

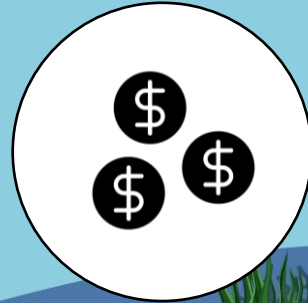
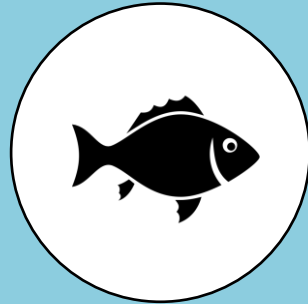
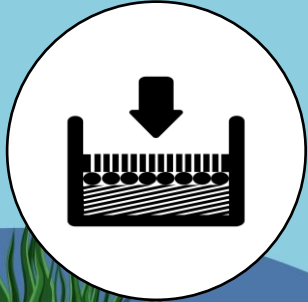
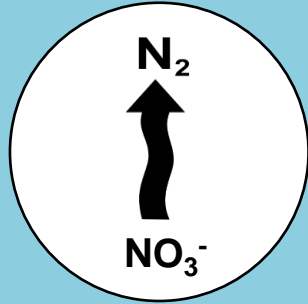


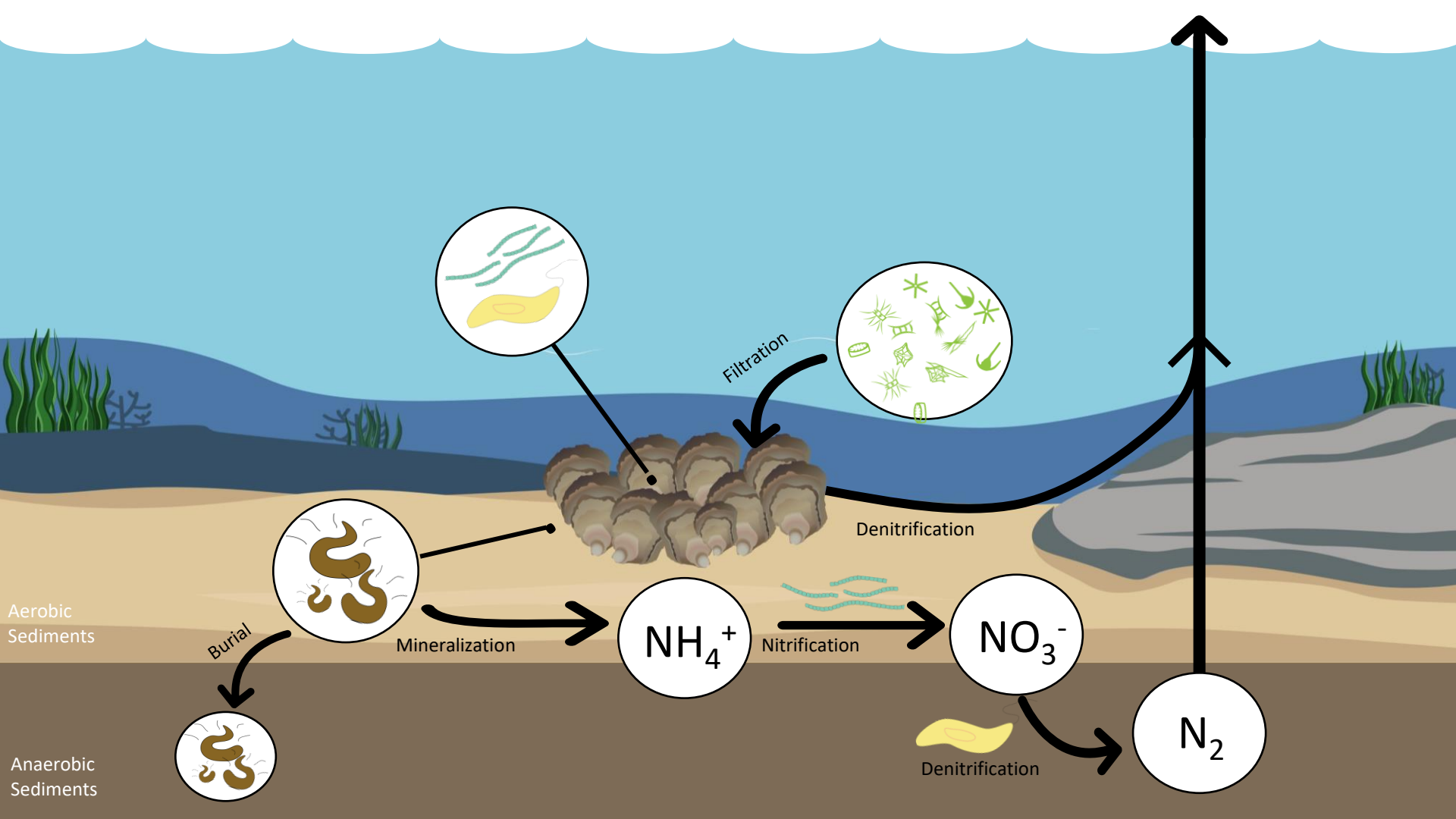
# OYSTER REEFS AS A BIOREMEDIATION TOOL

ITRS 2023 - Hobart

**Giulia Filippini**<sup>1</sup>, A. Bugnot<sup>2,3</sup>, J. Palmer<sup>1</sup>, K. Erickson<sup>4</sup>, A. Ferguson<sup>5</sup>, R. Coleman<sup>2</sup>, P. Gribben<sup>4,6</sup>, N. Siboni<sup>7</sup>, D. Varkey<sup>1</sup>, K. Dafforn<sup>1,6</sup>











