Assessing the potential impact of the non-native Asian date mussel in the UK using inter-species comparisons of feeding rate

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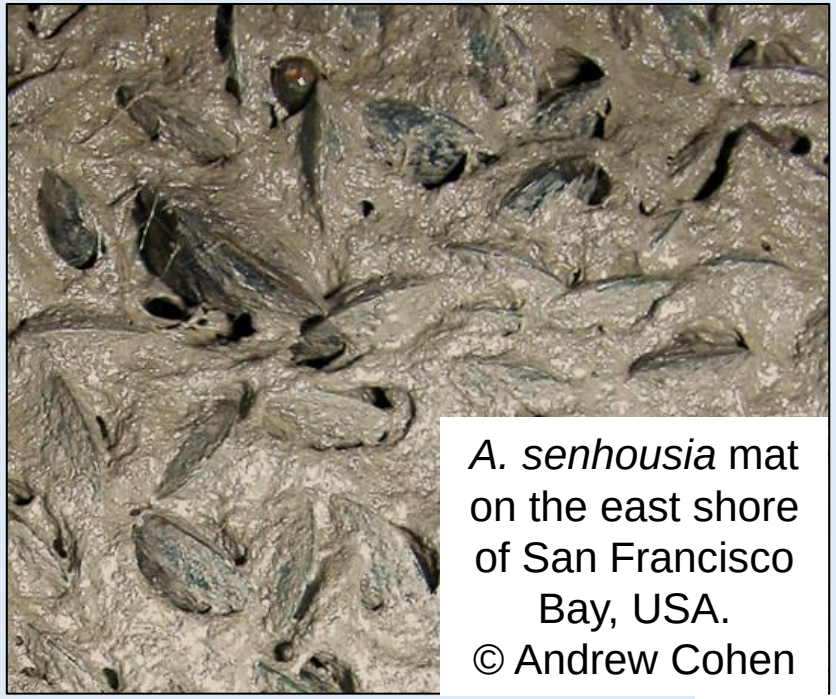
Funders:

Asian date mussel (*Arcuatula senhousia*)

What is it?

- Small marine mussel
- Fast growth rate
- Short-lived
- Forms dense mussel mats

A. senhousia © Kate Dey 2021



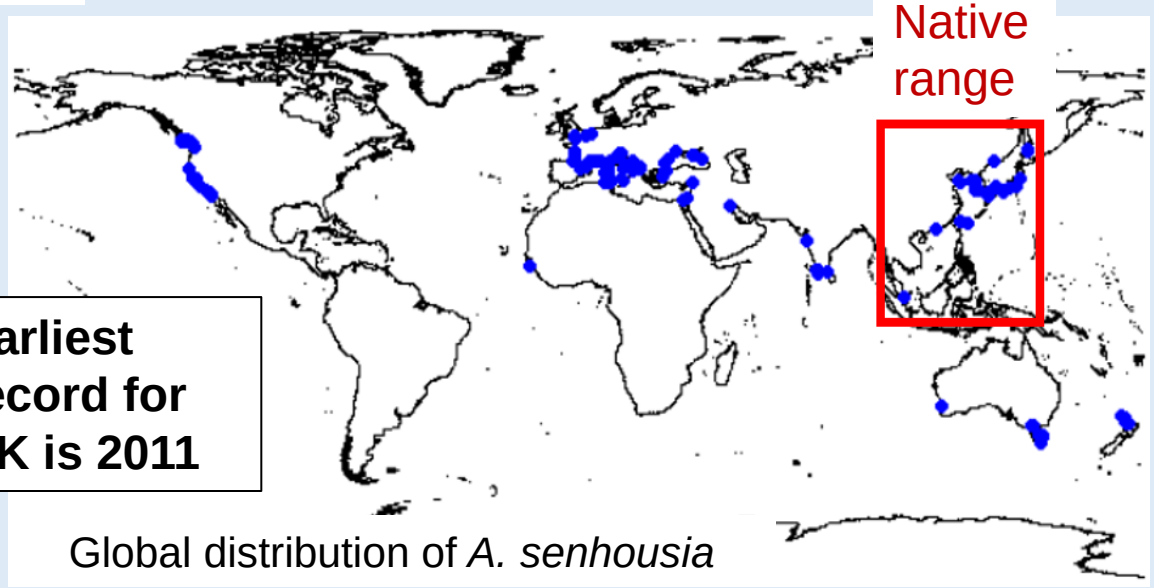
A. senhousia mat on the east shore of San Francisco Bay, USA. © Andrew Cohen

