Ocean acidification boosts reproduction to buffer against population collapse

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Sean Connell & Ivan Nagelkerken

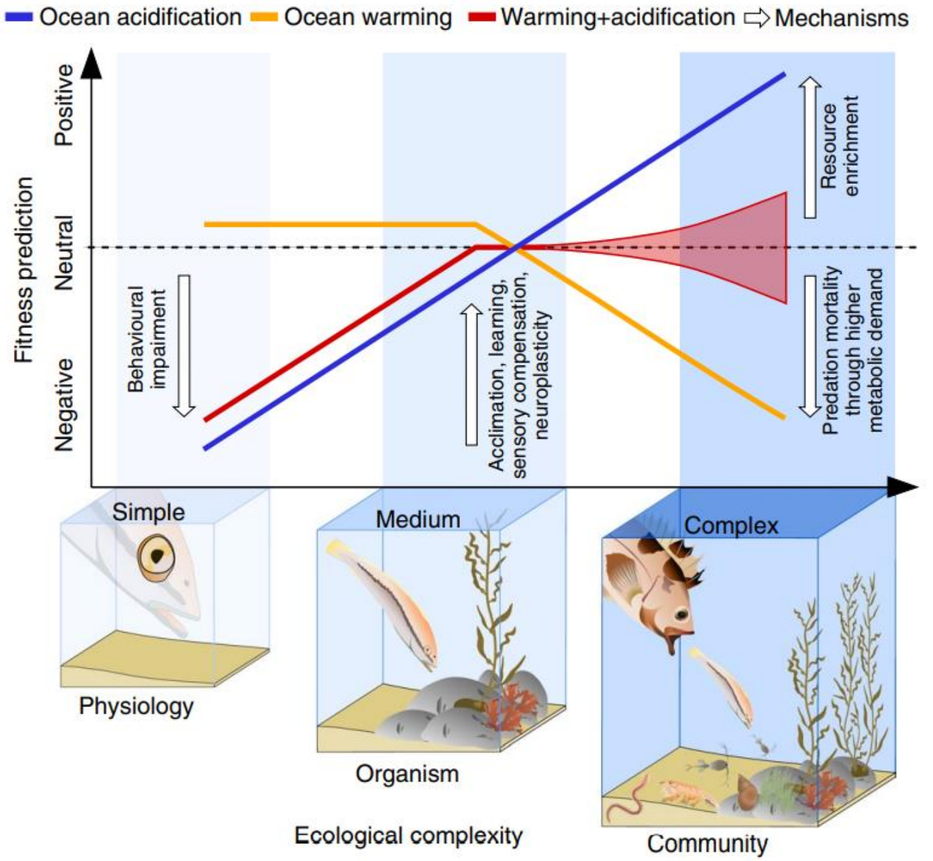
THE UNIVERSITY of ADELAIDE

SUB CRUCE LUMEN

Southern Seas Ecology Laboratories

Ecological complexity buffers the impacts of future climate on marine consumers

Silvan U. Goldenberg, Ivan Nagelkerken*, Emma Marangon, Angélique Bonnet, Camilo M. Ferreira and Sean D. Connell



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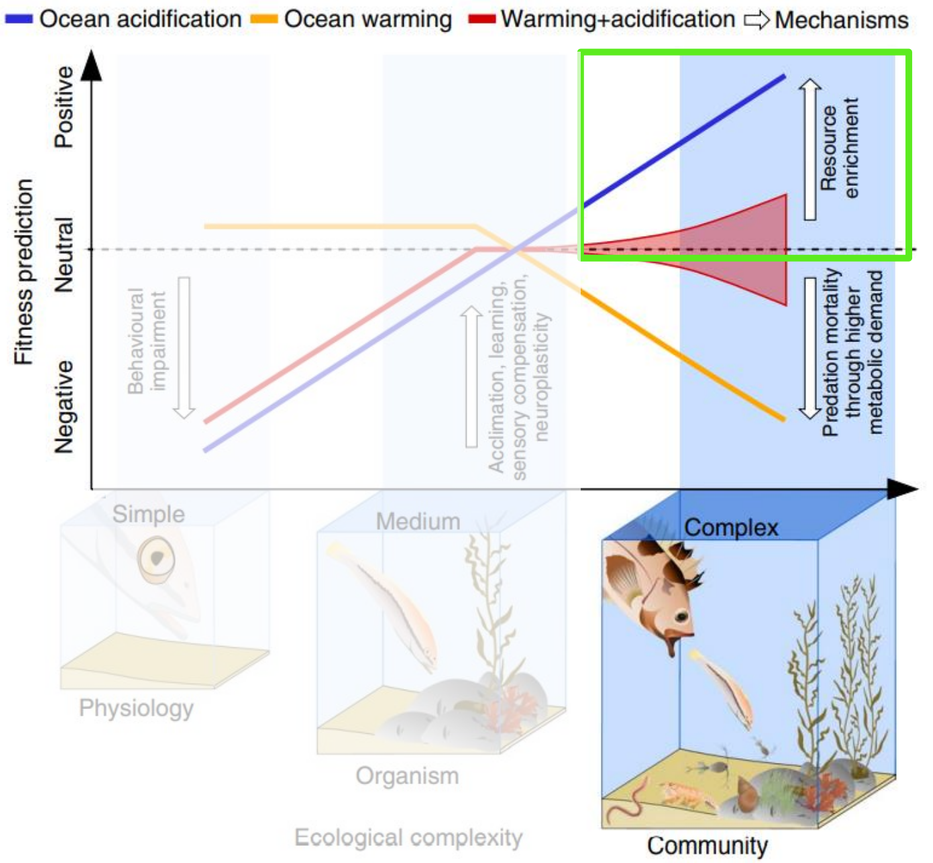
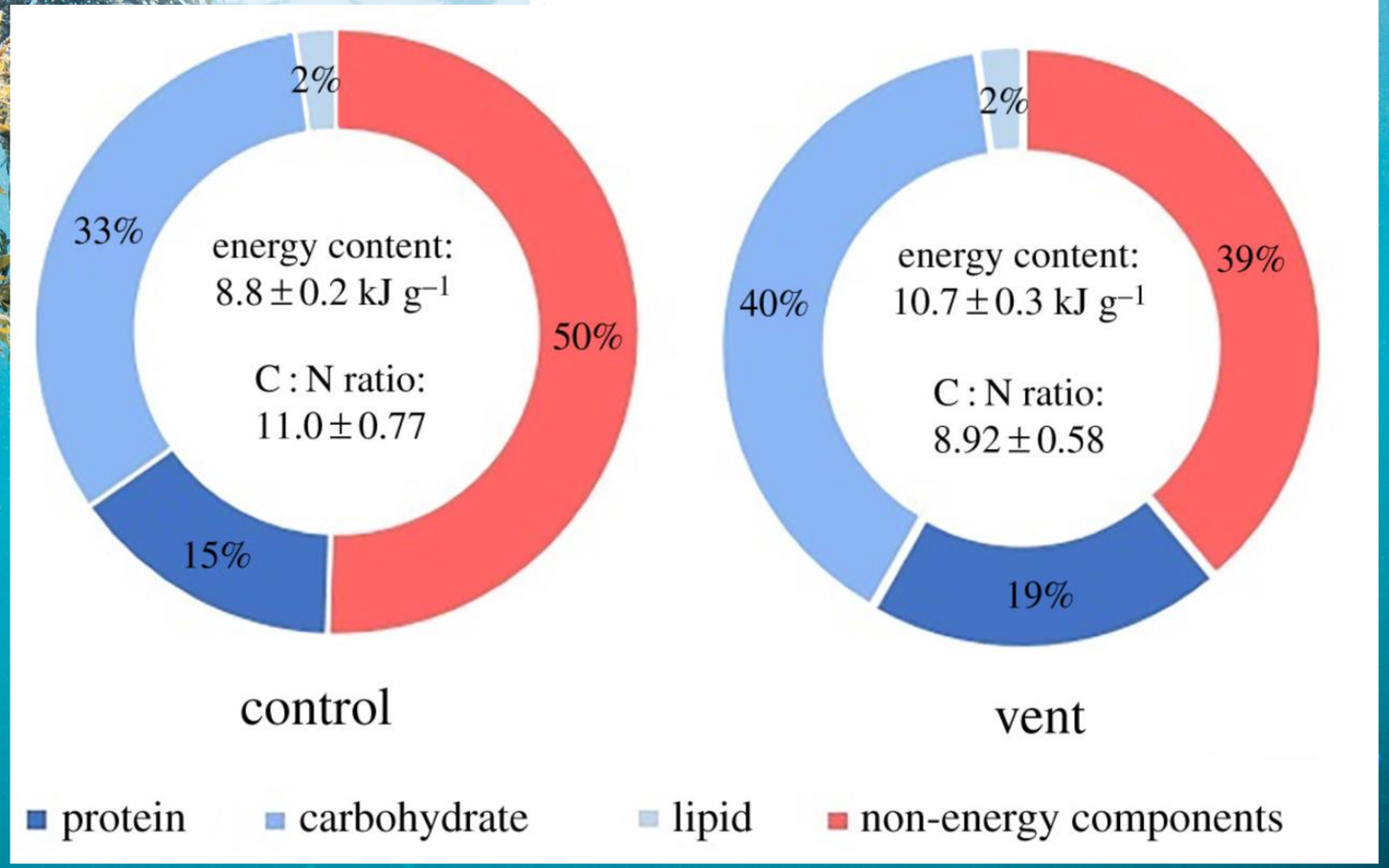


How calorie-rich food could help marine calcifiers in a CO_2-rich future

Jonathan Y. S. Leung[1,2], Zoë A. Doubleday[2,3], Ivan Nagelkerken[2], Yujie Chen[1,4], Zonghan Xie[4,5] and Sean D. Connell[2]









Pteropod image: Alexander Semenov

Is Ocean Acidification Really a Threat to Marine Calcifiers? A Systematic Review and Meta-Analysis of 980+ Studies Spanning Two Decades

