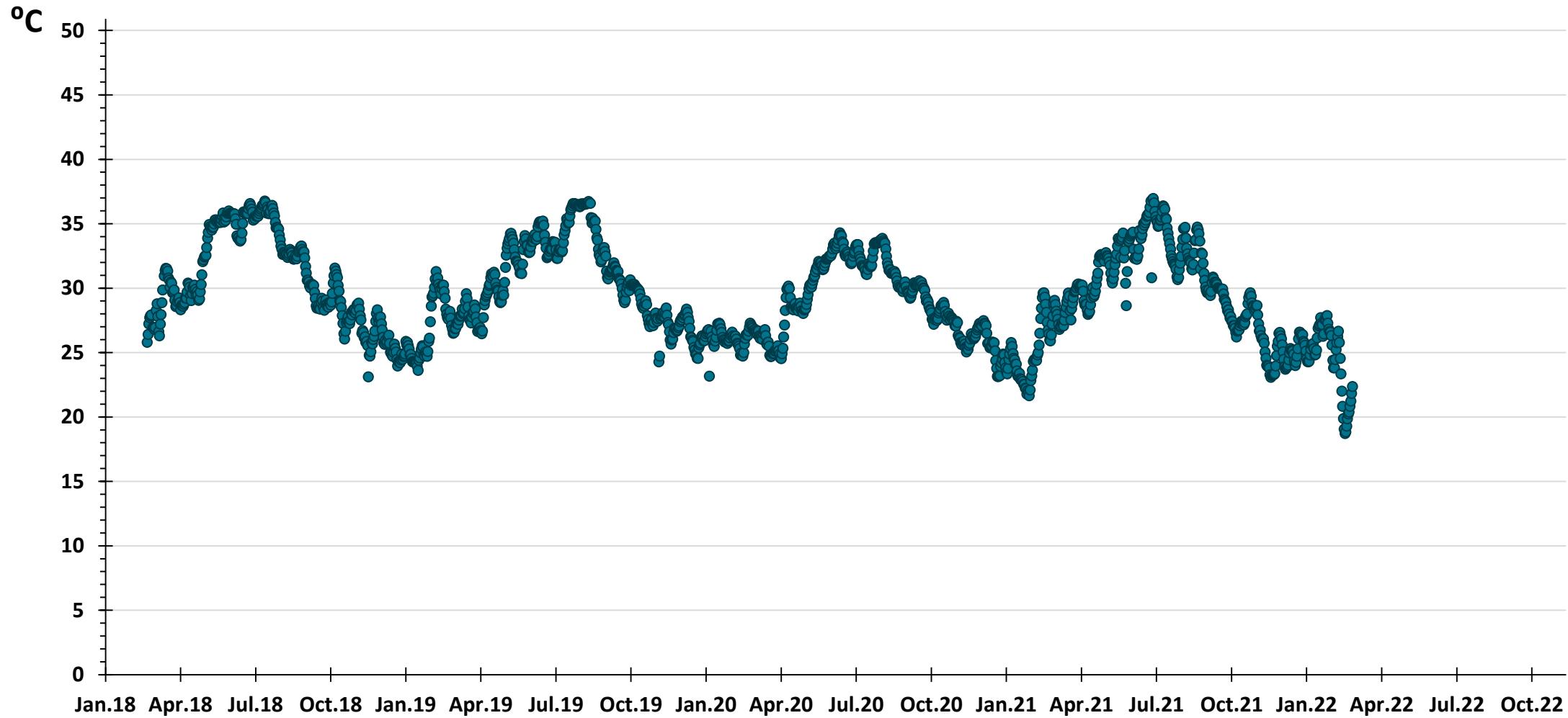
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Operational goals