# Oyster restoration



Sediment characteristics

Temperature

Nutrients

Oxygen

Others

Environmental factors

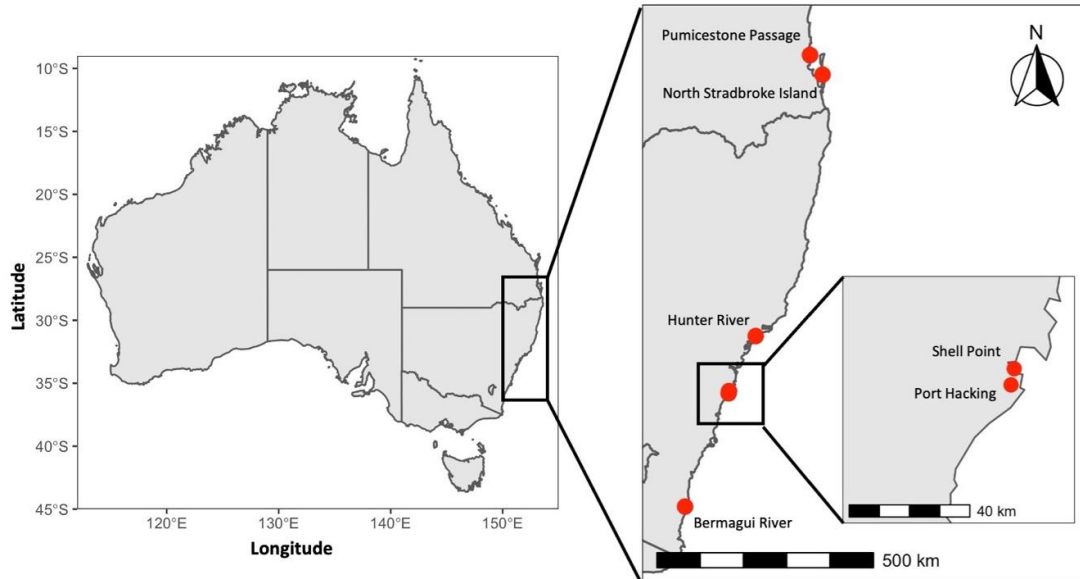
Nitrogen removal



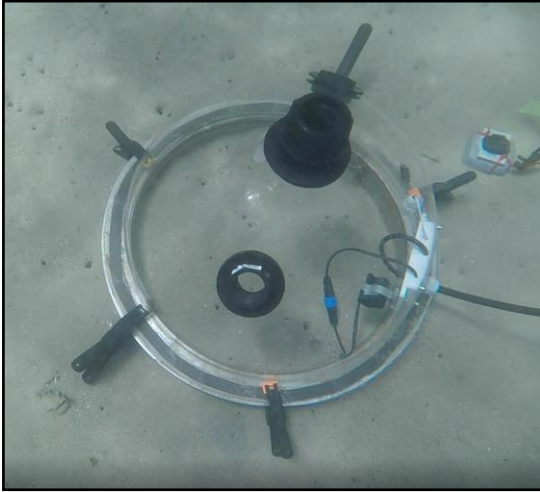
# Aim



Investigate **denitrification** ( $N_2$  fluxes and gene abundances) occurring on and around six remanent Australian oyster reefs with **different environmental characteristics**



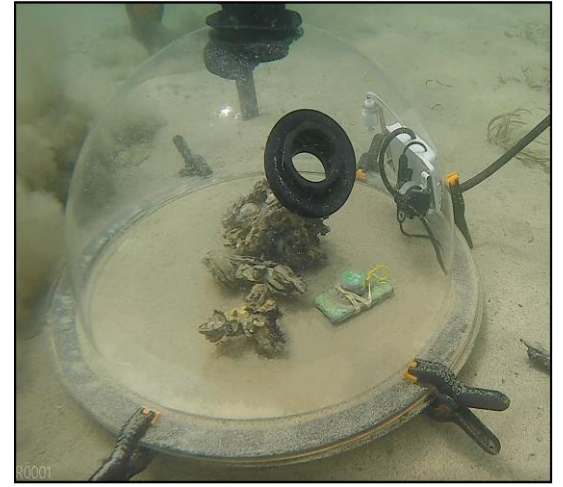
# Method



Sediments  
(n = 5)



Sediments + Oysters  
(n = 5)



Oysters  
(n = 5)



## Membrane Inlet Mass Spectrometer MIMS

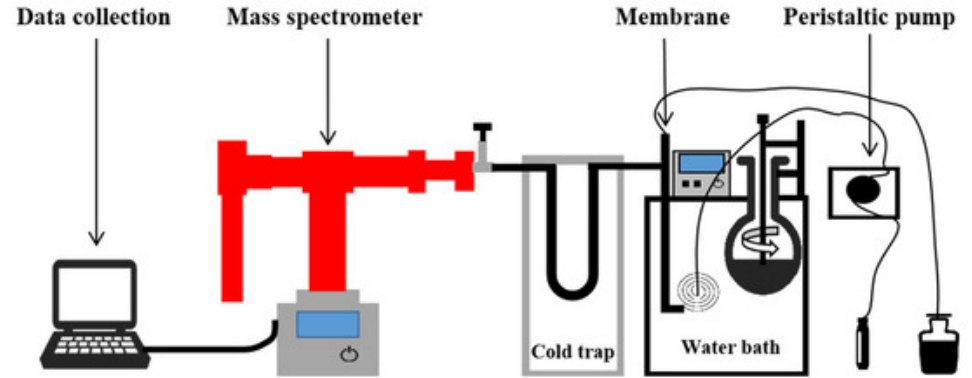


Illustration from Zhao *et al.*, 2021. *Water*.