Jonathan Y. S. Leung, Sam Zhang, Sean D. Connell

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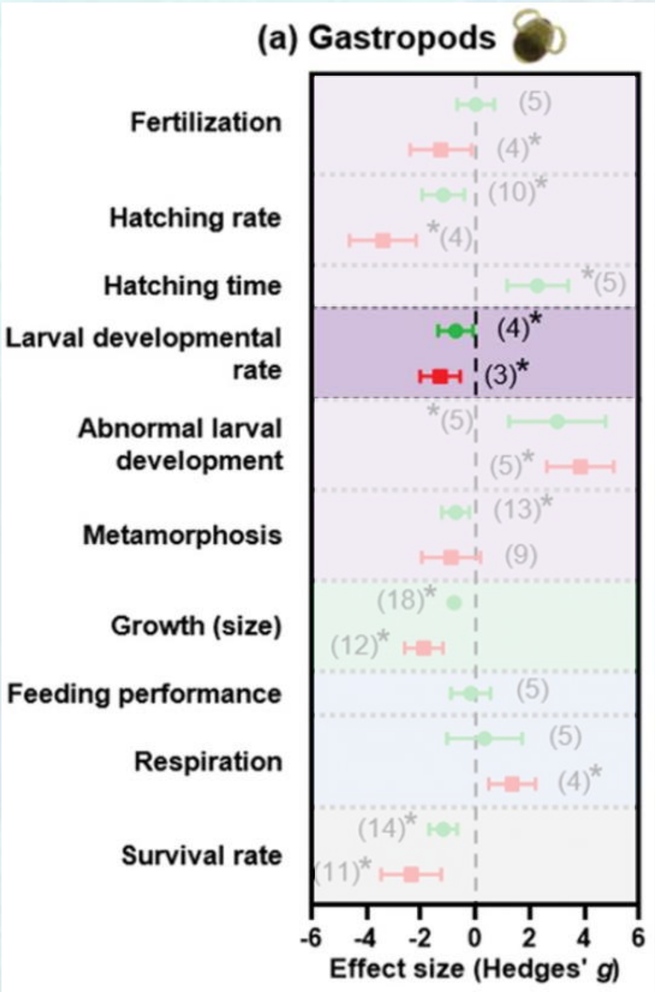

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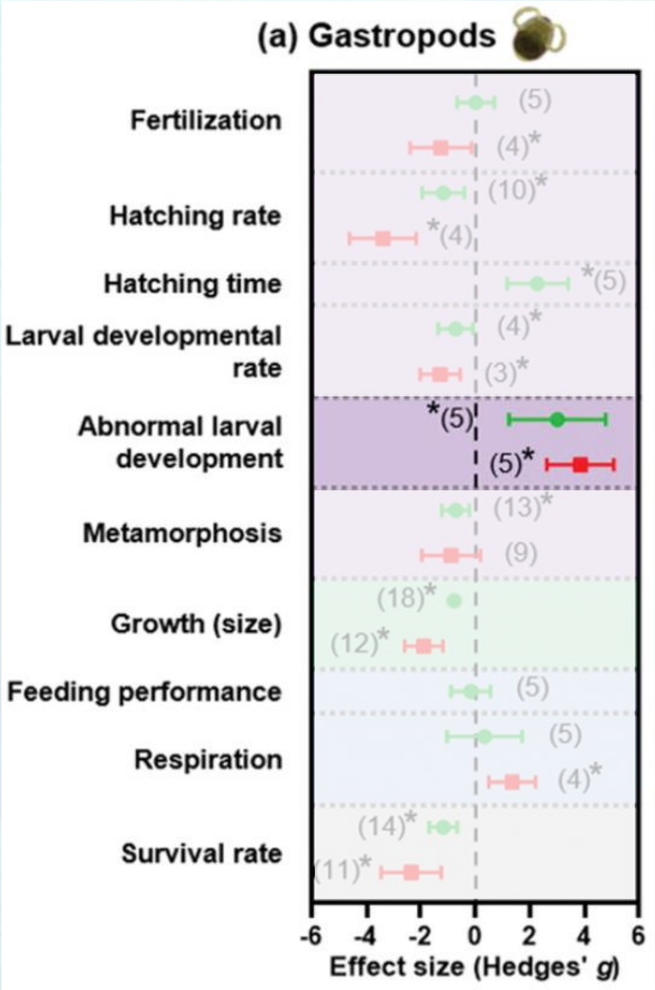

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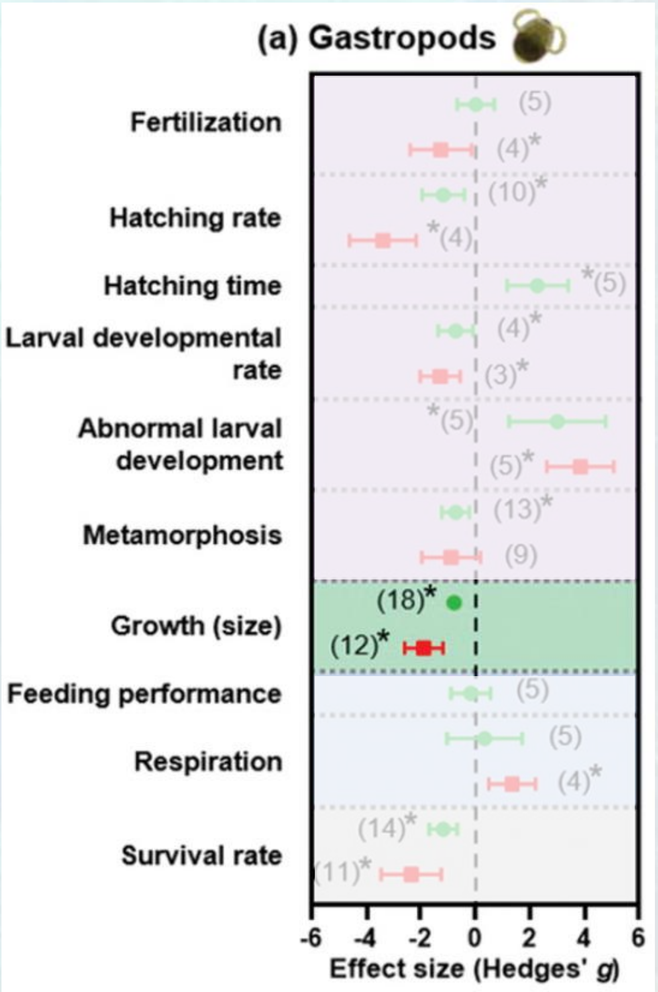

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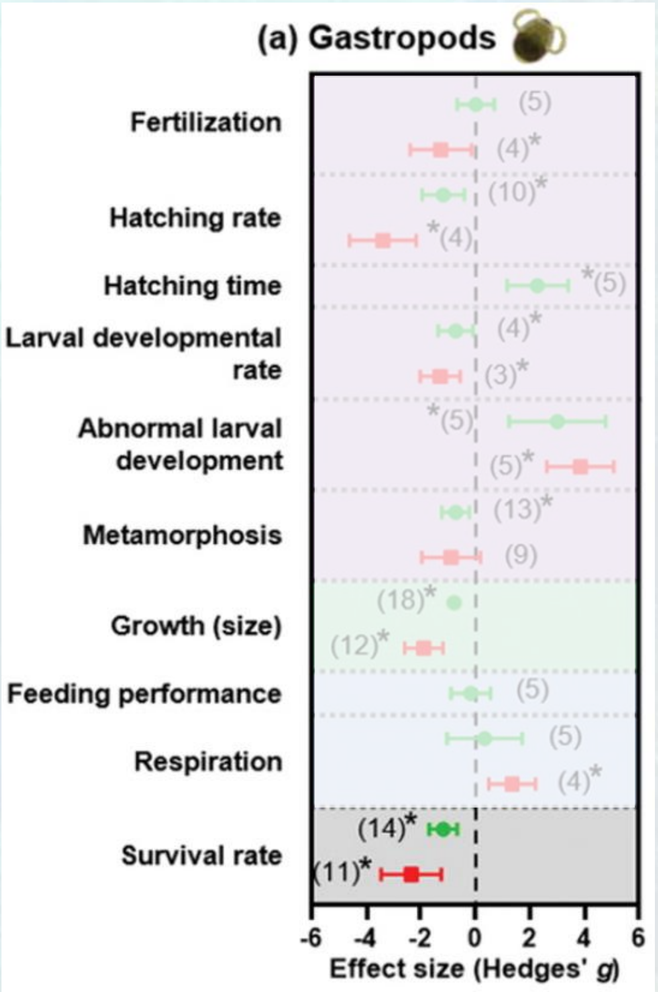