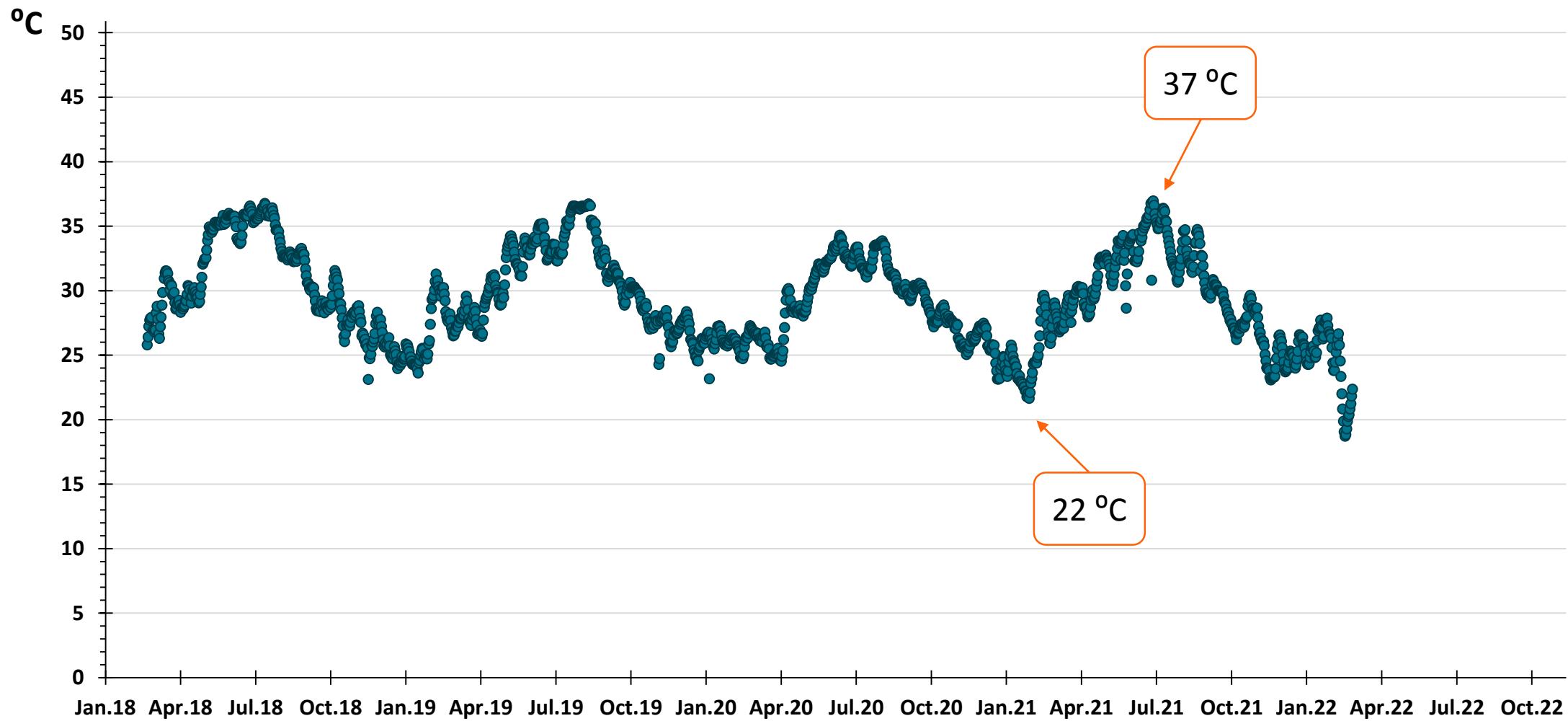
NH₄-N reduction: > 70%
Energy: < 2.5 kWh/m³

How did it go?...

