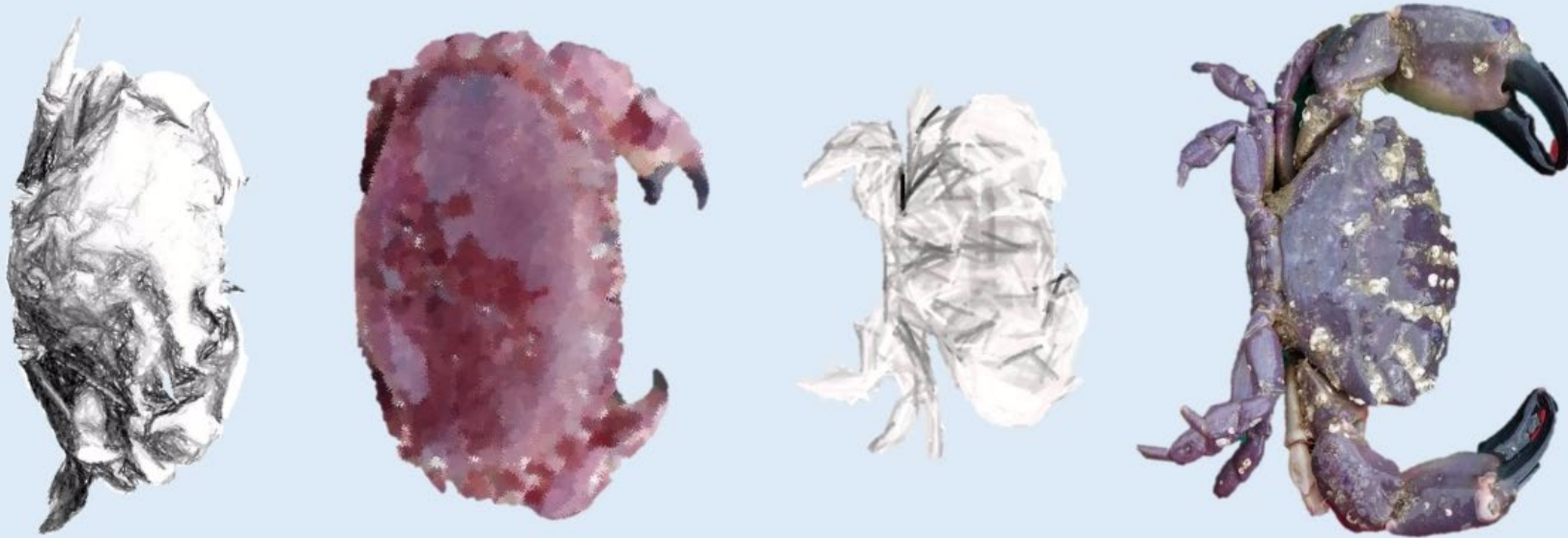


Changing Crabs



Monitoring the arrival of a new species with citizen science

Alex Purdie, Alderney Wildlife Trust, awte@alderneywildlife.org

Presentation for IEM Isle of Man 2025

Turn back the clock to 2017

- Trumps first inauguration
as president
- Hull is the UK city of
culture
- and Despacito is top of the
charts



Turn back the clock to 2017

But in Alderney, we are focused on crabs

- Fishers have noticed declining catches and increased disease
- And a new species has been recorded



A close-up photograph of a crab in shallow water. The crab's carapace is a vibrant orange-brown color with a textured, pitted surface. Its large, black-tipped claws are visible on the left. The crab is surrounded by various types of seaweed, including dark red and brown species. The water is clear, showing some submerged rocks and more seaweed in the background.

Crabs are important in Alderney

- Fishing fleet
- Strong cultural connection to the shore
- Important feature of intertidal and subtidal ecology ^{e.g. 1}

AWT felt it was important to respond to the concerns

Preliminary surveys

Dipping our toe into the proverbial rock pool

- What species are there?
- Is the new species a potential problem?
- Are there signs of disease in the intertidal zone?



Edible crab
(‘AKA’ Chancre)

Cancer pagurus





Green shore crab

Carcinus maenas



Velvet swimming crab

Necora puber



A range of other
infrequent species
e.g. this hairy crab

Pilumnus sp.

Furrowed crab

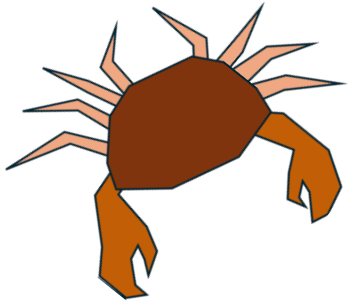
Xantho hydrophilus



Risso's crab

Xantho pilipes

And two 'new' species,
driven by climate change



The Big Three



Edible crab ('AKA' Chancre)

Cancer pagurus



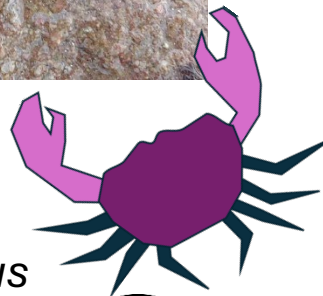
Green shore crab

Carcinus maenas



Furrowed crab

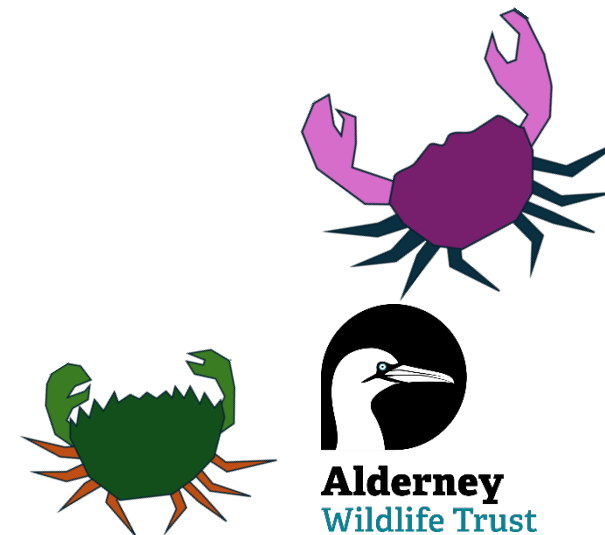
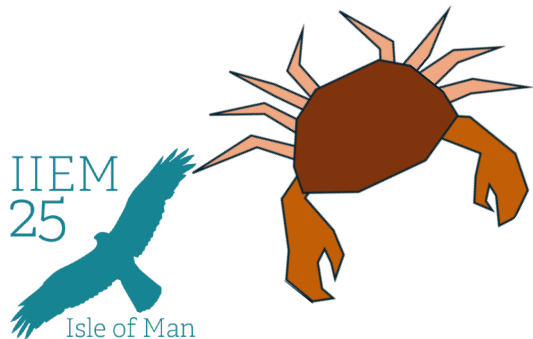
Xantho hydrophilus



Preliminary survey results



Year	n. Surveys	Green shore crab	Edible crab	Furrowed crab
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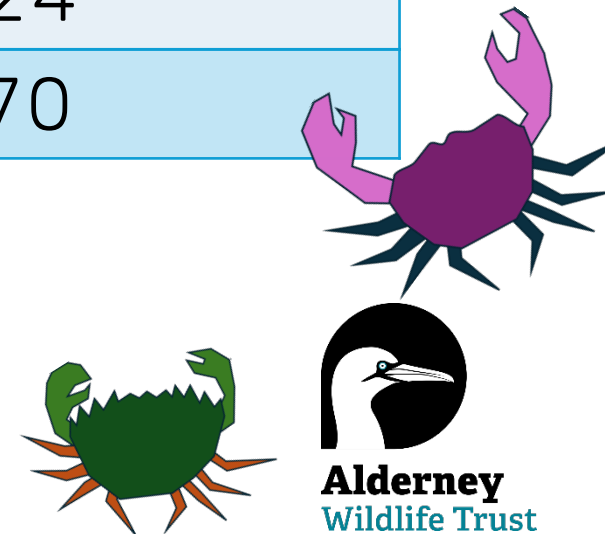
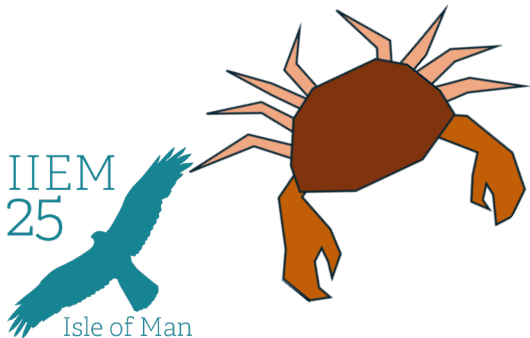
Preliminary survey results



Year	n. Surveys	Green shore crab	Edible crab	Furrowed crab
2017-2018	2	15	8	0

Partially-standardised surveys

2020	4	2	24	24
2021	11	1	41	70



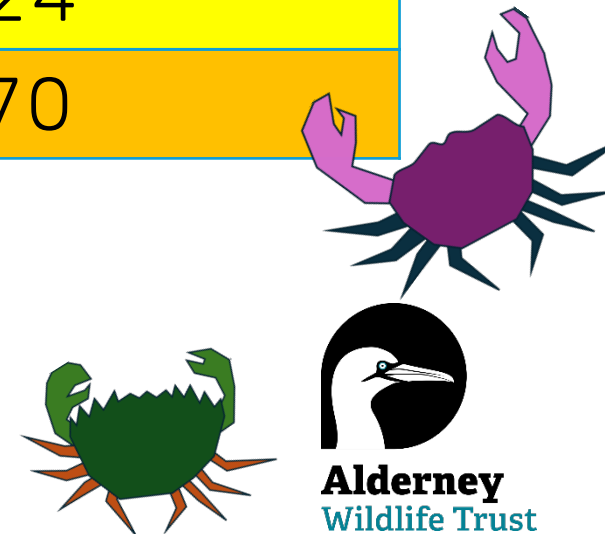
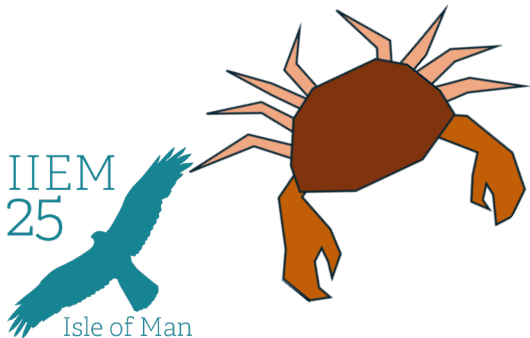
Preliminary survey results



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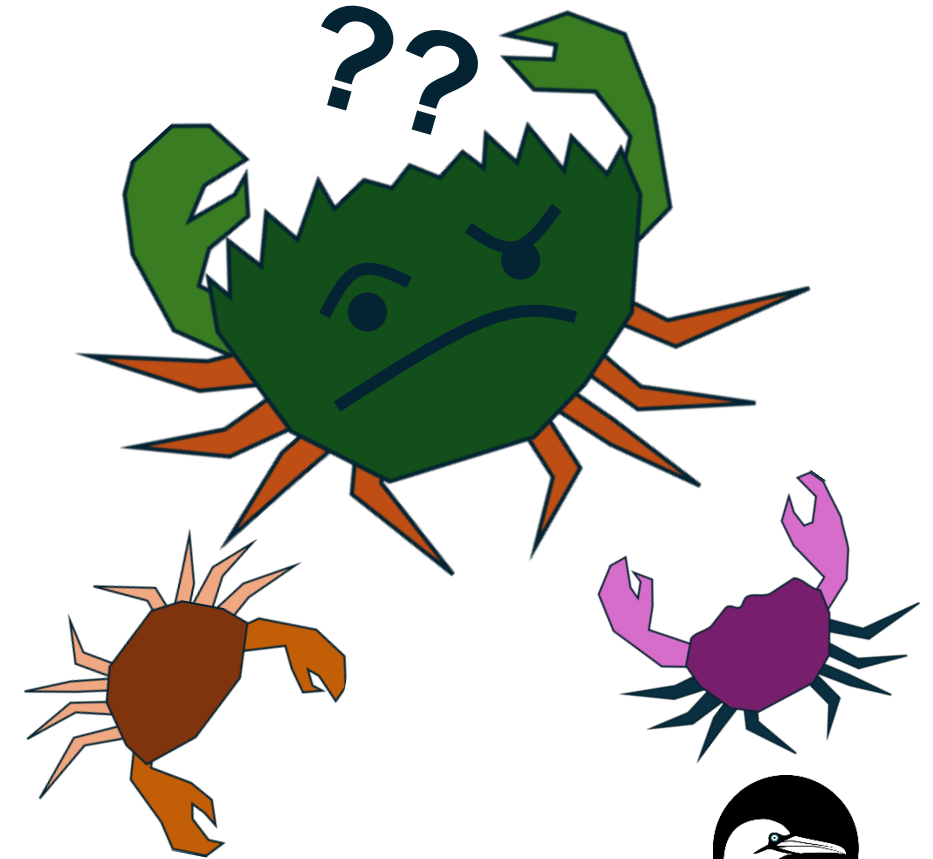




The preliminary surveys had some significant drawbacks

Without standardized surveys we cannot tell what is really happening

But without resources how can we conduct standardized surveys!?



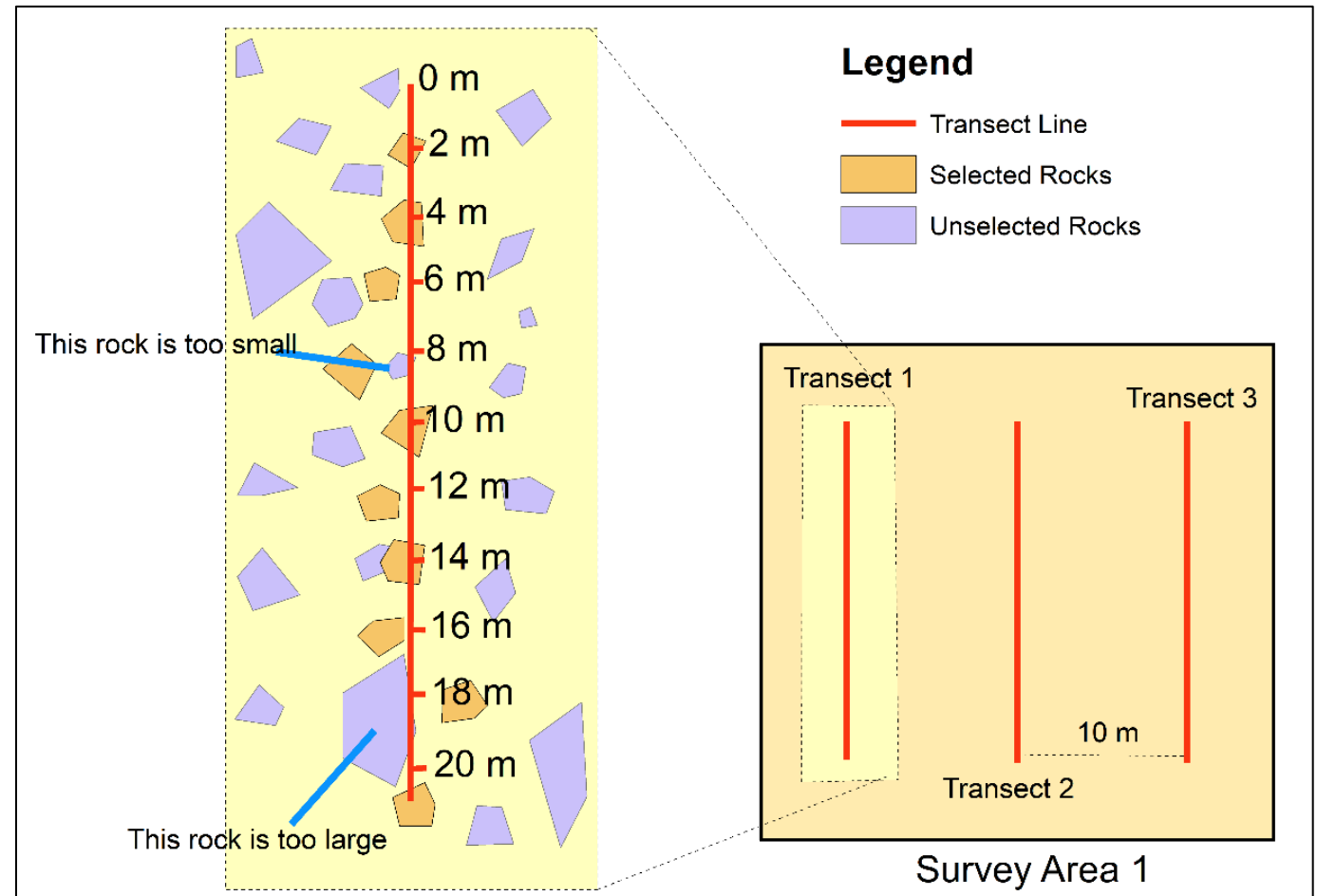
The answer... Citizen Science



Crab Surveys

We designed a new method for our 'Marine Group' to carry out

Aims to record **abundance** of all species and **biometrics** of target species.



Crab Surveys

Can be conducted by between 2-10+ people.