PhD focus

Current and future distribution

Population dynamics and reproduction

Impacts



Earliest record for UK is 2011

Global distribution of *A. senhousia*

Co-occurring bivalve species

Blue mussel,
Mytilius edulis

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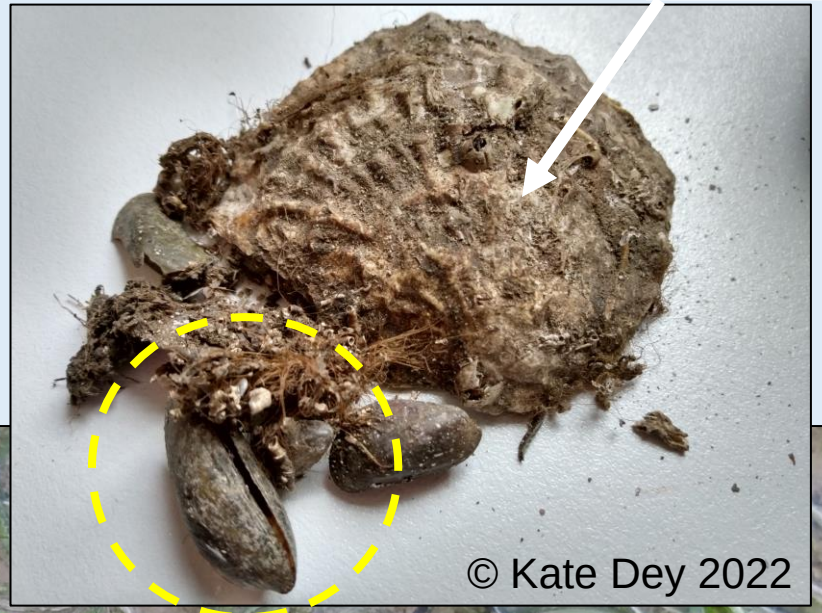
European flat oyster,
Ostrea edulis



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Pacific oyster,
Crassostrea gigas

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Manila clam,
Ruditapes philippinarum

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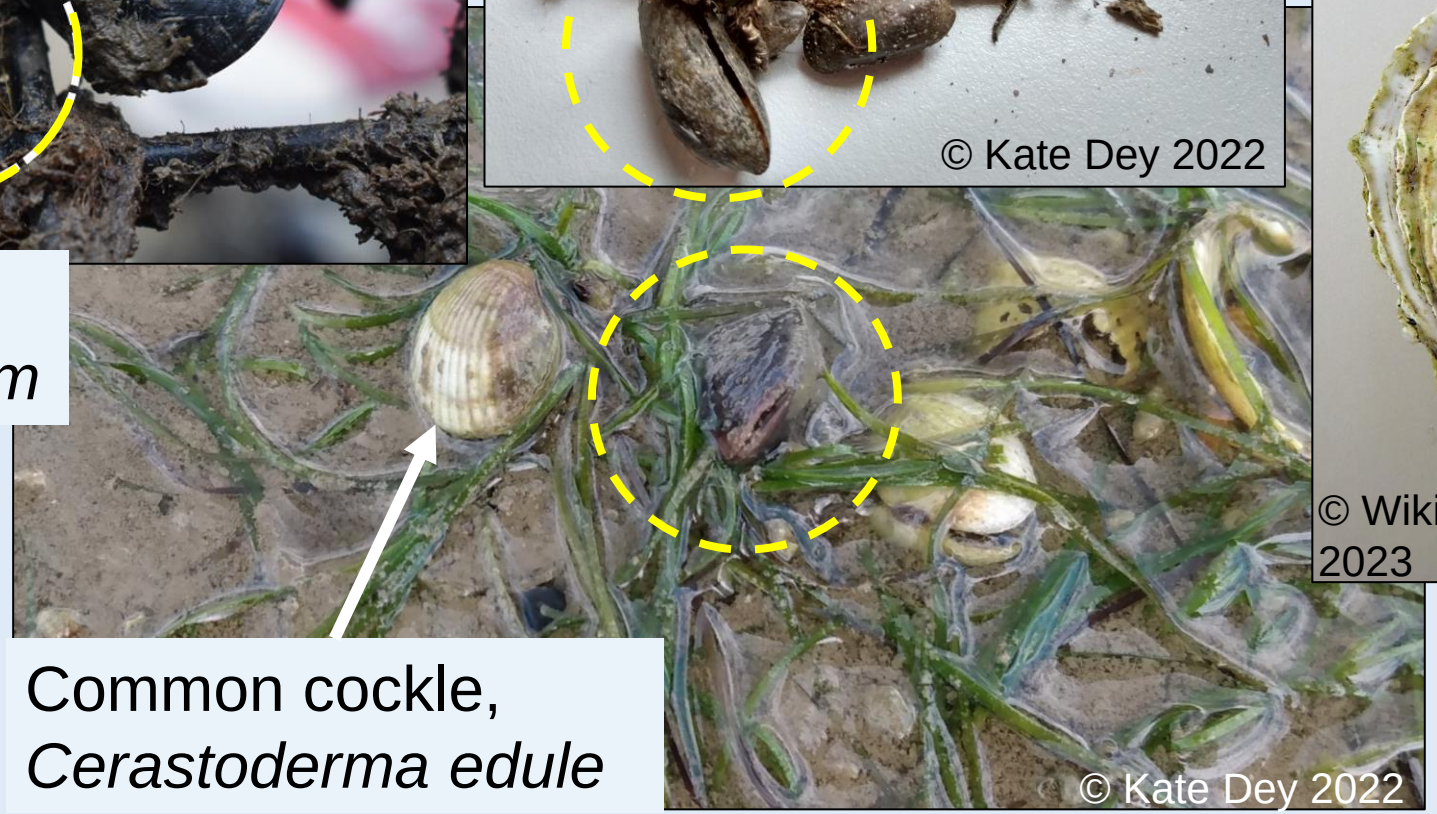
Common cockle,
Cerastoderma edule