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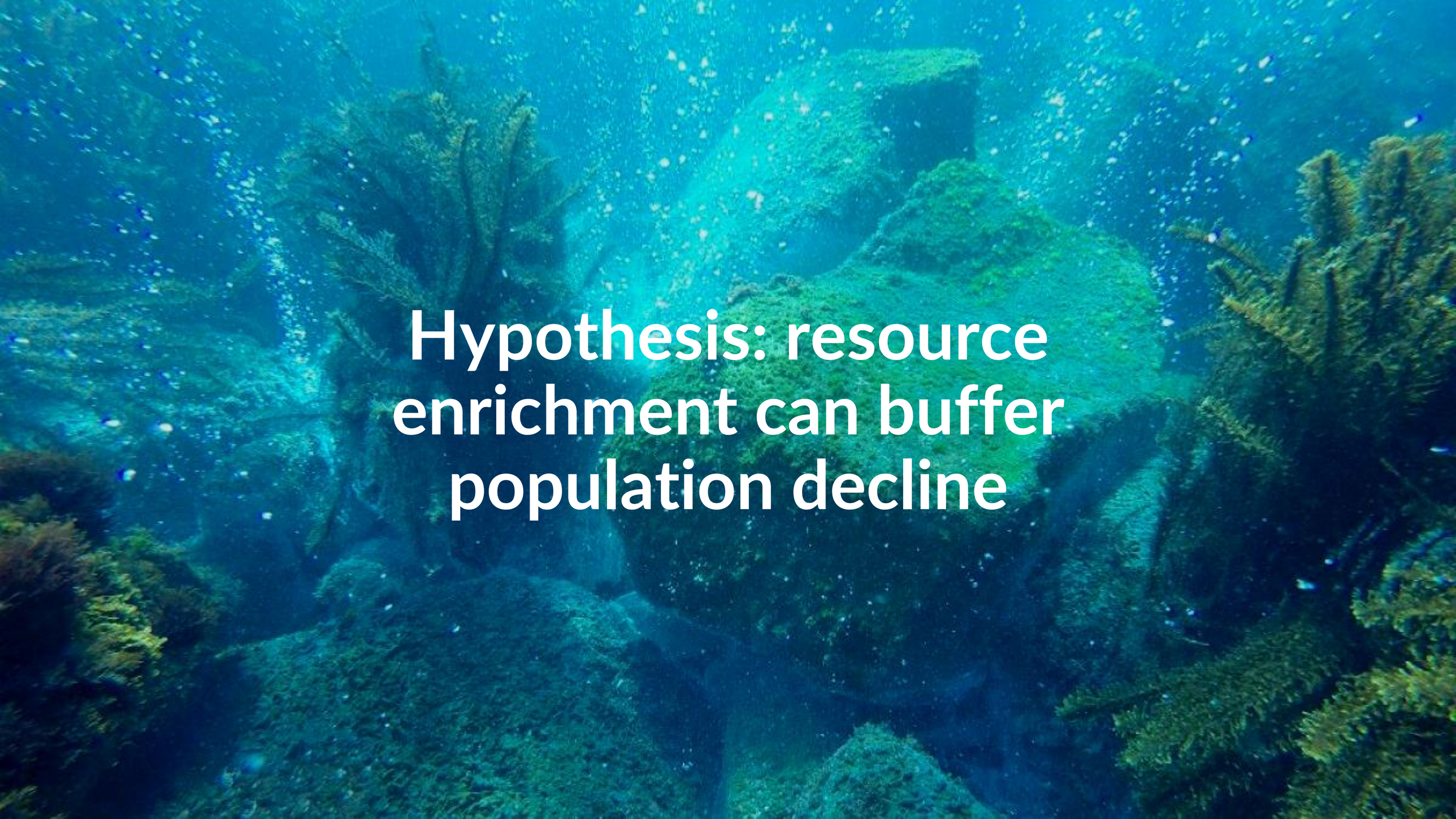
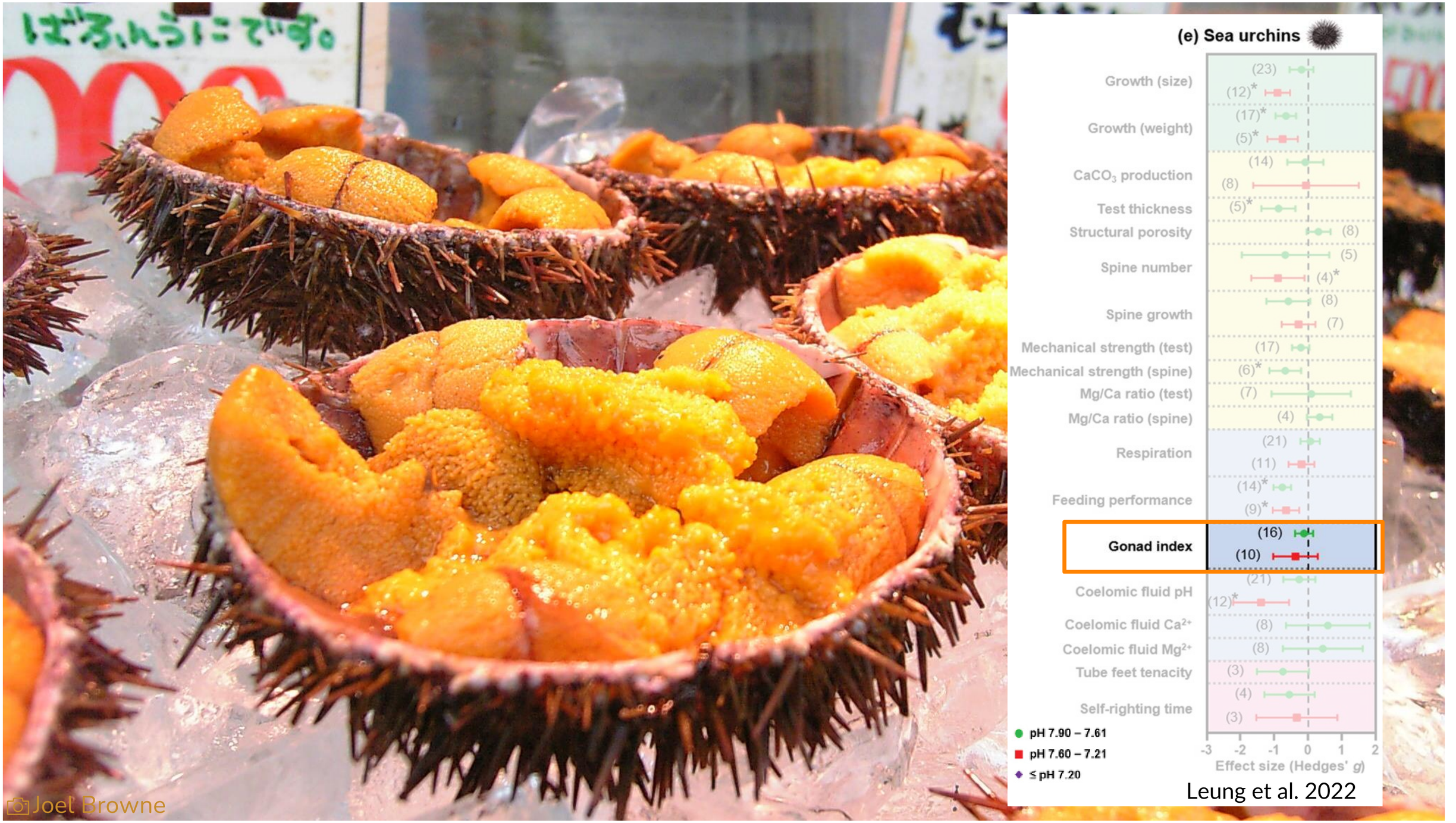


Hypothesis: resource enrichment can buffer population decline

"naturally acidified habitats provide a realistic and holistic approach to provide insights into the echinoid faunas of the future"

Sea urchins in a high CO_2 world: Impacts of climate warming and ocean acidification across life history stages

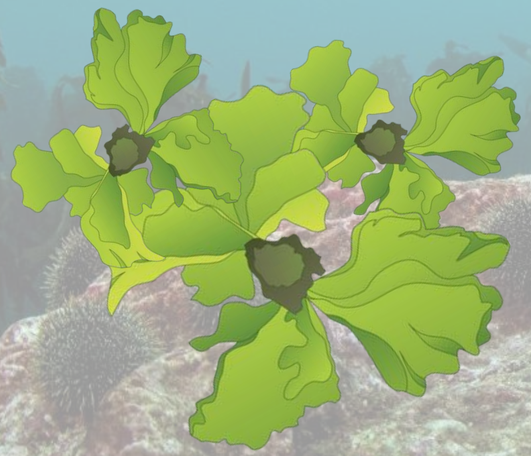
Maria Byrne[a,*] and José Carlos Hernández[b]