Crab Surveys

They are very popular with our volunteers and are one of the best for learning opportunities

IIEM
25



Isle of Man

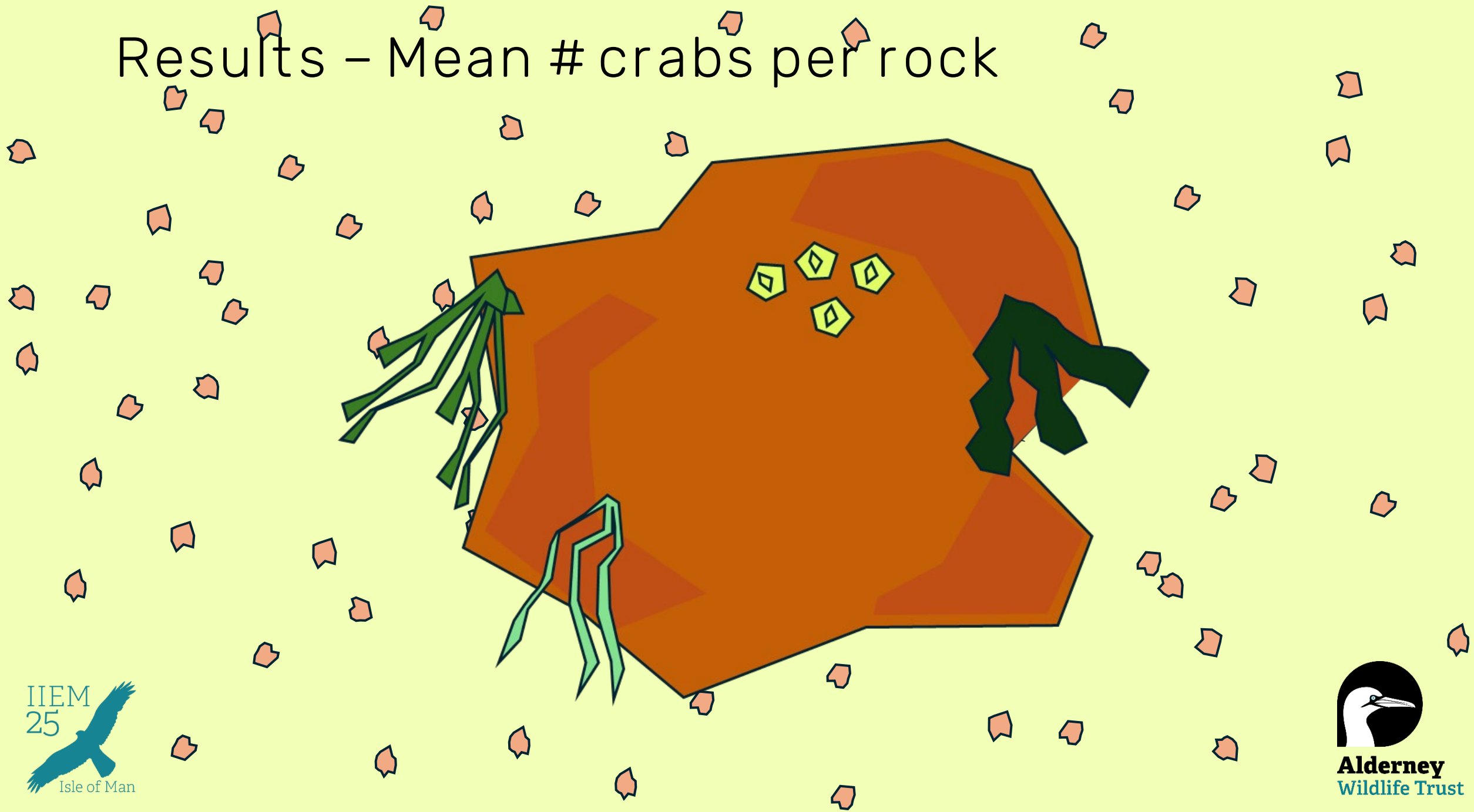


Alderney
Wildlife Trust

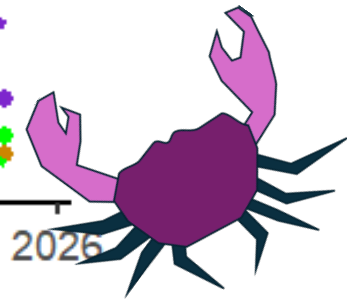
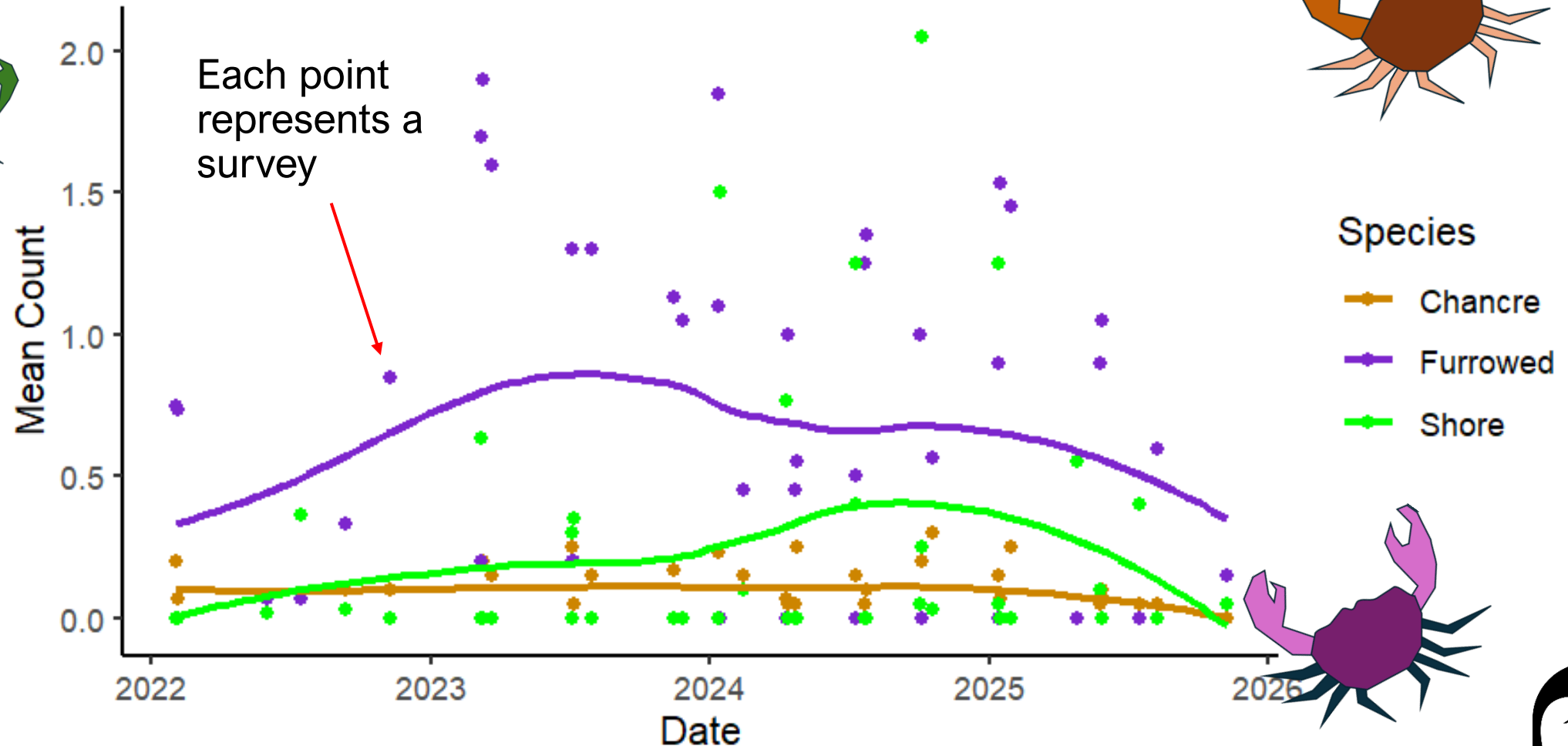
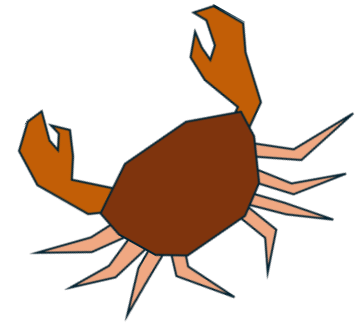


Results

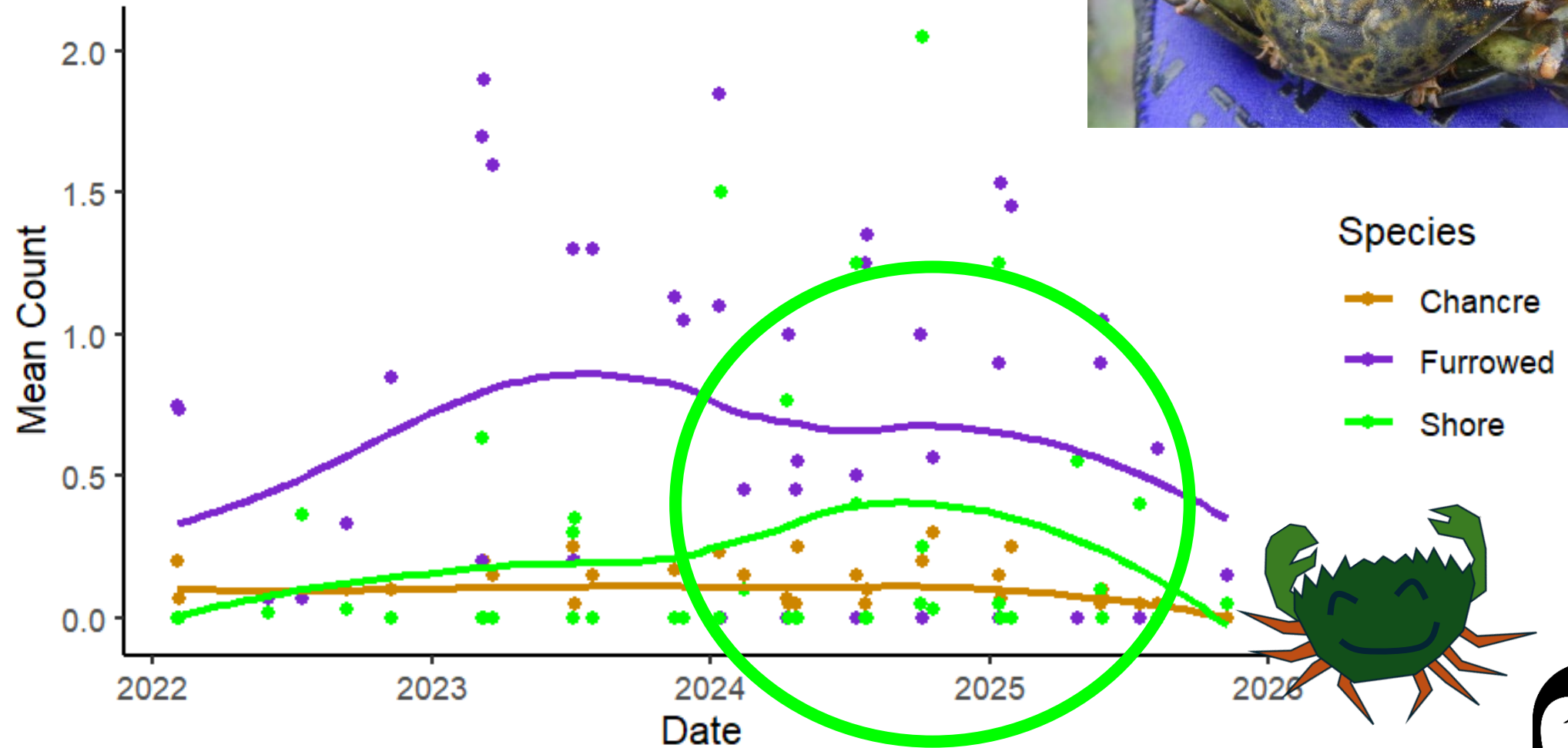
Results – Mean # crabs per rock



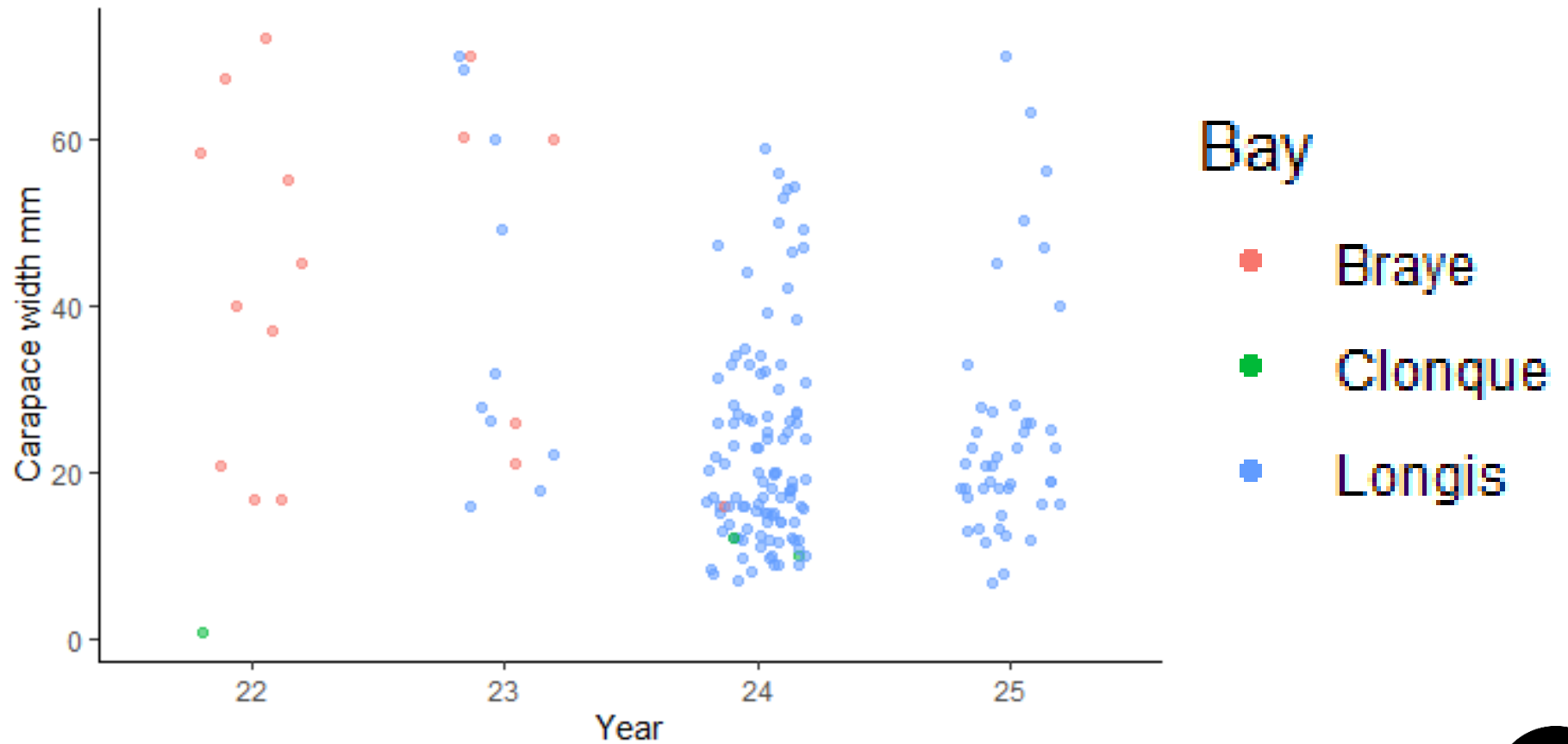
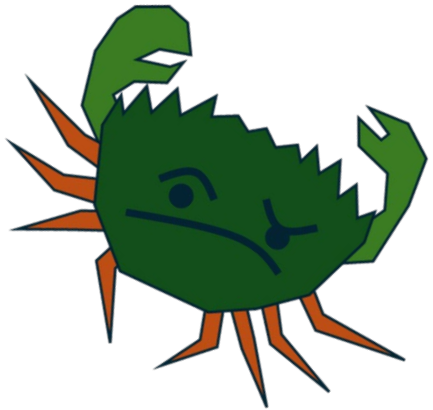
Mean # crabs per rock 2022-2025

