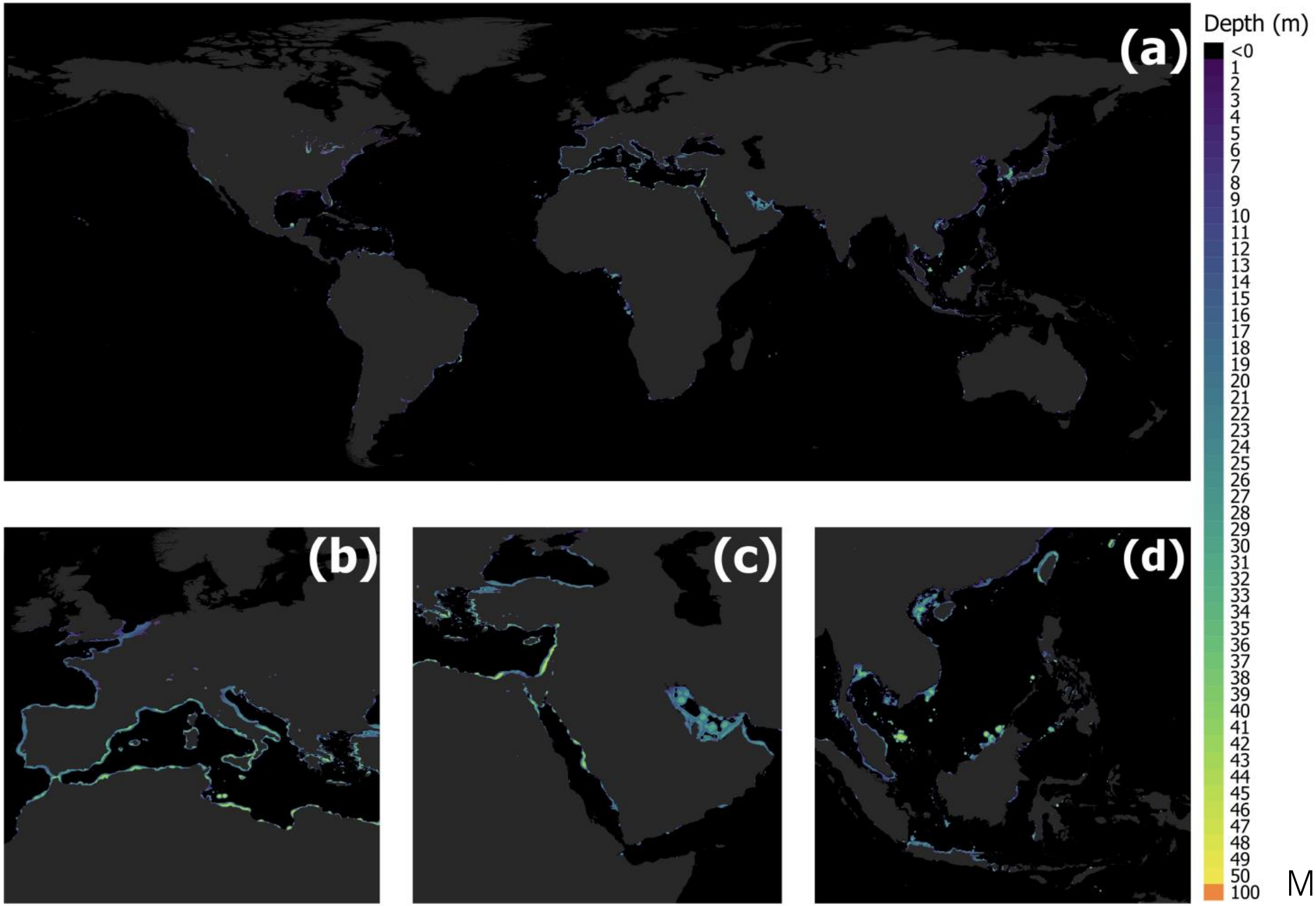
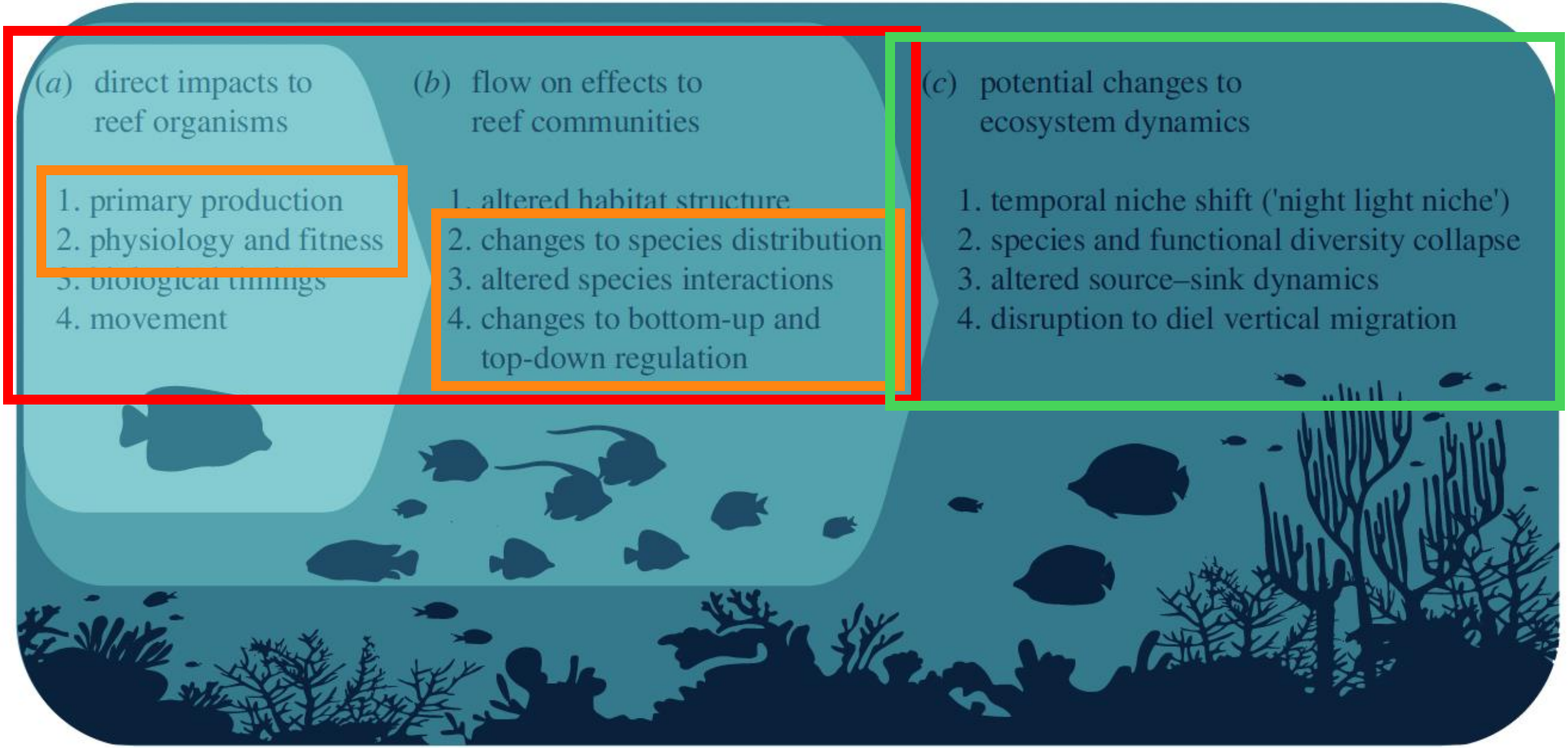
EFFECTS OF ALAN ON THE MARINE ENVIRONMENT