# Method



Sediments

Sediments + Oysters

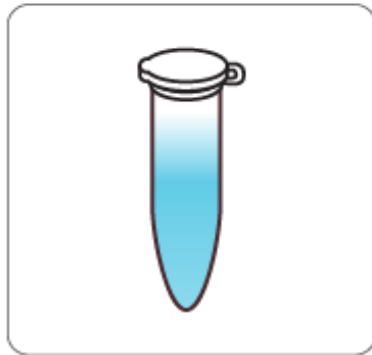
Oysters



Sediment samples



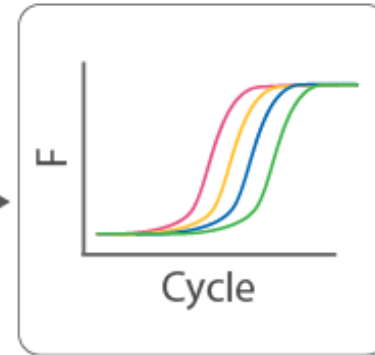
Biofilm samples



DNA Extraction

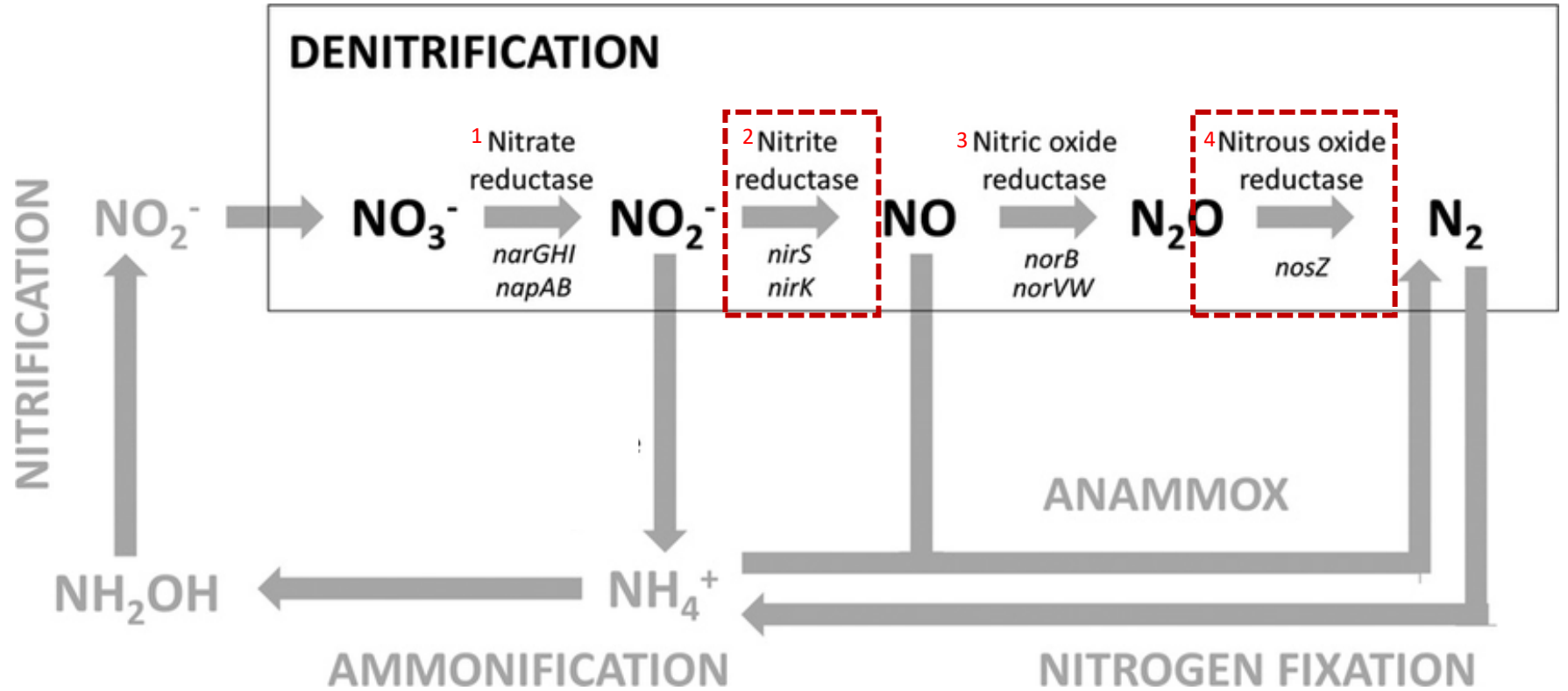


Quantitative PCR

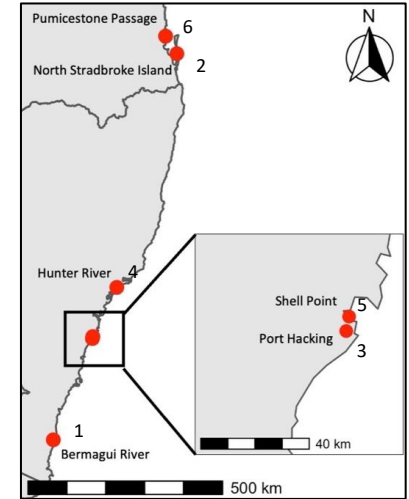
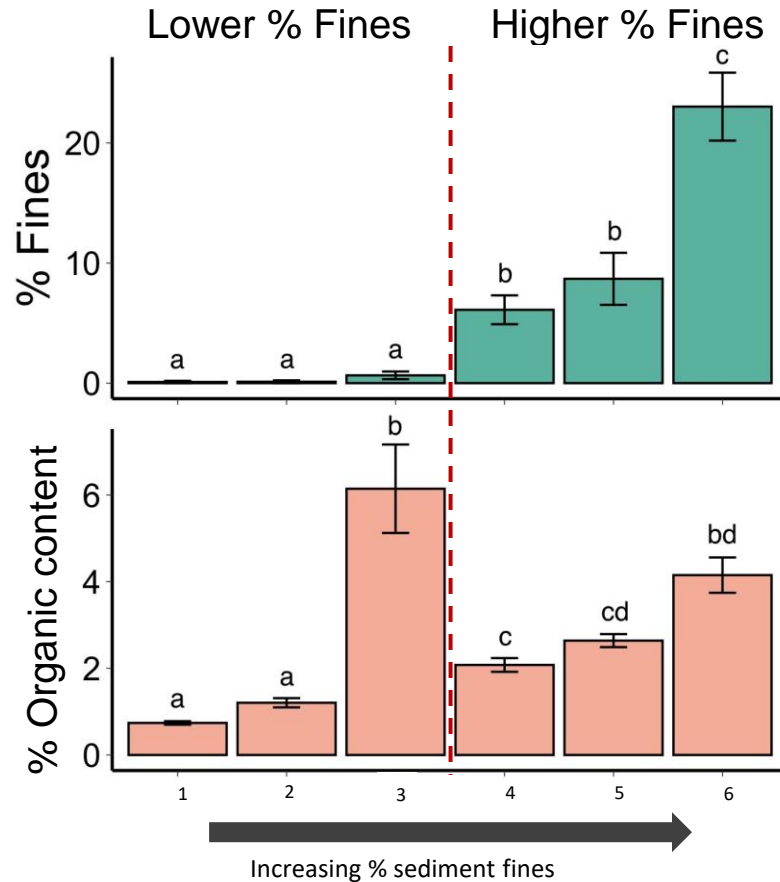