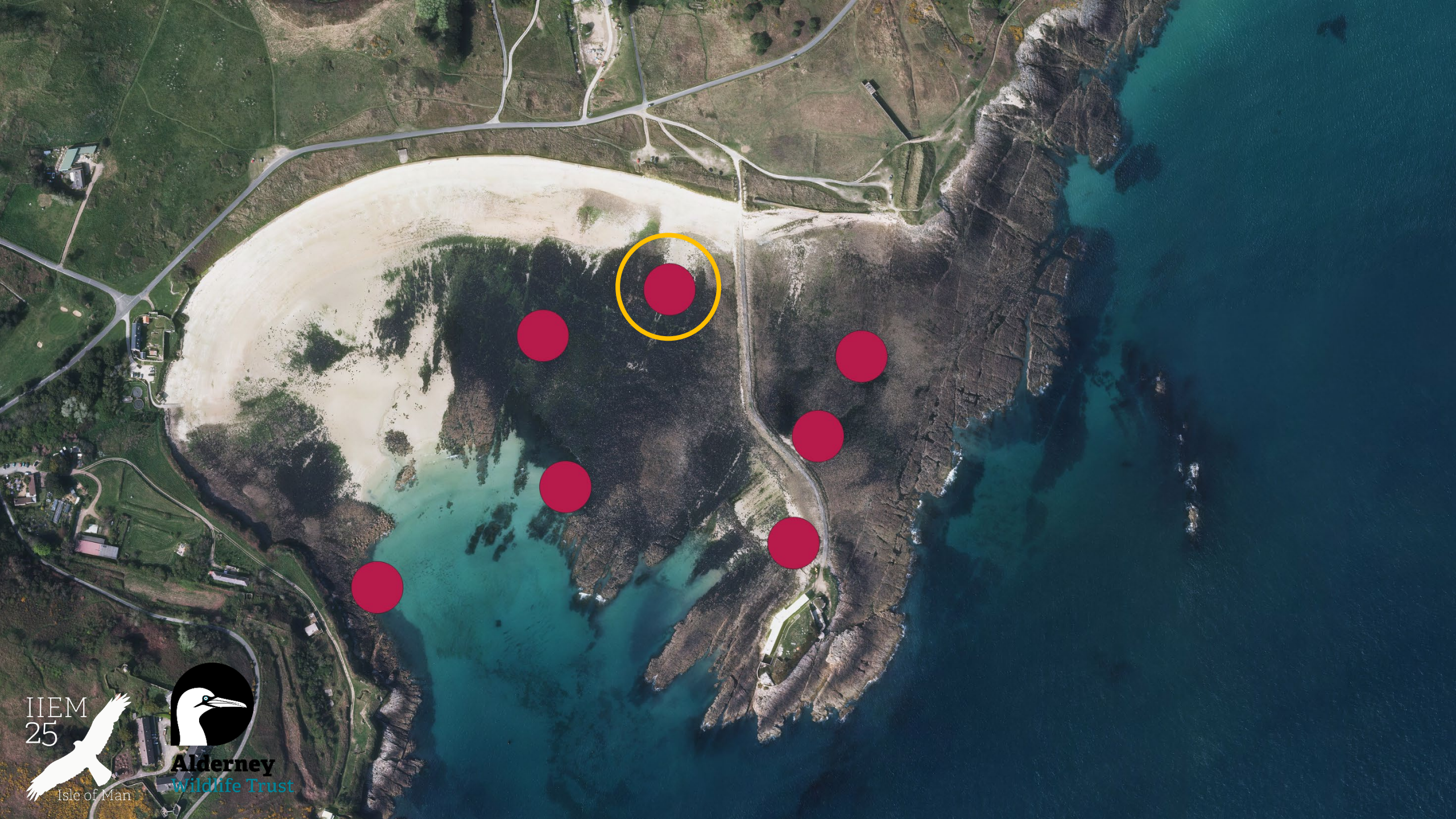


Mean # crabs per rock 2022-2025



Shore crab locations

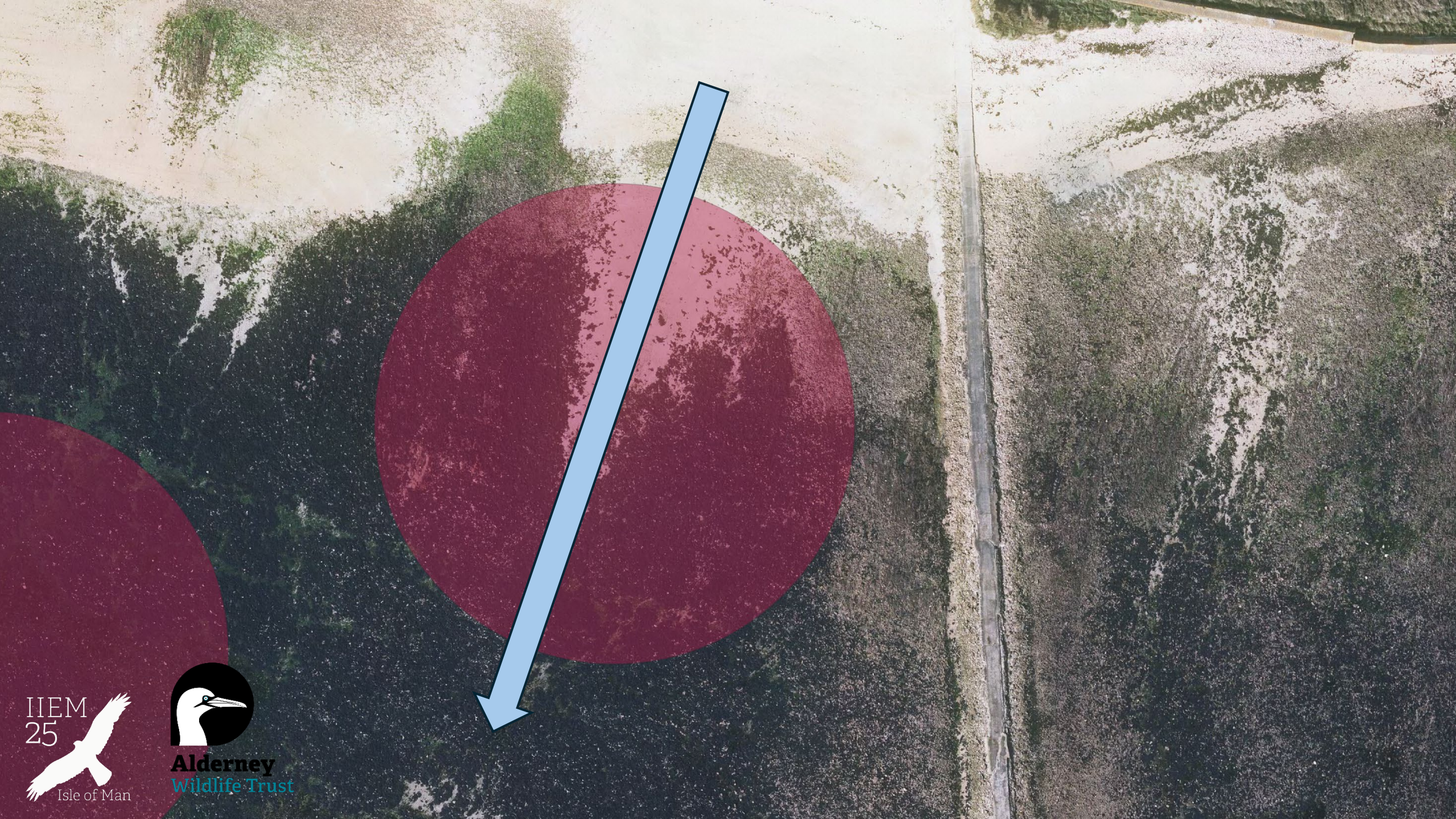


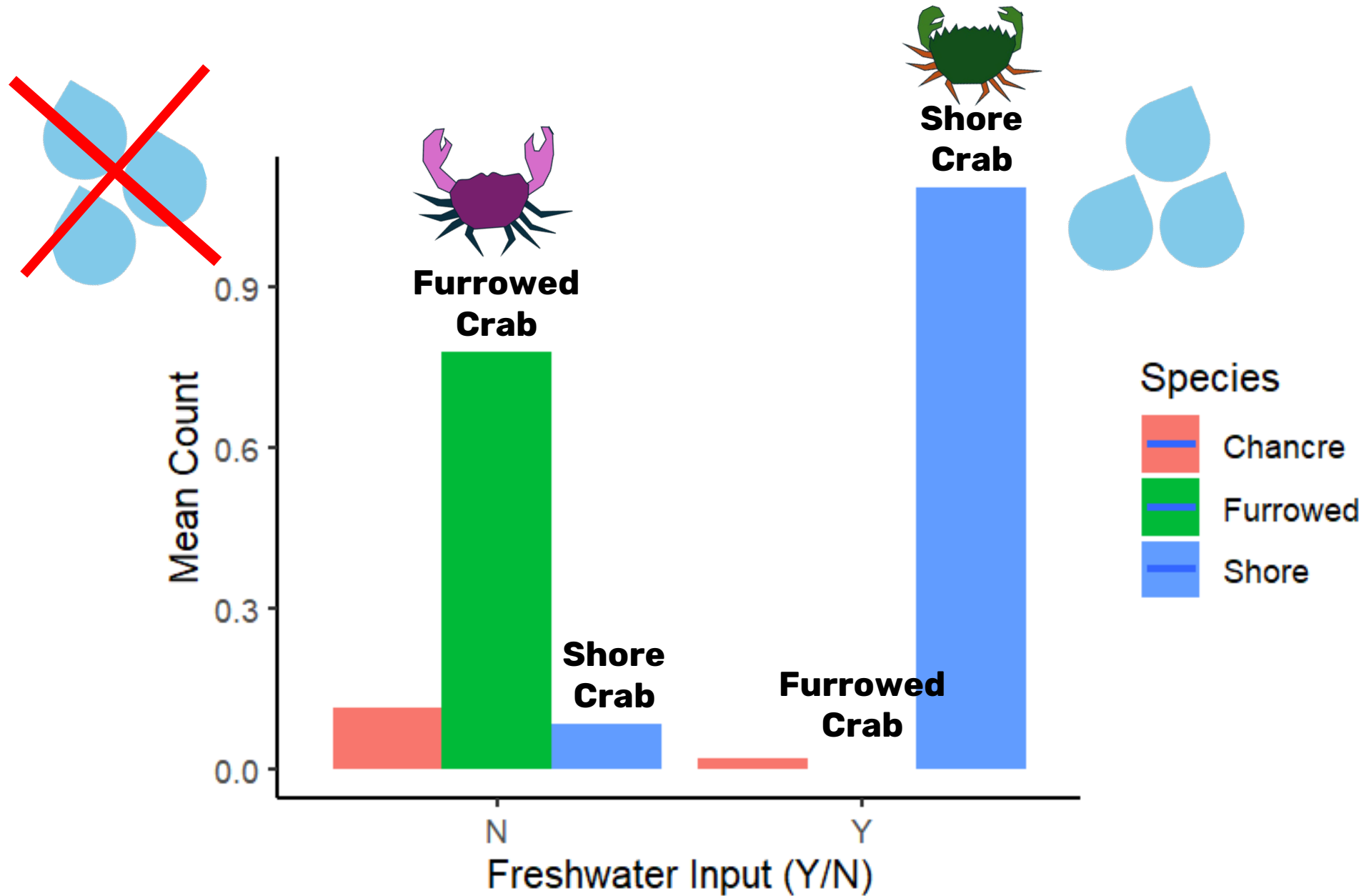


IIEM
25

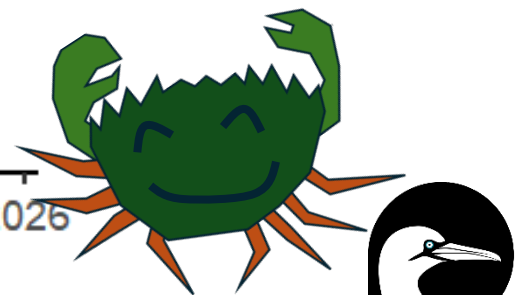
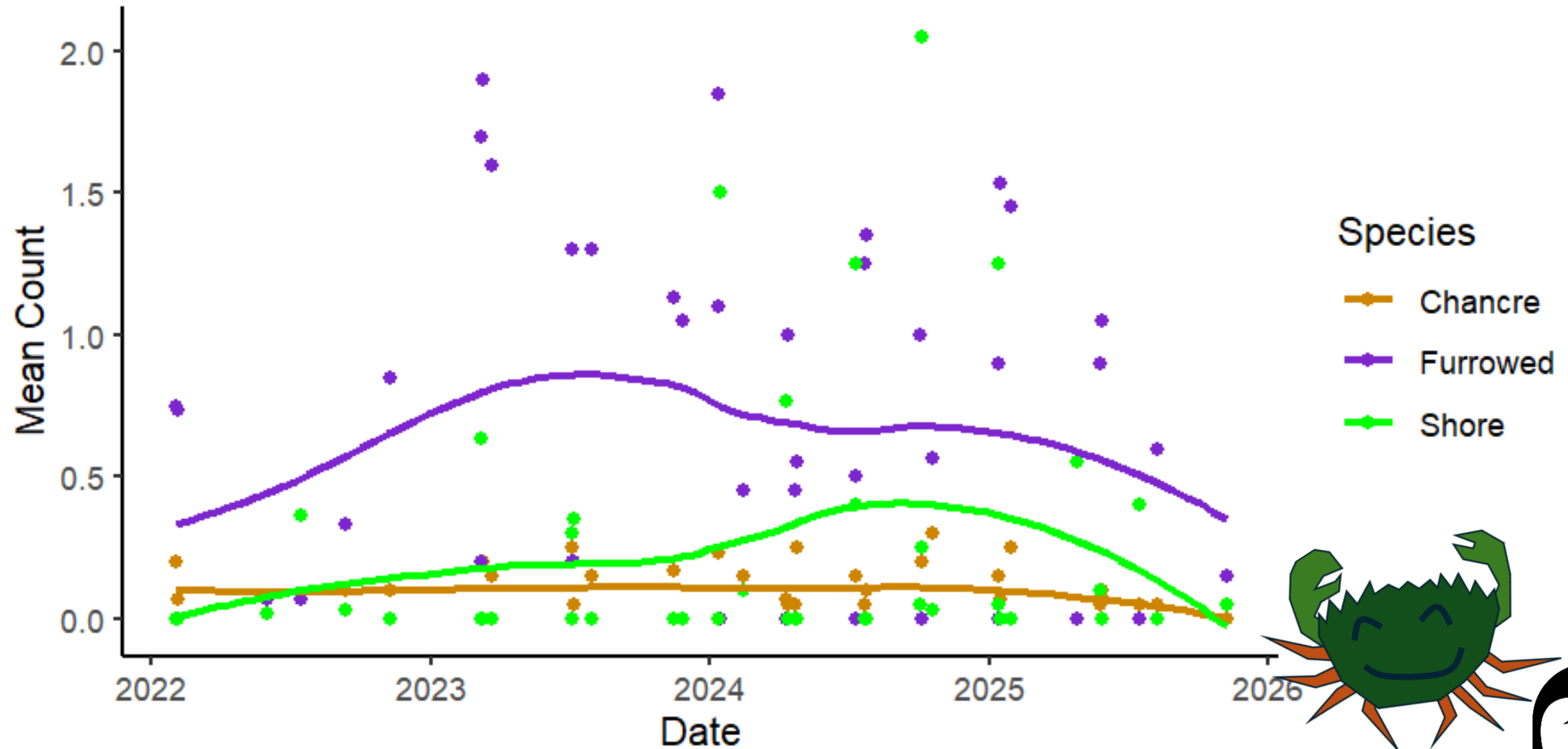