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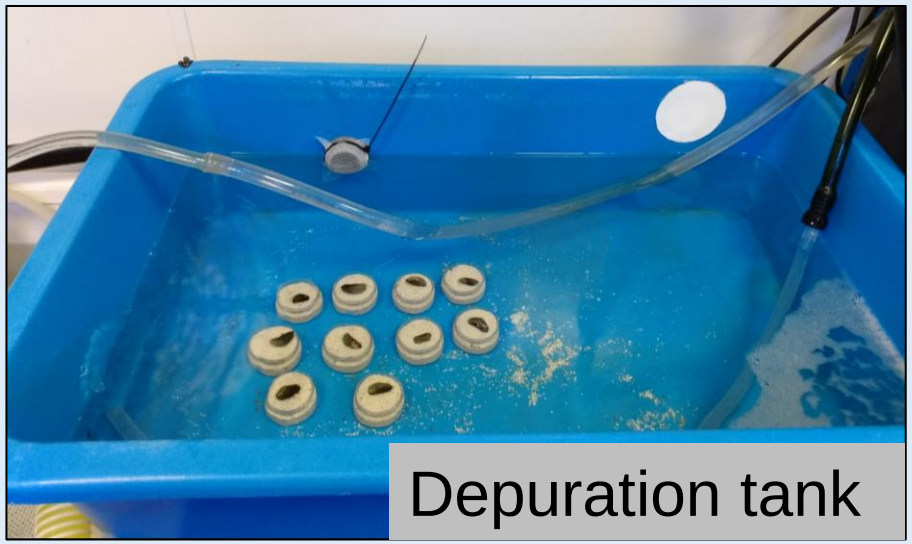
Feeding rate experiment

