

Whelk Symposium



BLUE MARINE
FOUNDATION

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EXECUTIVE SUMMARY

Overview

- **Effort to harvest the UK whelk fishery has grown significantly** in recent years, but life history traits could mean that local whelk populations are vulnerable to exploitation or environmental events.
- **Low dispersal rates and a sedentary life-style** make whelk populations vulnerable to over-fishing.
- **A Minimum Landing Size (MLS) of 45mm is the only current UK-wide management measure for whelk** inherited from the EU.
- **Research suggests a MLS of 45mm is too small** to sufficiently protect recruitment in many areas.
- **Outside 6nm there are no effort restrictions** or additional management measures except in Wales where a Whelk Fishing Permit Order sets an annual catch limit.
- **Within 0-6nm regional IFCAs have introduced a variety of measures** including flexible permit byelaws, specific minimum size limits reflecting regional variation in size of maturity, effort restrictions such as pot limits and riddle specifications.
- **Collaborative research is underway to investigate whelk stocks** and inform more effective management measures.
- **A Whelk Fisheries Management Plan for English waters** is due to be published by the end of 2023.



Background

In June 2022, the **Blue Marine Foundation (Blue Marine)** held an online symposium dedicated to the sharing of knowledge on UK whelk stocks and fisheries management.

Over fifty delegates heard about efforts around England and Wales, concerning regional research and management initiatives, and larger networks designed to bring knowledge and expertise into one space to inform nationwide priorities.

The event brought together fishermen, academics, fisheries management bodies, and conservationists to promote collaborative action to support and sustain UK whelk stocks.

A recording of the event can be viewed here:

[Blue Marine Foundation Whelk Symposium 2022](#)
[- YouTube](#)

55 delegates

Biology

The common whelk (*Buccinum undatum*) is a large, slow-moving gastropod (member of the snail family) that lives on the seabed around the UK between the intertidal to as deep as 1,200 metres. Whelks are carnivorous, feeding on worms, crustacea and bivalves, drilling holes through the shell to reach the soft tissue inside, and are preyed upon by fish such as cod and crustaceans. Around England, whelks are close to their southern limit, as warmer temperatures are thought to be a limiting factor to reproduction.

Eggs are laid between October and May in spongy clumps often found along the shoreline, used in the past for washing, leading to common names such as fisherman's soap or sea wash balls. Up to 2,700 eggs may be laid in one egg mass, but only one percent of the eggs laid hatch, as those that hatch first eat the rest! Juveniles emerge directly from the eggs after three to five months and therefore enter the benthic-phase directly i.e. with no pelagic phase, resulting in limited dispersal potential. Adult whelks are relatively sedentary and only exhibit limited movements.

Whelks have a life expectancy of 10-15 years. The lack of a pelagic phase and sedentary life-style could limit mixing between populations, reducing gene flow, and resulting in local variations and adaptations. Size at maturity (SOM)* is highly variable around the UK, and in many regions has been found to be above the EU MLS of 45 mm. Removing juveniles (i.e.<SOM) before they can contribute to the spawning stock is therefore likely to affect recruitment (MRAG, 2018).

**Size at onset of maturity. Size at which the probability of an individual being mature is 0.5 i.e. the size at which 50% of the population is sexually mature.*



Laying whelk eggs. Photo © Gordon Lang

Fishery

- Whelks are caught using baited pots, weighed down with cement and laid in strings of up to 1,000 pots on larger vessels. Small scale inshore fisheries use much shorter strings of 30-60 pots. Pots are hauled every 1- 3 days in depths of 10-30m. The whelk season typically runs from March to July with peaks in April and May.
- Whelk is a fishery of great economic importance to fishing communities. In 2020, it was the fourth most valuable fishery in England worth £19.8m (Table 1).
- Whelk landings have significantly increased across the UK in recent years, as have average prices, principally due to demand from nations such as South Korea although this market was significantly disrupted during Covid. The value of whelk landings rose from ~£500 per ton in 2005 to £1,300 per tonne in 2019 with a total UK landings value of £25.5m in 2019.
- Annual whelk landings into English ports between 2009 and 2019 for under 10m vessels have varied from around 4,000 tonnes to 7,000 tonnes. Landings by over 10m vessels increased over the same period, rising from 3,000 tonnes in 2009 to 7,000 tonnes in 2019 (NEF/AIFCA 2022).

- Out of the four UK administrations, England lands the most whelks, followed by Wales (average 5,400 tonnes 2015-2019). Whitehaven in North West England has the highest landings by weight, followed by Eastbourne, Shoreham, Saundersfoot, Morfa Nefyn and Weymouth.

Table 1 – Top 10 species by value landed into England by UK vessels 2017-2020.

Source: MRAG/Blue Marine Foundation from MMO fisheries statistics.

Species	Value (£m)			
	2017	2018	2019	2020
Scallops	35.3	36.4	34.5	22.7
Crabs	24.9	34.3	36.7	22.0
Lobster	24.8	22.9	23.9	20.0
Whelks	12.2	13.9	18.5	19.8
Sole	14.0	15.8	18.4	17.1
Cod	6.1	5.2	8.1	15.9
Cuttlefish	25.4	14.9	12.6	8.2
Monkfish	8.0	6.5	7.7	7.5
Cockles	4.3	6.3	9.9	7.4
Nephrops	9.8	7.7	13.8	5.2

2020 England whelk fishery

£19.8m



Whelk bags. Photo © Geoffrey Lee

Management

Given that whelk populations have relatively little intermixing, they tend to have distinctive characteristics, which means that bespoke management measures at the regional level are often considered more effective than nationwide management measures.