Alderney
Wildlife Trust

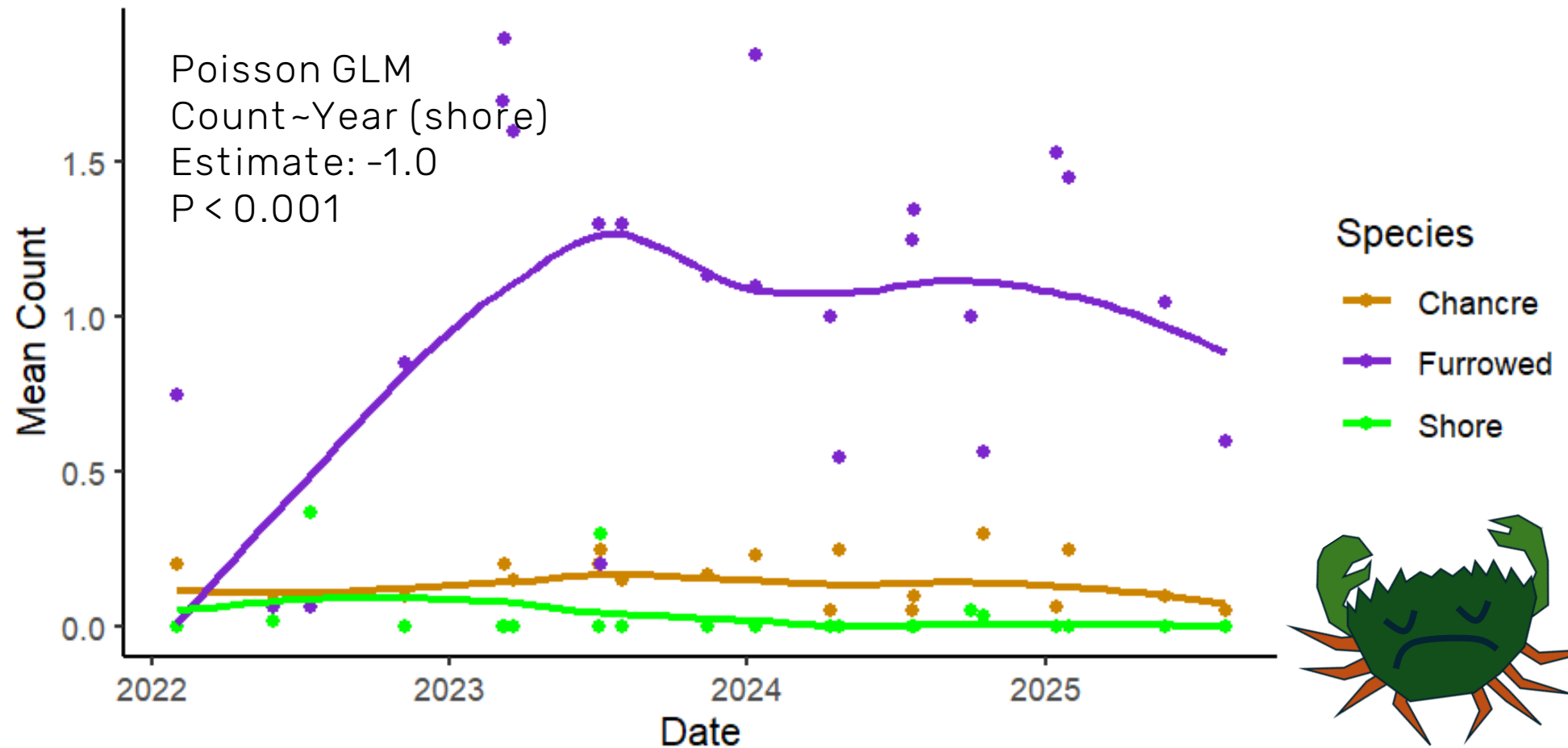




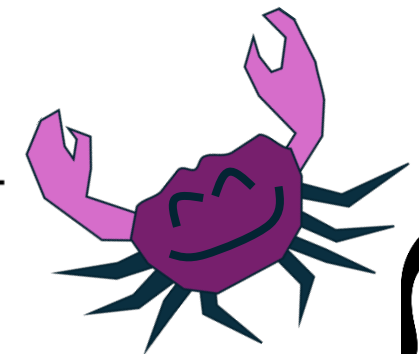
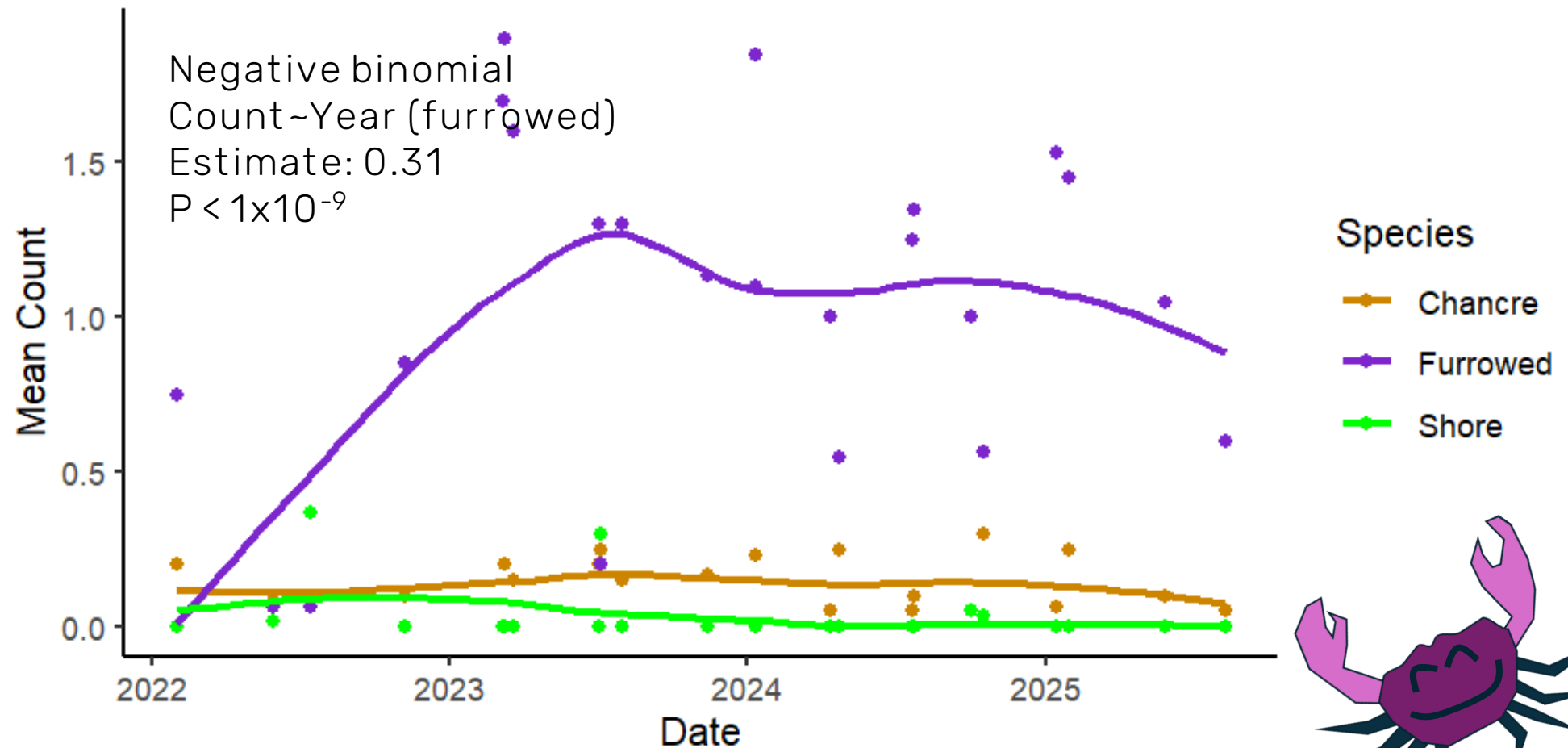
With freshwater input

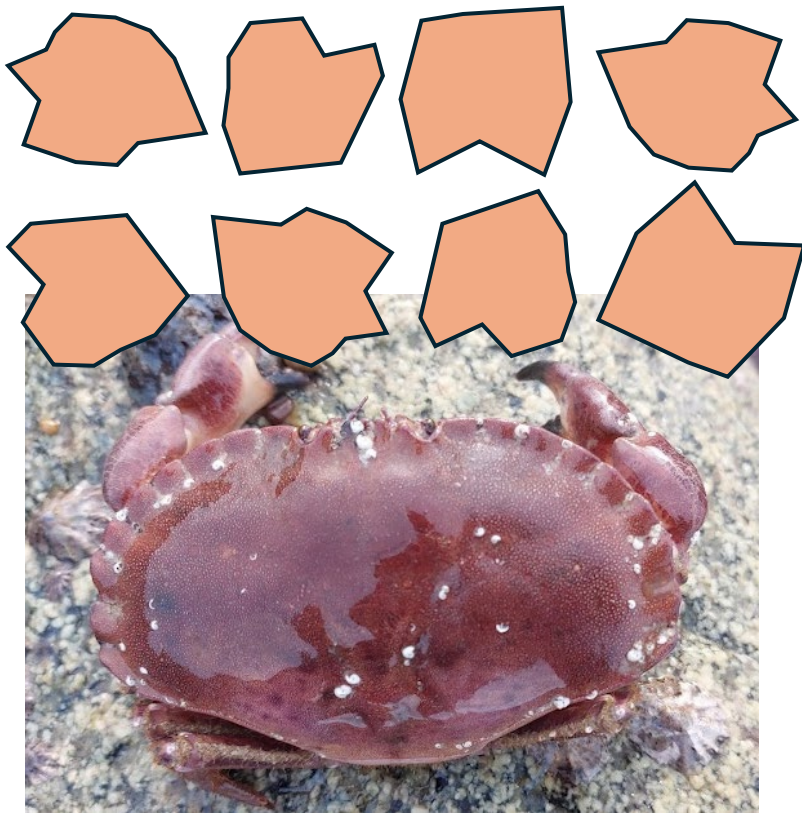


Without freshwater input (Longis Removed)



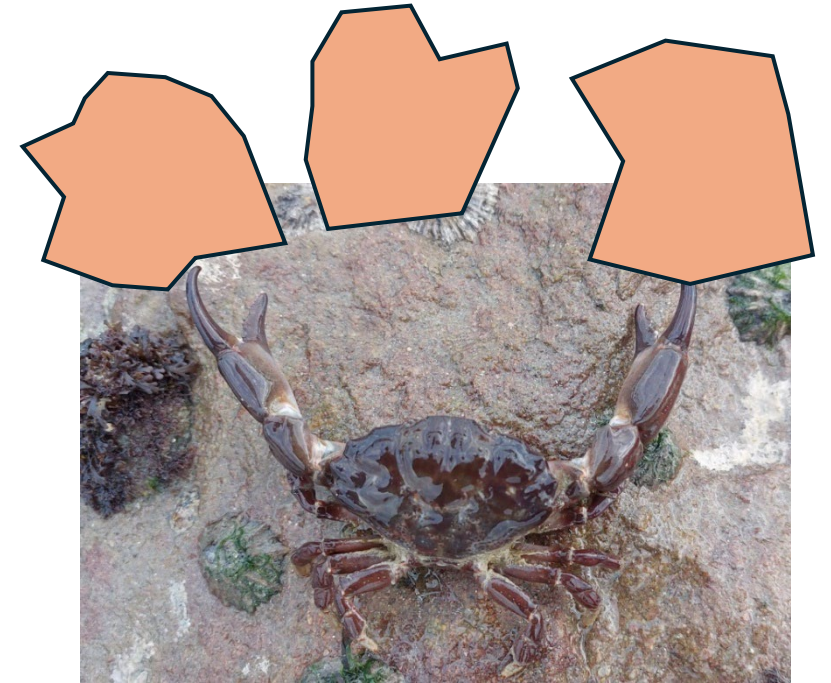
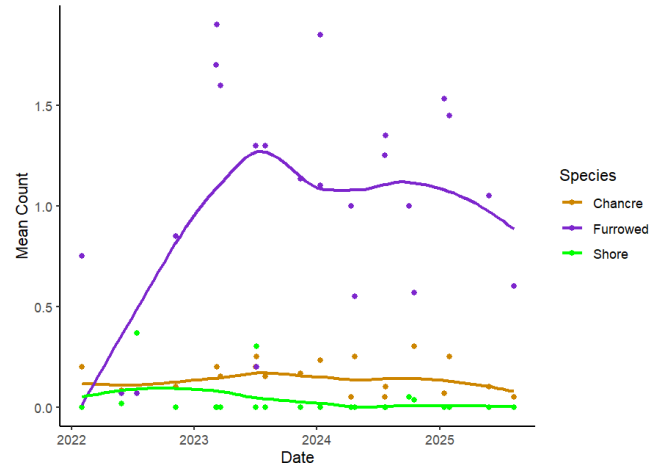
Without freshwater input (Longis Removed)





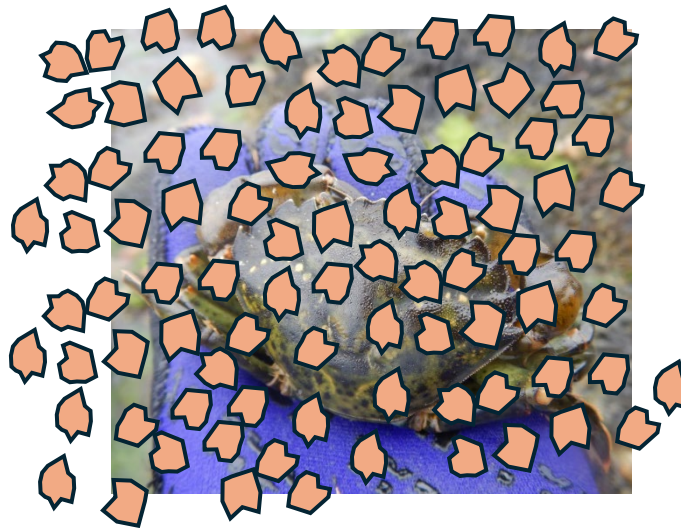
Edible crab ('AKA' Chancre)