Data analysis

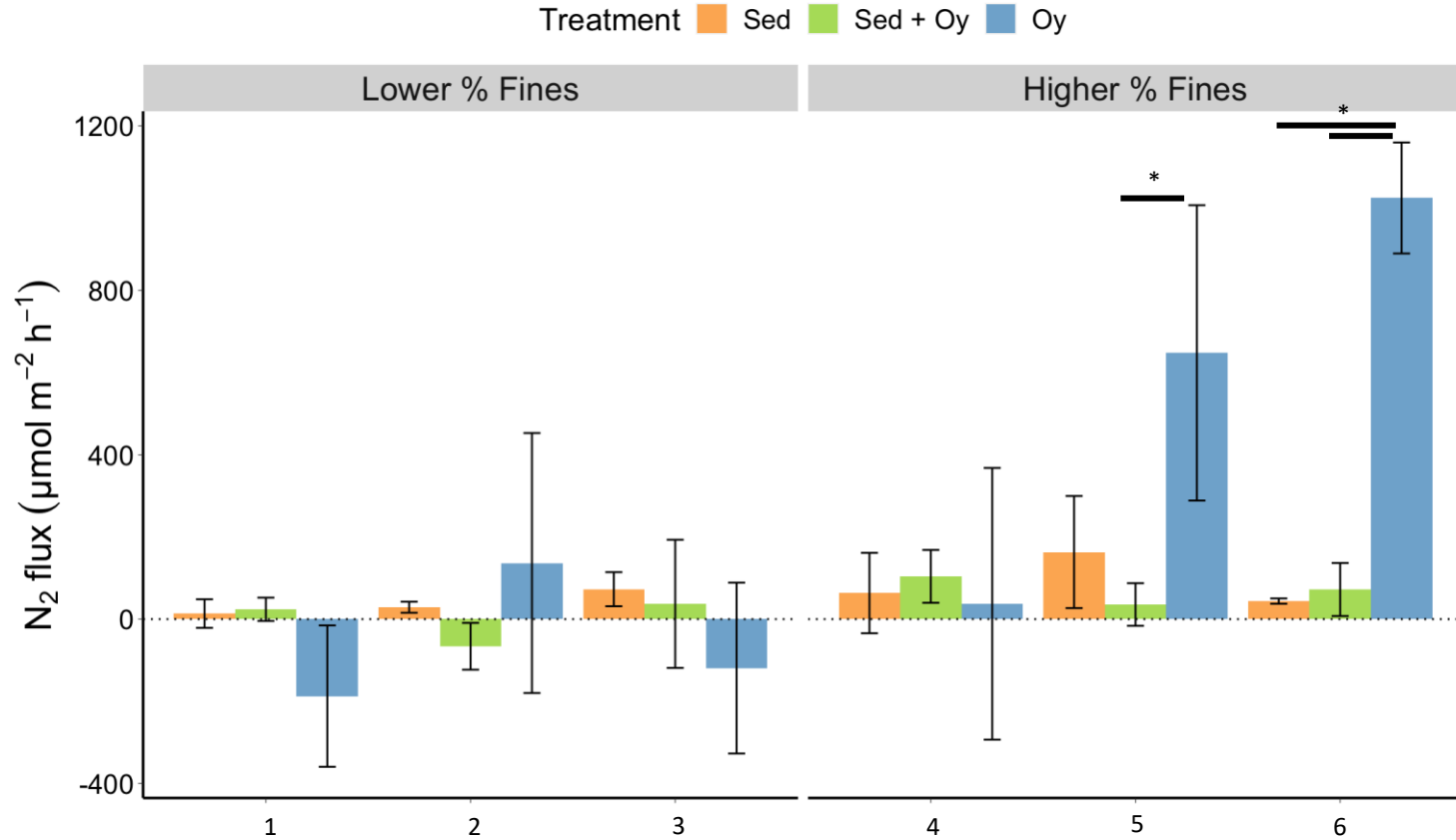
# Method



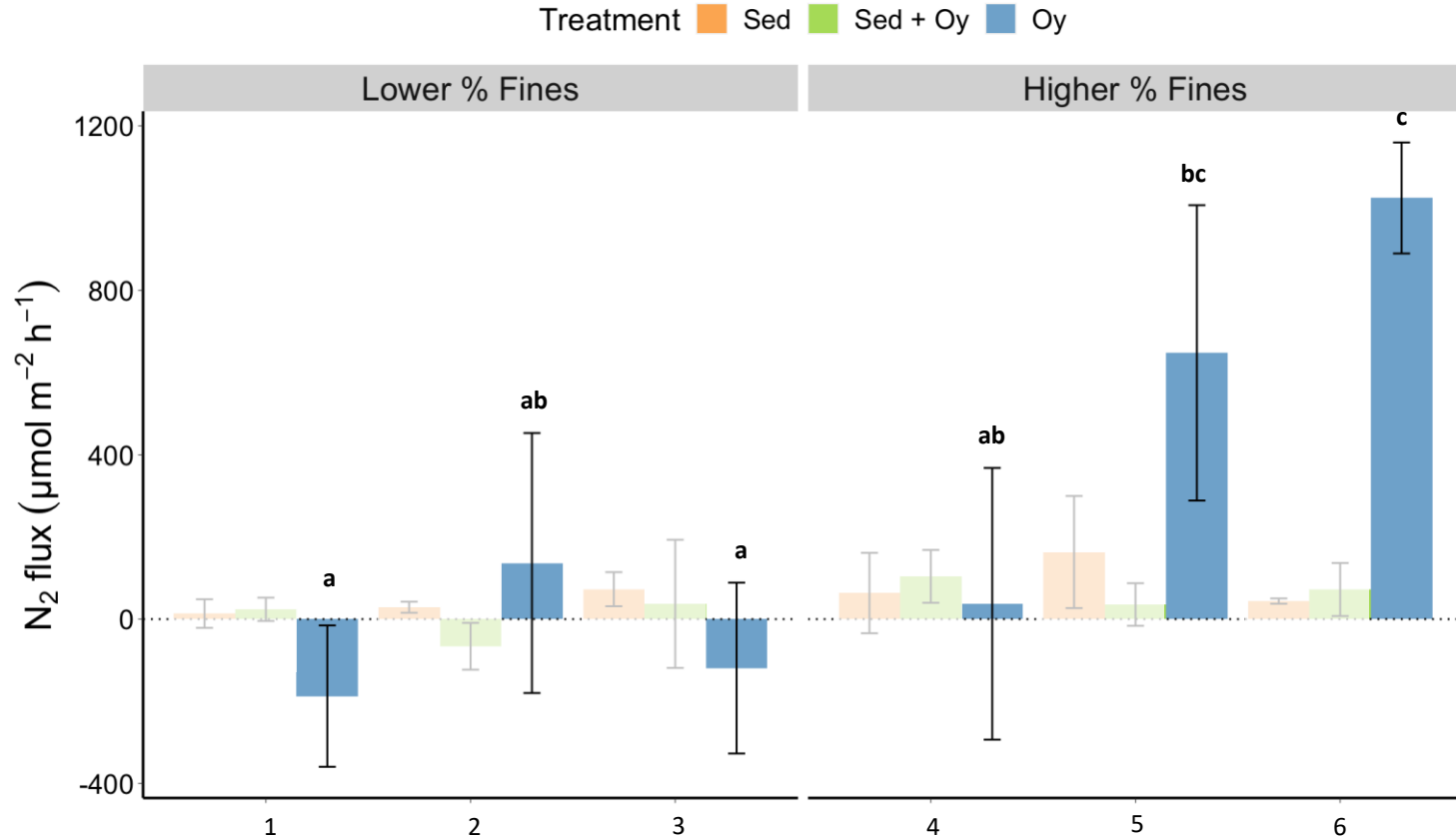
# Results & Discussion