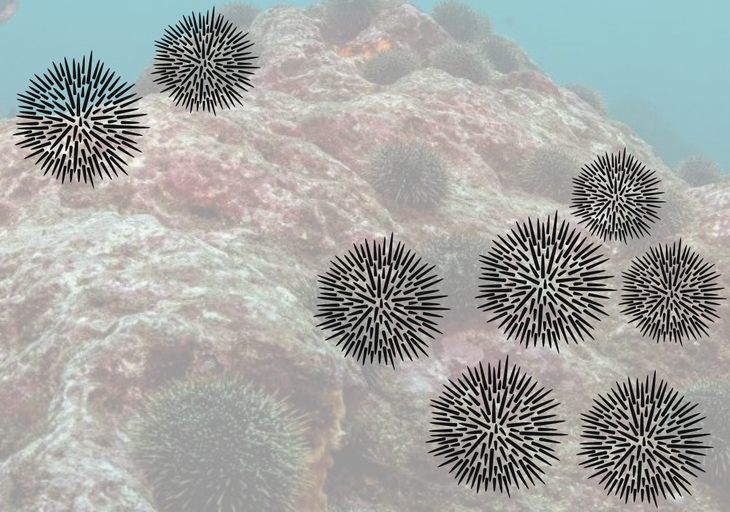
Leung et al. 2022

Joel Browne

Method



Resource Quality & Quantity



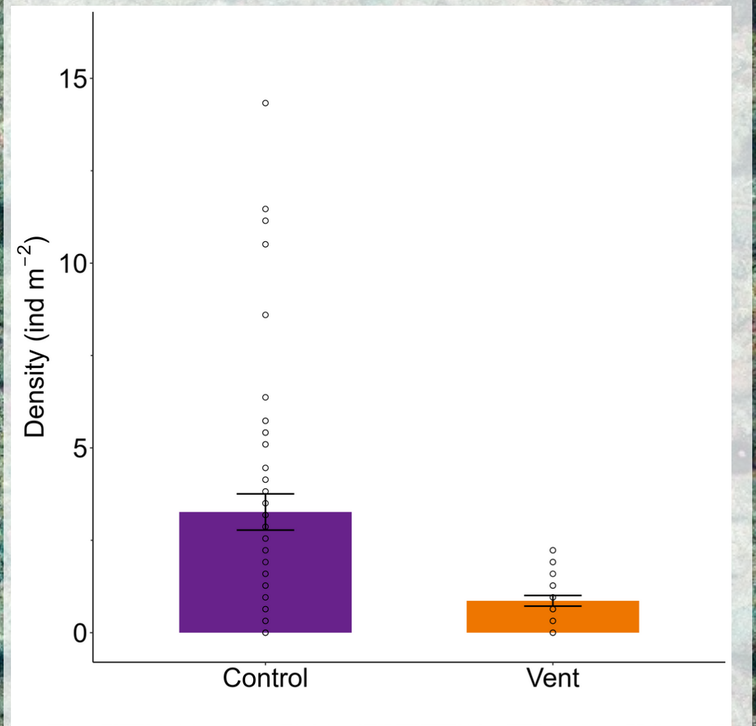
Density

Gonad Weight

Results

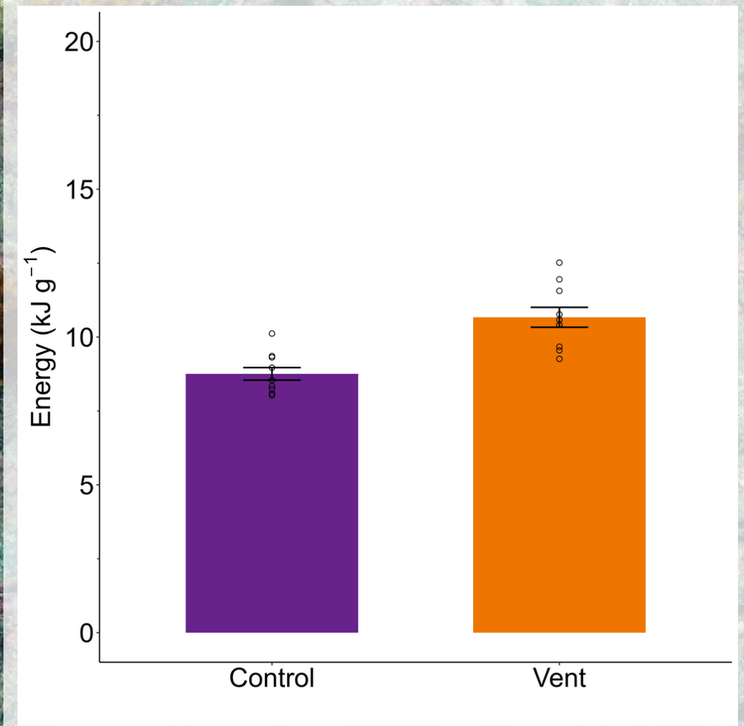
Density

3 x
reduction



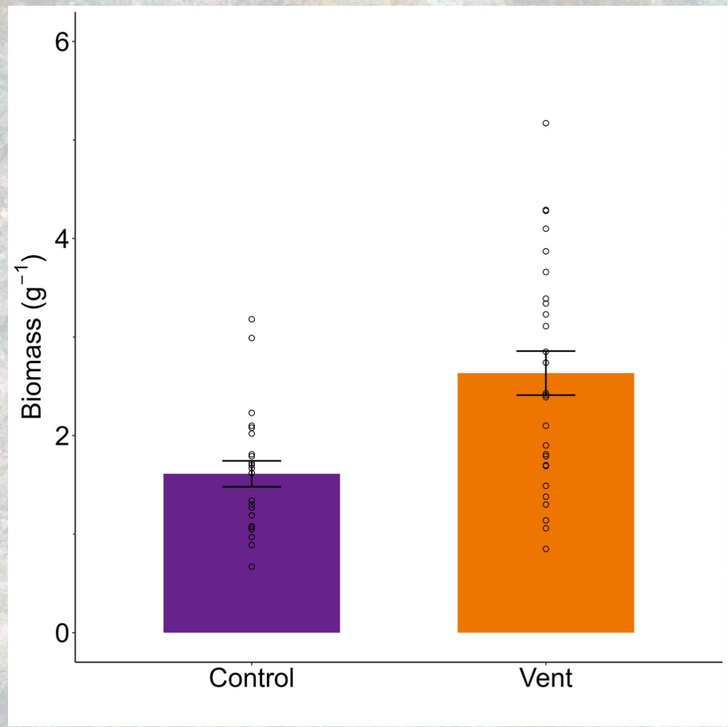
Resource Quality

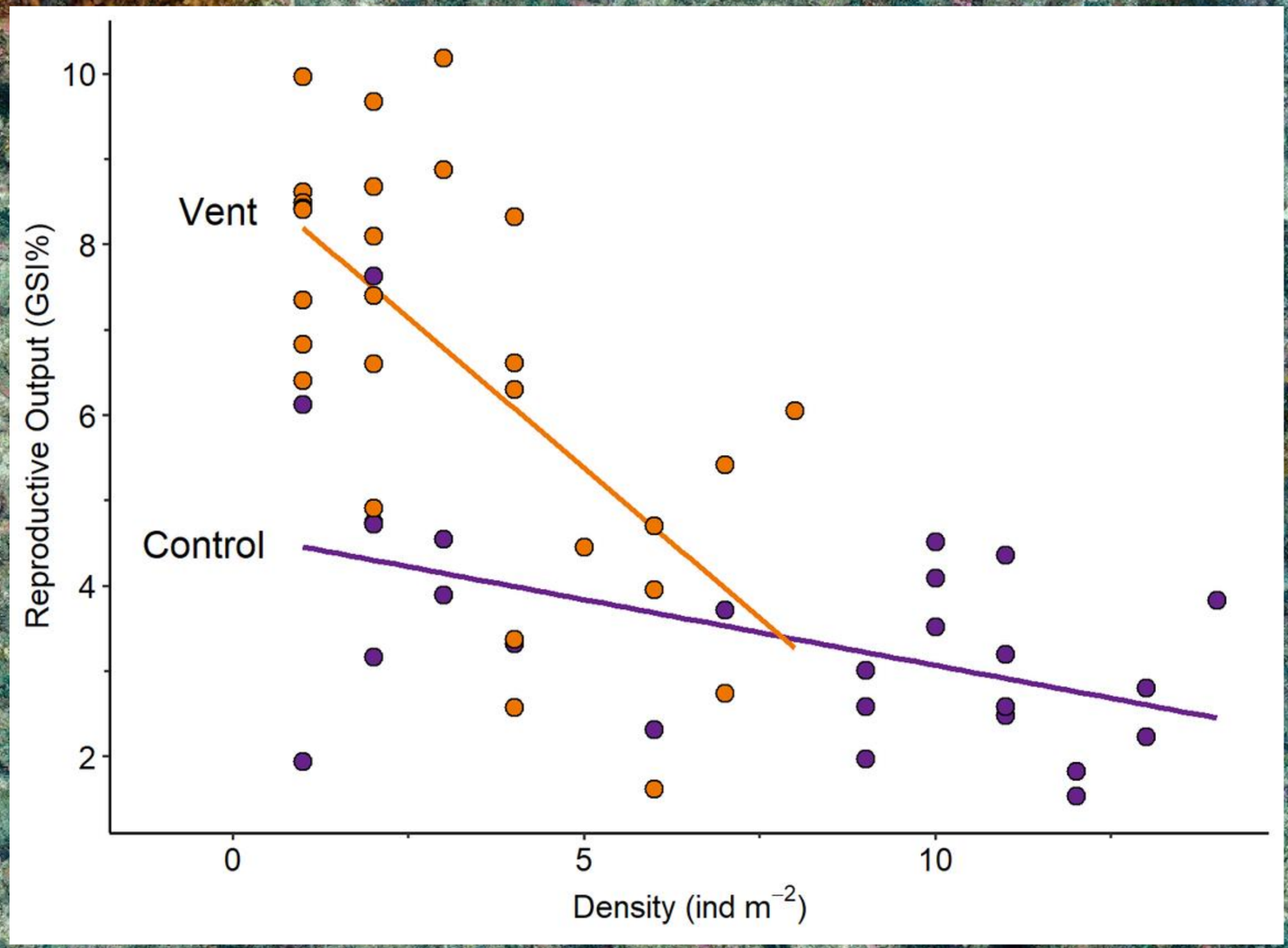
22%
Increase

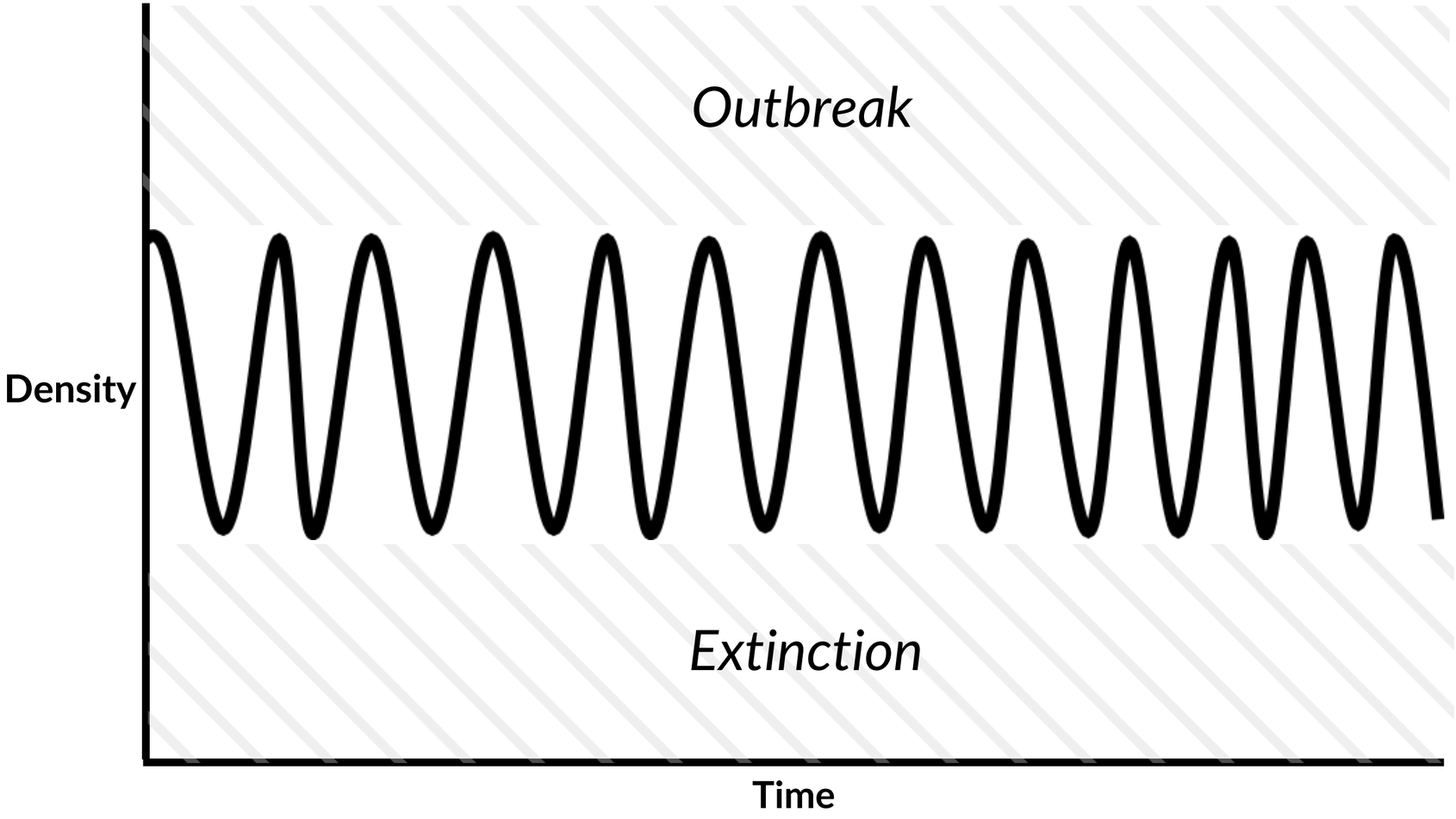


Resource Quantity

63%
Increase




Vent
Control
Reproductive Output (GSI%)
10
8
6
4
2
0
5
10
Density (ind m^{-2})