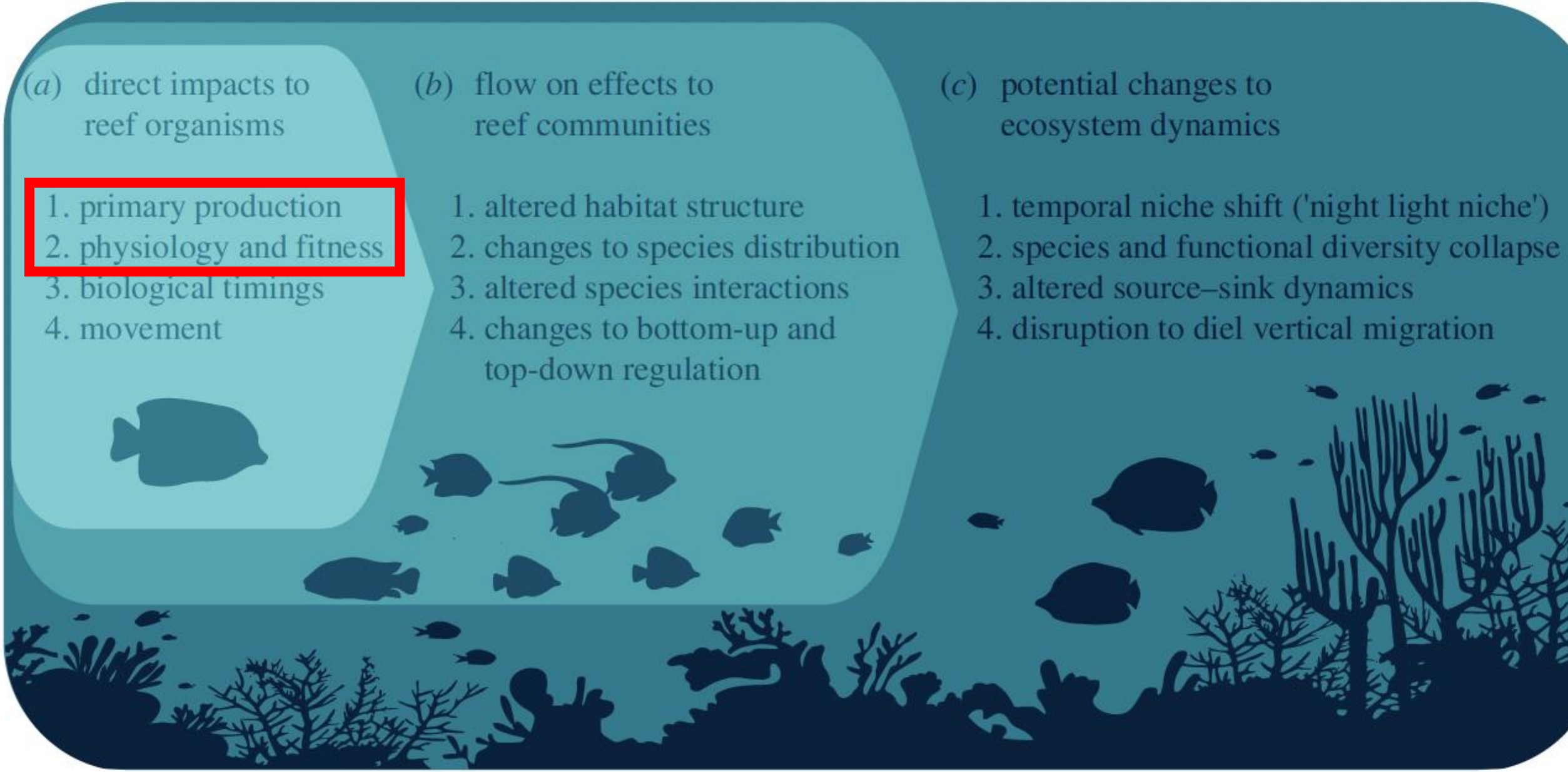
Mariana Mayer-Pinto



Marangoni et al 2022



Fobert et al 2024


(a) direct impacts to reef organisms
1. primary production
2. physiology and fitness
3. biological timings
4. movement
(b) flow on effects to reef communities
1. altered habitat structure
2. changes to species distribution
3. altered species interactions
4. changes to bottom-up and top-down regulation
(c) potential changes to ecosystem dynamics
1. temporal niche shift ('night light niche')
2. species and functional diversity collapse
3. altered source–sink dynamics
4. disruption to diel vertical migration