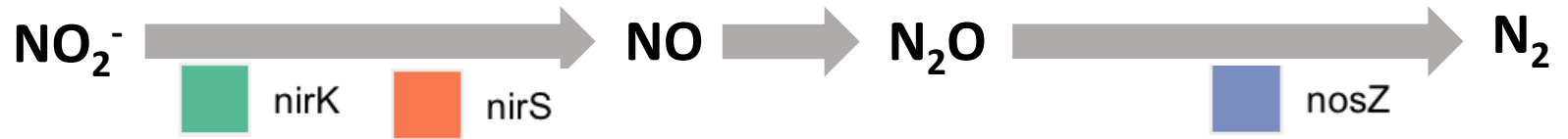
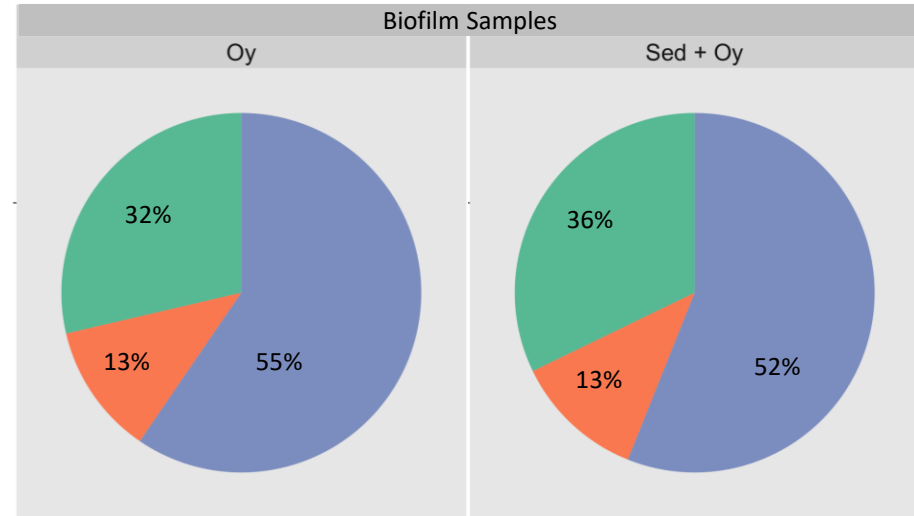
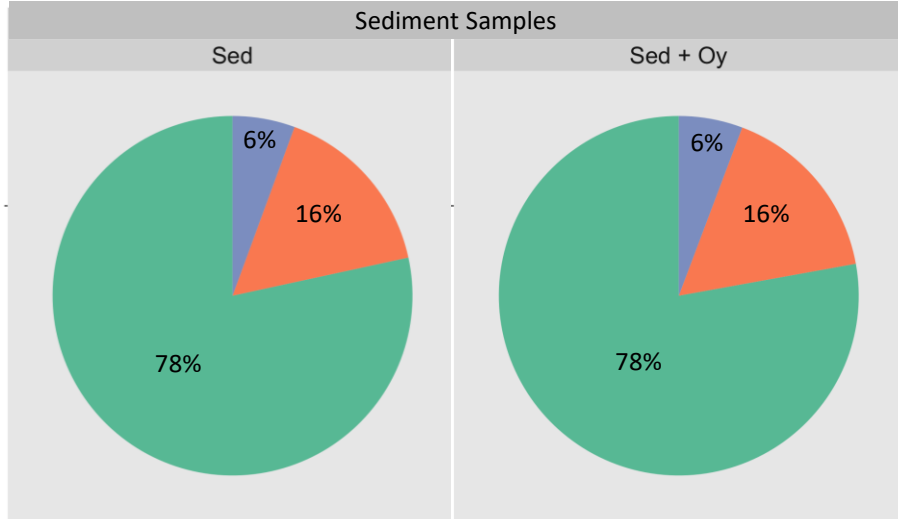
# Results & Discussion