Cancer pagurus



Furrowed crab

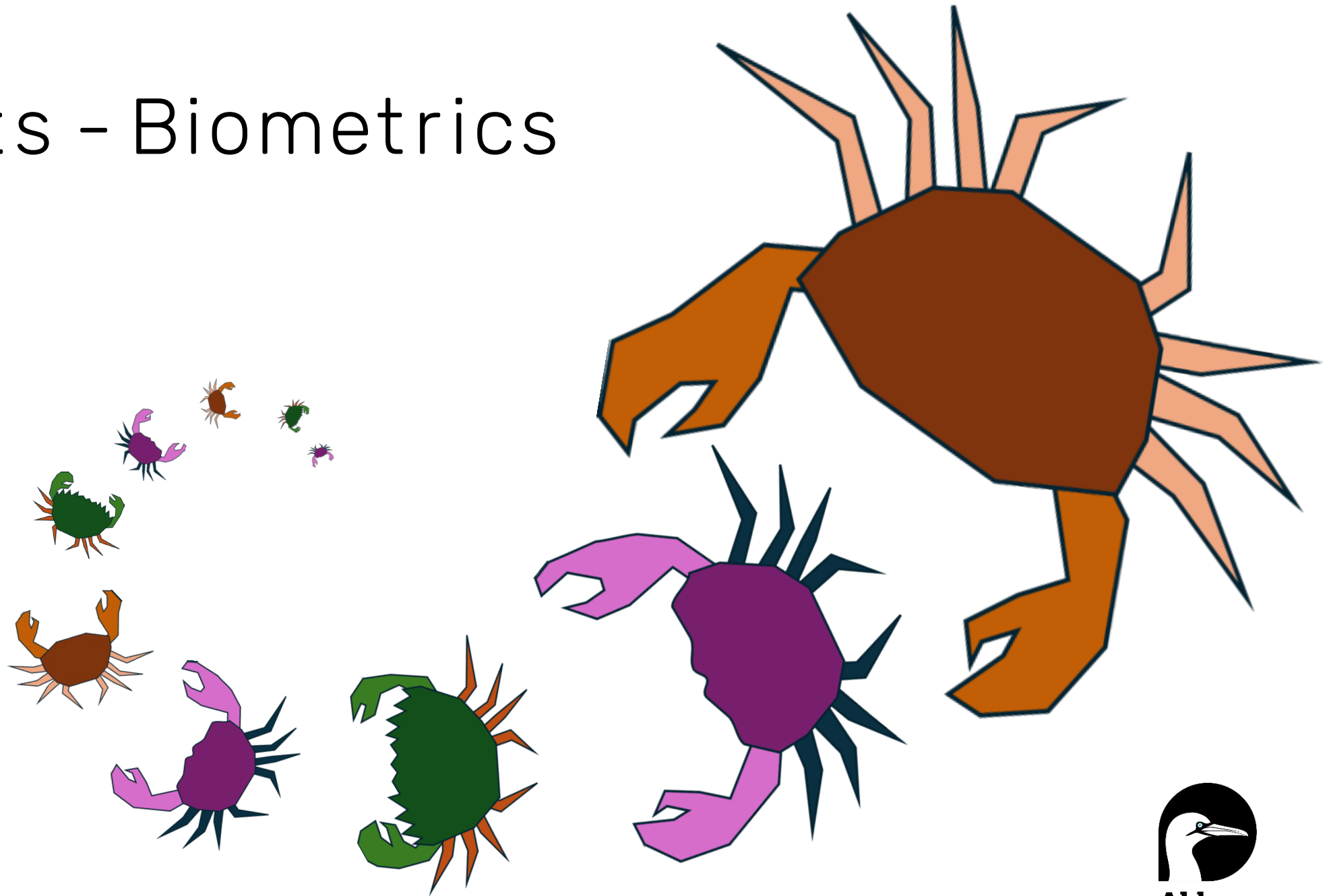
Xantho hydrophilus



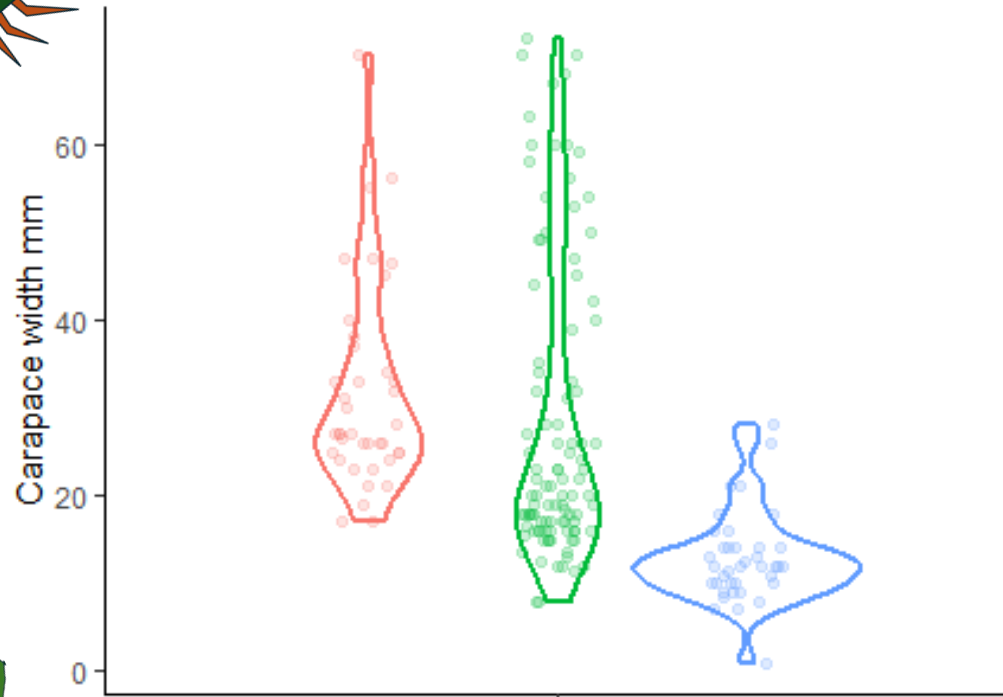
Green shore crab

Carcinus maenas

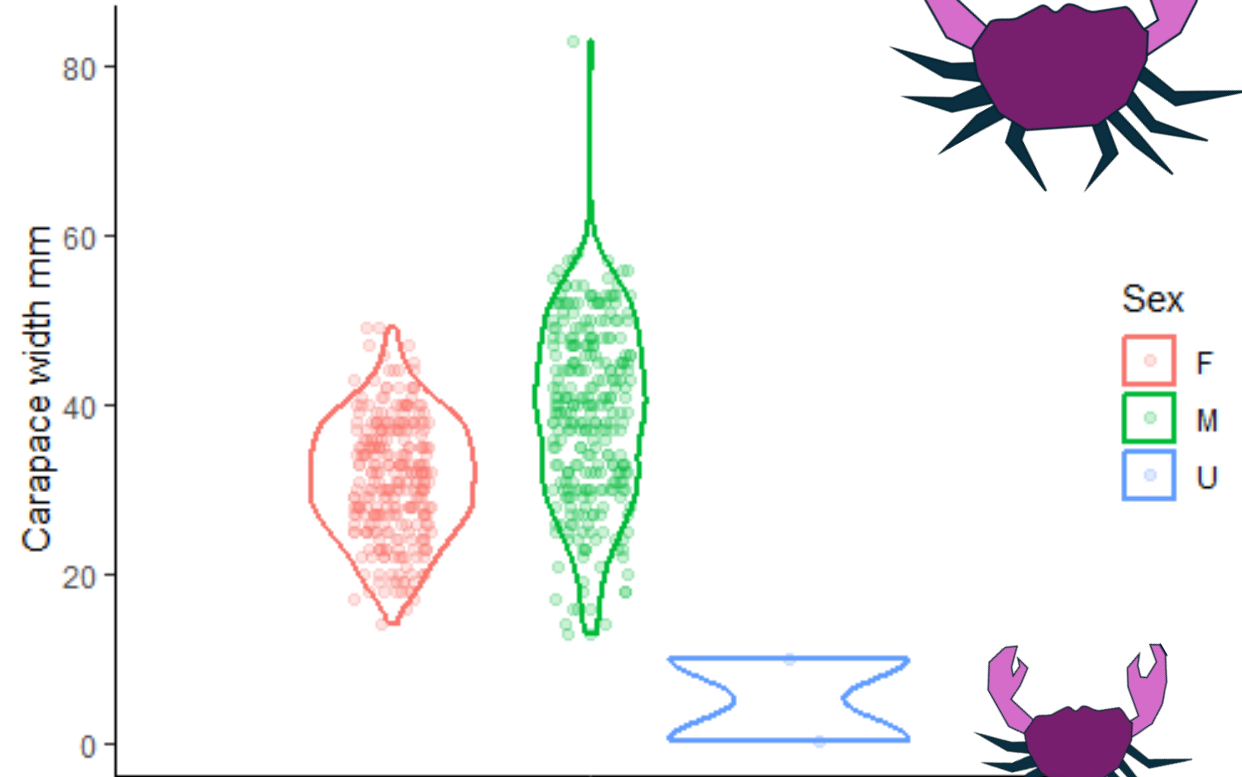
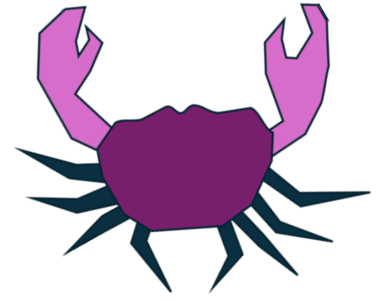
Results - Biometrics



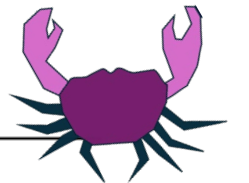
Results – Size Profile



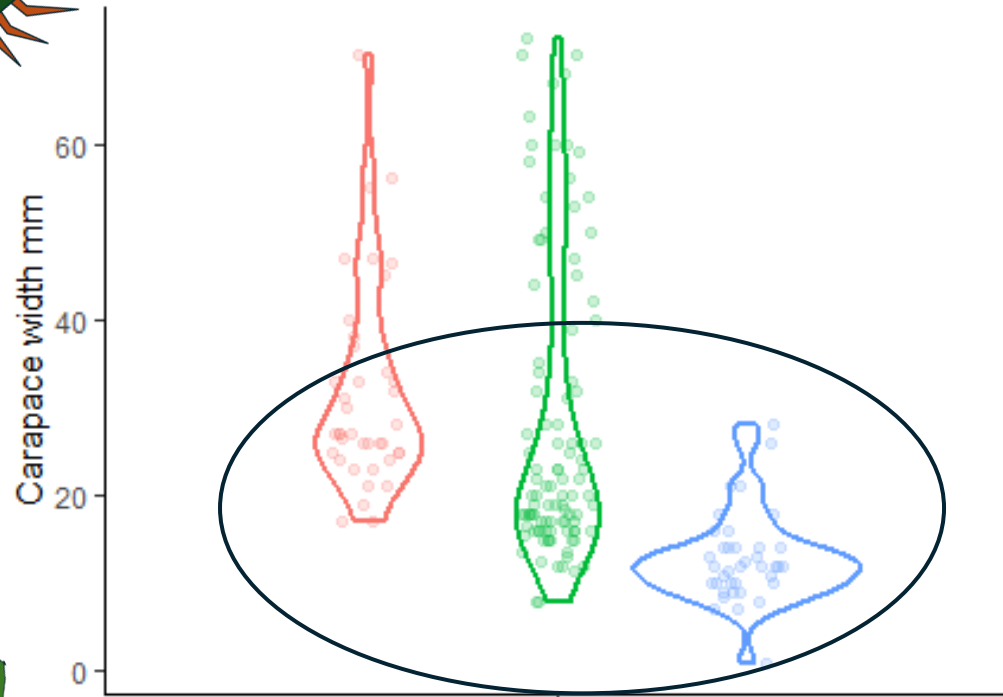
Green Shore Crab



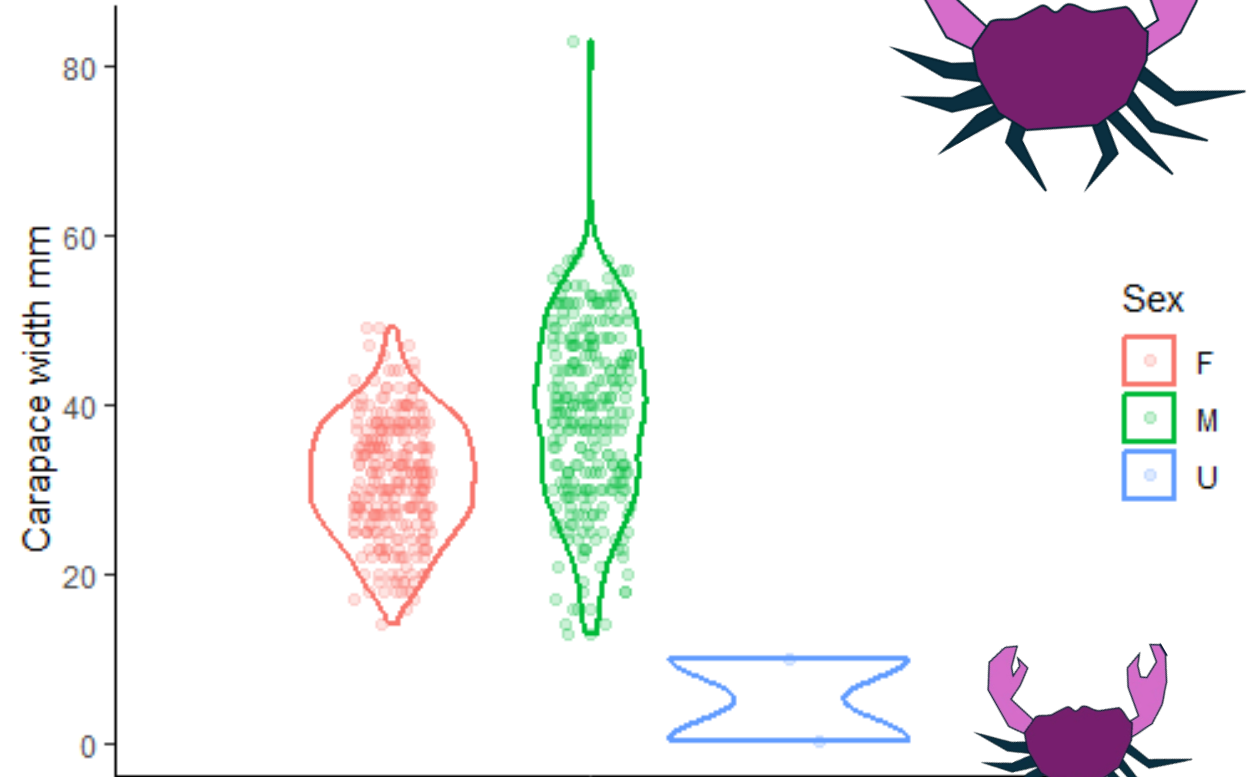
Furrowed Crab



Results – Size Profile



Green Shore Crab

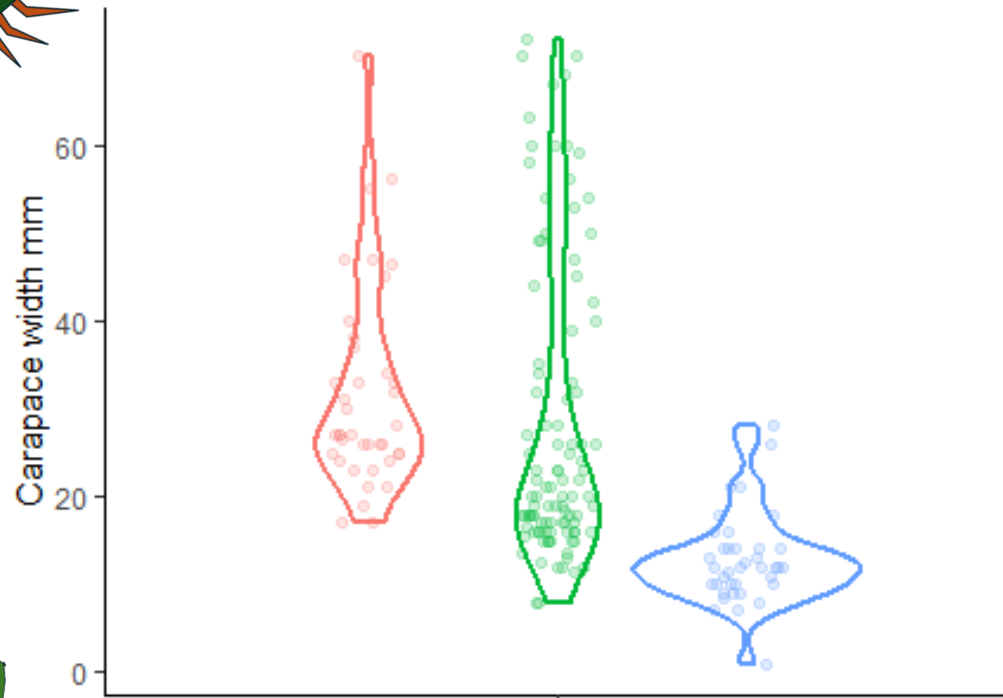


Furrowed Crab

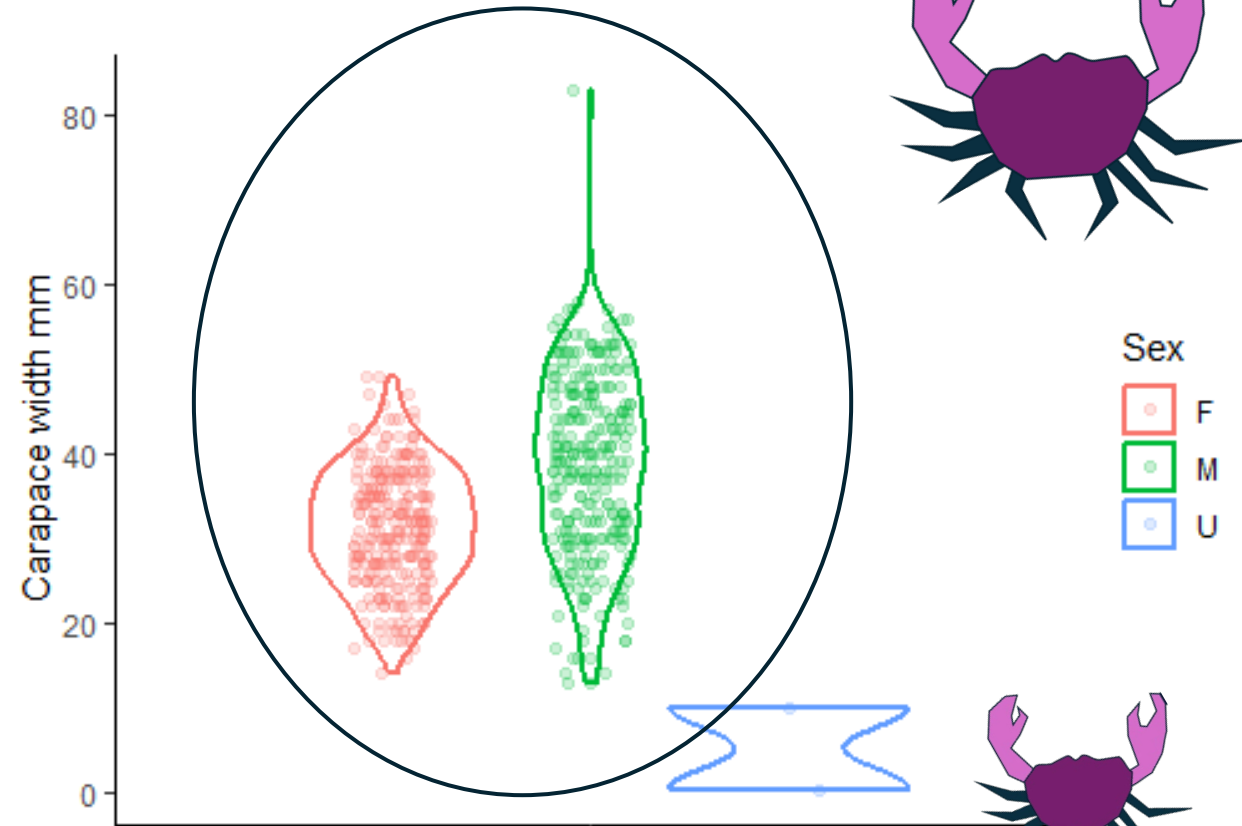
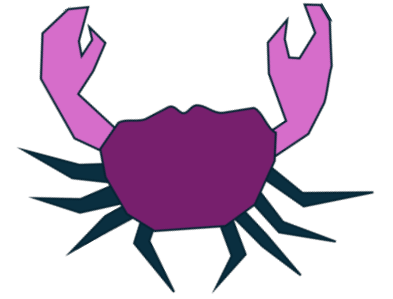
Juvenile shore crabs spend most of their time in the intertidal zone but adults migrate into the subtidal²

Results – Size Profile

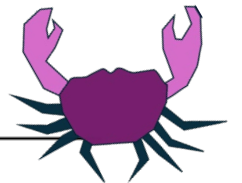
Normal distribution indicates all adult age cohorts are in the intertidal zone.