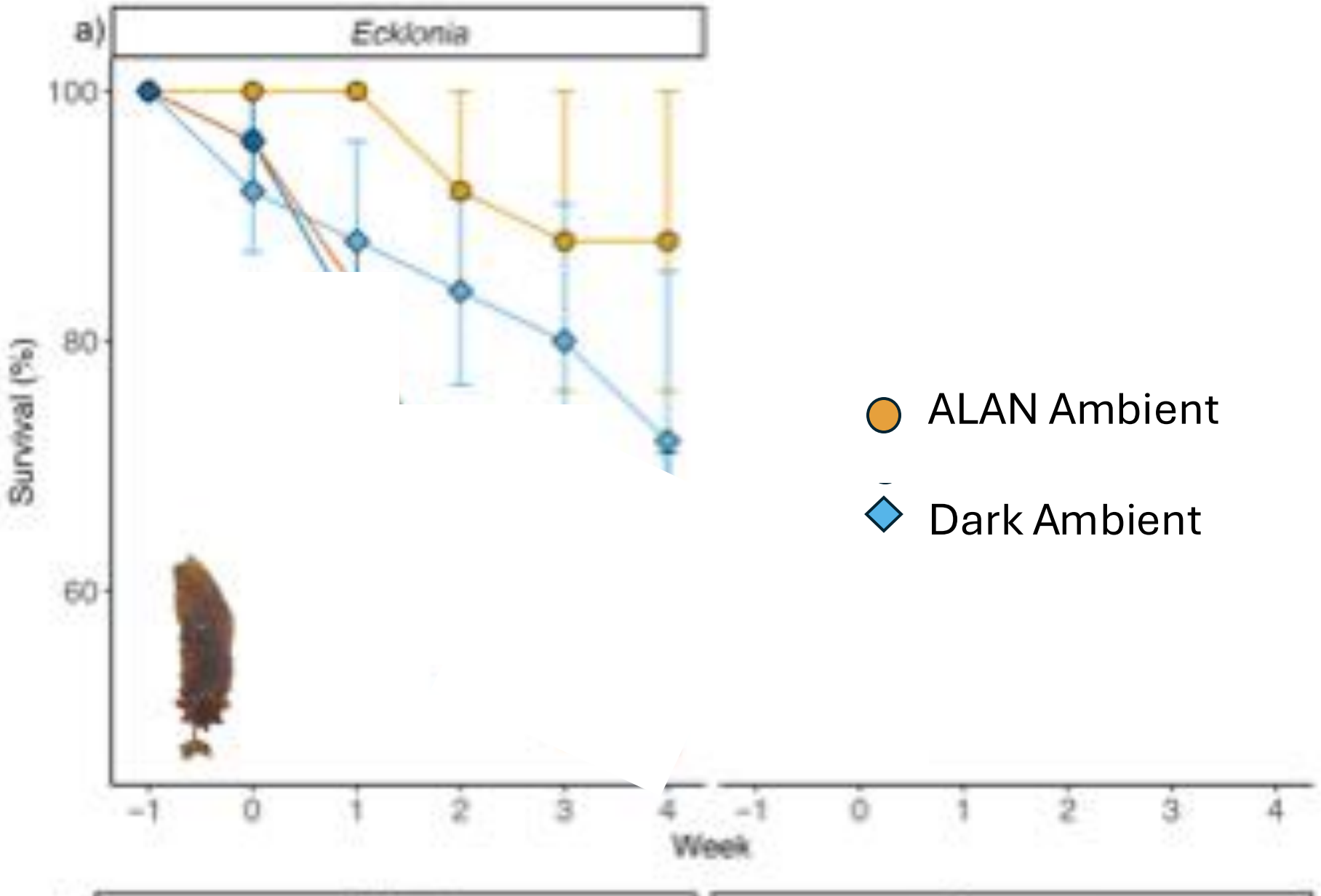
DIRECT EFFECTS OF ALAN

Ecklonia radiata (Golden kelp) & *Sargassum* spp.

Effects of artificial light at night on seaweed growth and survival

Milly Caley

ALAN & warming ha negative synergistic effects on kelp survival

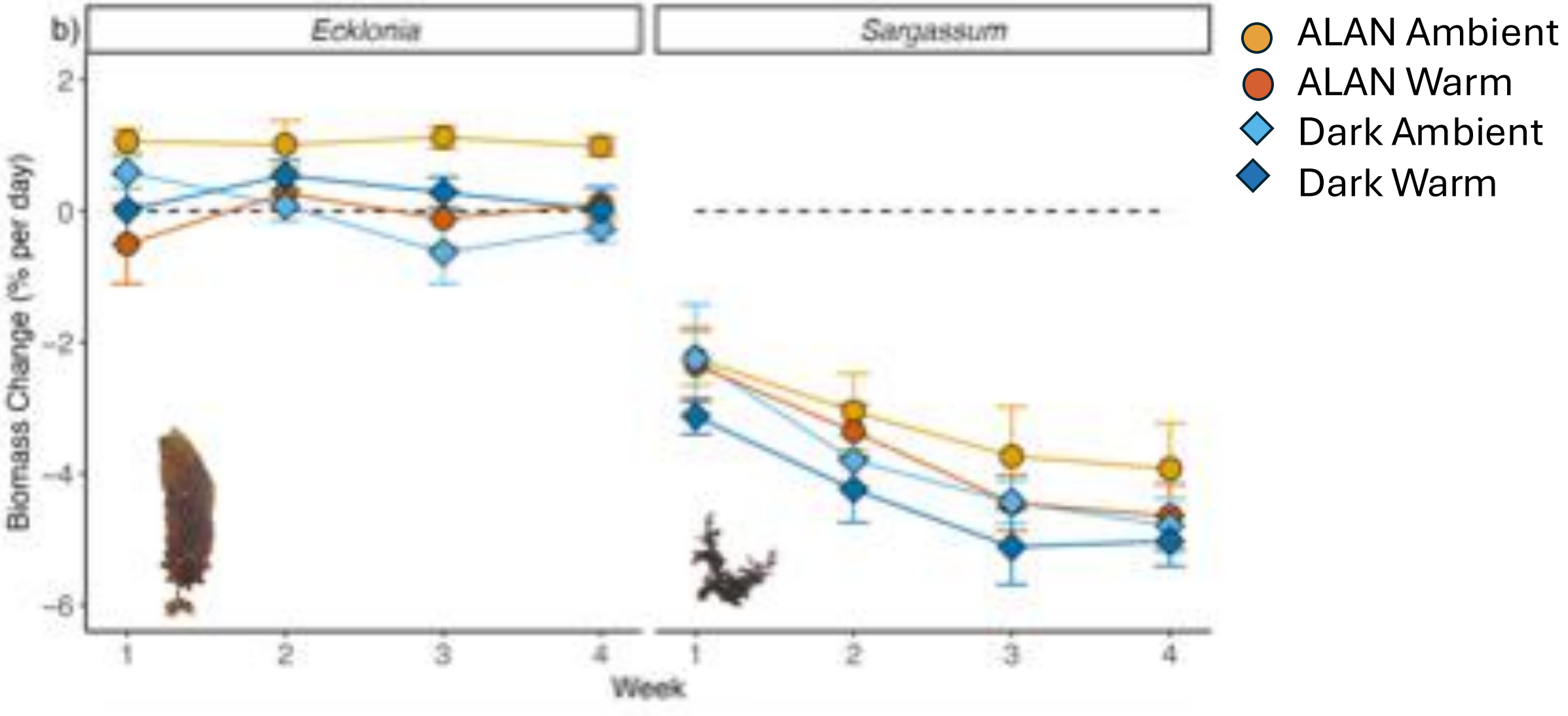


ALAN Ambient

Dark Ambient

Reduced survival

Artificial light at night increases growth of kelp, but only in the absence of warming



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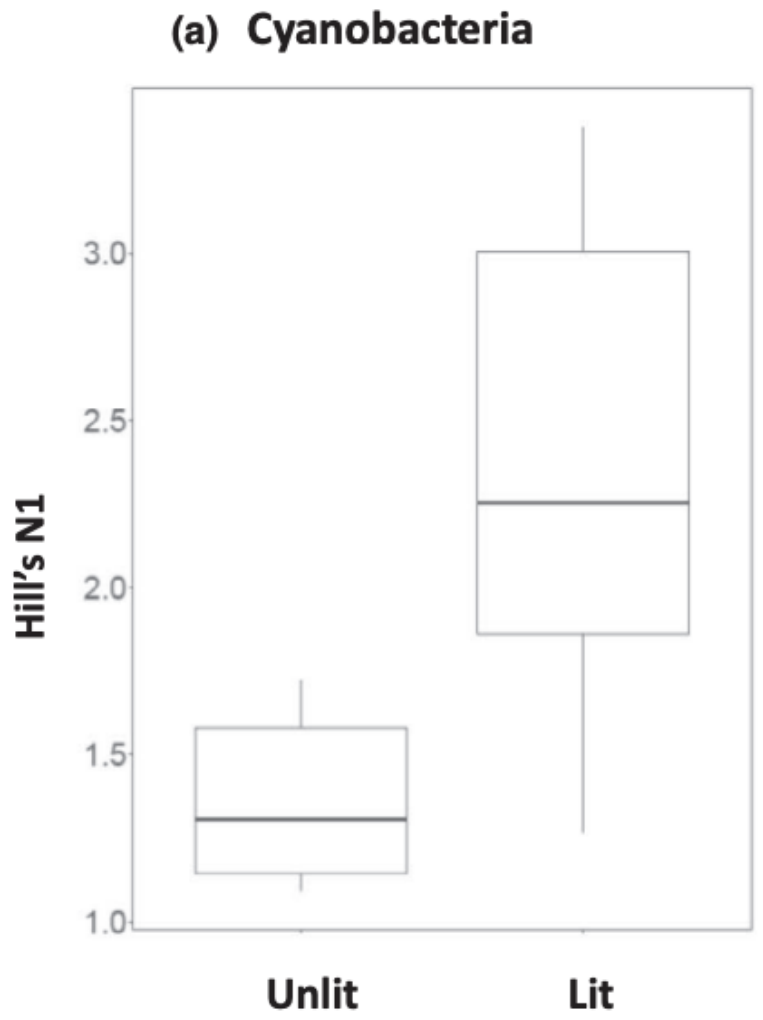
Artificial light at night (ALAN) alters the physiology and biochemistry of symbiotic reef building corals☆