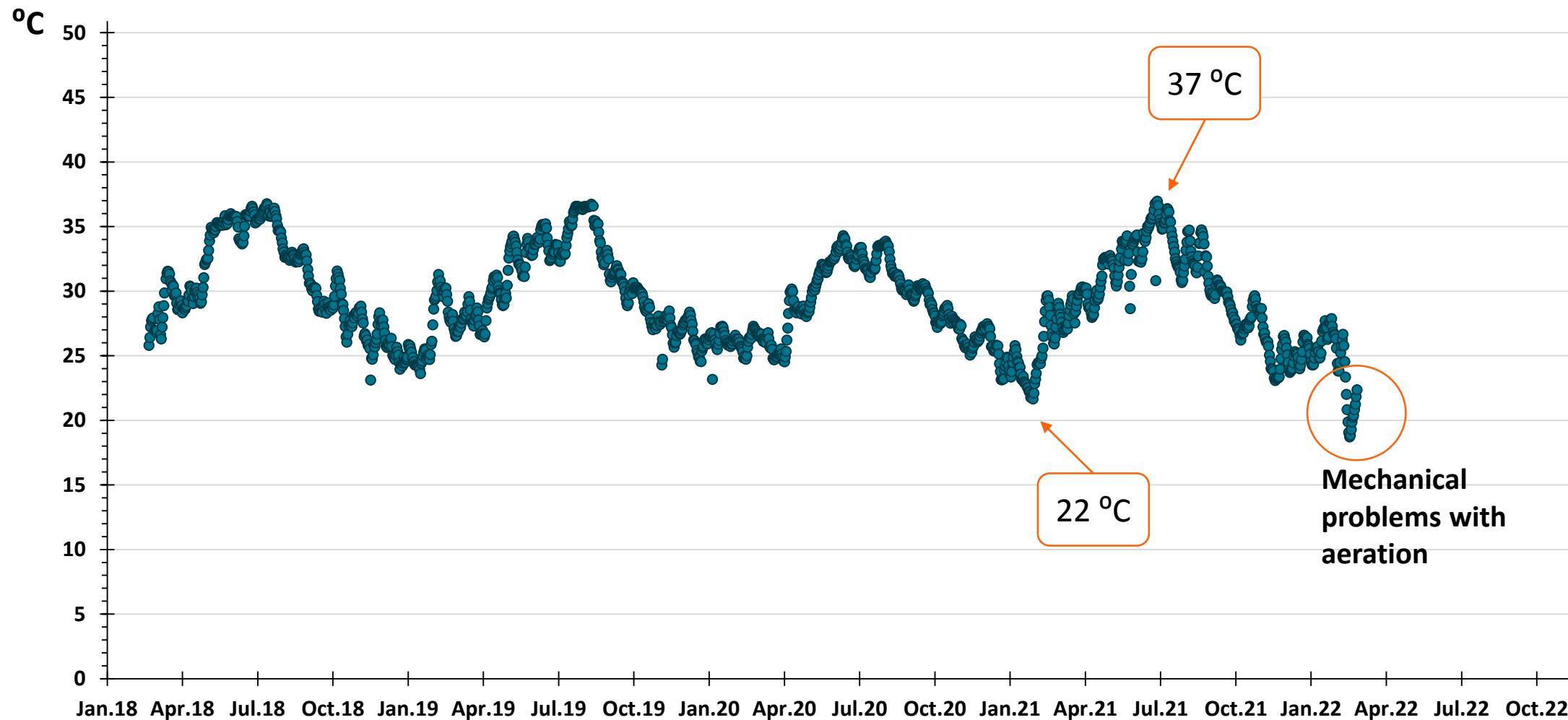
Temperature in reactor



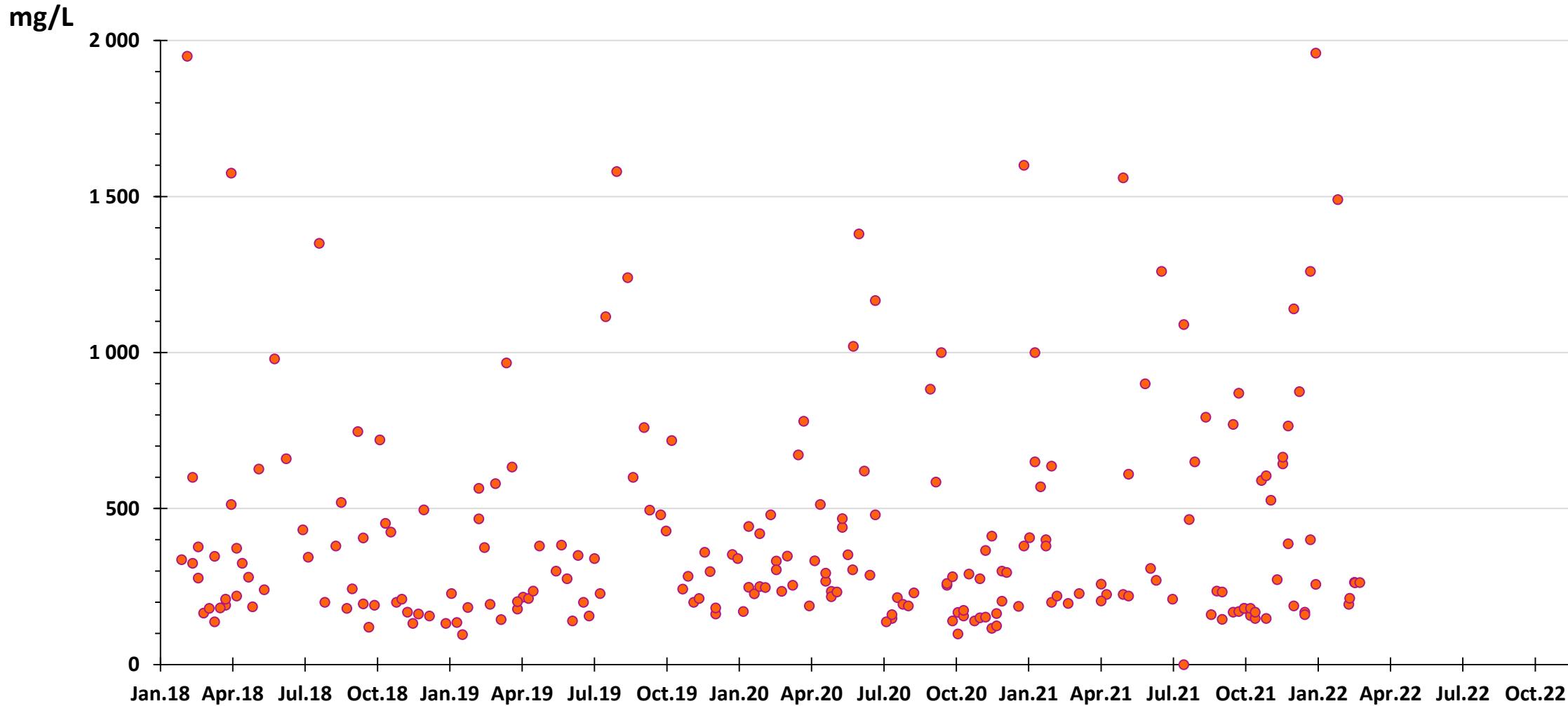
Temperature in reactor



