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 @SAGB



Shellfish  
Association of Great Britain

THE CROWN  
ESTATE



Llywodraeth Cymru  
Welsh Government



Department  
for Environment  
Food & Rural Affairs



The FISHMONGERS'  
Company's

FISHERIES CHARITABLE TRUST

SEPAmatic



Infrastructure  
and Environment



Crown Estate  
Scotland  
Oighreachd a' Chrùin Alba

seafish



Marine  
Management  
Organisation



# Naked Clam Aquaculture

## Opening up a new seafood sector

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## Naked Clams have already changed the course of history once – can they do so again?

*'Naked Clams, or teredinids, achieved notoriety during the age of sail by causing significant damage to wooden vessels .... one of the most famous examples being the stranding of Columbus in Jamaica during his 4th Voyage to the New World after scuttling his fleet'*



*'modern naval engineering has thankfully mitigated the marine risks of Naked Clams'*

Willer, D. F. & Aldridge, D. C. (2020). From pest to profit - The potential of shipworms for sustainable aquaculture. *Frontiers in Sustainable Food Systems*, 4:575416. <https://doi.org/10.3389/fsufs.2020.575416>

Quotes from: Shipway, J.R., Tupper, M., Willer, D. F. (2024). Gross to Gourmet: A Social Media Analysis of Naked Clams as a Sustainable Delicacy. *In review*

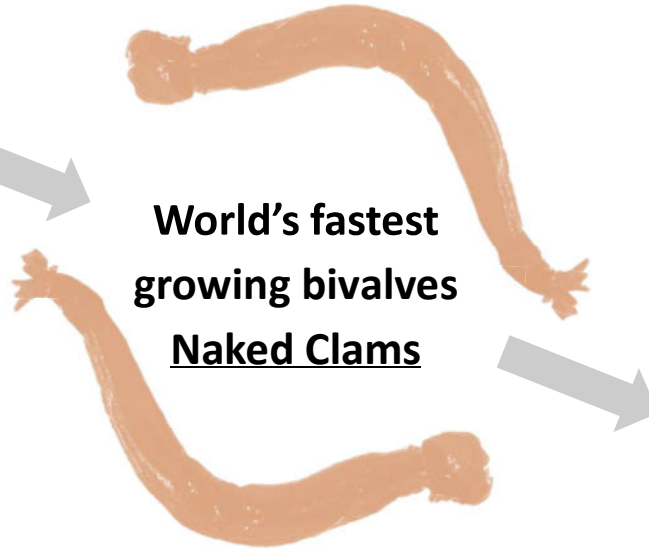
### ***Can we turn Naked Clams from pest to profit?***