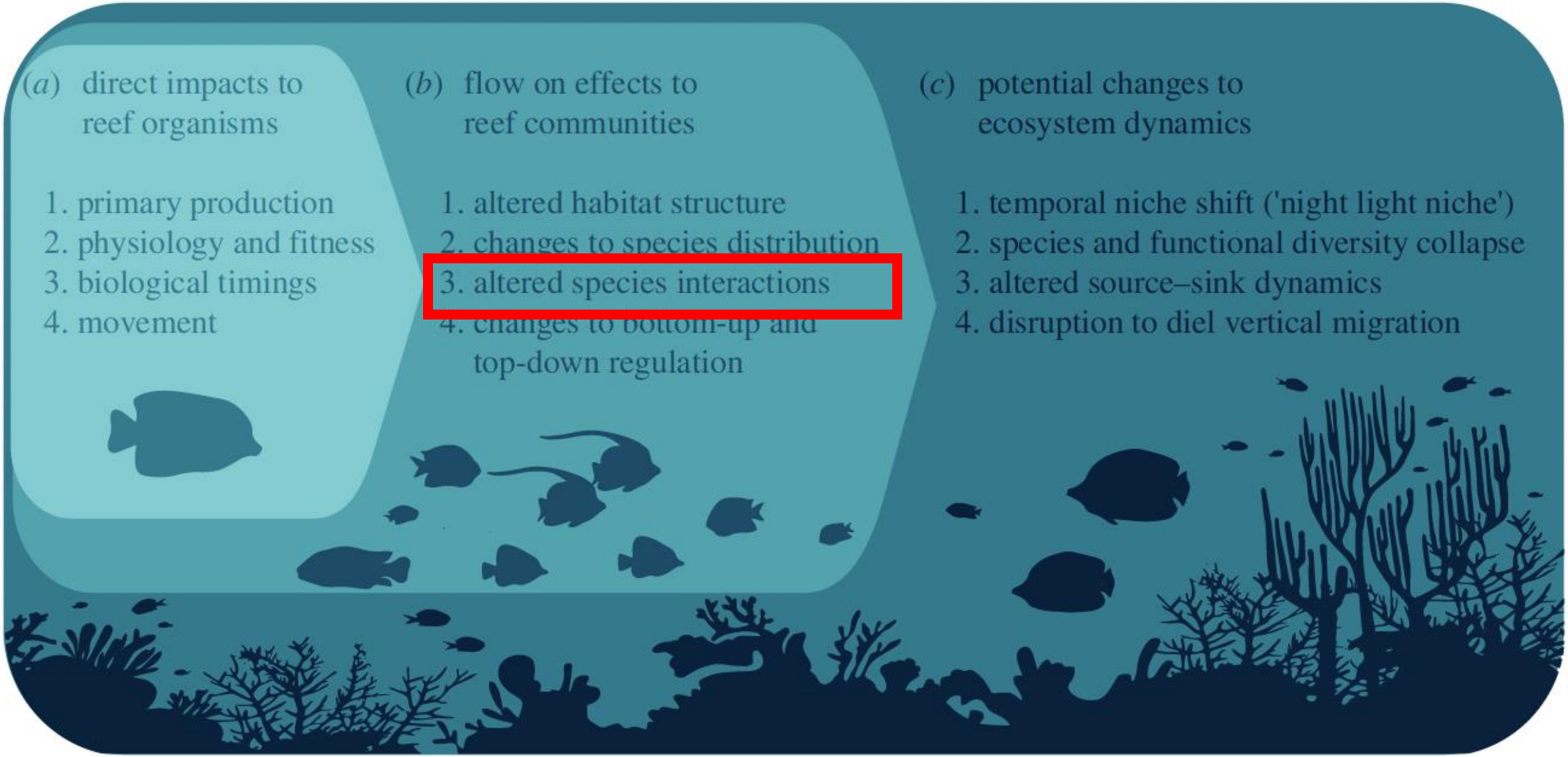
Oren Levy [a, *, 1], Laura Fernandes de Barros Marangoni [b, 1], Jennifer I. C. Benichou [a], Cécile Rottier [b], Eric Béraud [b], Renaud Grover [b], Christine Ferrier-Pagès [b]

[a] Mina and Everard Goodman Faculty of Life Sciences, Bar-Ilan University, Ramat Gan, 52900, Israel
[b] Centre Scientifique de Monaco, Biologie Marine, Equipe d'Ecophysiologie, MC-98000, Monaco