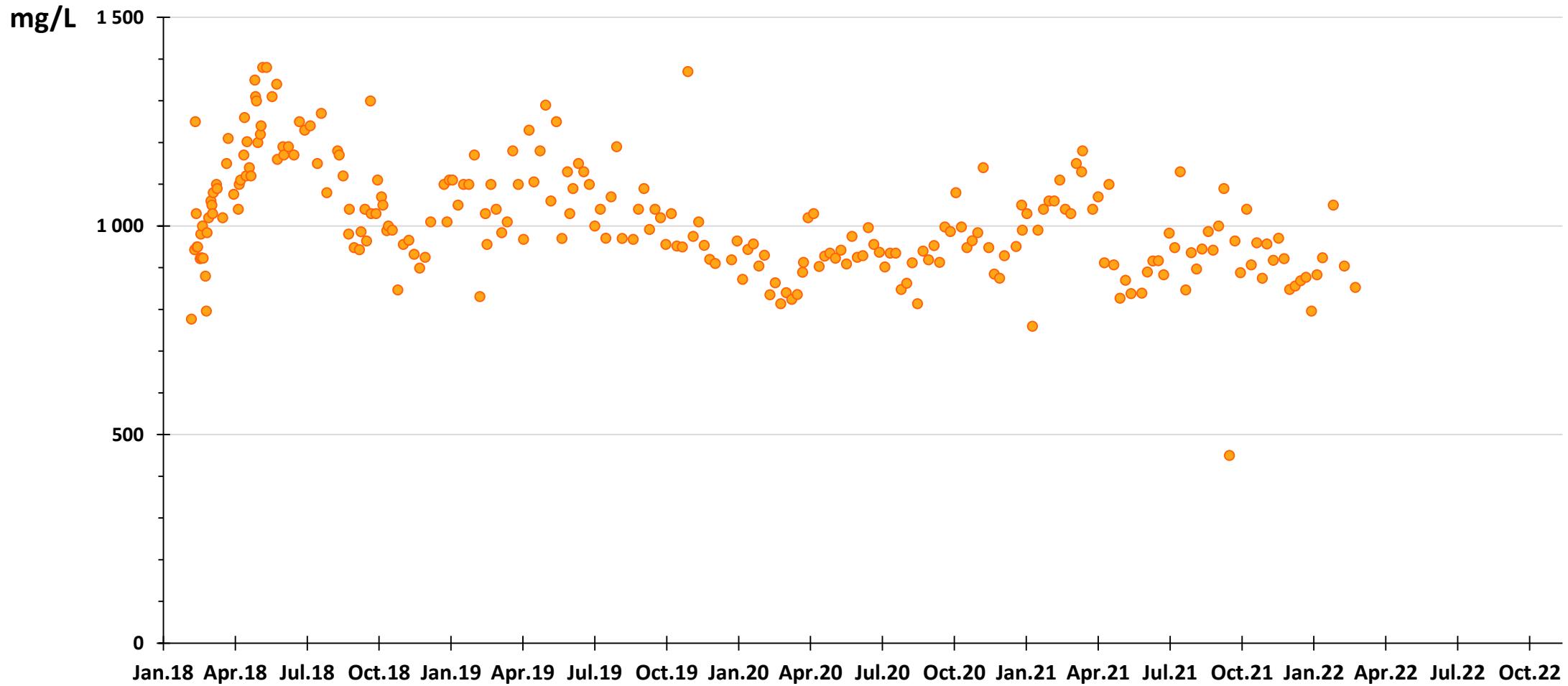
Temperature in reactor



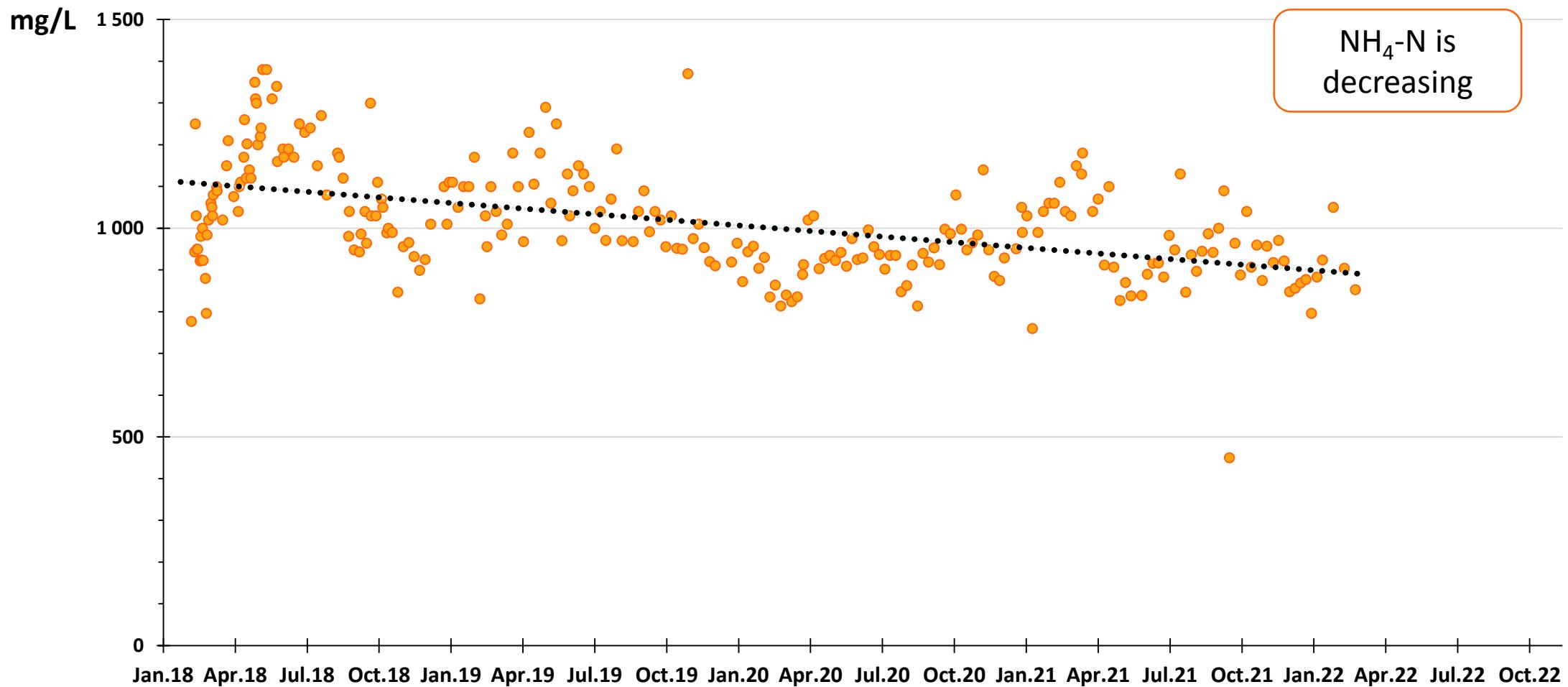