Green Shore Crab



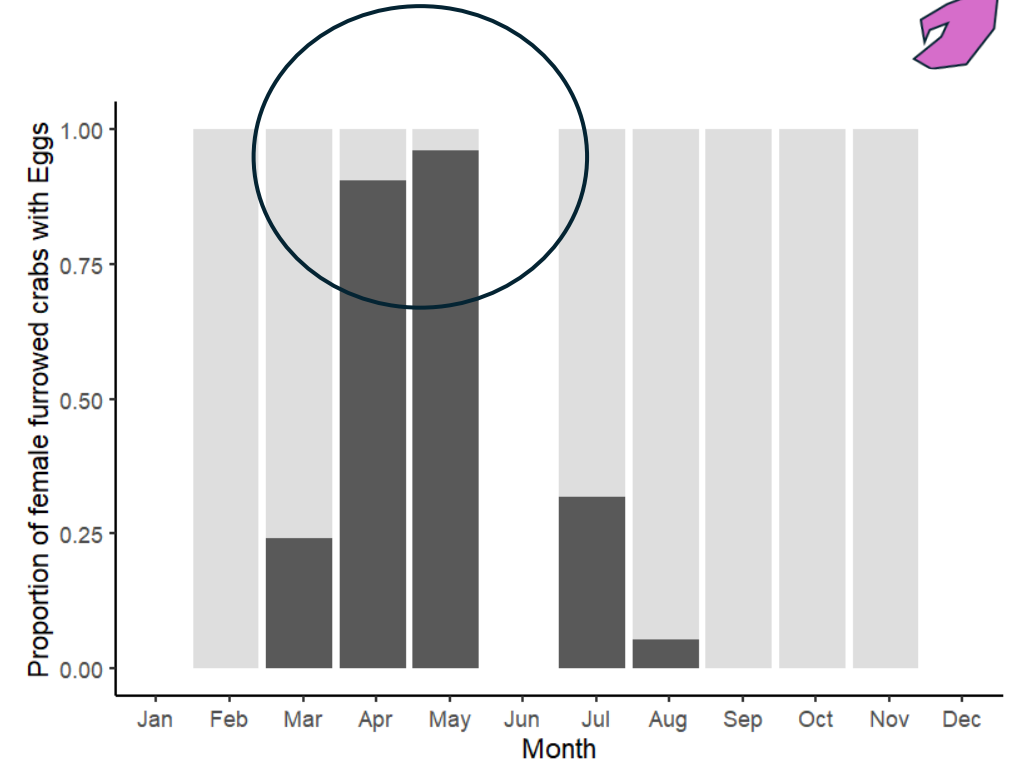
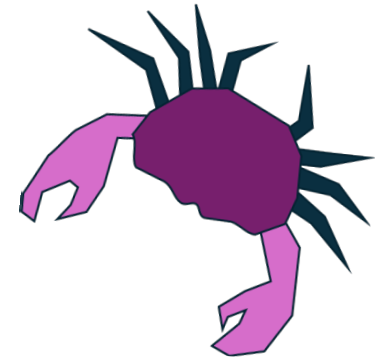
Furrowed Crab



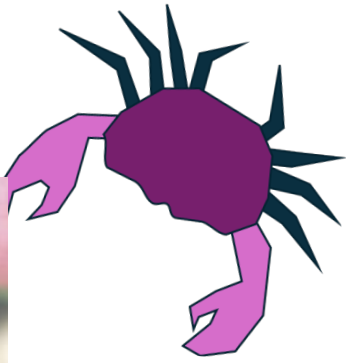
Sex
F
M
U



This is supported by high proportion of female furrowed crabs having eggs in summer

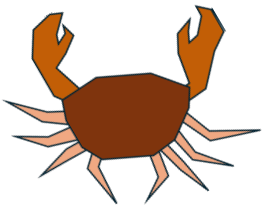
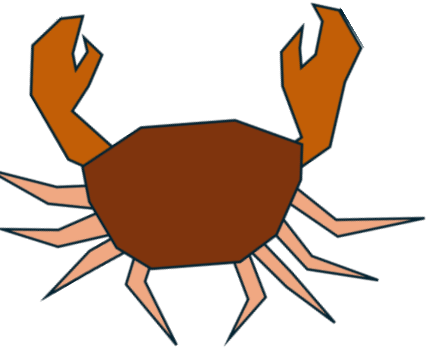
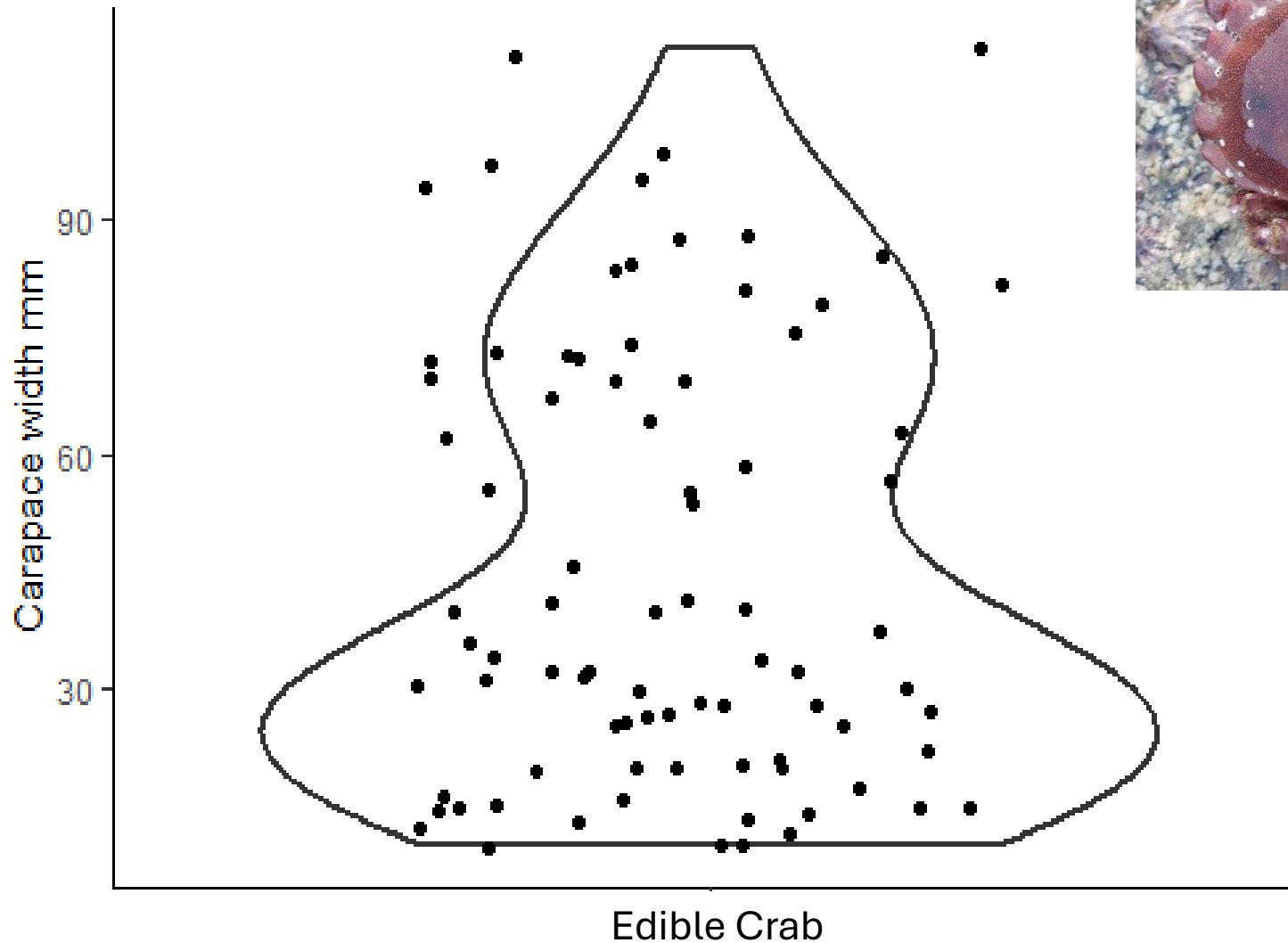


This is supported by high proportion of female furrowed crabs having eggs in summer

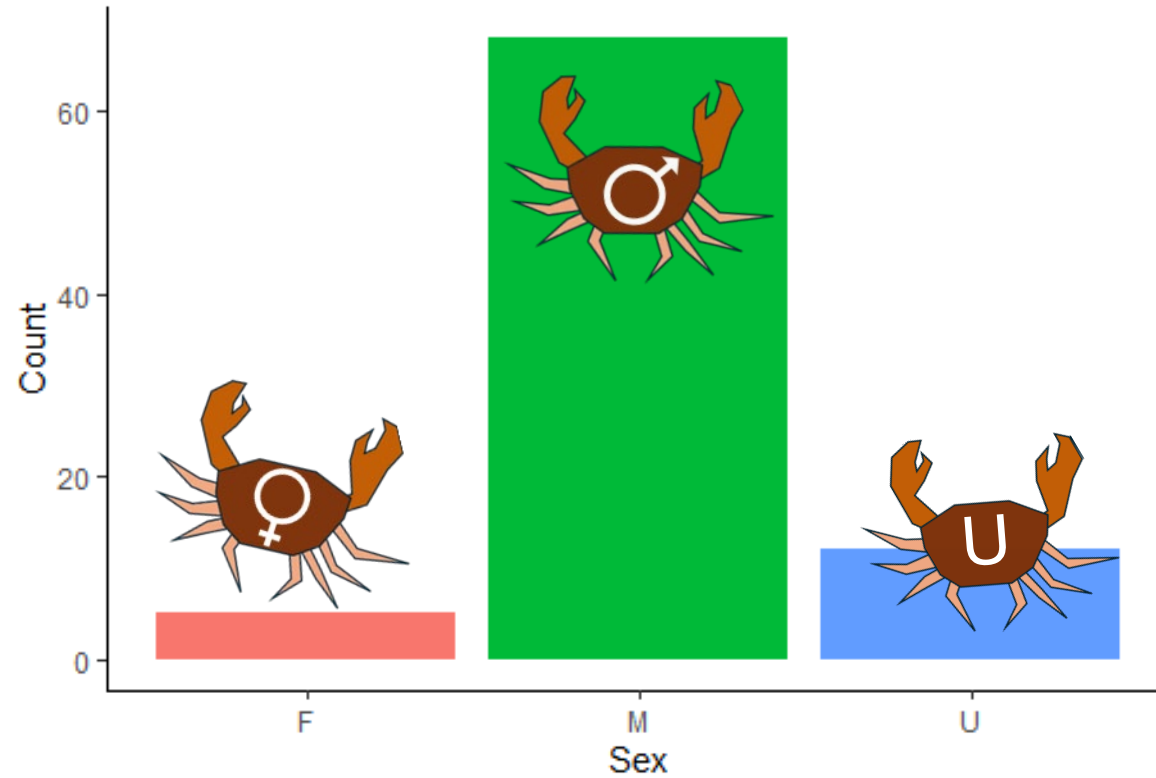


Results – Size Profile

Edible Crab/ Chancre



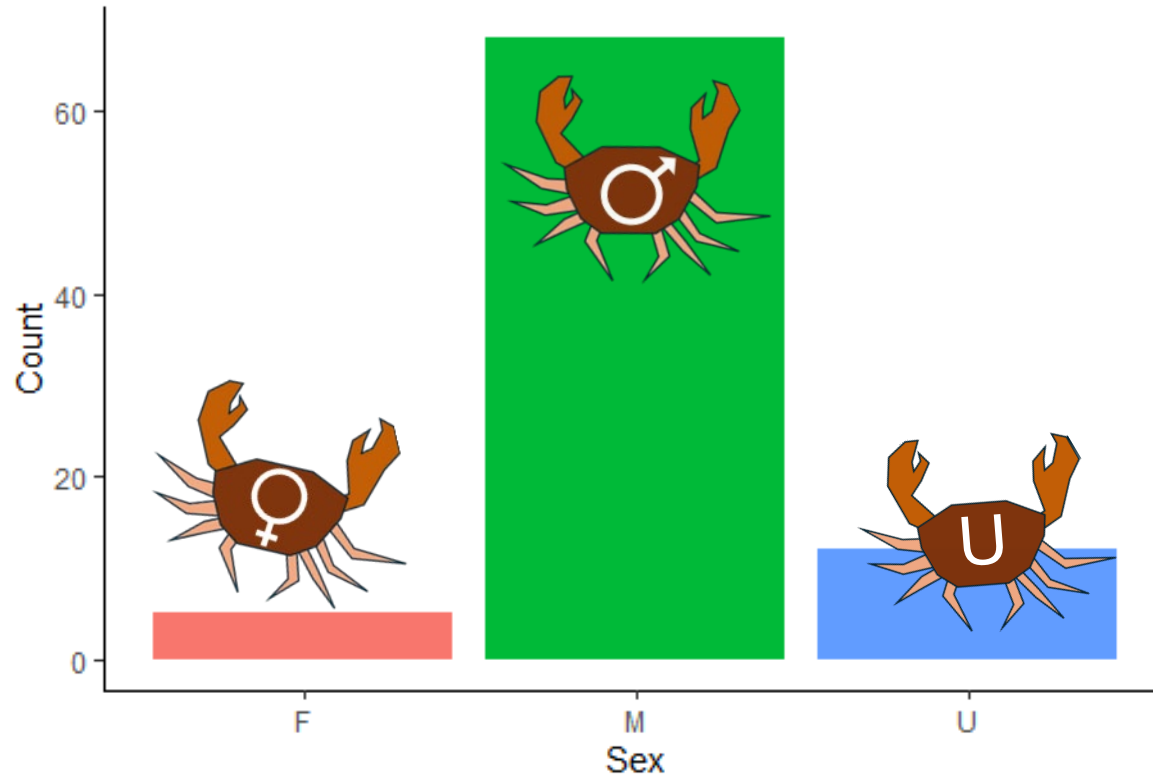
Sex ratio of edible crab found in Alderney since 2022



Edible Crab/ Chancre



Sex ratio of edible crab found in Alderney since 2022



In Anglesey sex ratio of 1 : **1.77**⁴

In Cornwall sex ratio of 1 : **0.6**⁵

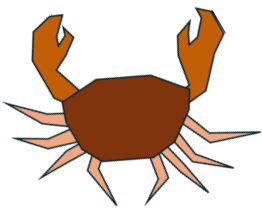
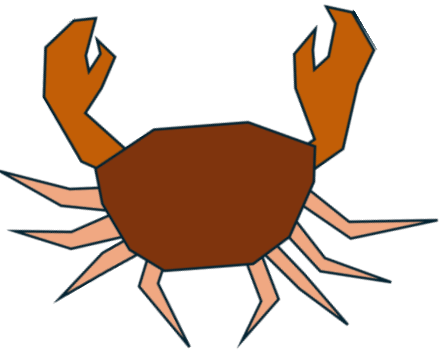
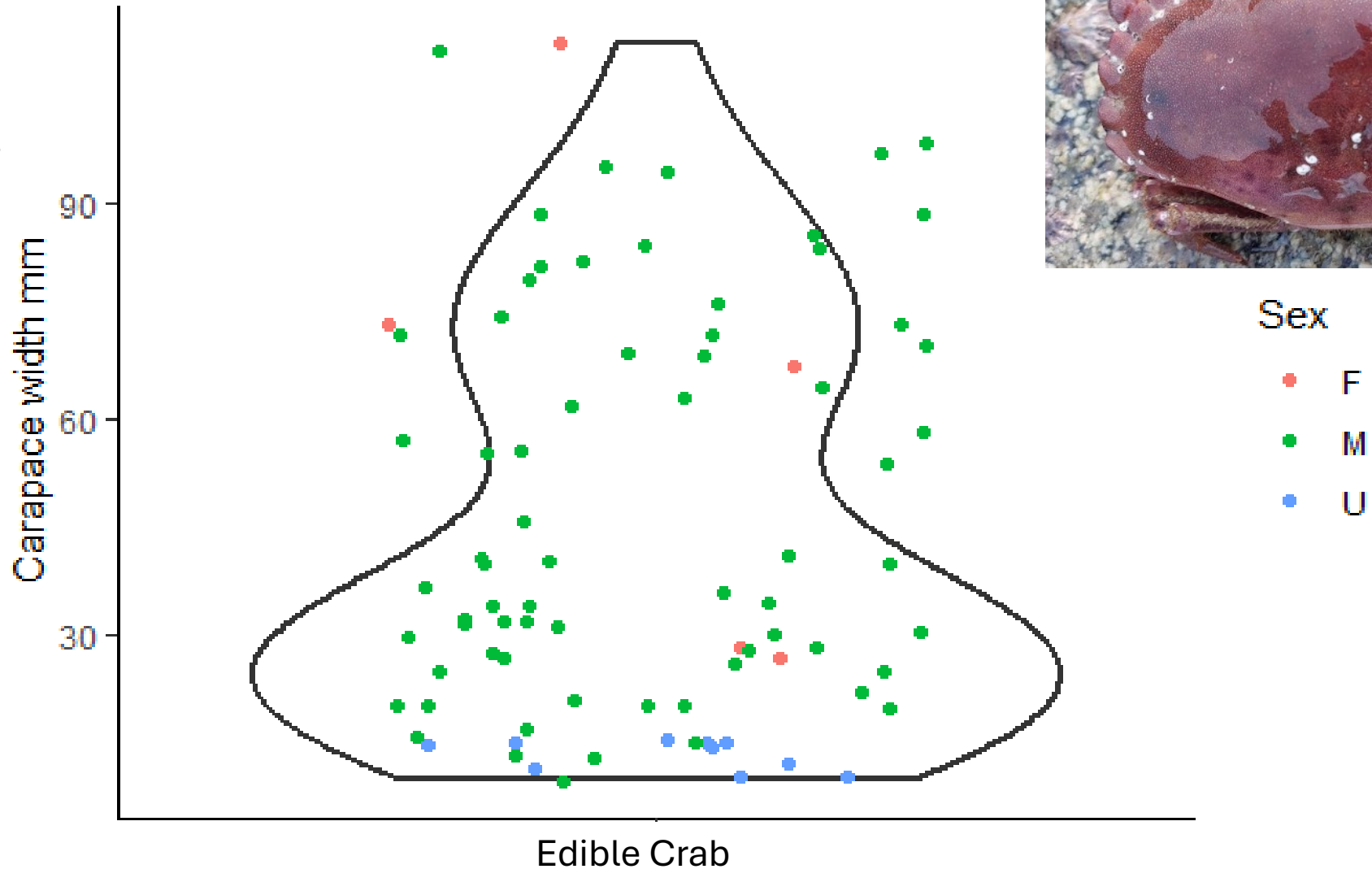
In Alderney, sex ratio of 1 : **13.6**