Marine Biofilm



Maggi et al 2019

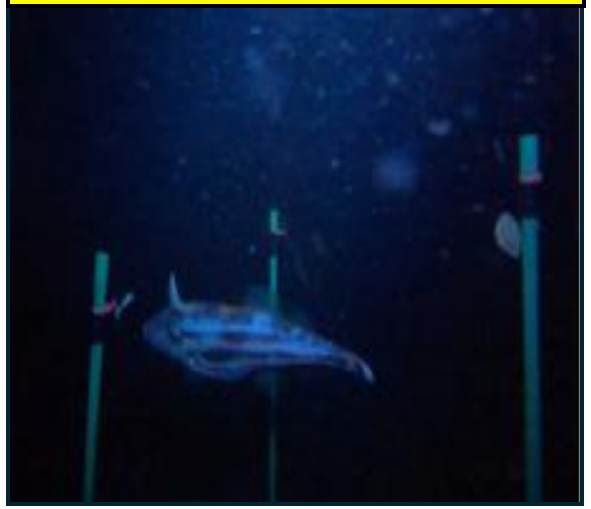


Fobert et al 2024

Effects of artificial light at night on fish predation and herbivory

Predation

Artificial Light at Night



Dark Night

Daylight

Effects of artificial light at night on fish predation and herbivory

Predation

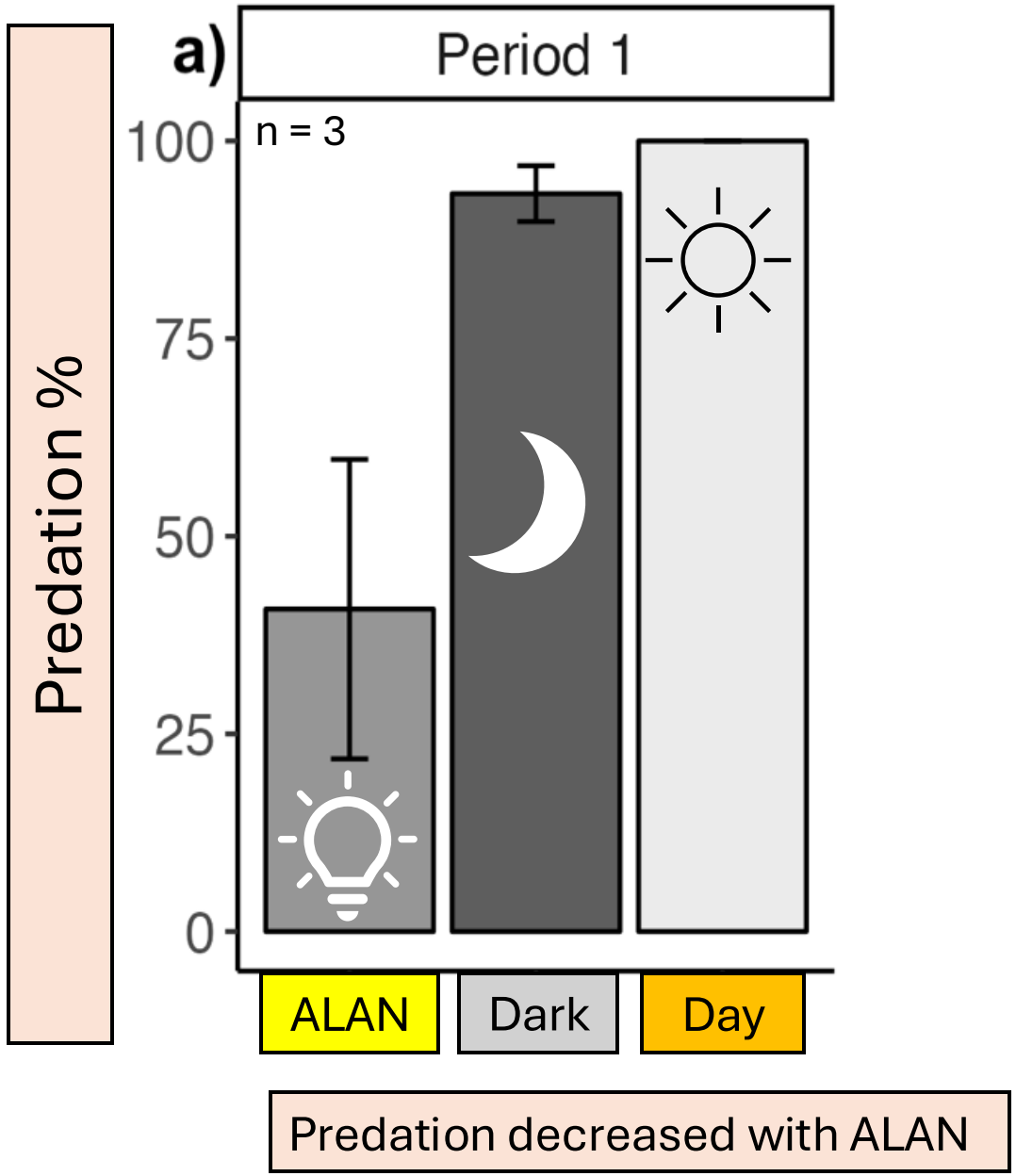
Herbivory

Artificial Light at Night

Dark Night

Daylight

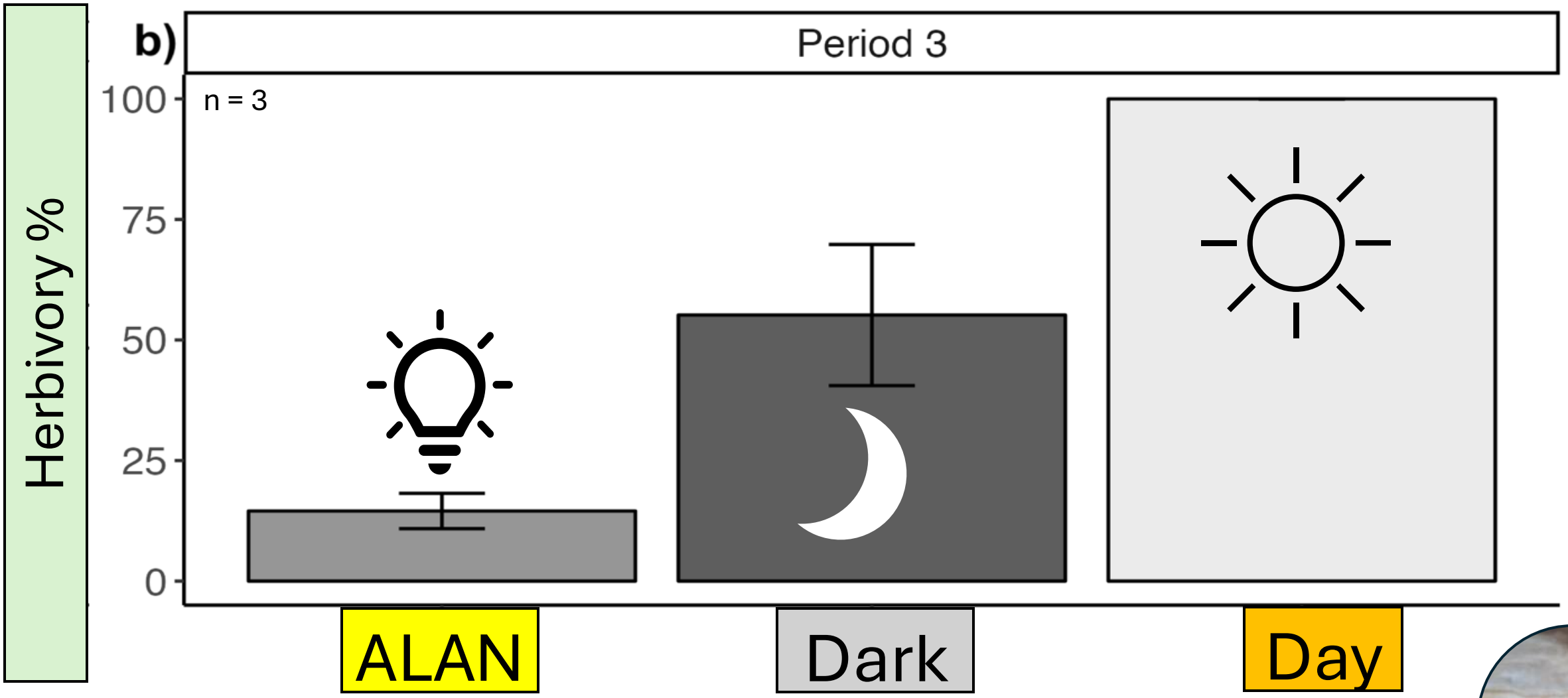
Artificial light at night reduces predation and herbivory by fish