Aims

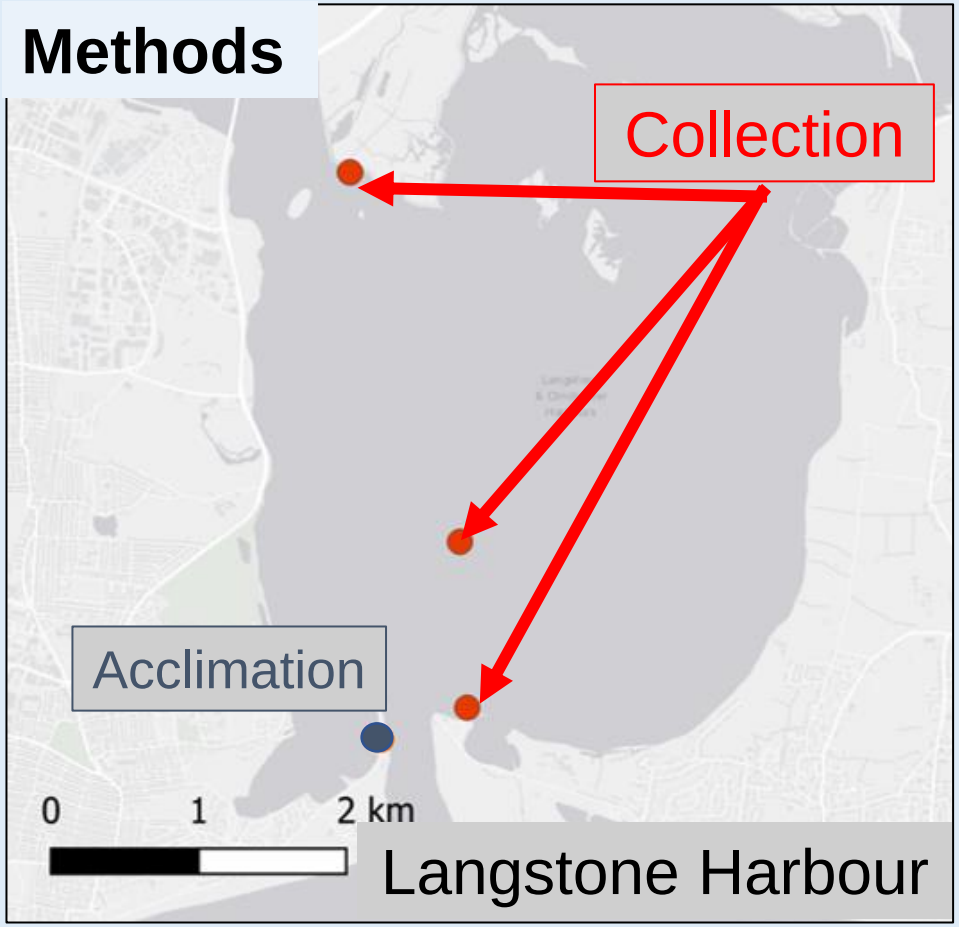
To determine if *A. senhousia*:

- will compete for food with species it occurs with
- will alter natural capital

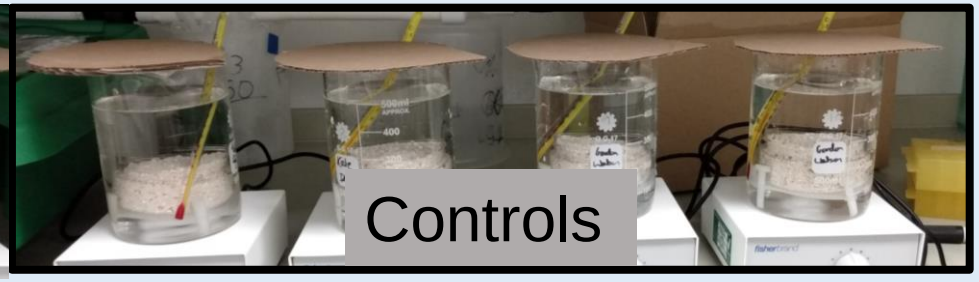


Depuration tank

Methods

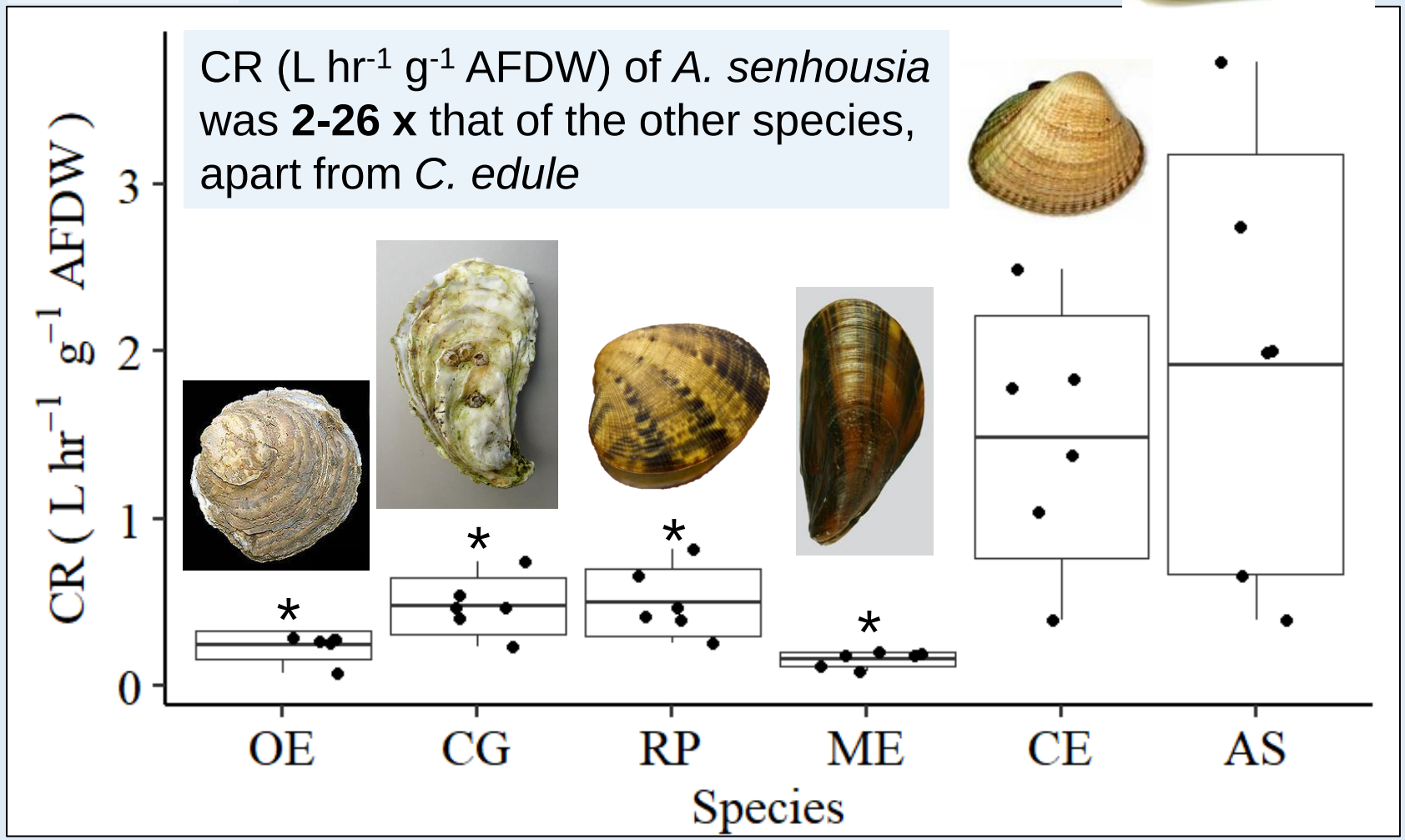


Indirect clearance rate (CR) method



Controls

Results



* = CR is significantly different from *A. senhousia*

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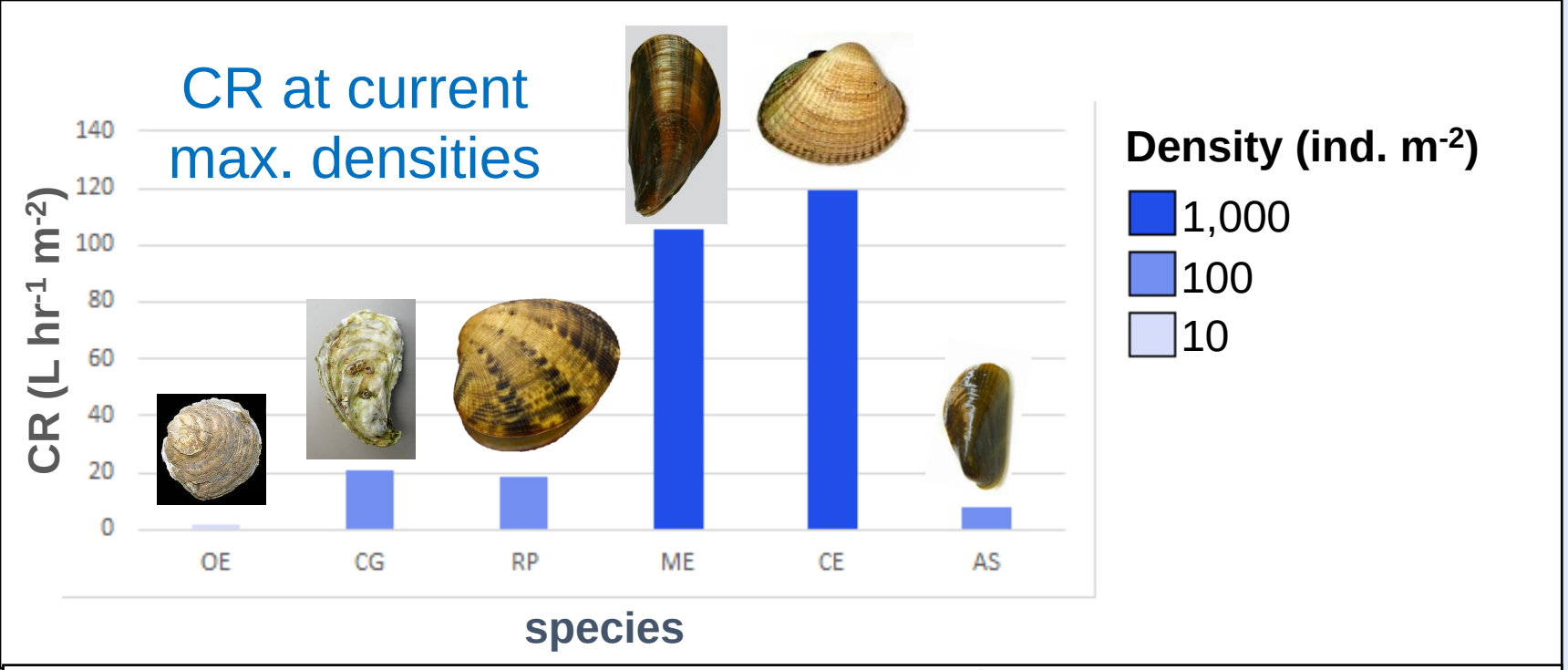