Edible Crab/ Chancre



Results – Size Profile

Edible Crab/ Chancre

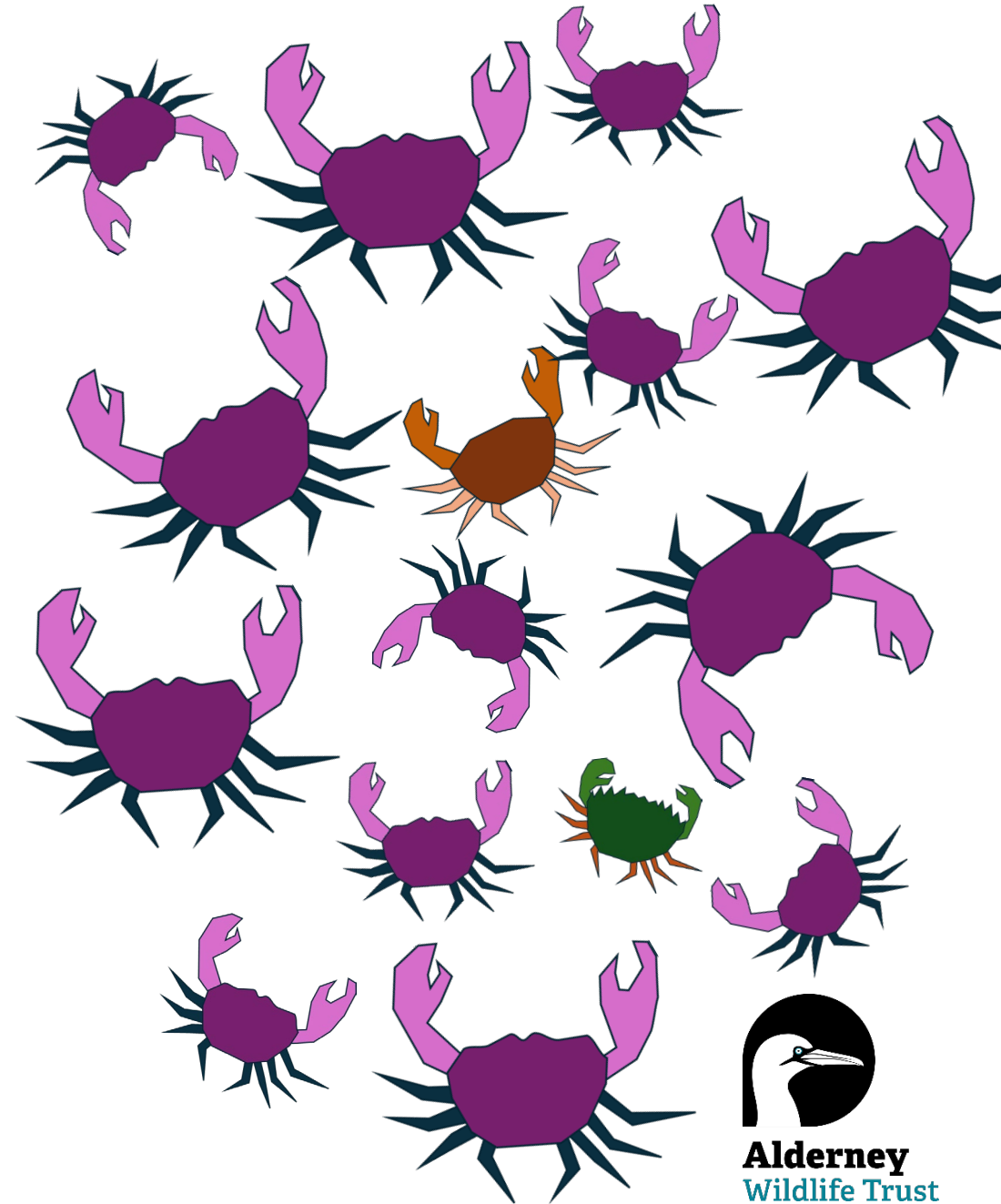




What's Happening?

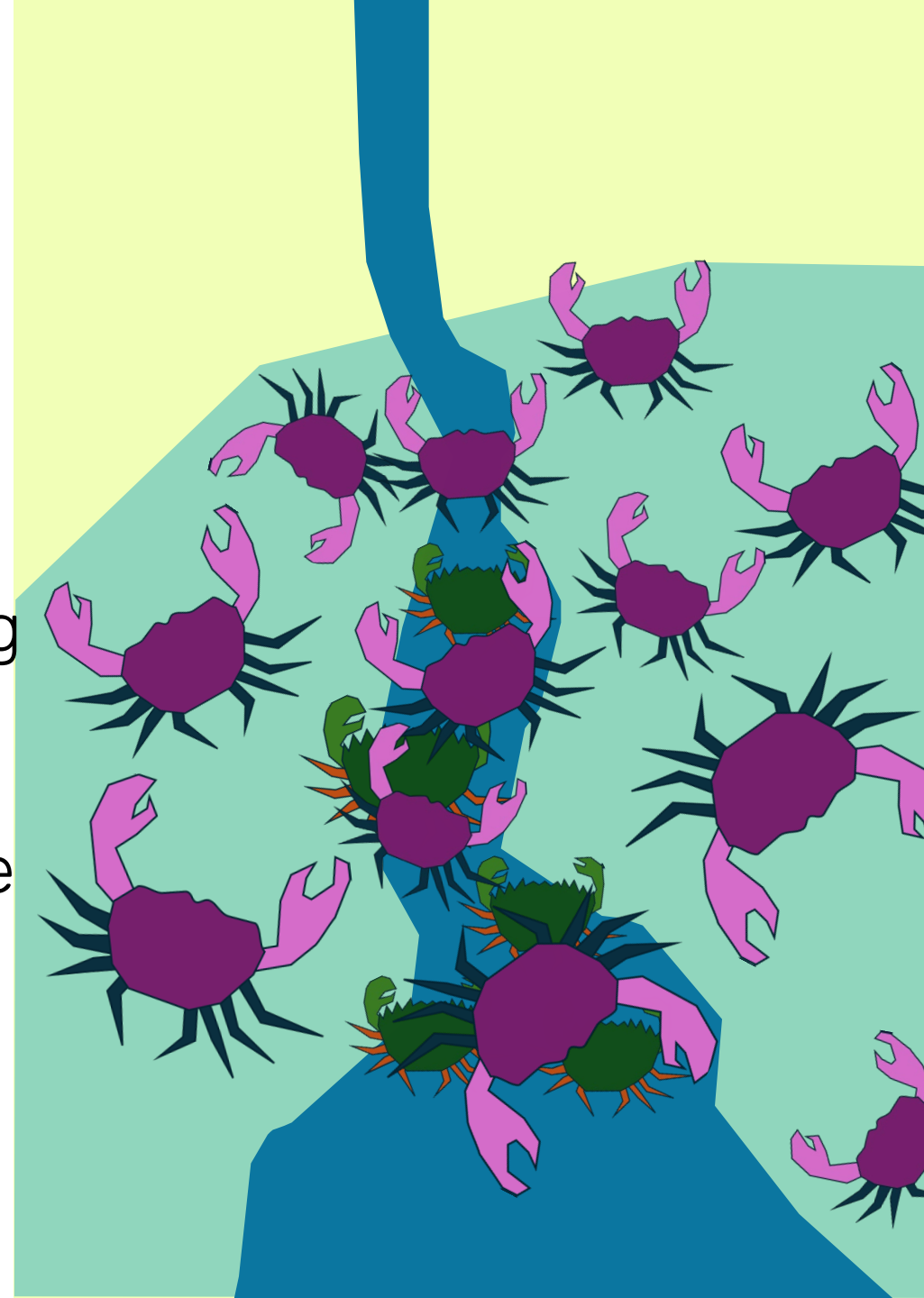
What's happening?

- Furrowed crab have become the most abundant on the rocky shore in just a few years
- This is a climate change driven shift
- Changes such as these are only going to continue as sea temperatures warm



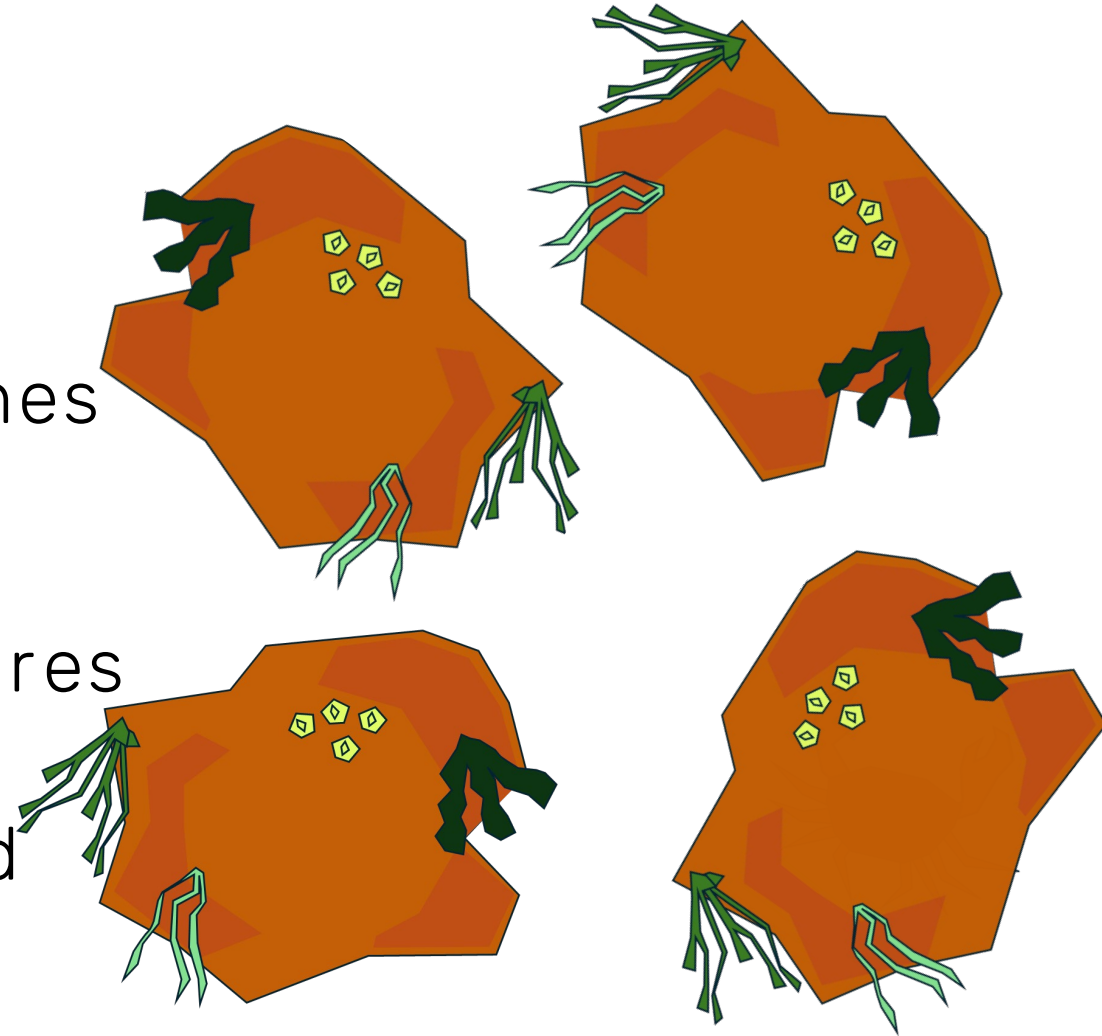
What's happening?

- Green shore crab appear to be restricted to brackish areas
- Could this be due to competition?
- Changes in rainfall are also altering our freshwater inputs
- With no estuaries or other large brackish areas, shore crabs may be vulnerable in small islands



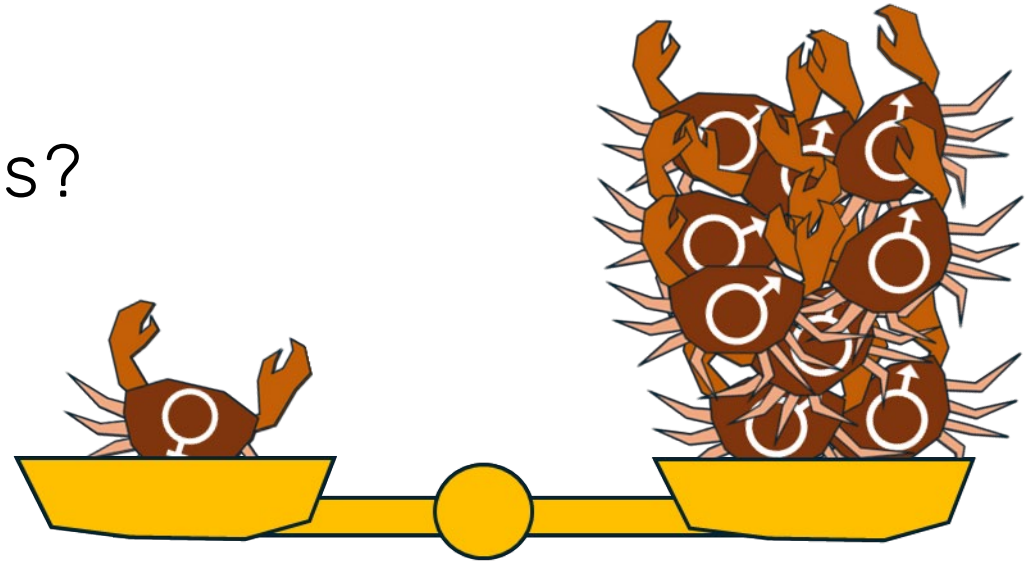
What's happening?

- Edible crab are infrequently encountered, but no clear declines (*SINCE 2022*)
- Good sign, given concerns over disease and warming temperatures affecting their life cycle ⁶
- However, we find very few... and

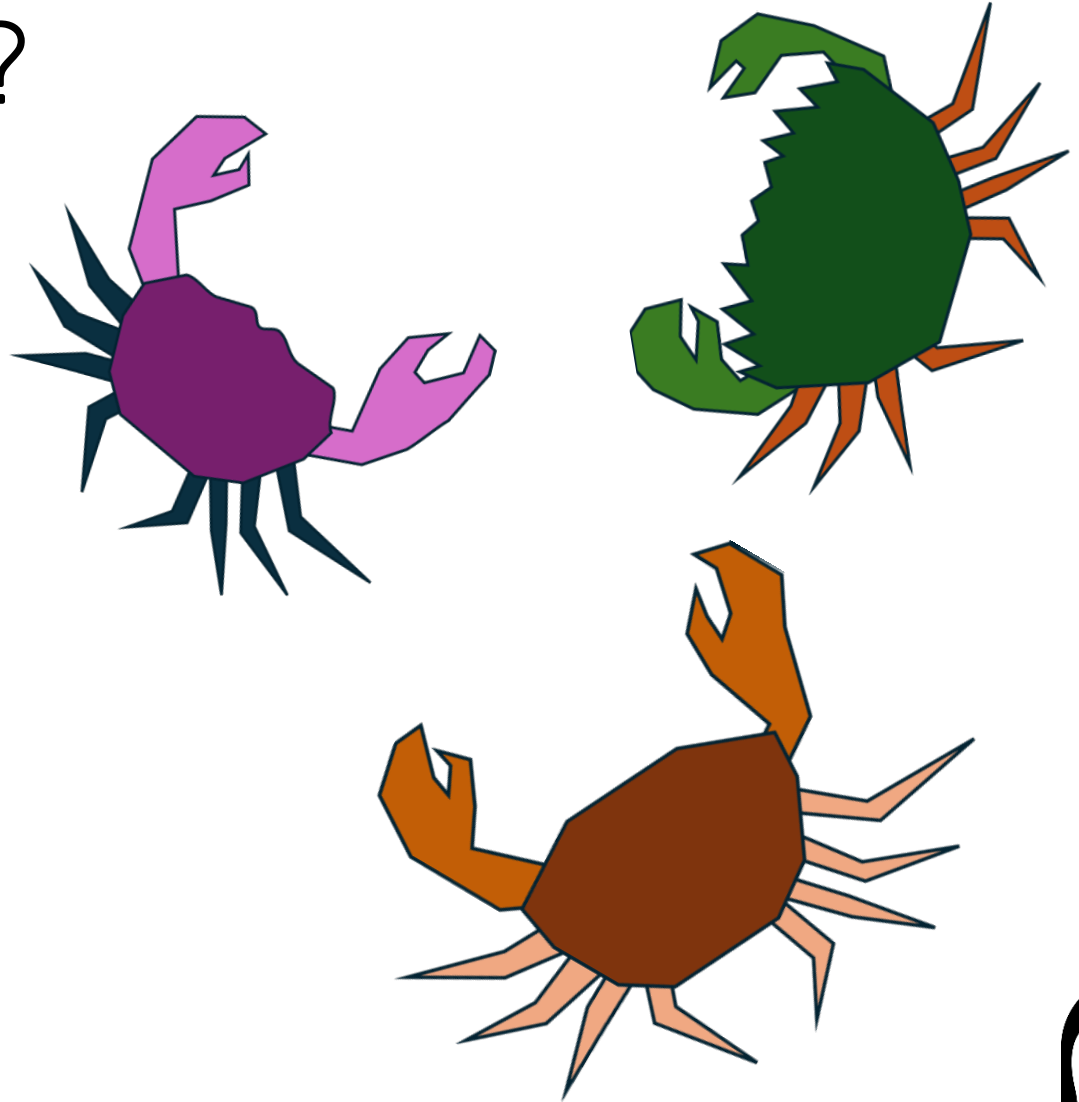


What's happening?