Predation decreased with ALAN

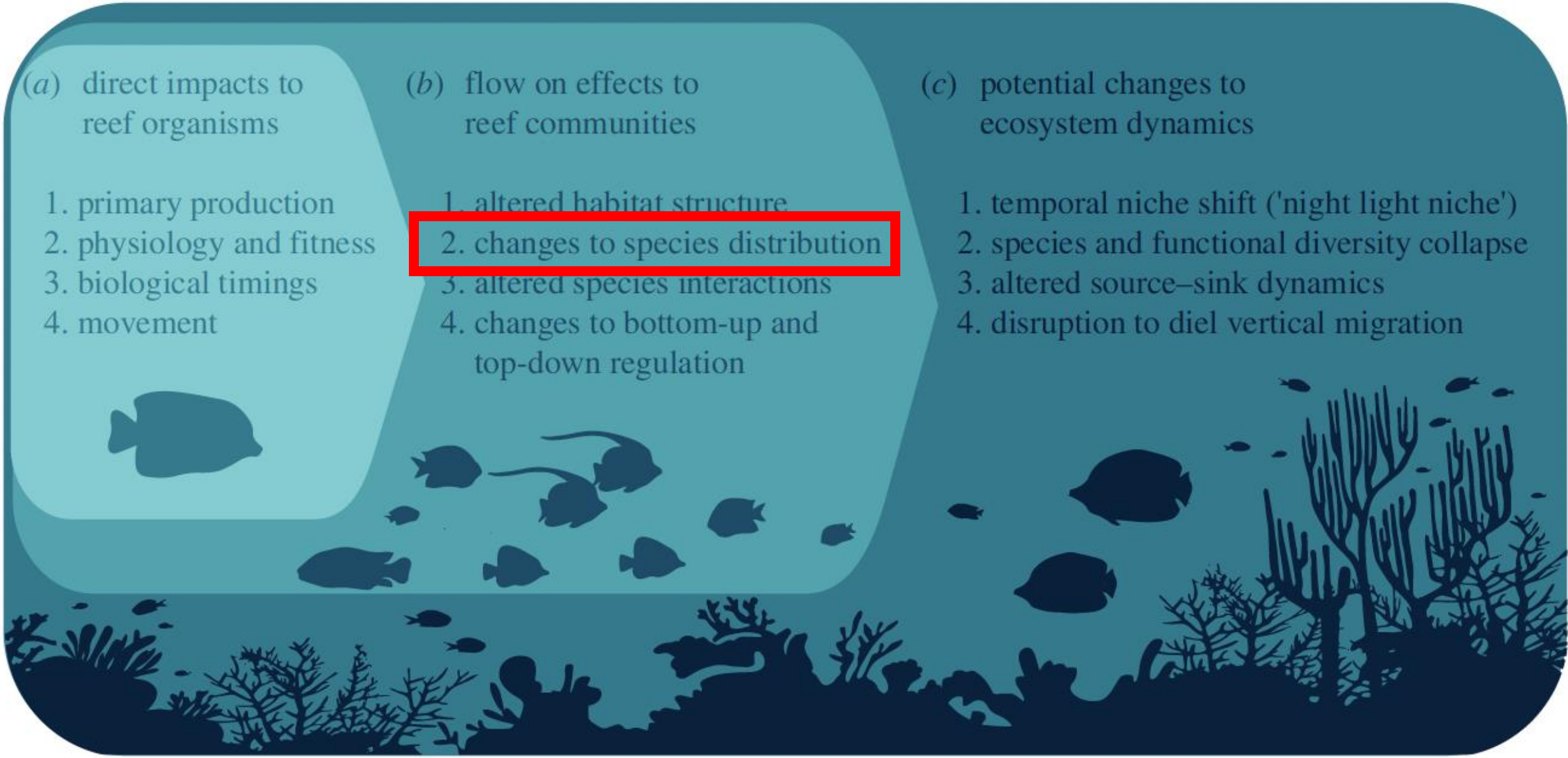
Hei et al. 2025

Artificial light at night reduces predation and herbivory by fish



Herbivory Decreased with ALAN

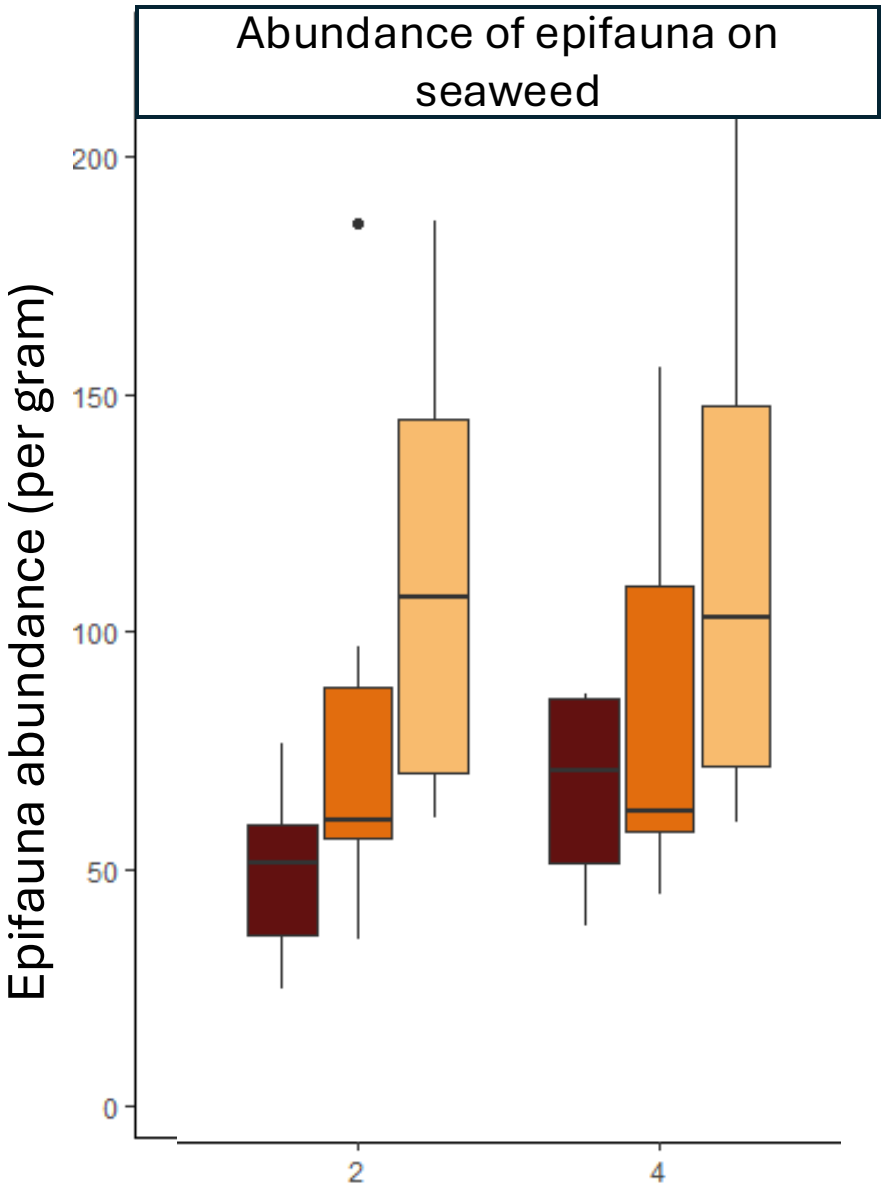
Hei et al. 2025

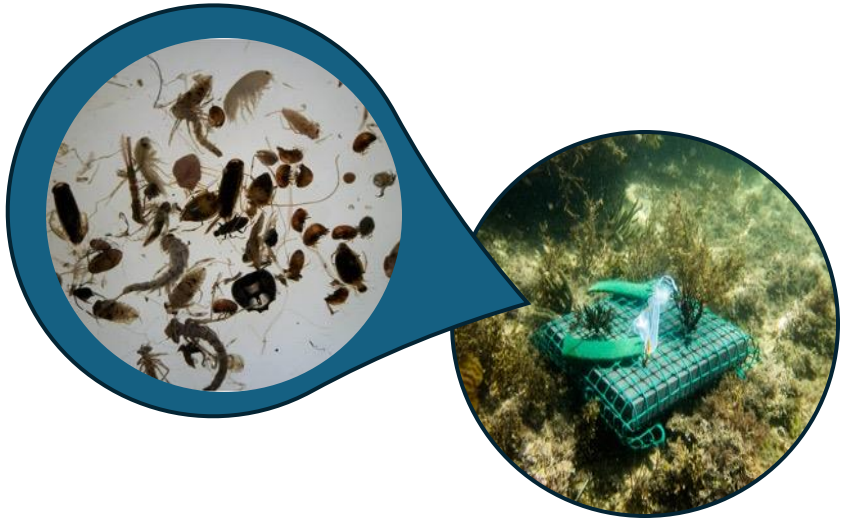


Fobert et al 2024

Effects of artificial light at night on re-distribution of species

Nikki Hubbard





Light Levels

Control

Low

High

Abundance of epifauna on seaweed

Epifauna abundance (per gram)