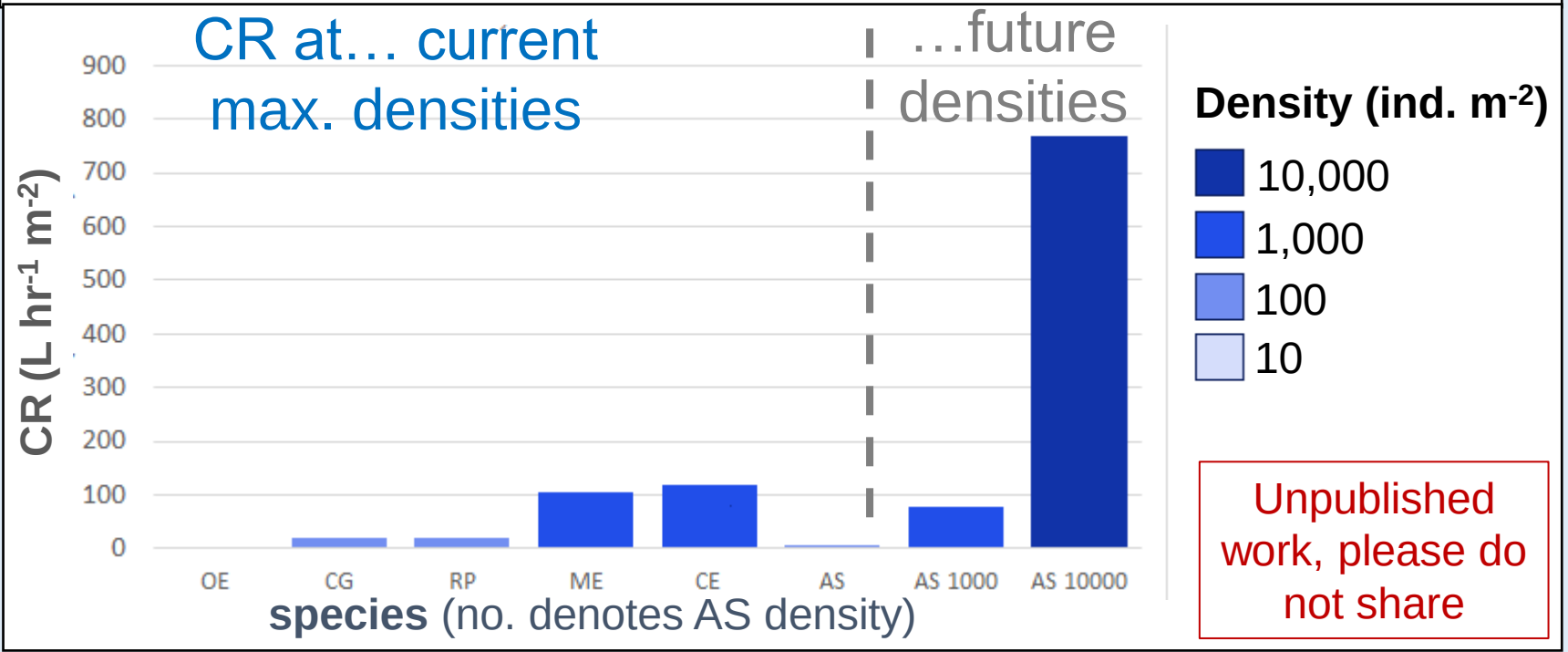
Fig. 2. Clearance rate (CR) (L hr^{-1} g^{-1} AFDW) of *Ostrea edulis* (OE), *Crassostrea gigas* (CE), *Ruditapes philippinarum* (RP), *Mytilus edulis* (ME), *Cerastoderma edule* (CE) and *Arcuatula senhousia* (AS). Horizontal line = mean, box = 1 standard deviation, dots = CR for each specimen