- Alarming sex ratio in edible crabs
- Temperature? Behaviour?
Sampling error?
- And what is the ratio in adults?

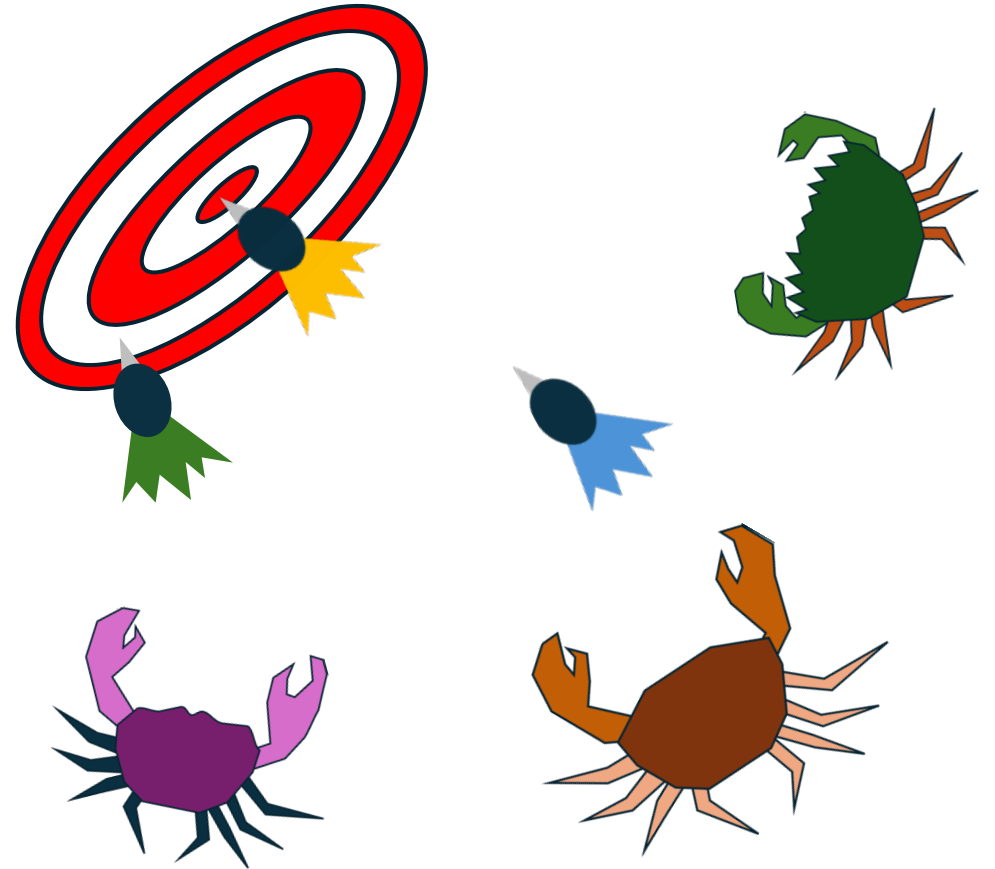


And what's next for our crab surveys?



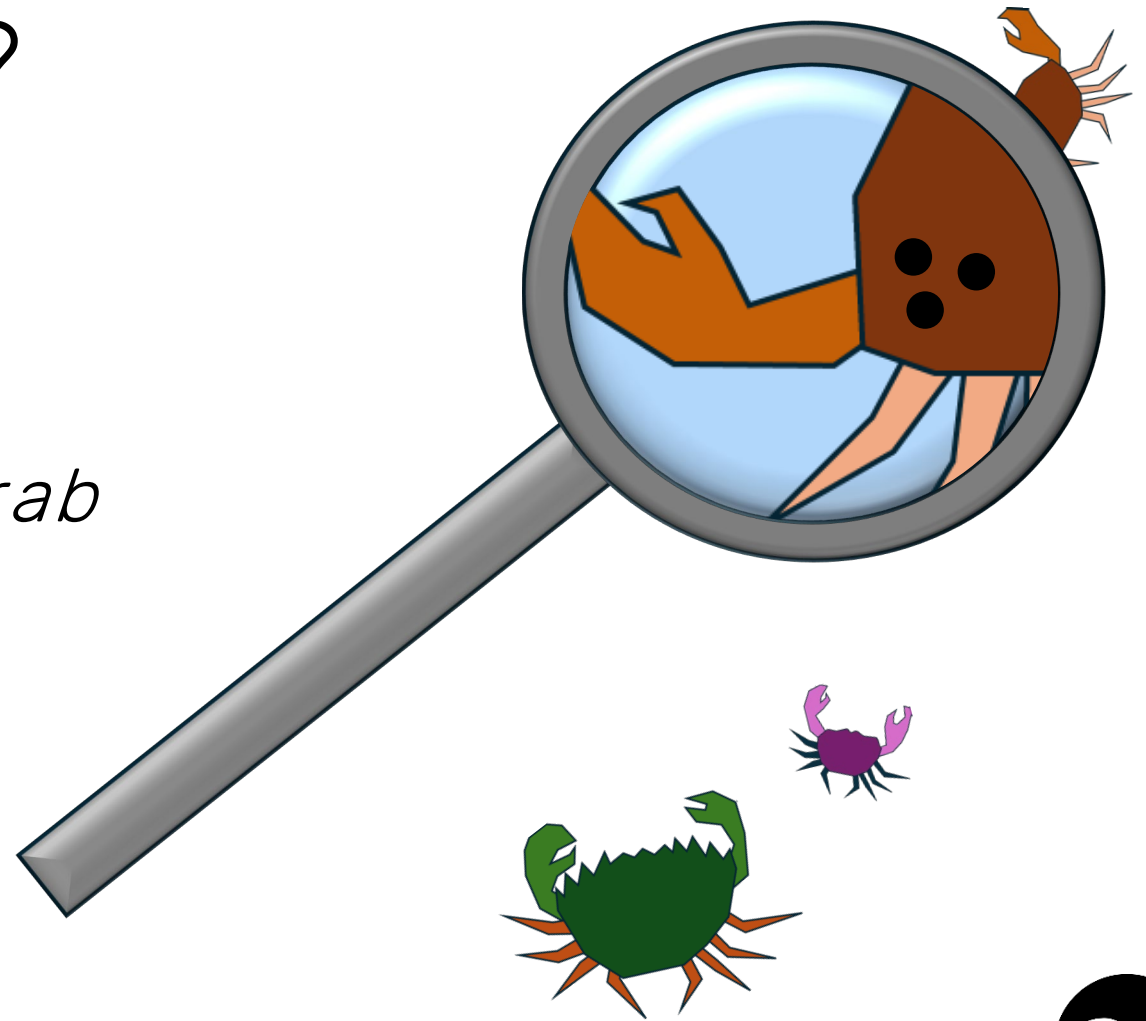
And what's next for our crab surveys?

- Desk based review



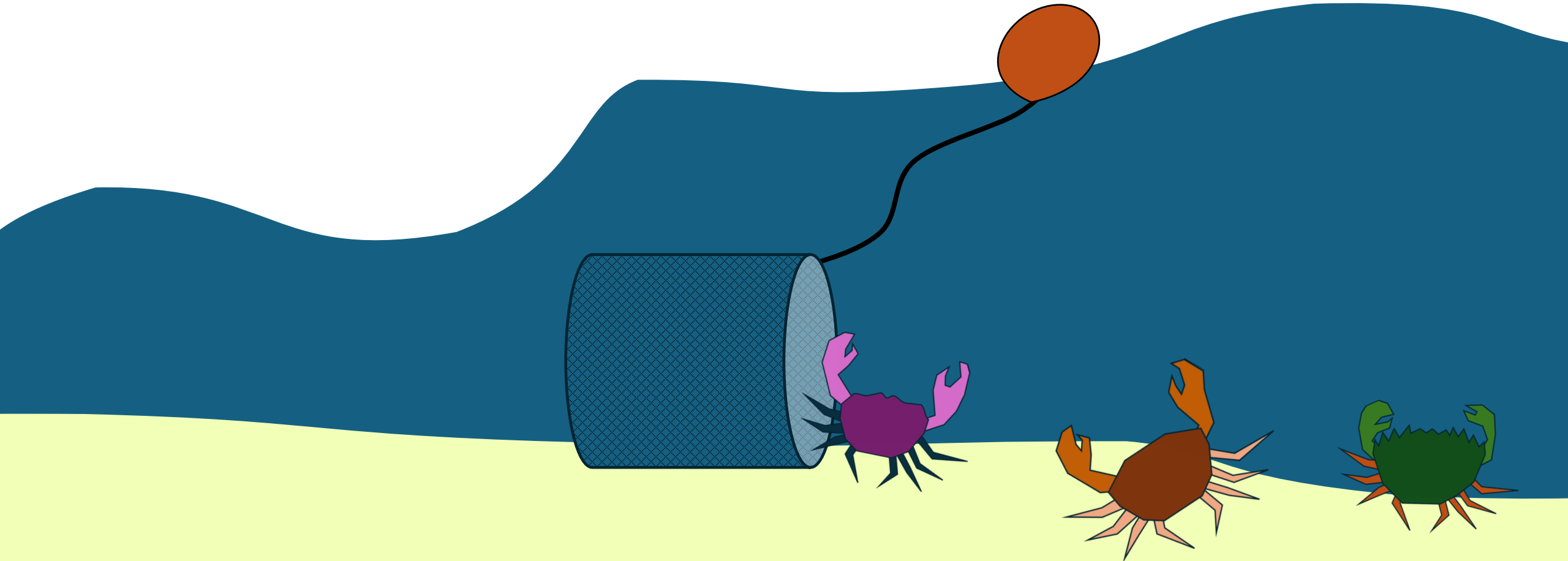
And what's next for our crab surveys?

- Refine method and investigate targeted projects, e.g. MSc
- Other citizen science – *crab most wanted?*



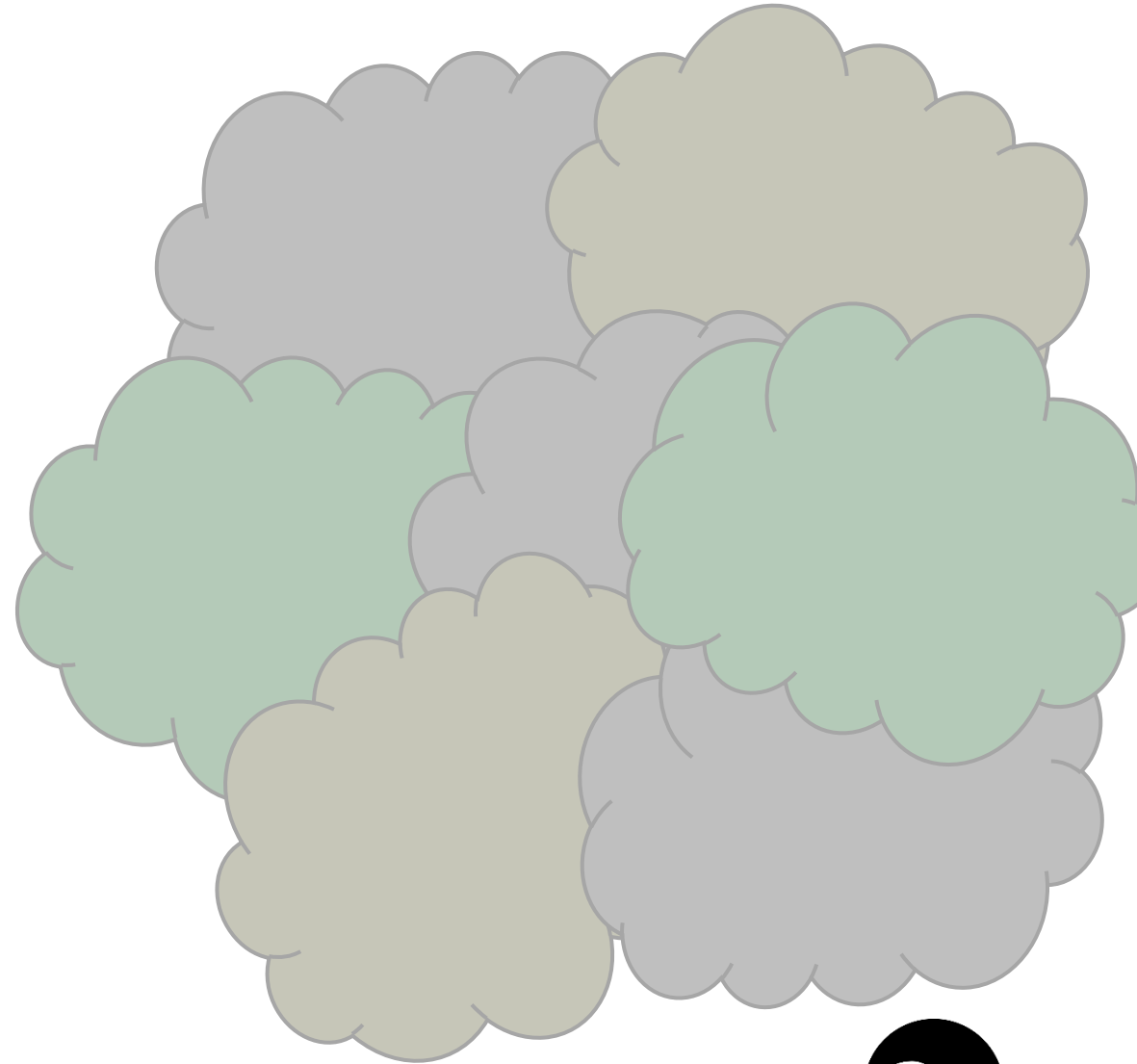
And what's next for our crab surveys?

- Subtidal Monitoring



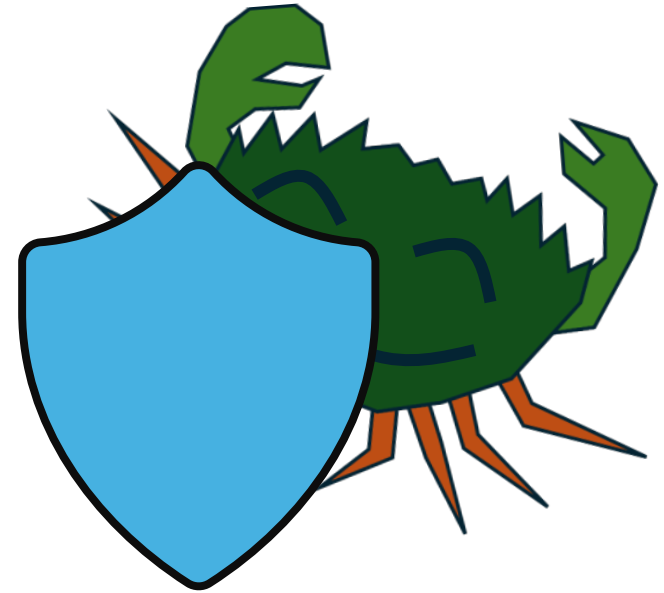
And what's next for our crab surveys?

- Reduce carbon in the atmosphere



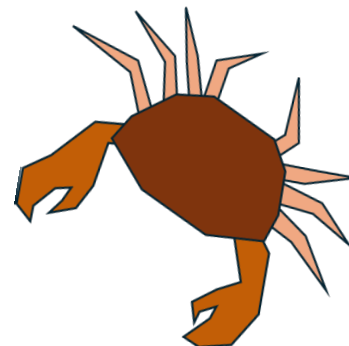
And what's next for our crab surveys?

- Reduce carbon in the atmosphere
- Consider **conservation action**





References



1. Silva, A. (2008) *Predation by crabs on rocky shores in north-east Atlantic*. Thesis. University of Plymouth. Available at: <http://dx.doi.org/10.24382/3535>
2. Rowley, A.F. & Coates, C.J. (2023) Shell disease syndromes of decapod crustaceans. *Environmental Microbiology*, 25(5), 931–947. Available from: <https://doi.org/10.1111/1462-2920.16344>
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4. Heraghty, N. (2013). Investigating the abundance, distribution and habitat use of juvenile *Cancer pagurus* (L.) of the intertidal zone around Anglesey and Llŷn Peninsula, North Wales (UK). MSc thesis, Bangor University, Fisheries & Conservation report No. 29, Pp.75
5. Jenkin, A., Trundle, C., Sturgeon, S., Daniels, C. and Street, K. 2023. Intertidal Edible Crab (*Cancer pagurus*) Survey 2022. Cornwall Inshore Fisheries and Conservation Authority (Cornwall IFCA), Hayle.
6. Weiss, Monika & Thatje, Sven & Heilmayer, Olaf & Anger, Klaus & Brey, Thomas & Keller, Martina. (2009). Influence of temperature on the larval development of the edible crab, *Cancer pagurus*. *Journal of the Marine Biological Association of the United Kingdom*. 89. 753 - 759. 10.1017/S0025315409003269.



Thank You for Listening!

Key findings

1. Furrowed crabs are now very abundant
2. Shore crabs only abundant in brackish areas
3. Edible crabs are uncommon
4. Sex ratio of 1 : 14 female : male edible crabs

What's next?

- Assess priorities and adapt survey
- Desk review & MSc?
- Subtidal data
- Consider campaigning to protect key areas

Acknowledgements

Alderney Marine team and volunteers, in particular: Dr Mel Broadhurst-Allen, Lou, Bob, Mark, Diana, Esme, Nigel, and many others.



Alderney
Wildlife Trust

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