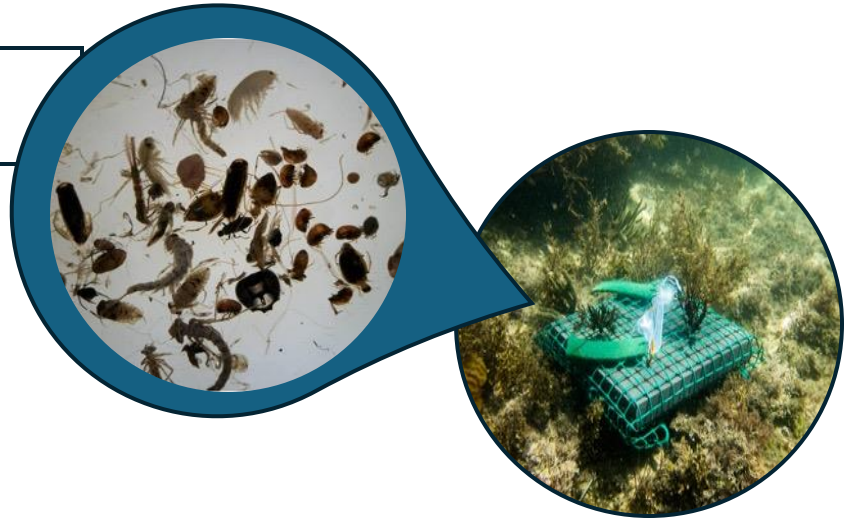
200
150
100
50
0

2
4

Spp Richness of epifauna on seaweed

Species Richness (per gram)

