Can coastal lagoons self-purify from high nitrogen loading?

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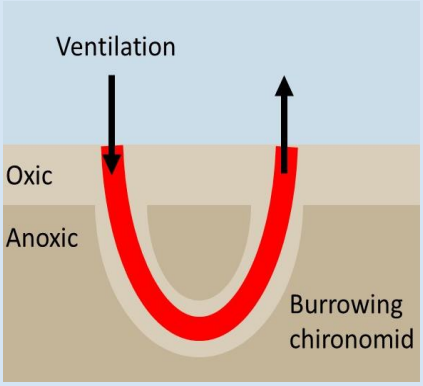
Our coastal ecosystems are under increasing pressure from nitrogen loading, which leads to eutrophication. Excess nutrients can contribute to high algal biomass, which in turn can cause toxic algal blooms, reducing light and oxygen availability.

My research is looking at the ability of coastal lagoons to remove nitrate from the water column, converting it to nitrogen gas, through microbial processes that occur in the sediments (denitrification). This process is extremely important as it makes the nitrate unavailable for use by algae, which can form nuisance algal blooms.

To measure this process, I have built flexible *in situ* chambers allowing tubidity from wave forces to be incorporated, and am tracing the transformation of nitrate to nitrogen gas using stable isotopes.

It is extremely important to know how much nutrients the lagoons can remove under times of high loading, in order to help set allowable catchment limits.



Preliminary results have shown this process to be extremely spatially variable, and further studies are focussing on the “hotspots” of denitrification.

Burrowing invertebrates may play a role in enhancing denitrification, through their burrowing processes, mobilizing nitrate at sites where denitrification can occur.