## Can Naked Clams offer a game-changer as they rapidly turn wood into protein?

Sustainable wood waste  
from forestry



World's fastest  
growing bivalves  
Naked Clams

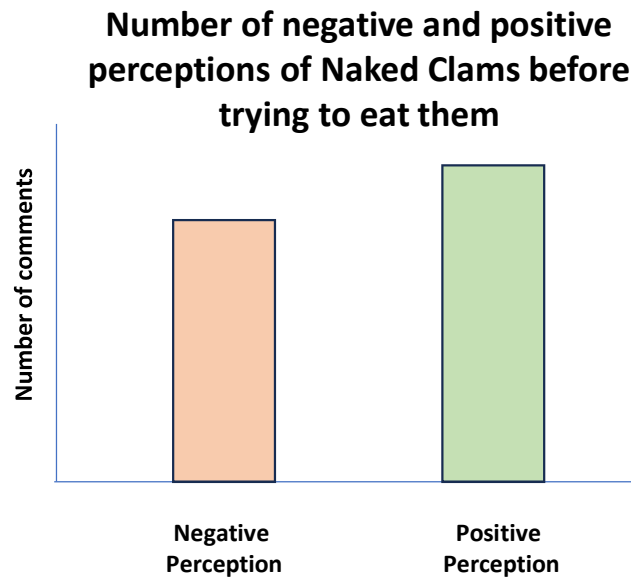


Nutrient-packed protein

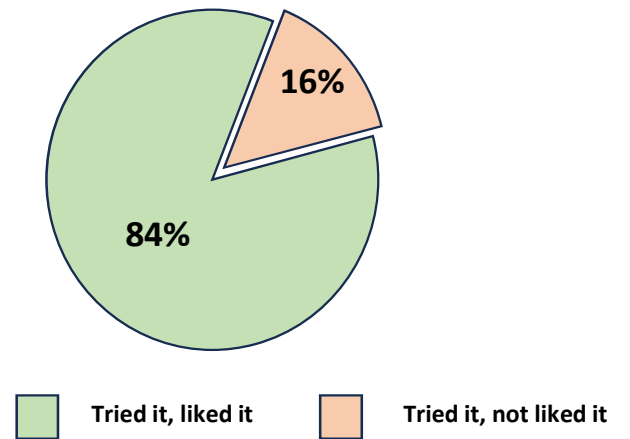
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## The majority of people that try Naked Clams like them - potential for expansion?

- AI Tools used to analyse social media globally
- Encompassed over 40 million views, 1.4 million likes, thousands of comments and over 40 videos from Facebook, Instagram, TikTok, and YouTube
- Before trying, positive and negative perceptions are similar
- 84% of people that try Naked Clams like them



Naked Clams: tried it, liked it vs tried it not liked it



# Celebrity chefs are contacting us to design recipes - suggesting wider market potential

## Margot Henderson

### Naked Clams, Brown Butter, Capers & Monks Beard

serves 2

- 1 handful of naked clams approx 200g
- 2 tbsp of unsalted butter
- 1 cup of plain white flour seasoned with a pinch of salt, black pepper and 1 tsp smoked paprika
- 1 tsp of sherry vinegar or brown rice vinegar
- 1 tsp of capers
- a splash of white wine
- 100 g of monks beard, washed and blanched in hot water for a moment or samphire if its in season.

In a pan heat a tbsp of butter until it starts to brown. Toss the worms in seasoned flour. add a handful of naked worms, season with salt & pepper. Fry for a few moments, moving the pan so the worms keep moving. After a few moments, add splash of sherry vinegar and white wine. With a slotted spoon remove the worms and leave to the side. In the pan over a medium heat add a splash of water or dashi, add the monks beard and another tsp of butter shuffle until the sauce comes together. Finally gently add the worms into the sauce and pour onto 2 plates. Served with a green salad and a lovely glass of Riesling.



## Chef Joseph Yoon, Brooklyn Bugs

### Naked Clam Rolls

#### To Assemble:

- Spread Cricket Green Goddess on the grilled bread roll.
- Put a generous portion of fried naked clams on top.
- Top off with pickled red onions.

#### For pickled red onions:

- Thinly slice a red onion, and cover with red wine vinegar for at least 30 mins.

#### For the Cricket Green Goddess Sauce:

- 1/2 cup mayonnaise
- 1/2 cup Greek yogurt
- 1/2 ripened avocado
- 2 oz basil
- 2-3 scallions chopped
- 1-2 smashed garlic clove
- 2 tbs cricket powder
- 2 tbs fresh squeezed lemon
- Kosher salt, Freshly cracked black pepper, to taste
- Put all ingredients in blender until a smooth sauce consistency.

#### For the Naked Clam Cricket Tempura:

- 1 cup all-purpose flour
- 1/2 cup rice flour
- 1/4 cup cricket powder
- 1 large egg
- 1 1/2 cups ice cold sparkling water
- Preheat vegetable oil to 375F.
- Whisk flour, rice flour, and cricket powder together in a large bowl. Add eggs and soda water and, whisk until the mixture just comes together. Don't over mix.
- Working in batches, submerge the (cleaned) naked clams in the batter and make sure to coat entirely.
- Gently place naked clams into the hot oil one at a time, and don't overcrowd the pot.
- Use a wire mesh spider and rotate the naked clams to ensure the tempura is an even pale golden brown and very crisp, about 2-3 minutes.
- Place on paper towel lined baking sheet, and add a little flaky sea salt to finish.

#### For bread roll:

- Spread room temperature butter on bread roll, and place on preheated medium high pan and cook until golden brown.