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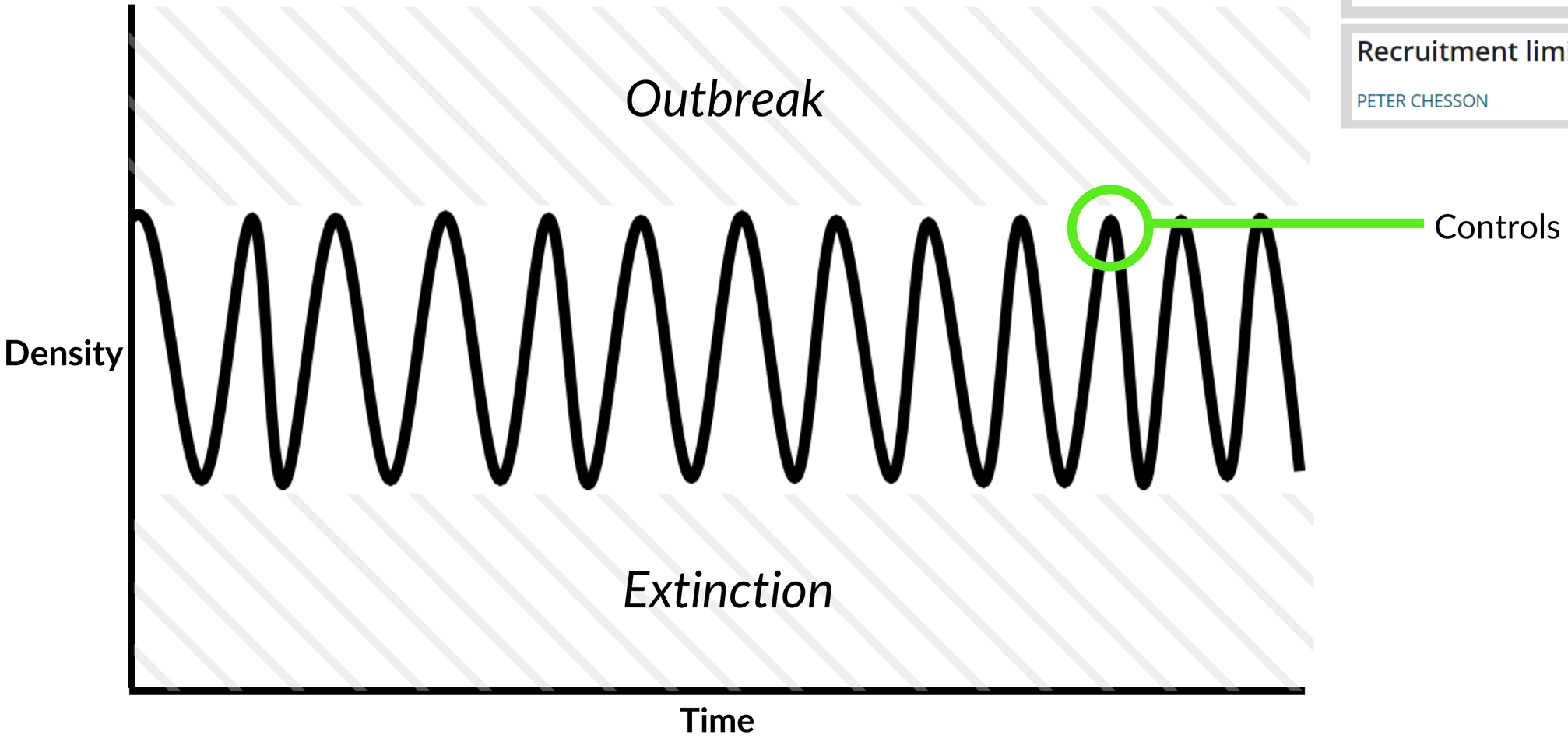
Population Regulation in Theory and Practice

William W. Murdoch

Recruitment limitation: A theoretical perspective

PETER CHESSON



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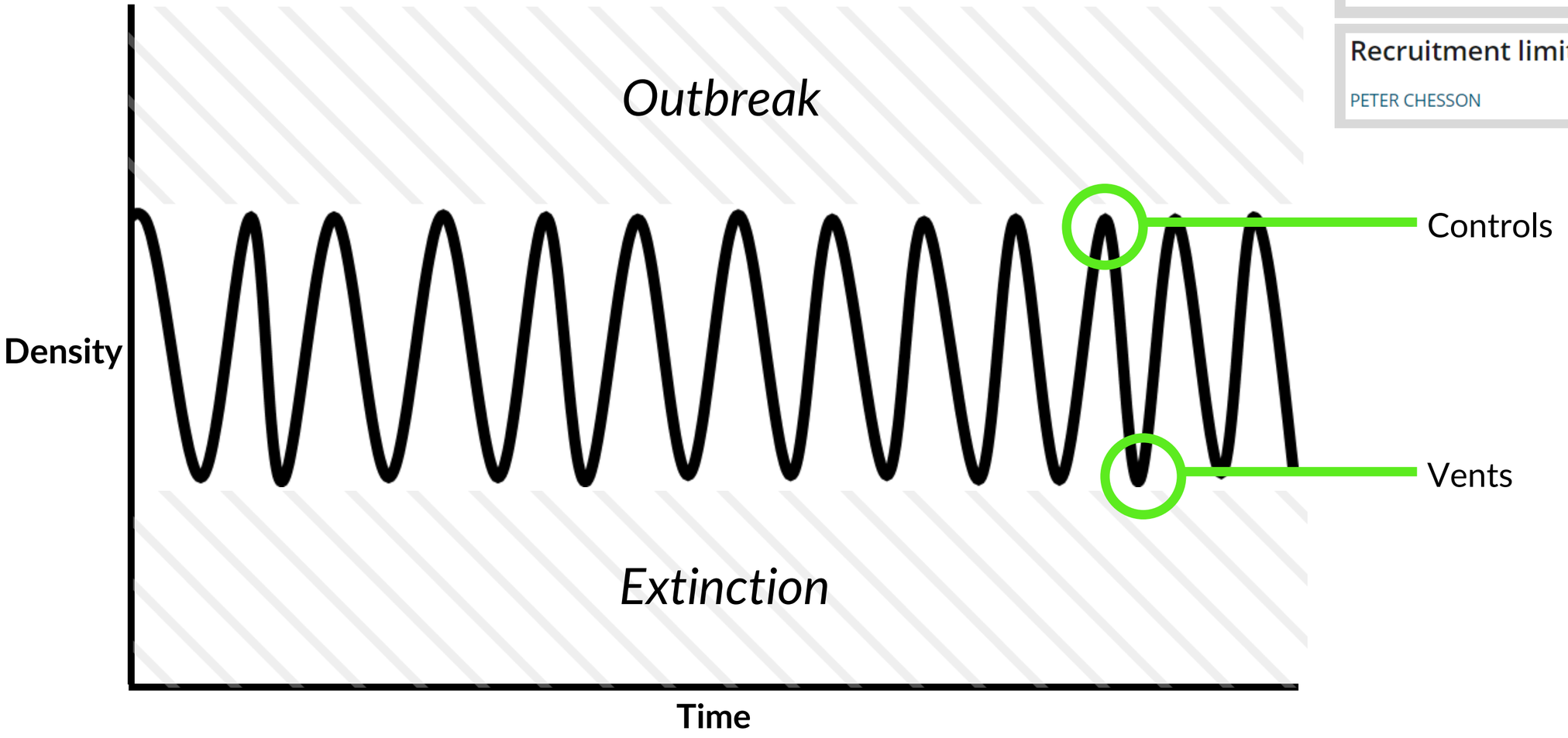
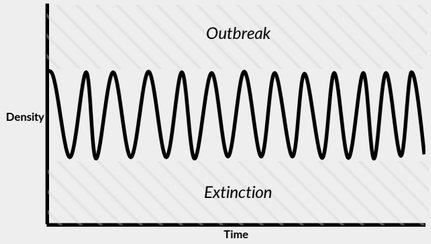
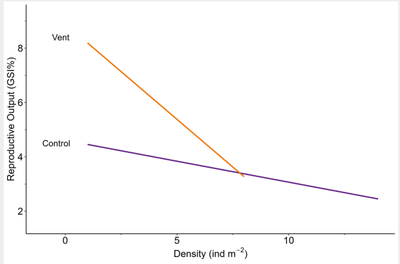
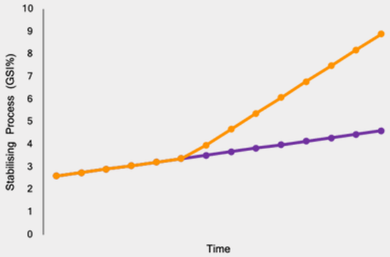
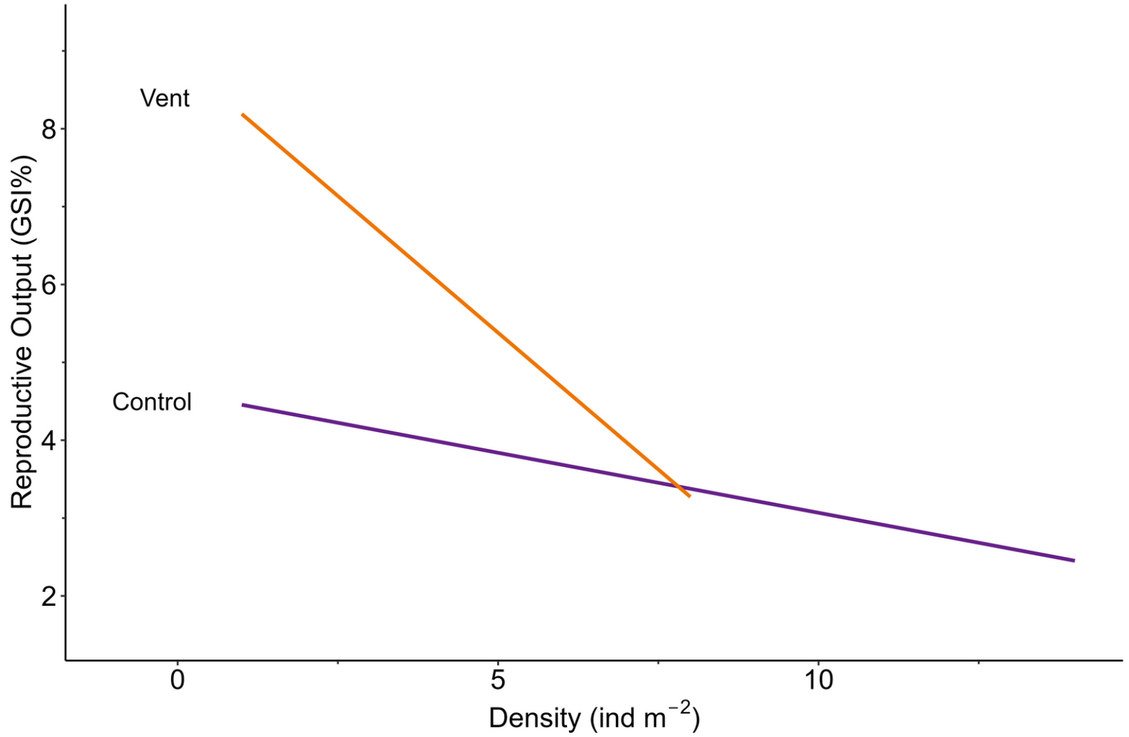
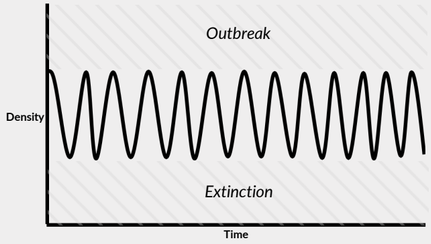