Suspended solids (SS) in reject water



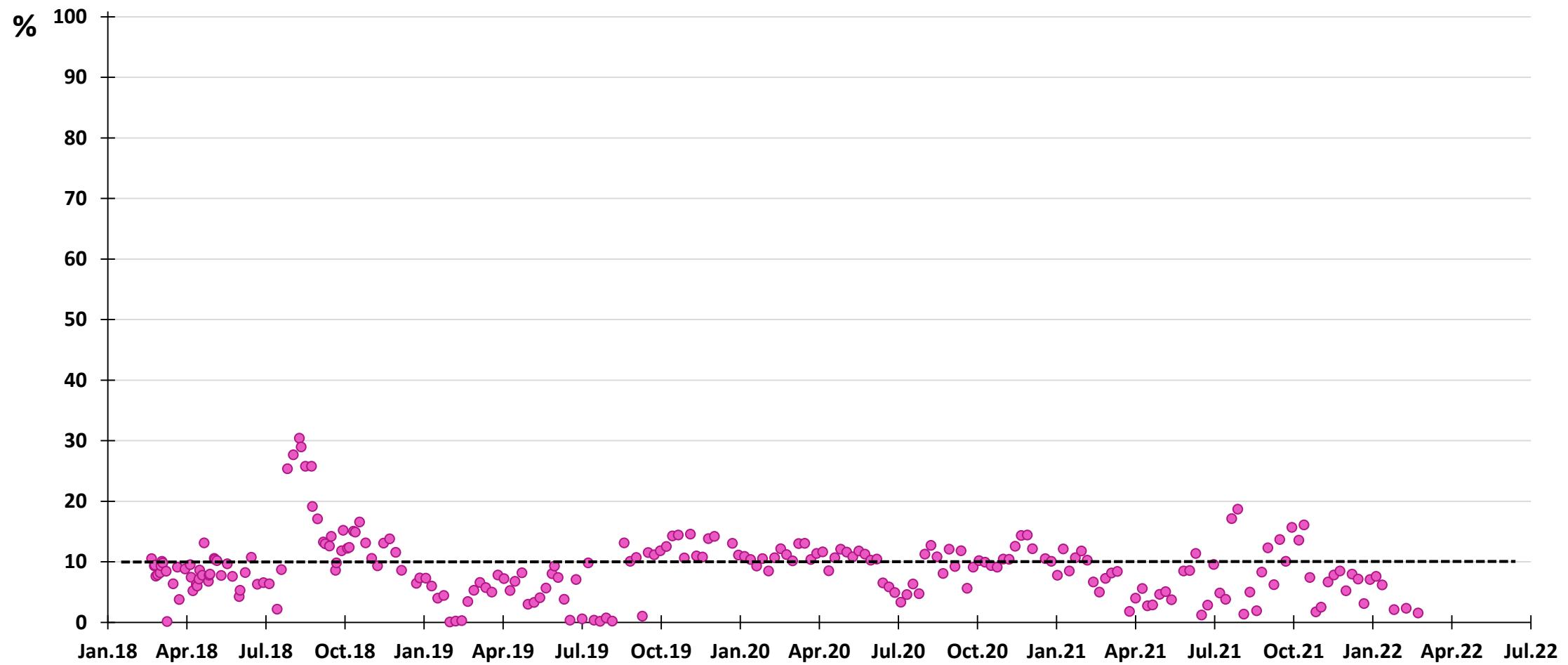
Ammonium in reject water ($\text{NH}_4\text{-N}$)