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Results

At current max. densities:

- CR of *A. senhousia* per m^2 is lower than all other species, apart from *O. edulis* (OE)

If *A. senhousia* densities reach **1,000 ind. m^{-2}**, its CR would be:

- 4 x higher than *C. gigas*
- 4 x higher than *R. philippinarum*
- 46 x higher than *O. edulis*

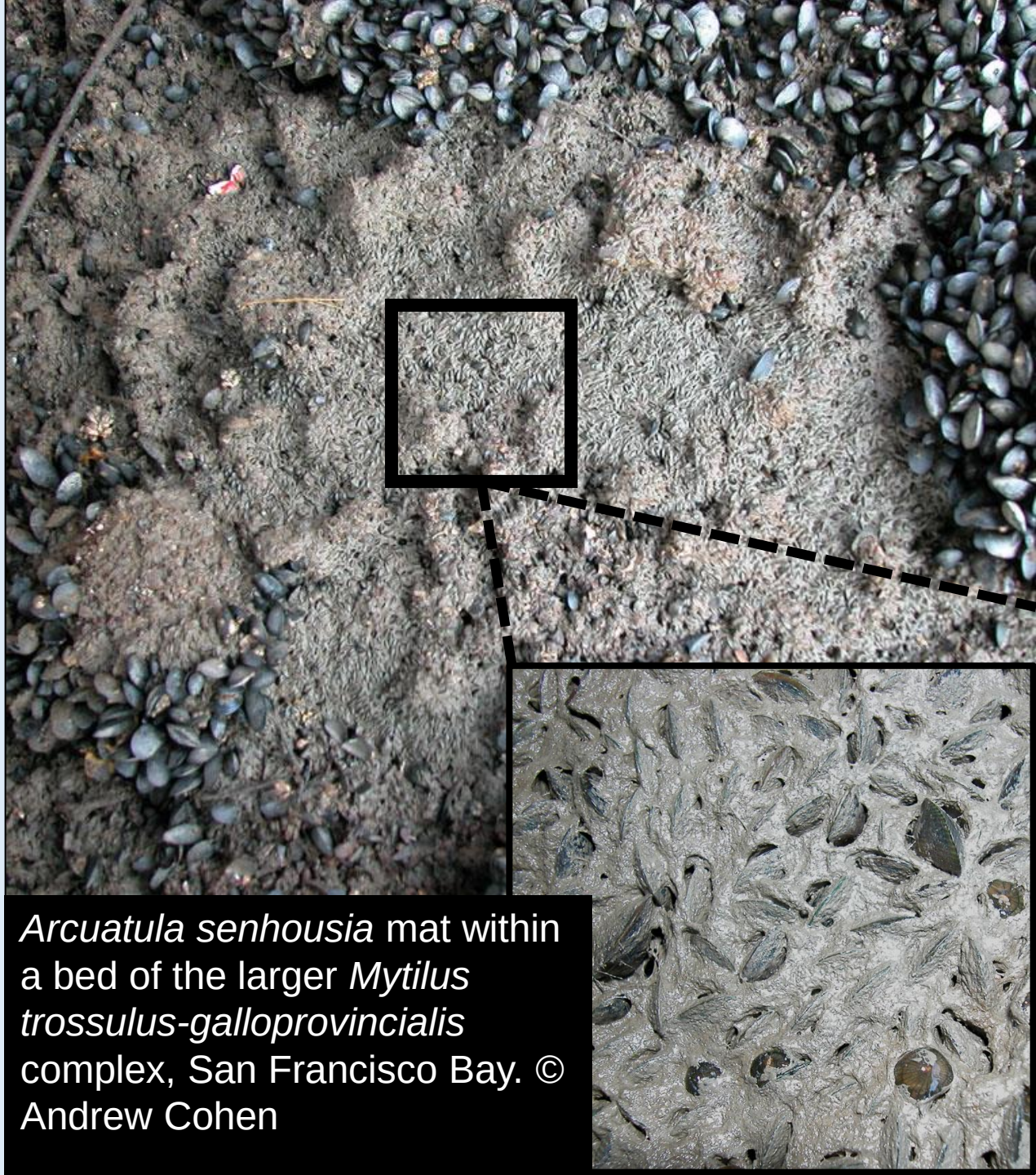
…when these species are at their maximum densities