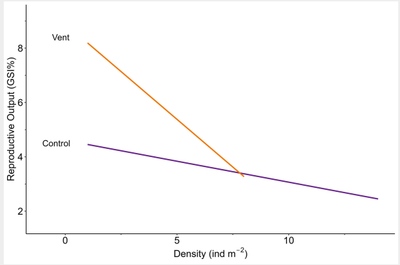

Outbreak
Density
Extinction
Time

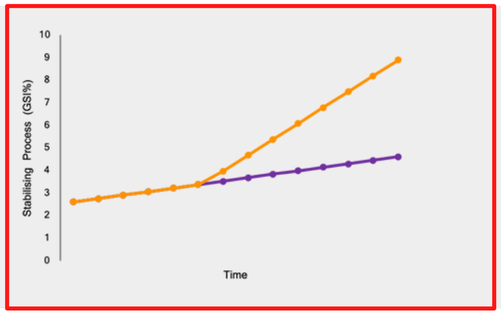

Vent
Control
Reproductive Output (GSI%)
Density (ind m⁻²)


Stabilising Process (GSI%)
Time


Vent
Control
Reproductive Output (GSI%)
Density (ind m⁻²)


Outbreak
Density
Extinction
Time


Vent
Control
Reproductive Output (GSI%)
Density (ind m⁻²)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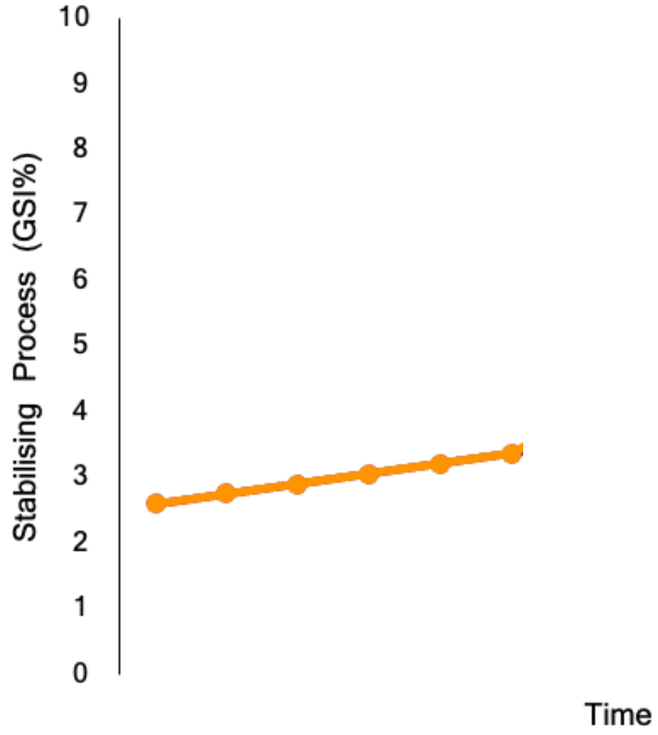
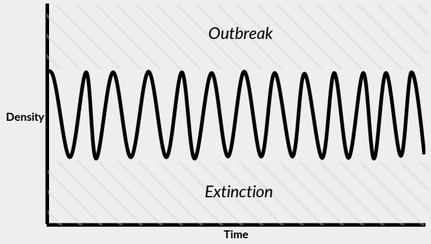
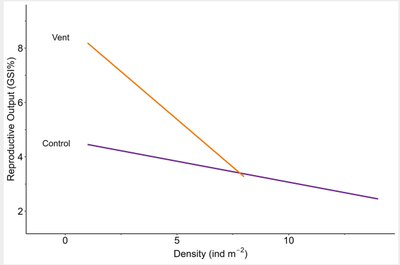
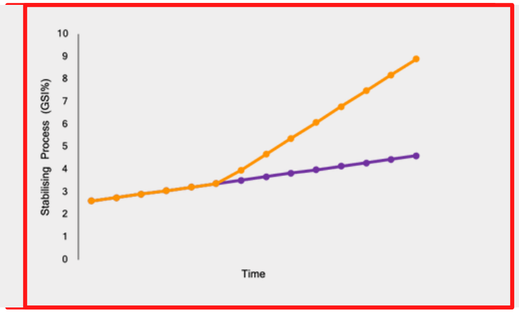
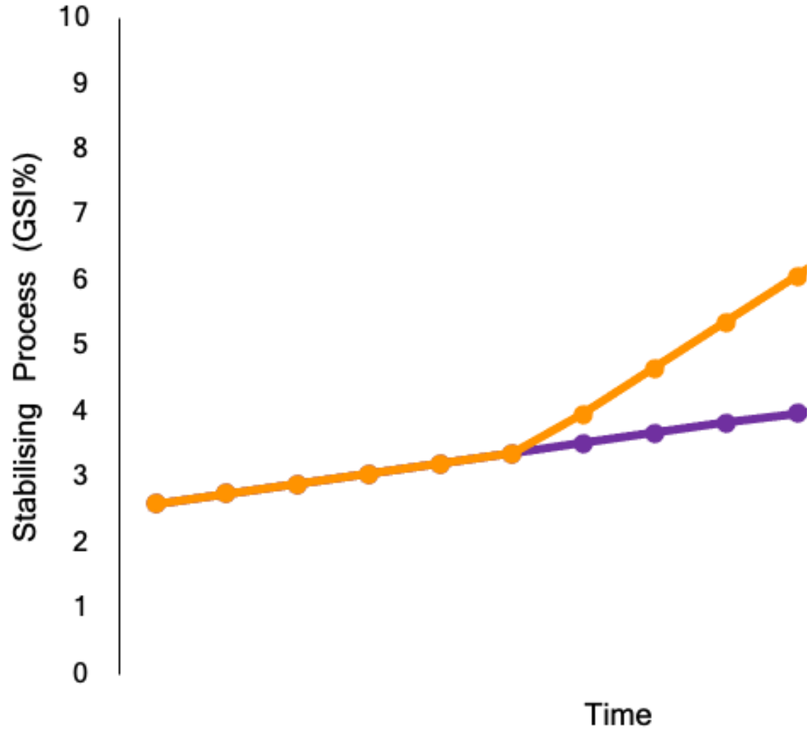
Time

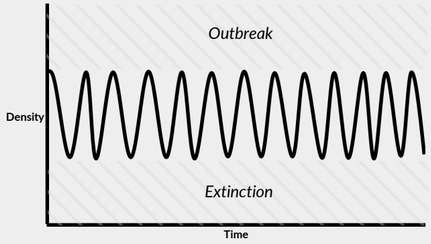

Stabilising Process (GSI%)
Time

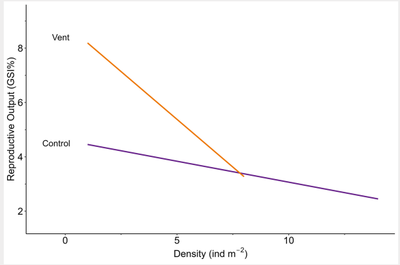

Outbreak
Density
Extinction
Time


Vent
Control
Reproductive Output (GSI%)
Density (ind m⁻²)