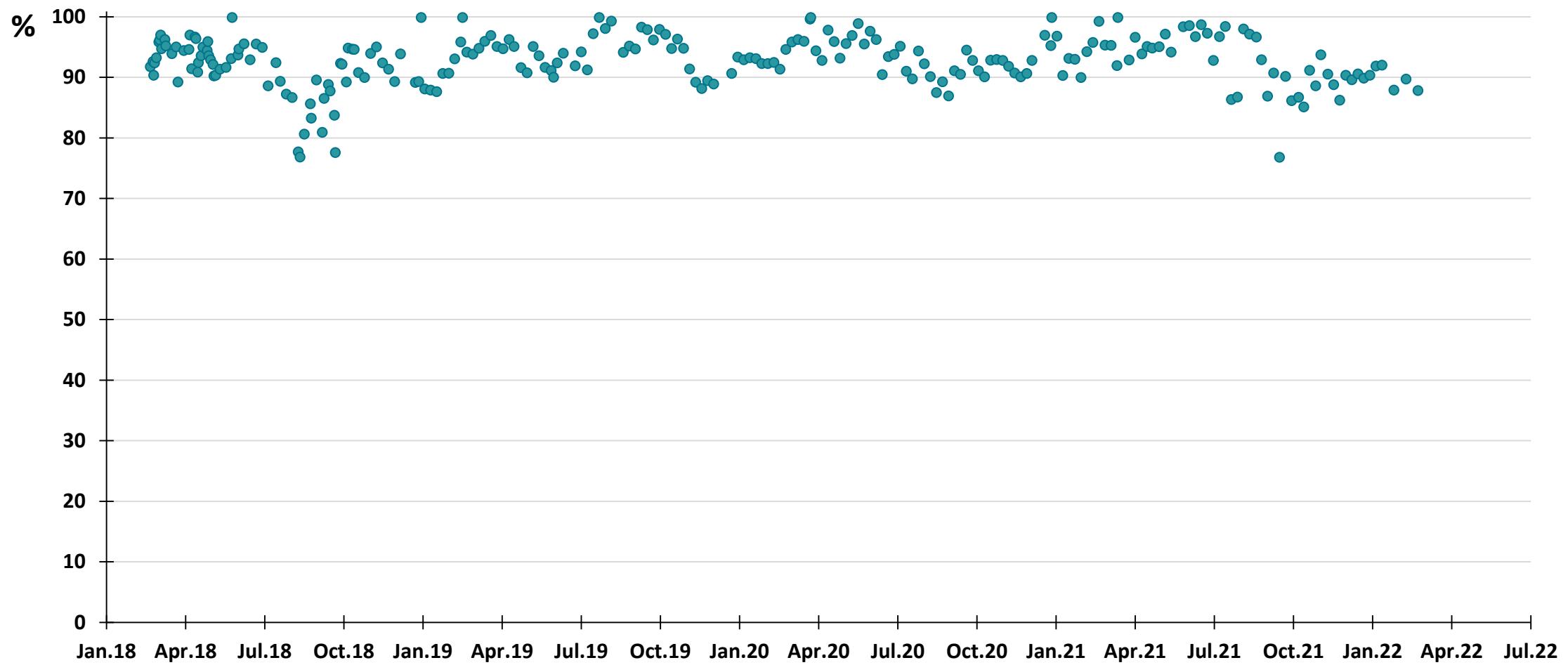
Ammonium in reject water ($\text{NH}_4\text{-N}$)



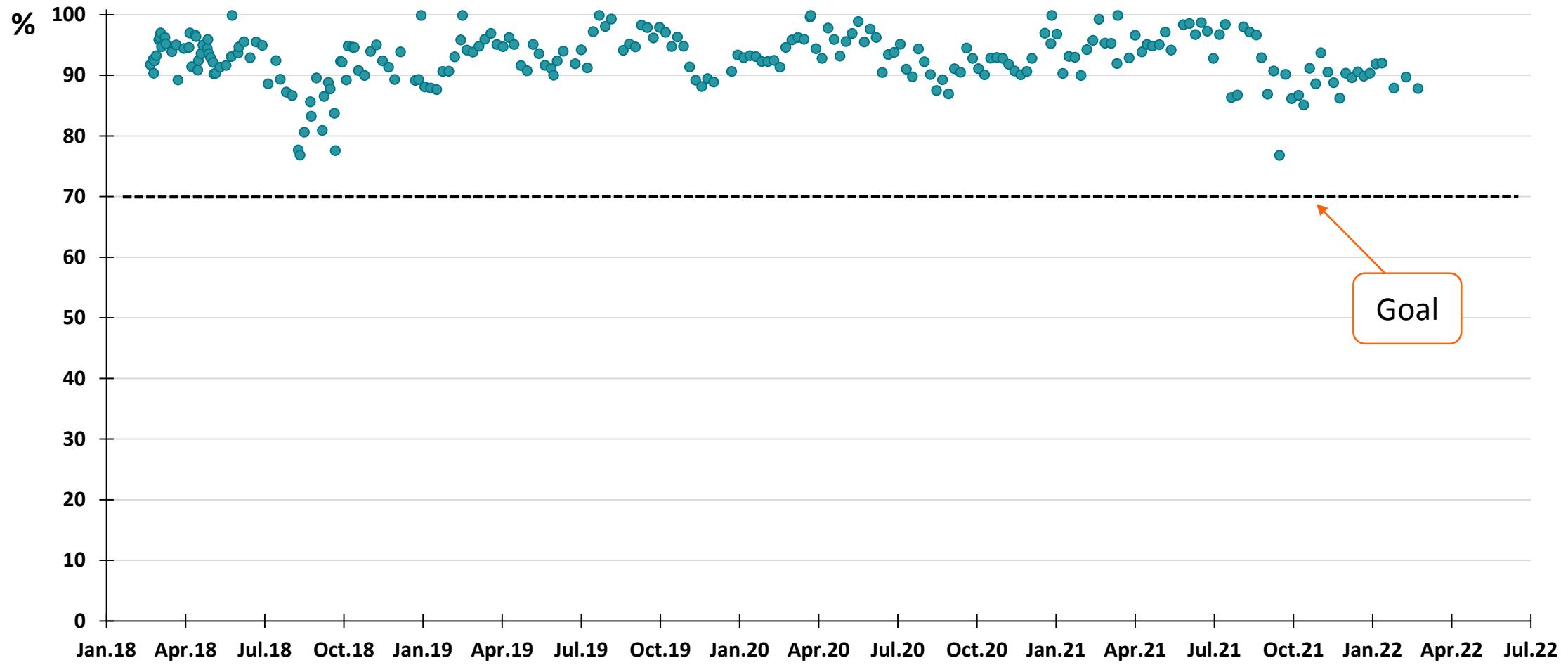
Nitrate formation ($\text{NO}_3\text{-N}_{\text{out}}/\text{NH}_4\text{-N}_{\text{in}}$)