## Alvin Leung

Naked clams in macerated fruit on ice

## Preparing Margot Henderson's recipe



## Naked Clams are also highly nutritious

### Headline results of first nutritional profile of Naked Clams:

- 70% more B12 than mussels, 140 µg per 100 g
- Rich in the same monounsaturated fats as in olive oil
- Rich in protein, 30% protein by dry weight
- Can fortify with additional omega 3 using microcapsules delivering a 75% uplift



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## We have now developed a Naked Clam aquaculture system at lab scale

- World's first aquaculture system – previously just wild capture
- Scope encompasses hatchery, grow out and harvesting
- Closed the reproductive cycle
- Identified mechanisms for seeding wooden matrices with juveniles
- Developed a range of wooden matrices for rapid growth and ease of harvesting
- Tested a range of supplemental algal and microencapsulated feeds to provide growth and nutritional profile uplift
- Currently optimising yield and growth rate
- Trade marked Naked Clams
- Patents applied for the aquaculture system



Working in the lab



Sample prep



Naked Clams siphons - feeding in action

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# We have received encouraging media reactions



To save the oceans, start eating 'naked clams'

<https://www.ft.com/content/d670f37a-2f66-4191-a6ce-770e35746613>



Shipworm fish fingers, anyone? Science's answer to cod

<https://www.thetimes.co.uk/article/meet-the-naked-clam-the-new-sustainable-seafood-76178p3fl>