# Results & Discussion



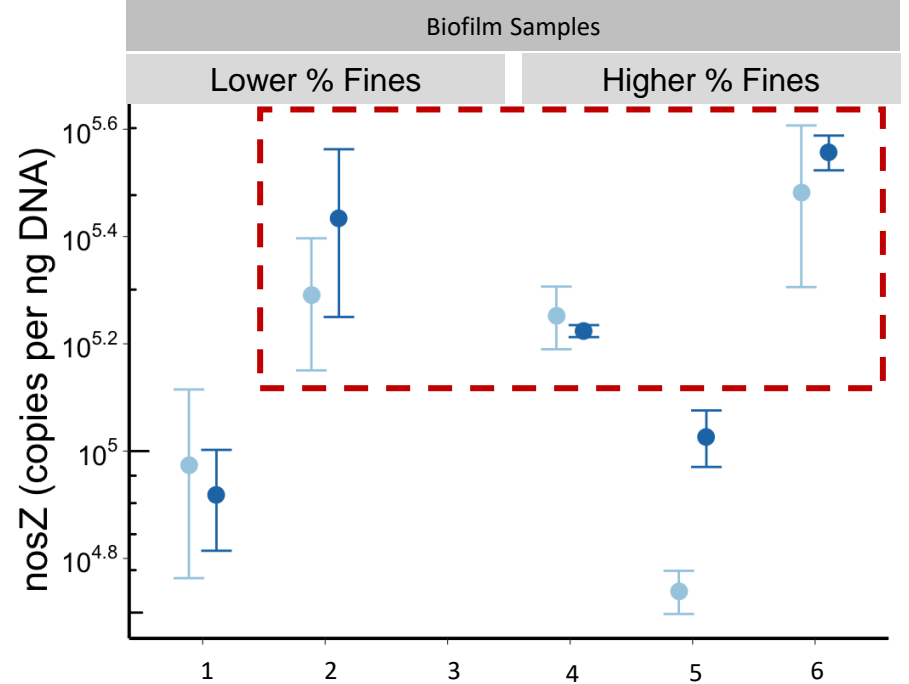
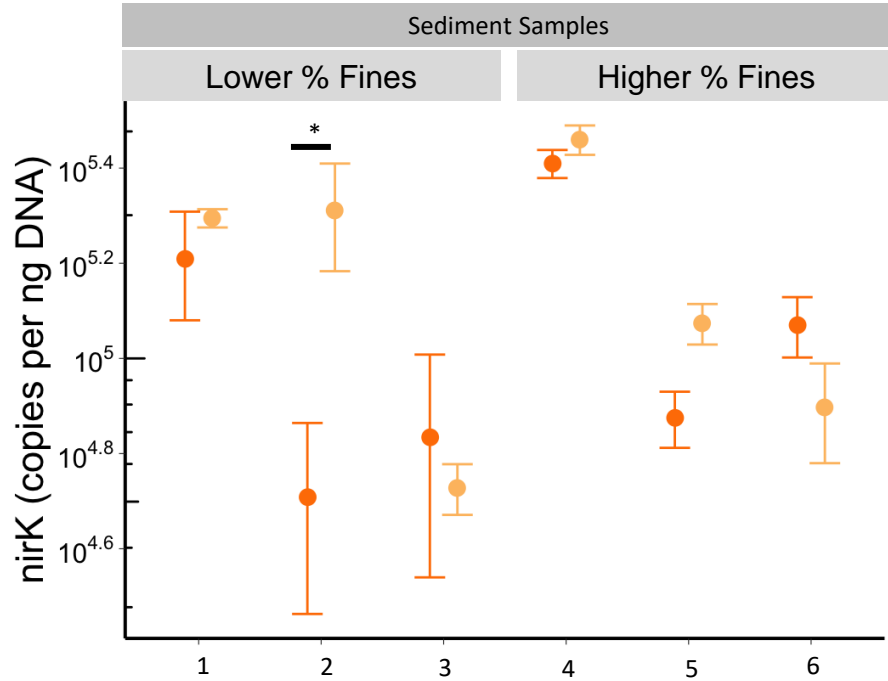
# Results & Discussion



# Results & Discussion







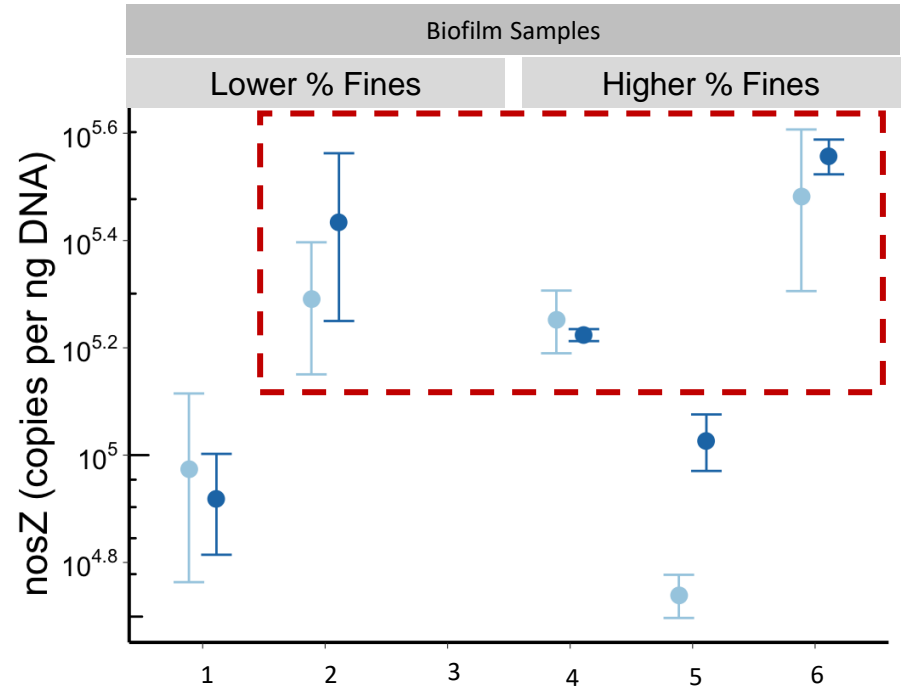
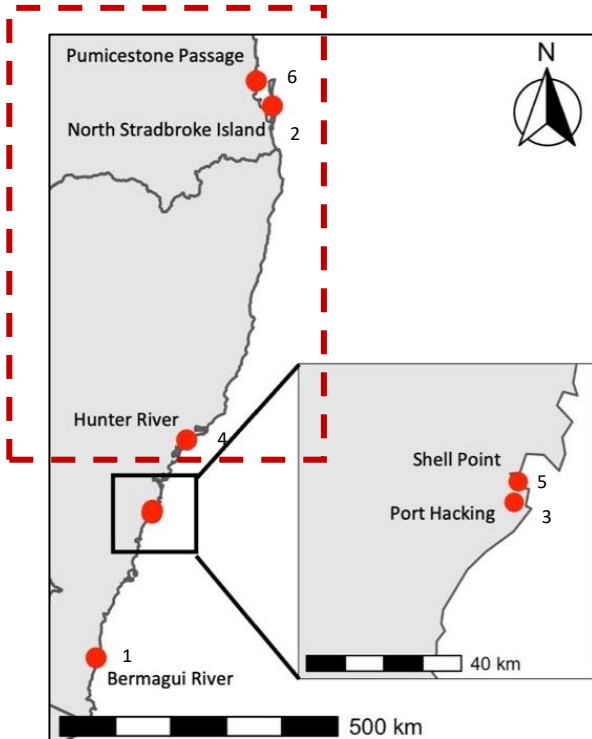
Treatment ● Sed.Sed ● Sed + Oy.Sed ● Sed + Oy.Biof ● Oy.Biof



# Results & Discussion



Treatment  Sed.Sed  Sed + Oy.Sed  Sed + Oy.Biof  Oy.Biof



# Conclusion



Oyster reefs are important habitats for removing N from coastal and estuarine systems.