Degree of reduction NH₄-N

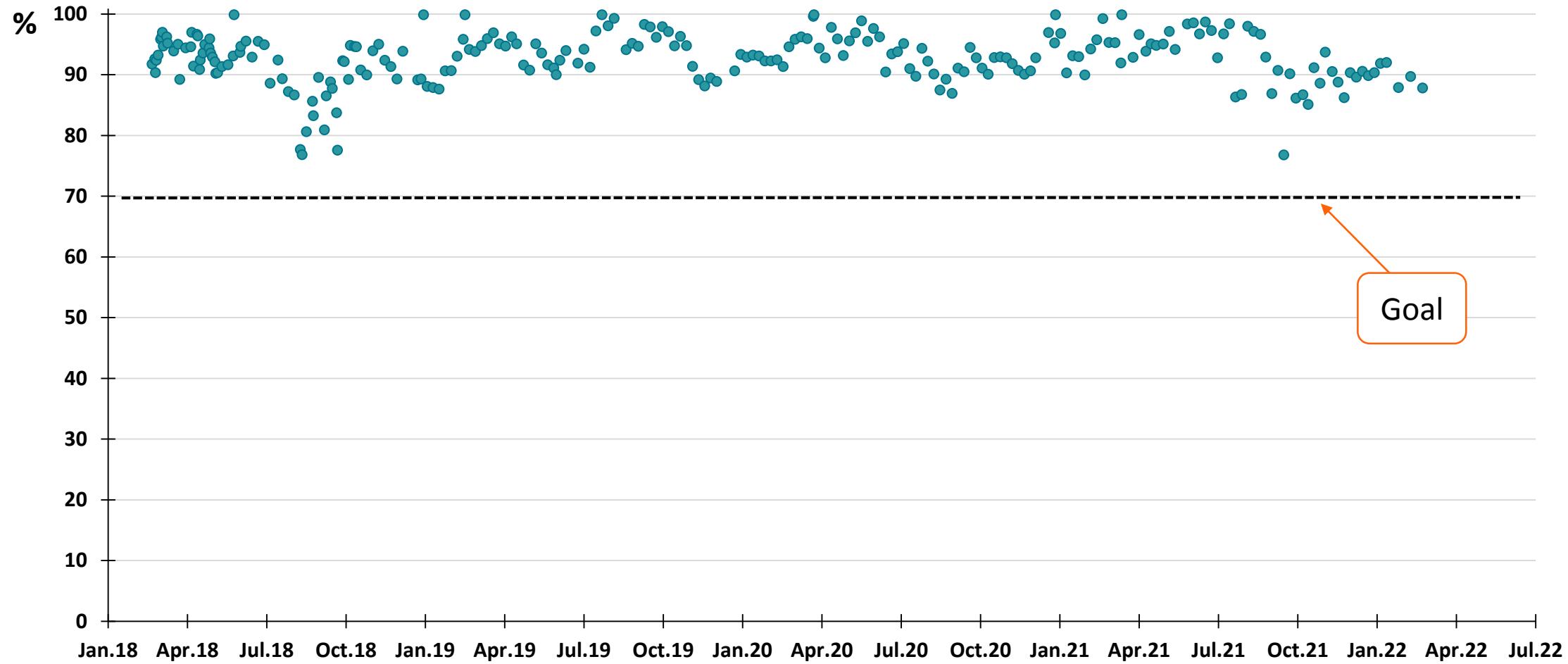


Degree of reduction NH4-N



Degree of reduction NH4-N

Year	Reduction NH4-N [%]
2018	91
2019	94
2020	93
2021	93
2022	89



Energy

Year	Energy [kWh/NH ₄ -N _{red}]	Energy [kWh/m ³]
2018	1.7	1.8
2019	1.6	1.7
2020	1.7	1.6
2021	2.1	2.0