Naked Clams on Air

<https://www.bbc.co.uk/programmes/m001slw4>

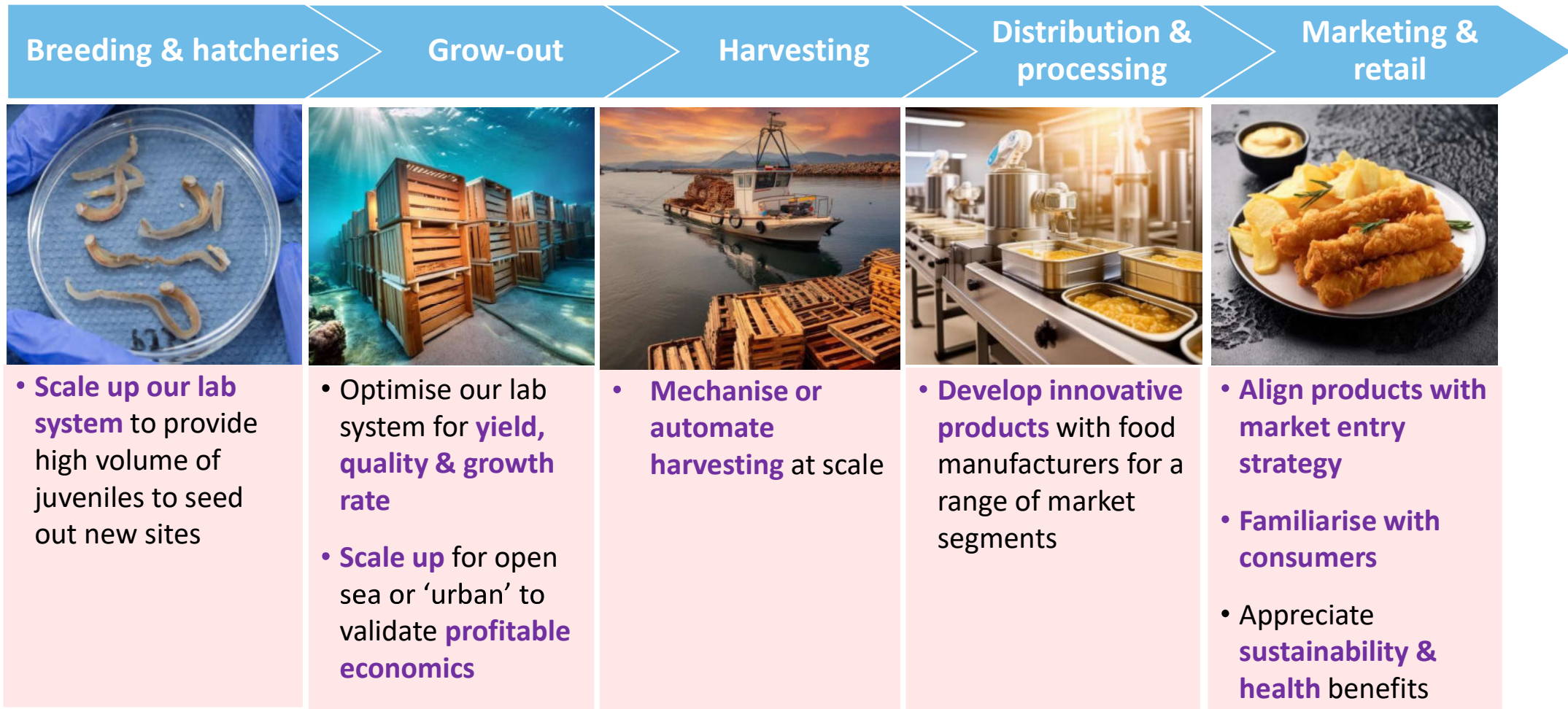


When the King is the warm-up act for Naked Clam aquaculture

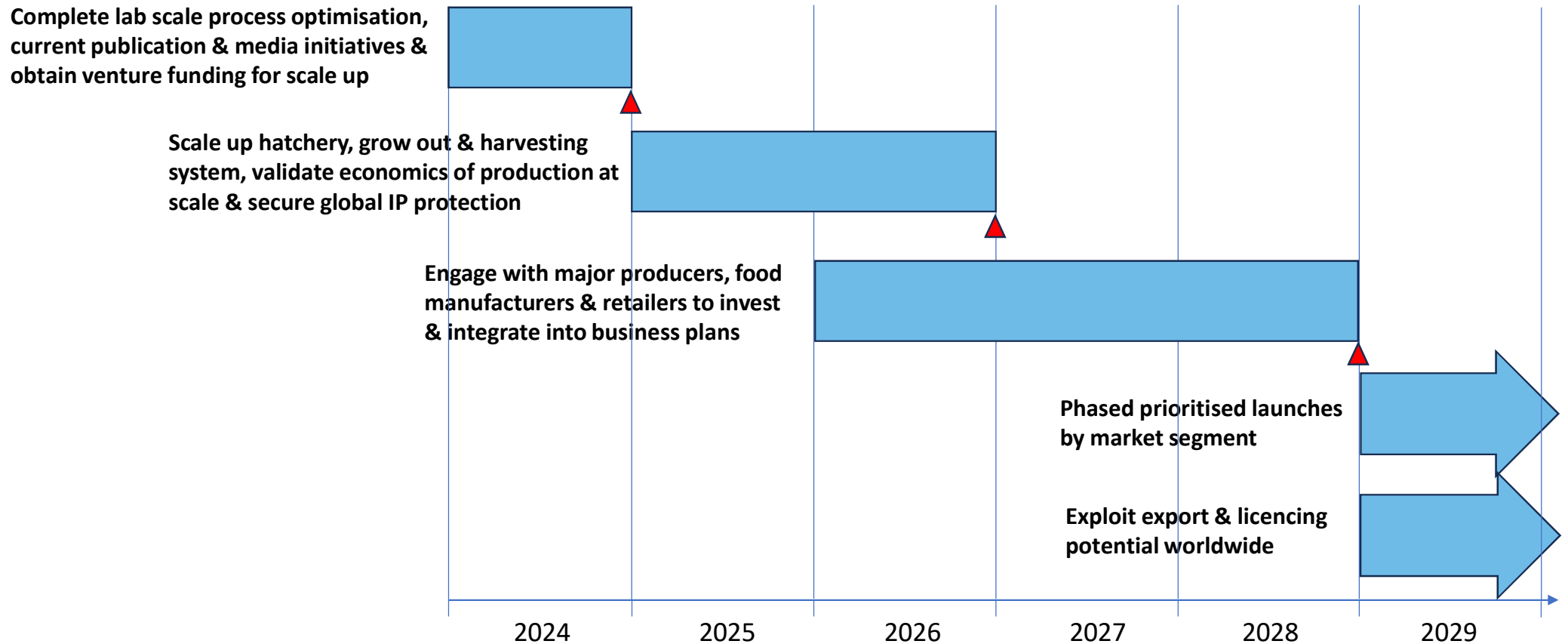
<https://youtu.be/UN8J6Wfde9U?feature=shared>