Implications

Increase in density of Asian date mussel could result in competition
(food and/or consumption of larvae)

Changes to natural capital, and ecosystem services as a result

Alteration to the abundance and composition of plankton



Arcuatula senhousia mat within a bed of the larger *Mytilus trossulus-galloprovincialis* complex, San Francisco Bay. © Andrew Cohen

Biosecurity actions

Monitoring
(citizen science, government records)

Prevention
(re: recreational vessels, artificial structures, aquaculture, ecological restoration)

STOP THE SPREAD

Consider *A. senhousia* presence / density as a factor for site-selection for aquaculture and ecological restoration

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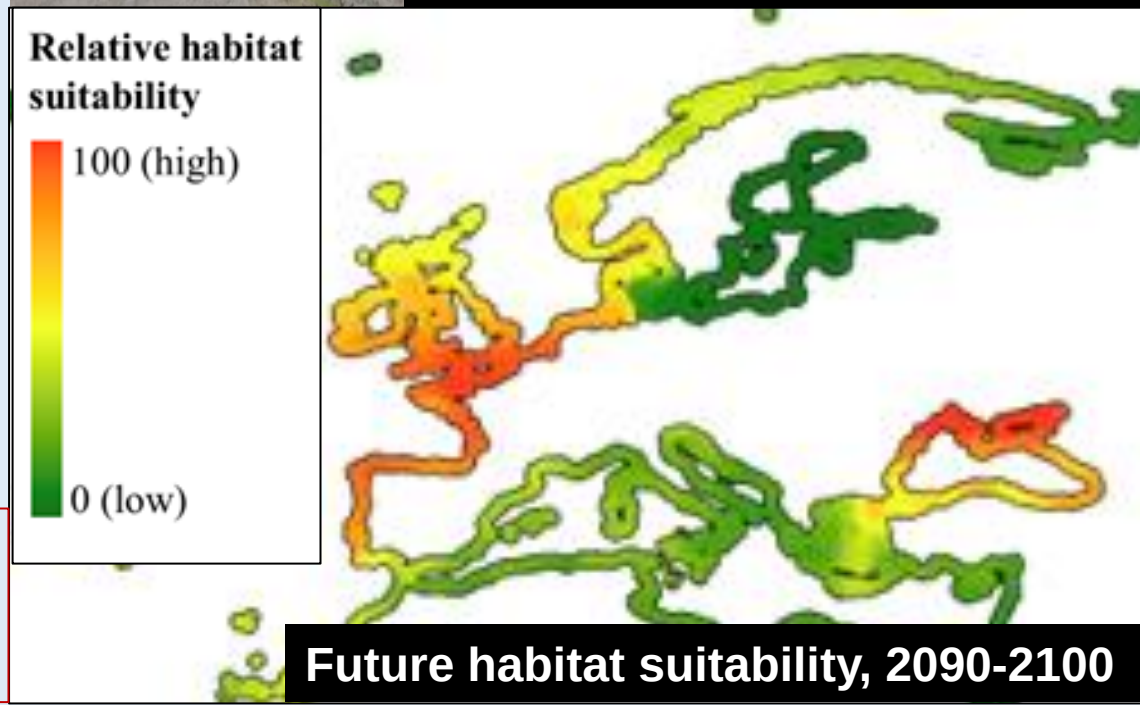
Arcuatula senhousia in seagrass bed, UK © Kate Dey 2022



Future habitat suitability, 2090-2100

Thank you for listening

Any questions?

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