2
4



Light Levels

Control

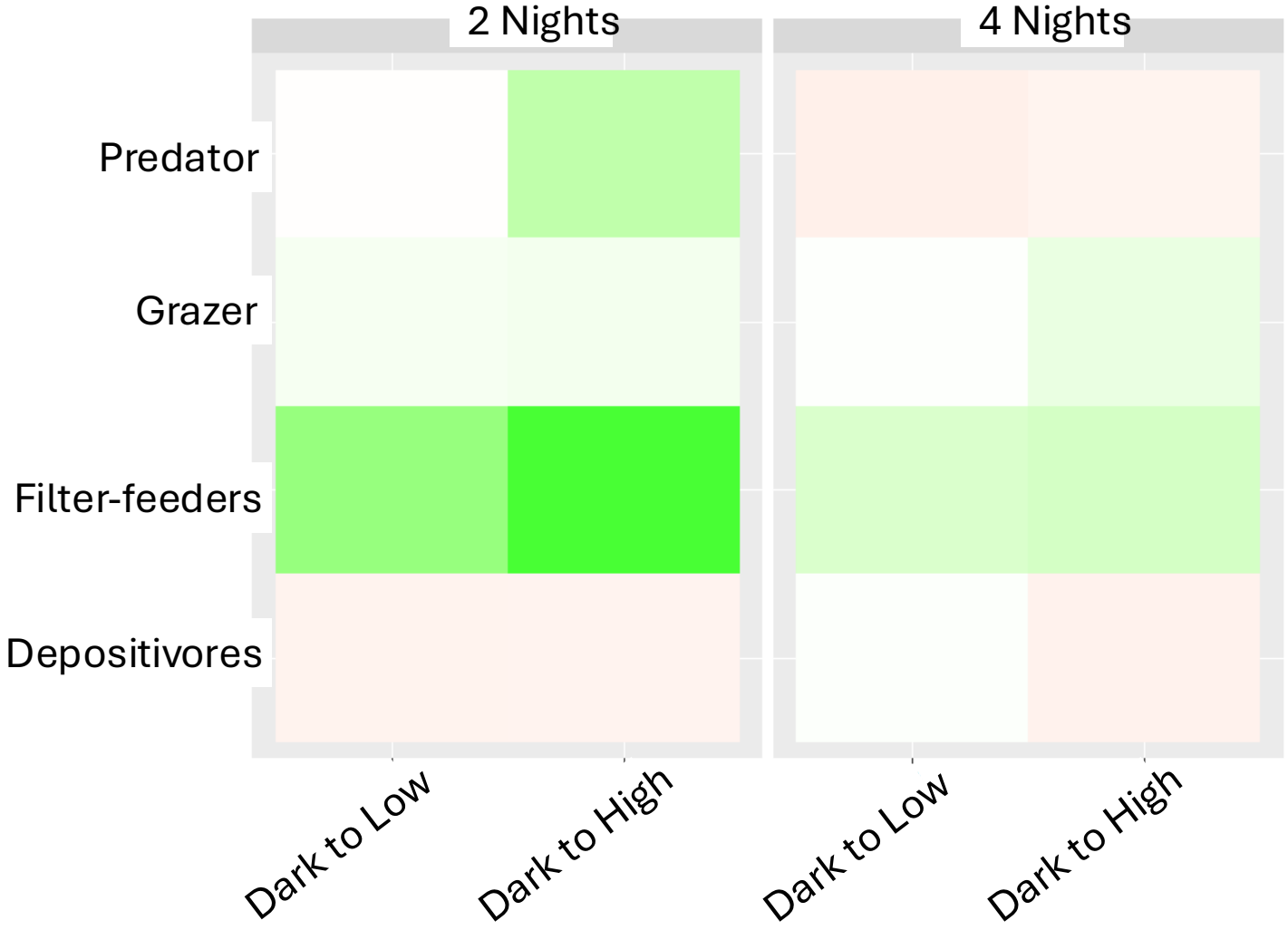
Low

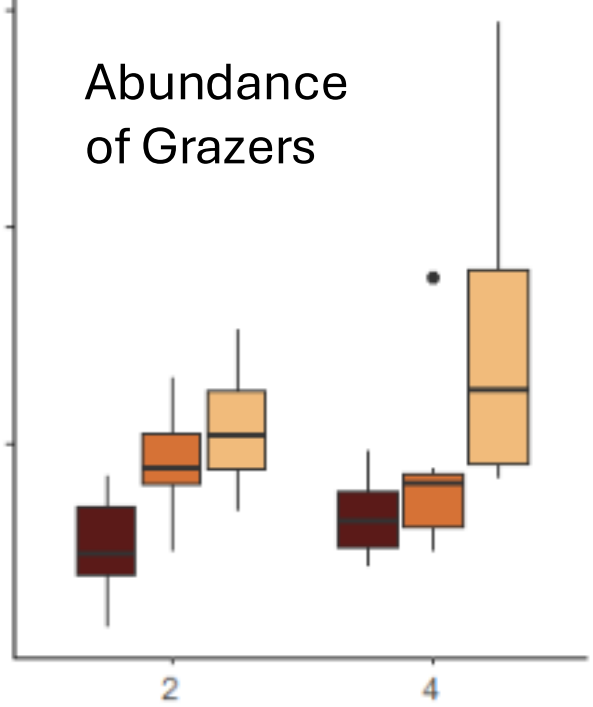
High

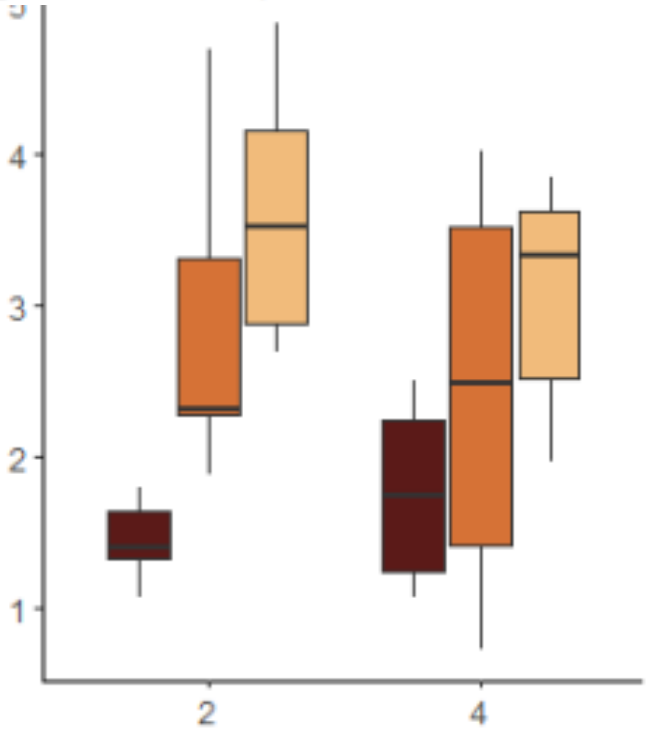
Length of Deployment (nights)

Functional groups – feeding guilds

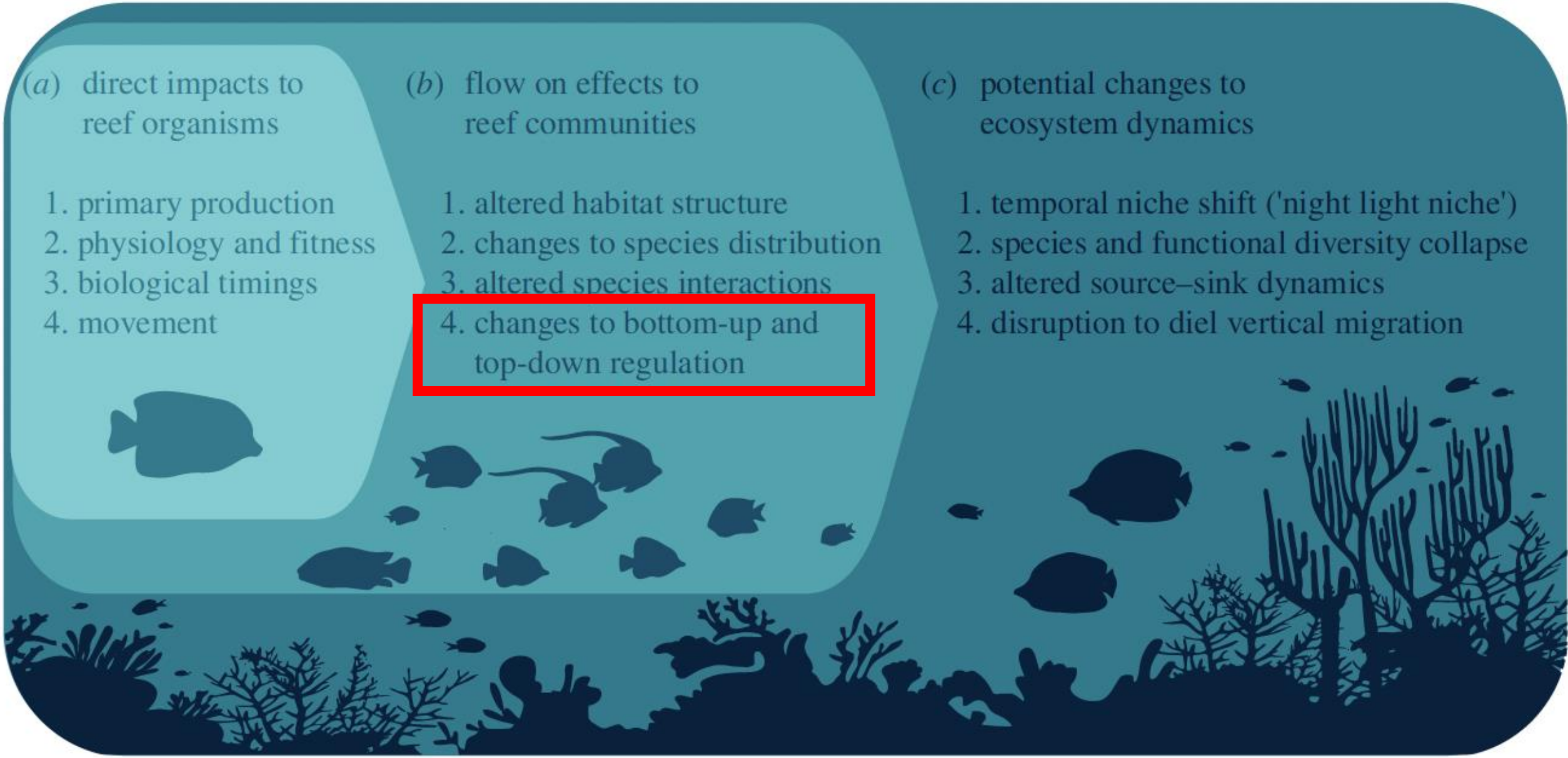
Heat map – Abundance changes







Abundance of
Filter feeders



Fobert et al 2024

Artificial light at night and warming impact grazing rates and gonad index of the sea urchin *Centrostephanus rodgersii*

Amelia Caley[1], Ezequiel M. Marzinelli[2], Maria Byrne[2] and Mariana Mayer-Pinto[1]

RESEARCH ARTICLE

Functional Ecology | BRITISH ECOLOGICAL SOCIETY

Artificial light at night erases positive interactions across trophic levels

Elena Maggi[1] | Lucia Bongiorni[2] | Debora Fontanini[1] | Antonella Capocchi[1] | Martina Dal Bello[3] | Andrea Giacomelli[4] | Lisandro Benedetti-Cecchi[1]

Coastal urban lighting has ecological consequences for multiple trophic levels under the sea

D. Bolton [a], M. Mayer-Pinto [a,b,*], G.F. Clark [a], K.A. Dafforn [a,b], W.A. Brassil [a], A. Becker [c], E.L. Johnston [a]

This work was conducted on the lands and waters of the Gadigal, Birrabirragal, Bidjigal and Cammeraygal people.

THANK YOU!

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Co-authors: Amelia Caley, Nik Hubbard, Emily Fobert, Gabrielle Hei Tung Yeung, Ezequiel Marzinelli, Maria Byrne, Katherine Dafforn, Alistair Poore and others

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