Energy

Goal < 2.5 kWh/m³

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Summary

- Operationally stable
 - variations in reject water
 - nitrate formation

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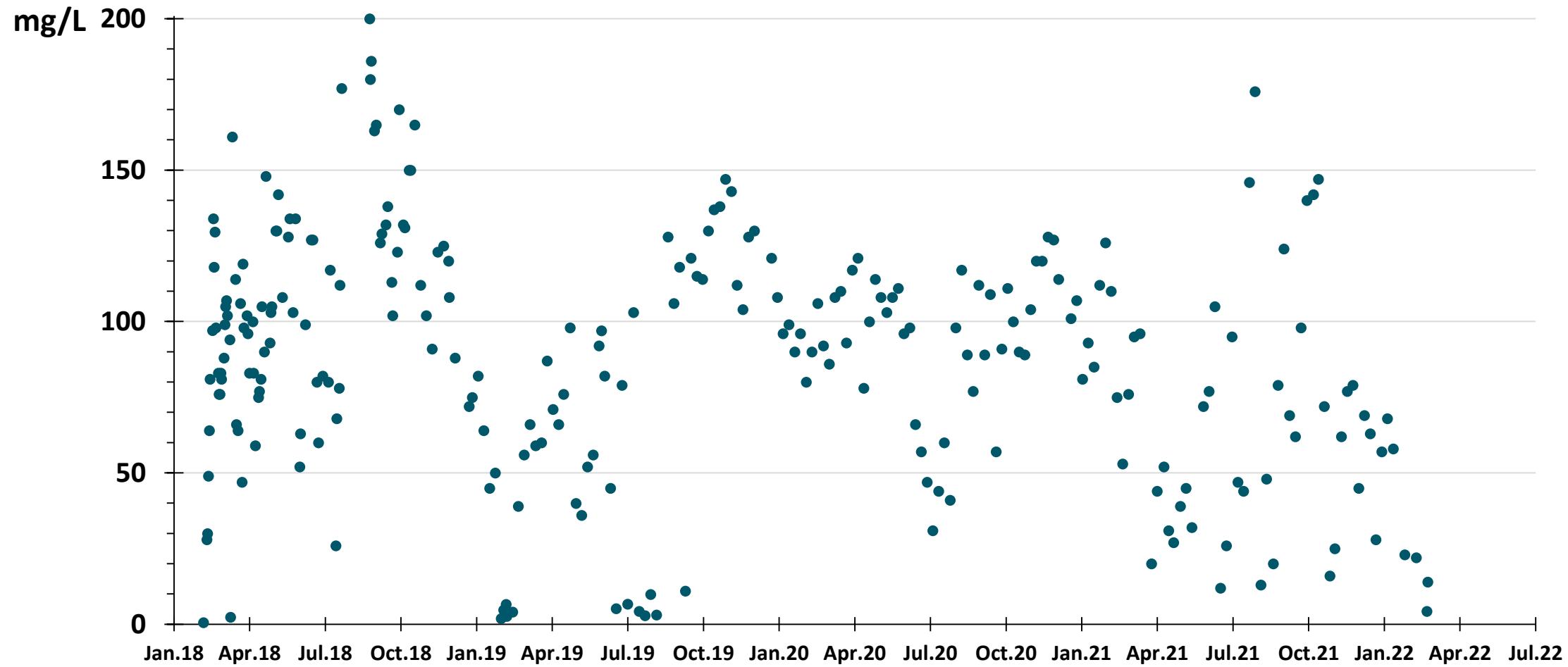
→ The capacity is 2x bigger than the load



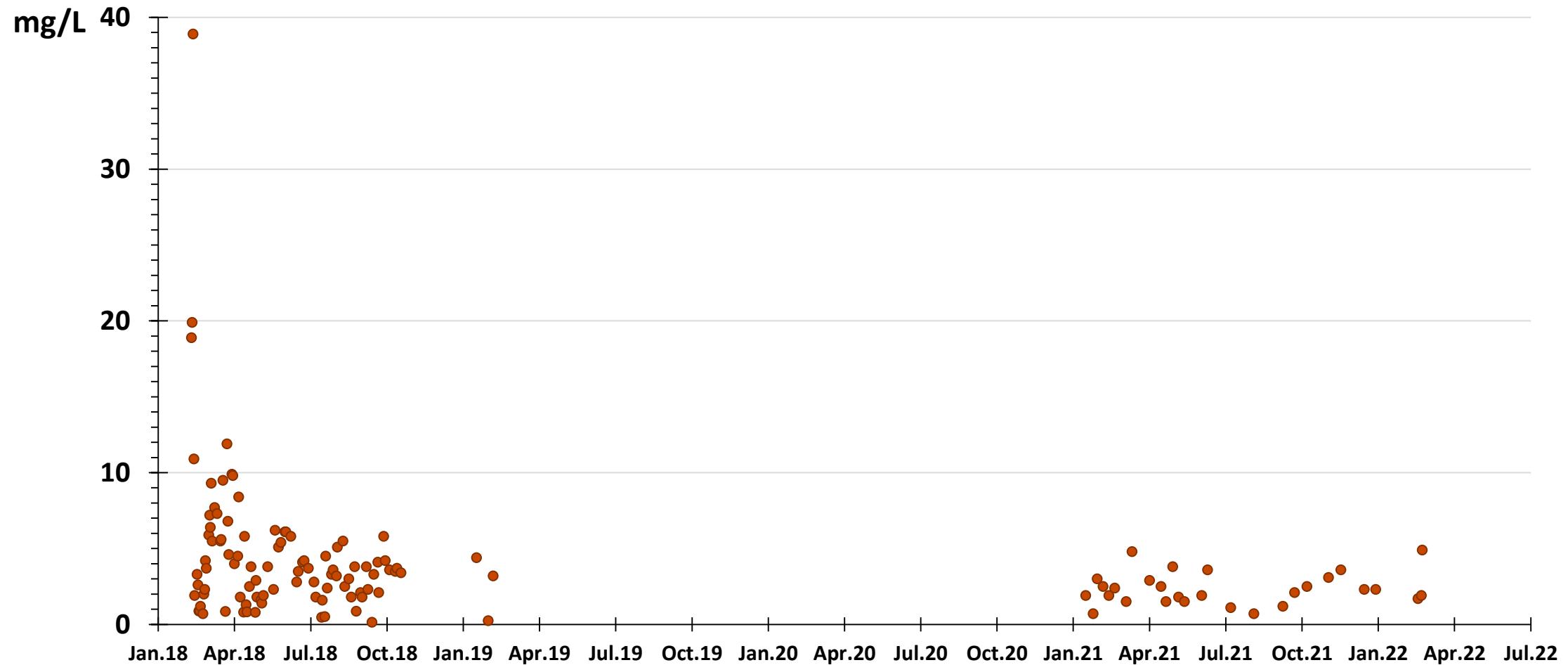
NODRA

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Nitrate NO₃-N mg/L



Nitrite NO₂-N mg/L



Load

Year	Load [kg NH4 /day]
2018	210
2019	220
2020	200
2021	180
Capacity	520

- pH: 7.1 – 7.2