Oyster restoration in more northerly sandy sites characterised by high % sediment fines might improve denitrification outcomes.



Further research should include gene expression and genotype analysis.

# Acknowledgements



I would like to acknowledge and thank the Quandamooka, Djindubari, Awabakal, Worimi, Tharawal and Yuin people, Traditional Custodians of the lands on which this work was conducted. I pay my respects to their Elders past, present and emerging.

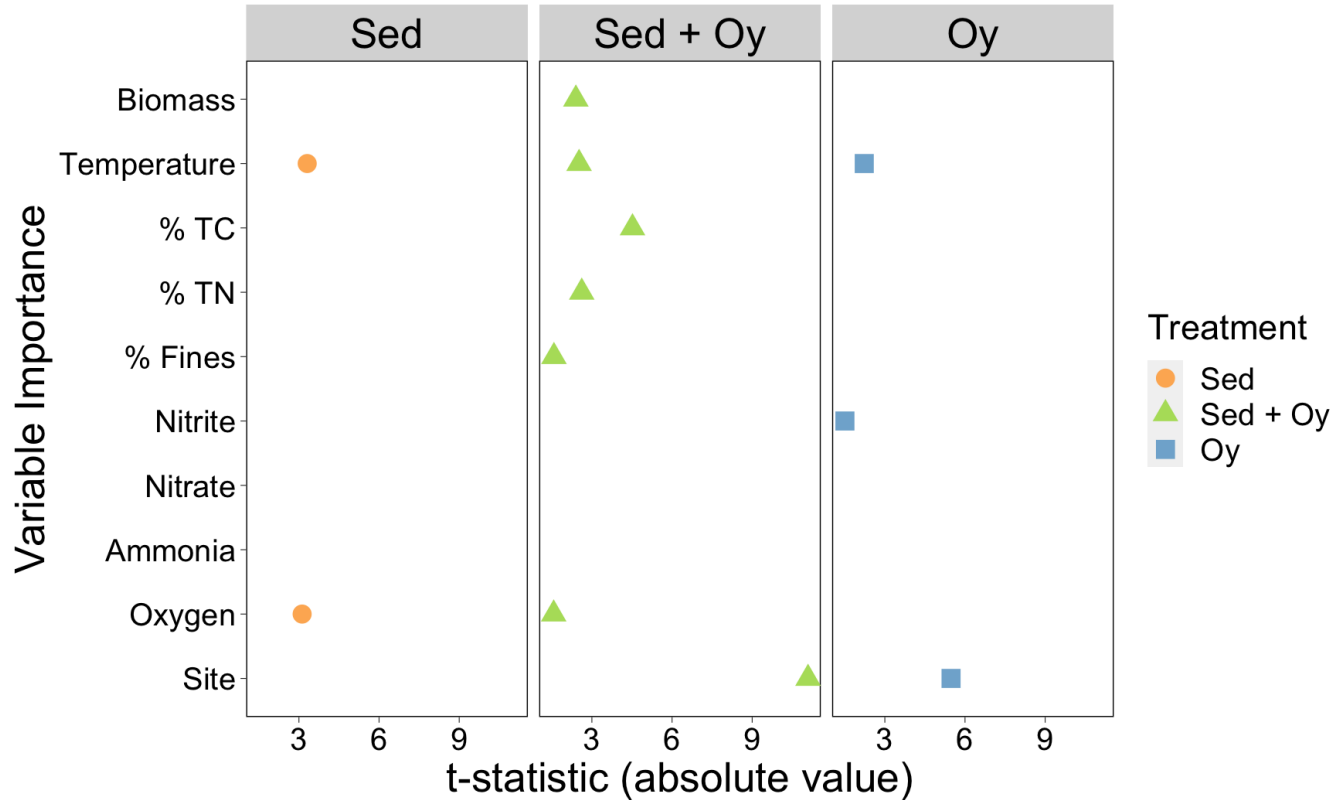
ARC linkage project LP 180100732

Malacological Society of London Student Award

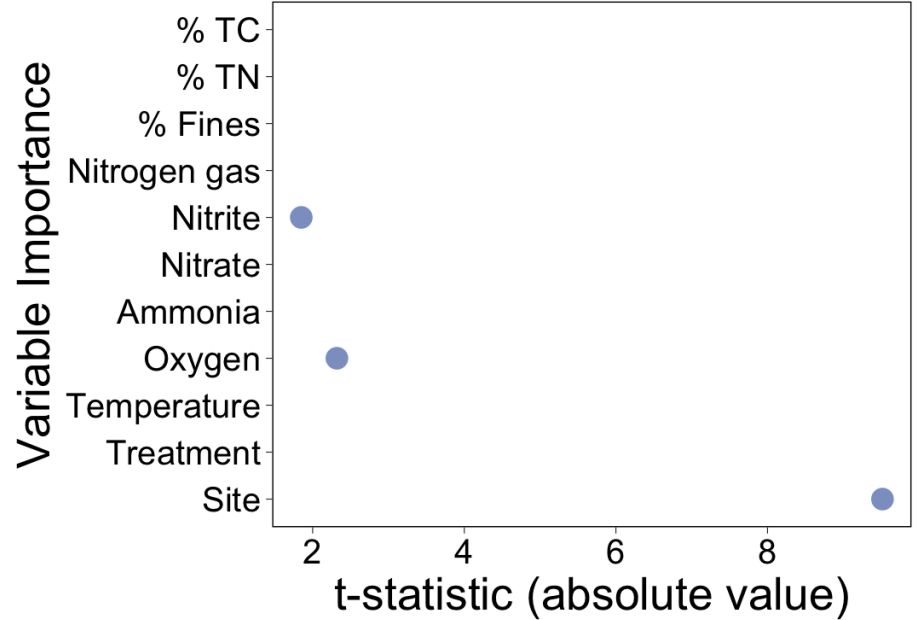
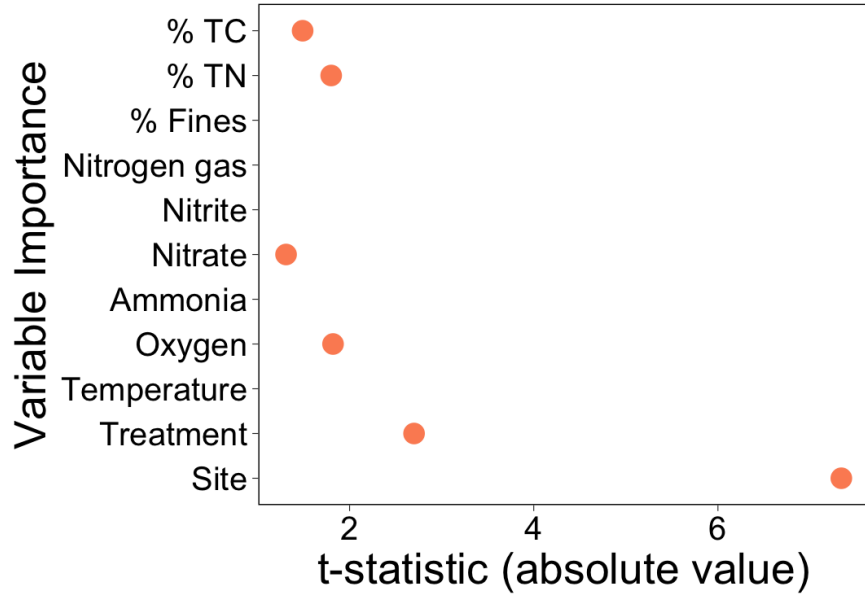
# Thank you!