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# However, several hurdles must be surmounted for Naked Clams to become a new sector

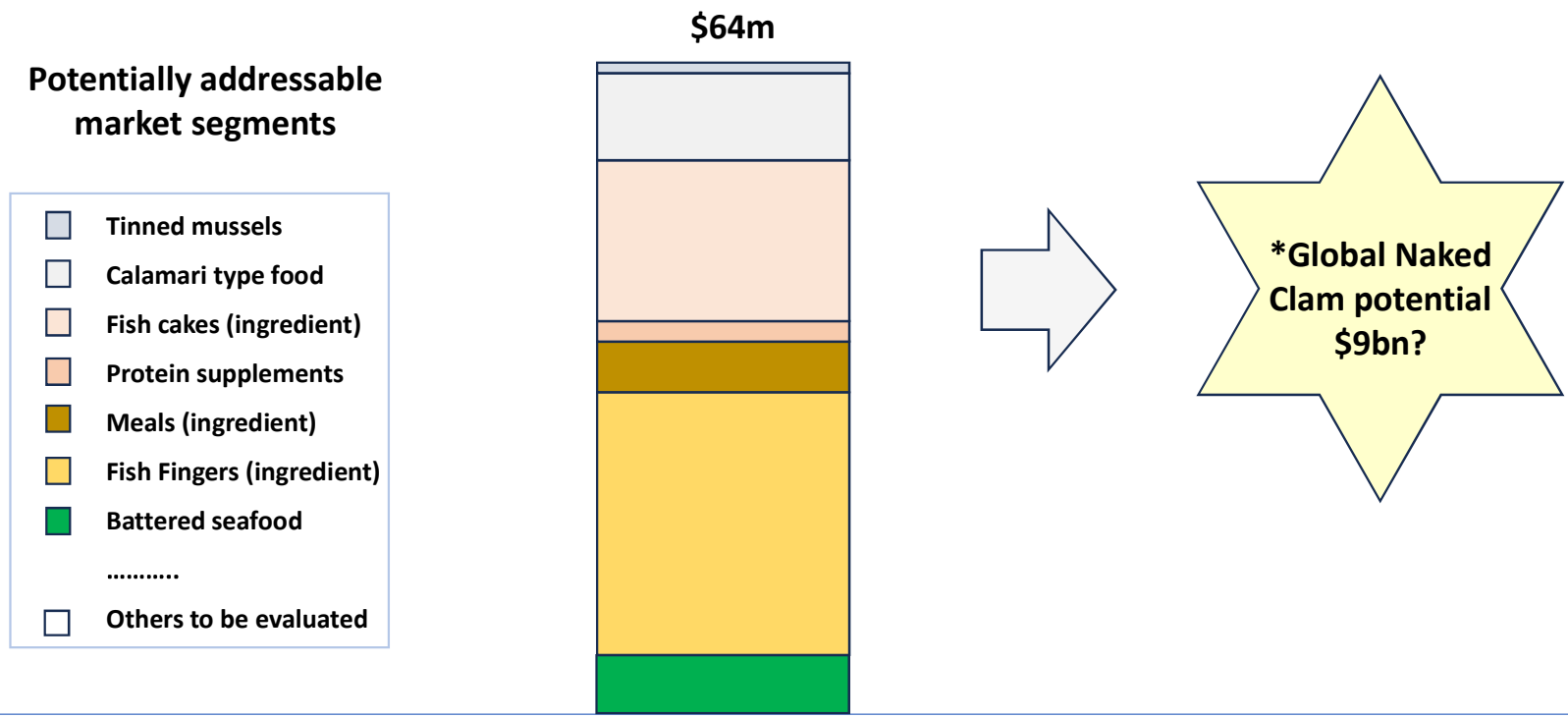


# Our high-level roadmap to open up a Naked Clam Aquaculture sector within 5 years



# The size of the prize?

Very preliminary



**UK Naked Clam potential by segment - very preliminary estimates 2023 basis**

Source: Our own preliminary estimates based on UK and global market data

\* Taking UK as 0.7% of global

# Thank you for listening!

Please scan the QR code to let us know your thoughts or if you are interested in working with us



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# 54th Annual Conference

Shellfish Association of Great Britain

#SAGB54