Stabilising Process (GSI%)
Time


Stabilising Process (GSI%)
Time


Outbreak
Density
Extinction
Time


Vent
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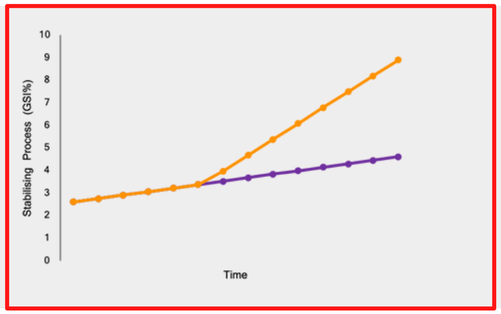
Reproductive Output (GSI%)
Density (ind m⁻²)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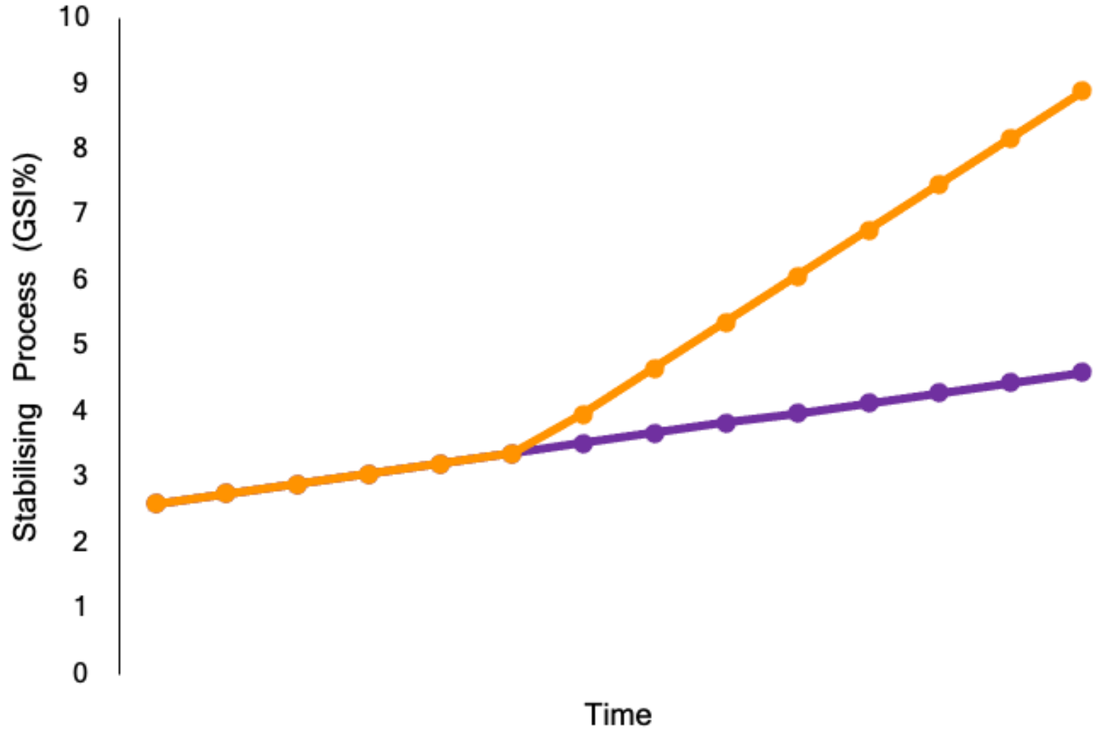
Time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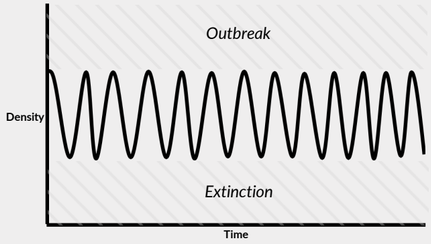
Time


Outbreak
Density
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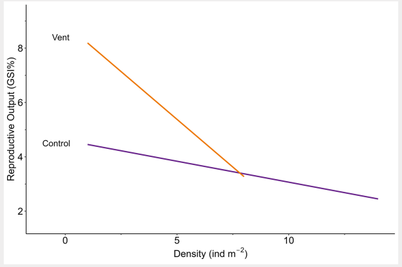
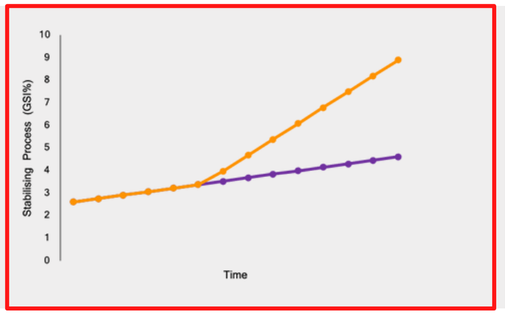
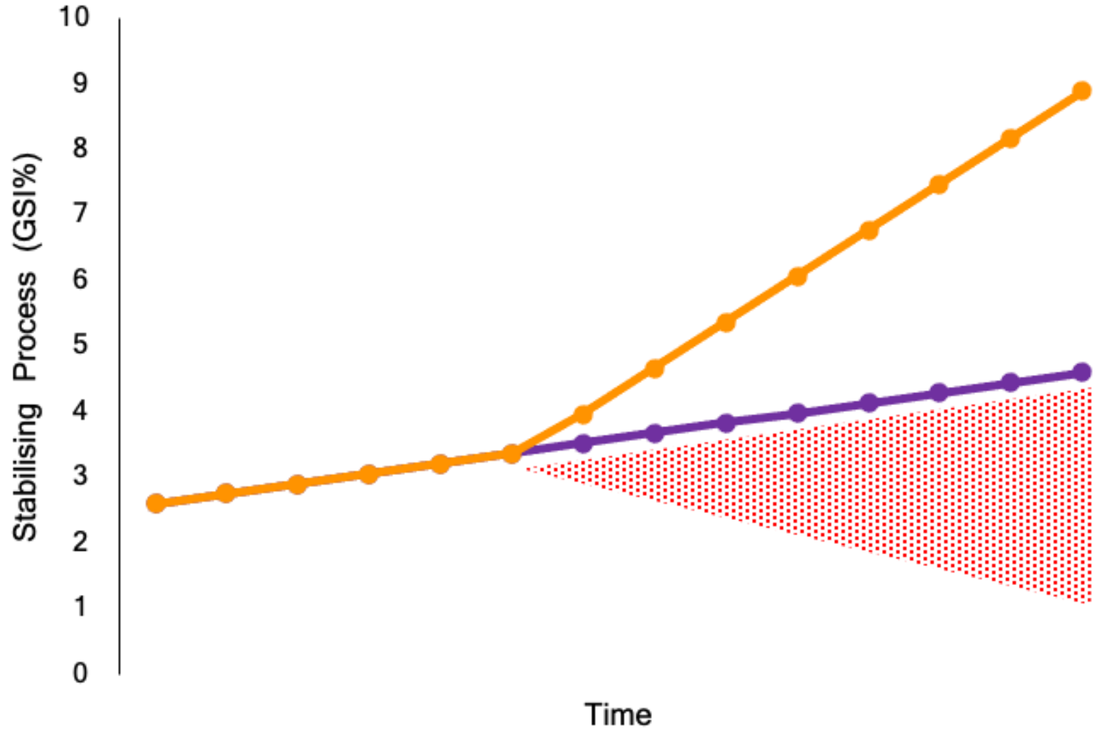
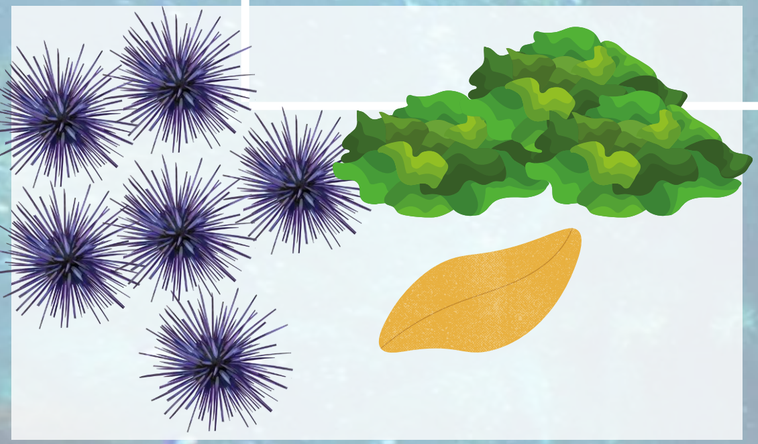

Vent
Control
Reproductive Output (GSI%)
Density (ind m⁻²)