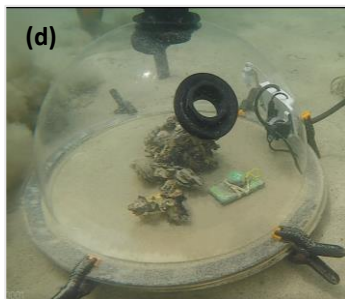
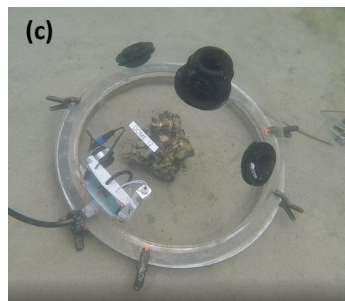
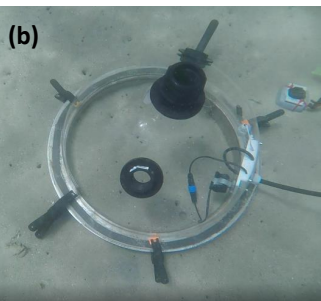
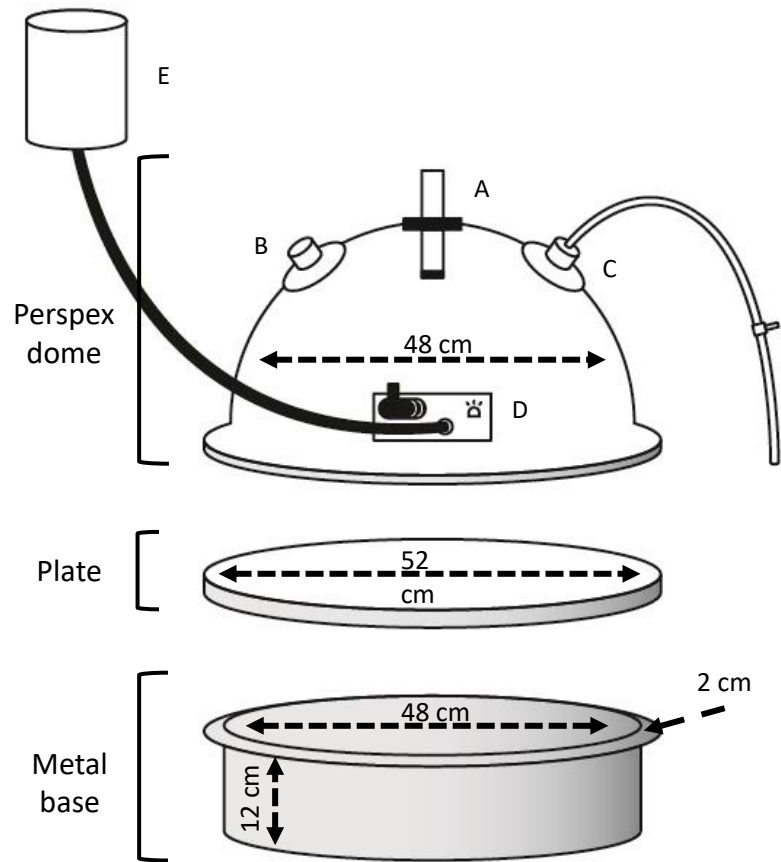
# Results



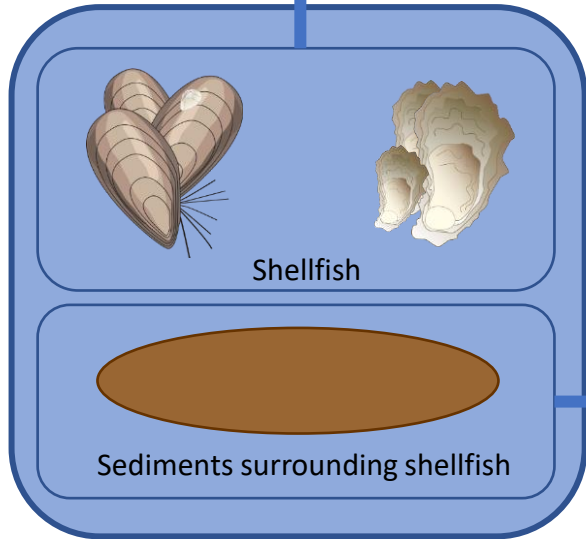
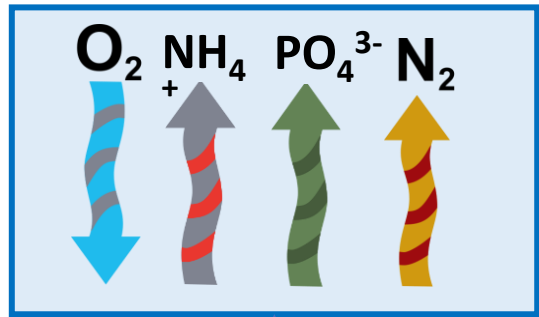
# Results



(a)



## Qualitative analysis



## Meta-analysis