Stabilising Process (GSI%)
Time


Stabilising Process (GSI%)
Time

Current



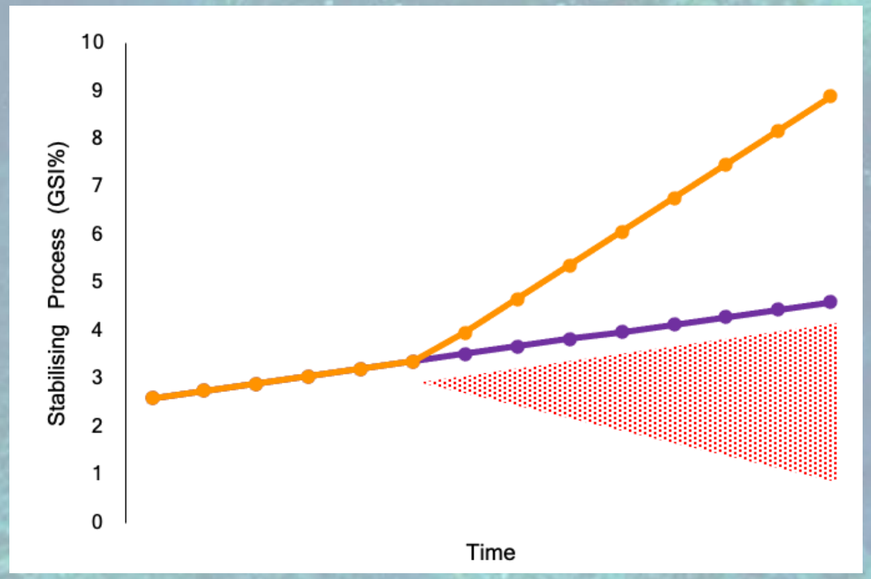
Future without compensation

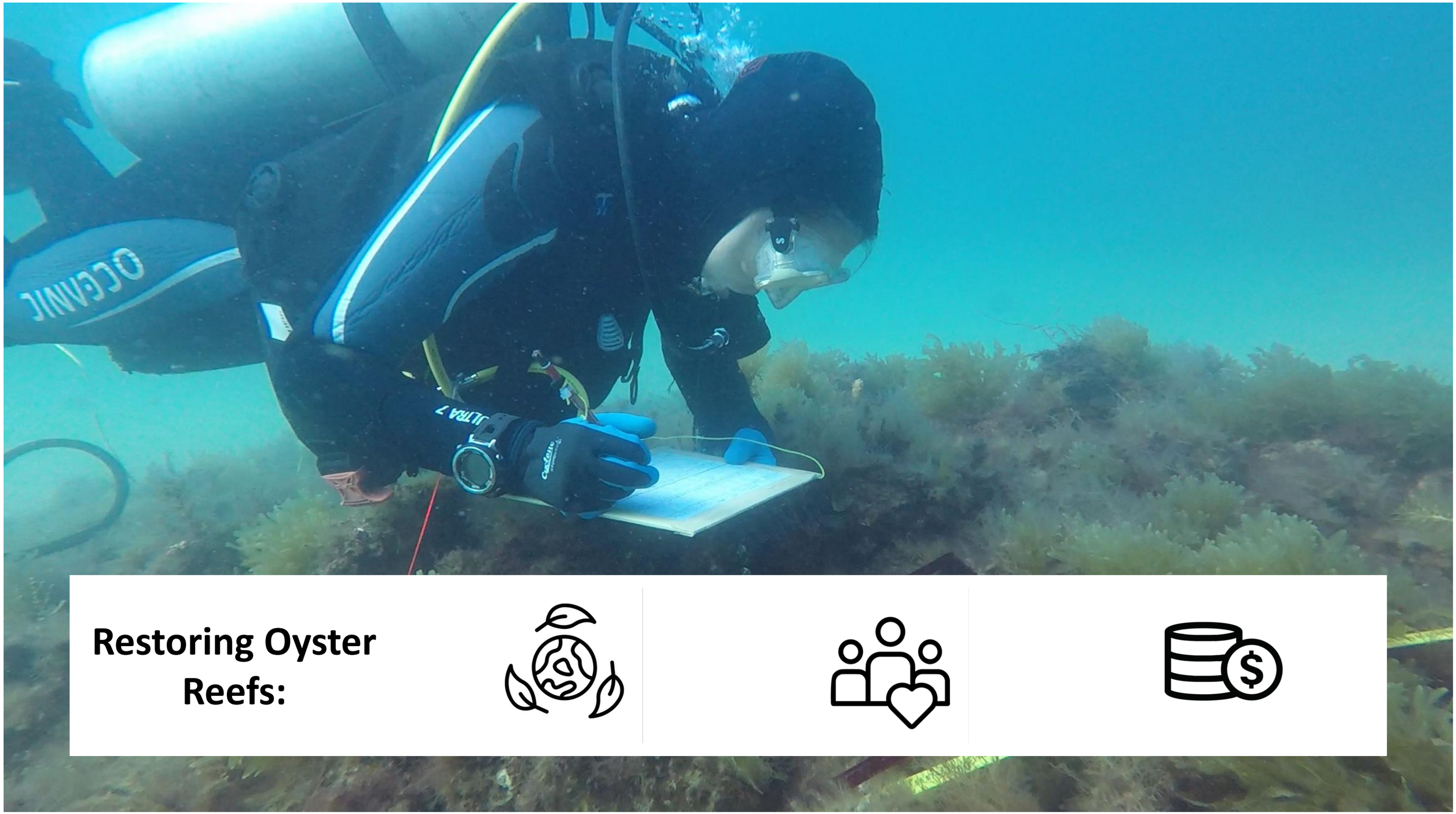
Future with compensation

Current

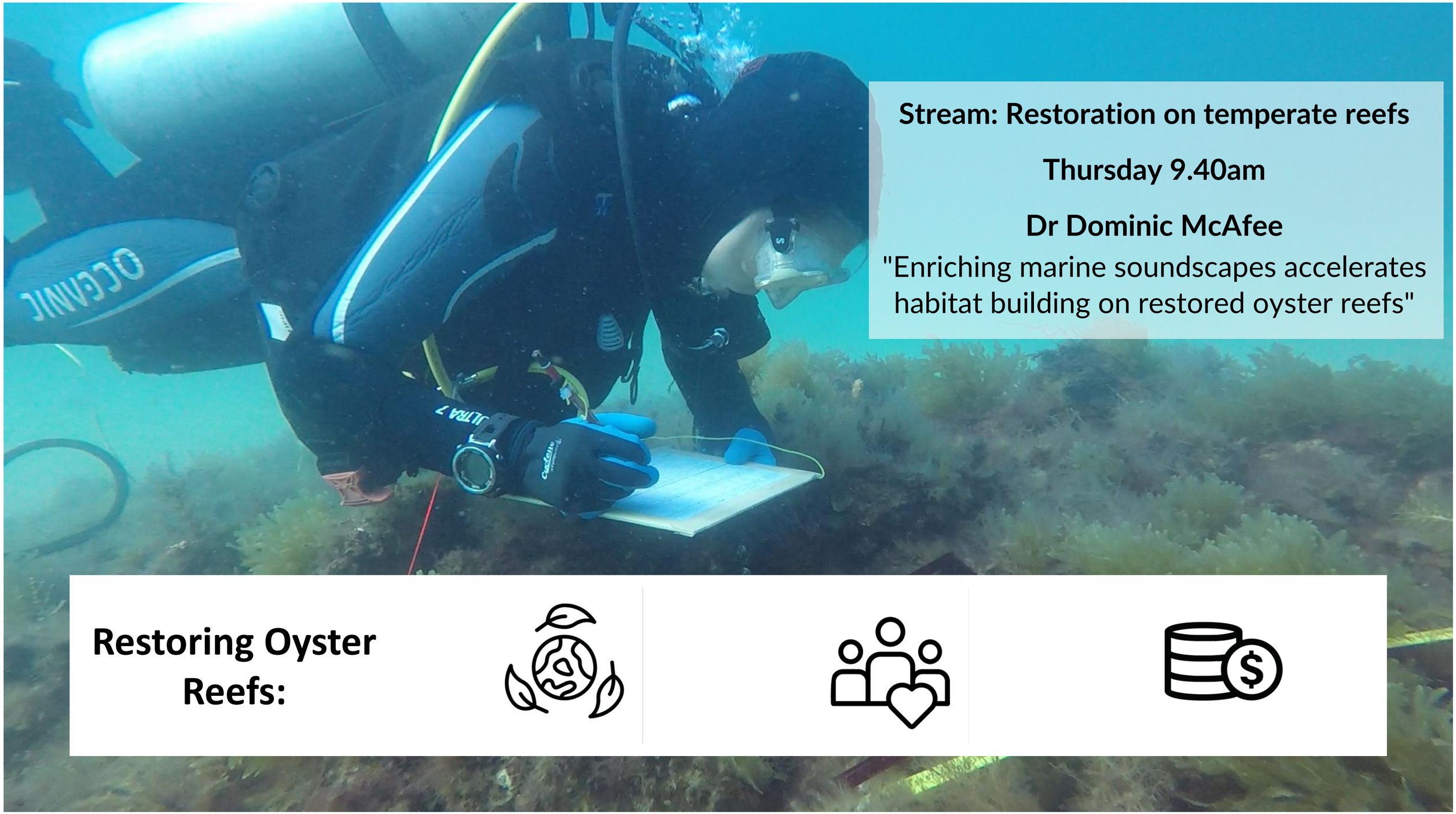
Future without compensation

Future with compensation





Restoring Oyster Reefs:



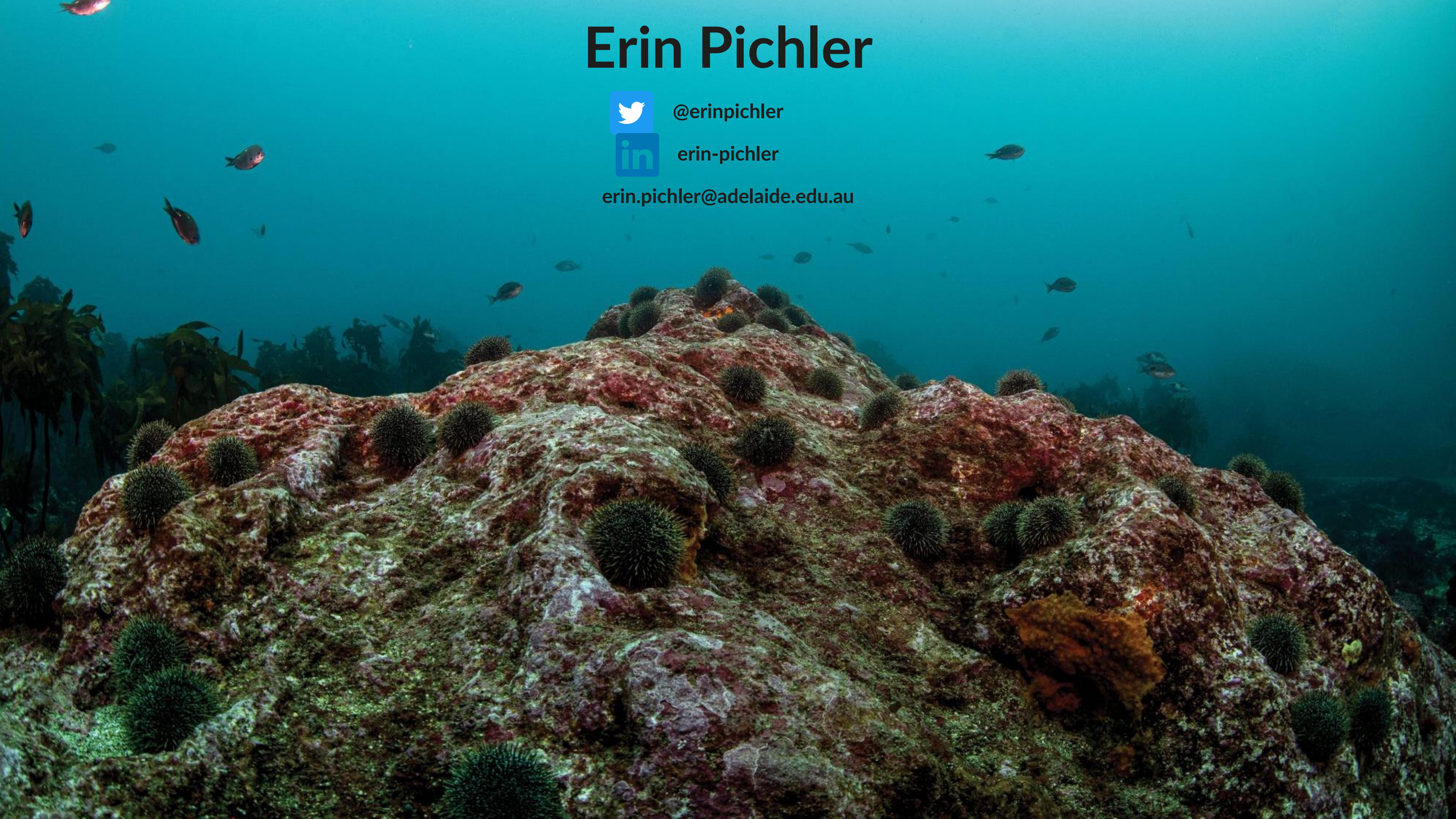
Stream: Restoration on temperate reefs

Thursday 9.40am

Dr Dominic McAfee

"Enriching marine soundscapes accelerates habitat building on restored oyster reefs"

Restoring Oyster Reefs:



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