Many regional management bodies emphasise that these measures need to be flexible, allowing them to adapt according to changes in the fishery or its environment. Regional research is helping to progressively refine these management measures further.

UK measures

The current management measure in place throughout UK waters for the whelk fishery is the EU-wide Minimum Conservation Reference Size (MCRS) or Minimum Landing Size (MLS) of 45mm shell height, as defined under EC regulation No 850/98. This is applied throughout UK waters beyond 6nm, but within Wales, Isle of Man, Shetlands and within the 0-6nm limit in England some regional IFCA's have introduced different MLS (Table 2).

National measures

Wales is the only nation of the UK with a nationwide permit scheme in place for whelks, which was introduced in 2021. The Welsh Government has recently stimulated research into whelk stock characteristics, with the dual aims of achieving biological sustainability of the stock while conserving the livelihoods of those who depend on it, with a focus on adaptive management measures as research develops further. Research is underway to further inform the Annual Catch Limit, involving the development of a suite of reference points and investigation of the fleet's fishing patterns to apportion such a limit with minimal disruption.

Regional measures

Wales, the Isle of Man and a number of IFCA's, have undertaken research into whelk stocks and exploitation at the regional level, often in collaboration with whelk fishermen. This has supported the emergence of a number of measures designed to sustain whelk stocks and the livelihoods of those who harvest them. These regional management measures (Table 2) include:

Regional measures

- **Increasing the MLS to protect juvenile stocks** and support recruitment and reflect regional variations in SOM. This may be done in stages to avoid a dramatic step change to fishermen's catches in any one year.
- **A fixed number of permits** to limit fishing effort.
- **Limitations** to the number of pots or landed weight per person or per vessel.
- **Pot specifications**, such as minimum sizes for escape gaps.
- **Consideration of a closed season** during times of peak reproductive activity.

Table 2 – Regional whelk management measures applied in UK waters. Source: Defra Shellfish Mapping Tool as at July 2022.

Note: Some IFCA's e.g. Southern IFCA were in the process of developing potting/whelk management measures at the time of writing which have not been included.

MEASURE	DISTRICT APPLYING MEASURE AND DETAILS
MLS 45mm (as set in retained EU Reg)	Cornwall; North Eastern; Northumberland; Southern; Sussex; Scilly; NI, EU
Increased MLS	Devon & Severn (65mm - Potting & Mobile gear Permits); Eastern (55mm); Kent and Essex (53mm); North Western (55mm, increasing 10mm each year to 75mm); Wales (65mm); Shetlands (75mm); Isle of Man (75mm)
Permit	Devon and Severn, Eastern, Kent and Essex, North Eastern, North Western, Northumberland, Sussex, Wales
Monthly catch return forms	Eastern, North Eastern, North Western, Sussex, IOM, Wales
Max vessel size	Cornwall (16.46m); Devon & Severn (15.24); North Eastern (16m); North Western (15m in NWSFC, 13.72m in CSFC 3nm); Northumberland (12m); Southern (12m); Sussex (14m); Wales (≤10m)
Commercial pot limit	Devon & Severn and SIFCA (voluntary code in Lyme Bay Reserve of 500 pots); Eastern (500); Kent and Essex (300); North Western (1000 with track record & 400 <10m vessels with no track record); Northumberland (800); Sussex (300 0-3nm & 600 3-6nm); Isle of Man (1000 for 2016 track record, 300 for 2017 track record, 600 limit within 0-3nm, combined limit of 3600 within 0-3nm)
Commercial catch limit	Wales (flexible monthly catch 50 tonnes)
Recreational pot limit	Devon & Severn (5); Eastern (5); Kent and Essex (10); North Eastern (10); North Western (5); Northumberland (5) (North District and Cumbria 5); Sussex (5); Wales (5)
Recreational catch limit	North Eastern (30 whelks per day); North Western (50 whelks per day, 5kg in NWSFC, 10kg in CSFC); Northumberland (20 whelks per day); Wales (5kg per day)
Tags on pots	Devon & Severn (Cat 2 recreational), Eastern, Kent and Essex, Northumberland, Sussex, North Western, Wales
Pots marked with a surface gear	Devon & Severn (Cat 1 PLN, Cat 2 permit number); Eastern (PLN); Kent and Essex (30cm, permit number and PLN); North Eastern (PLN); Sussex (permit number/ PLN)
Escape gaps required	Eastern; Kent and Essex (2); Sussex
Max Pot size/capacity	Eastern (30 litres)
Riddle size	Eastern (24mm bar spacing); Kent and Essex (25mm bar spacing); Sussex (25mm bar spacing)
Spatial restrictions	Devon & Severn (Lundy Island No Take Zone fishing is prohibited, voluntary "Whelk box" above Lundy Island); Devon & Severn and Southern (voluntary code in Lyme Bay Reserve limiting number of pots and pots on strings); Sussex (restrictions on use of nets & pots in Kingmere MCZ, Pagham MCZ); Wales (specific restrictions in permit conditions, in areas where specific features requiring protection are present)
Temporary closure option	North Western (any area in NWSFC, for any time up to a year); Wales (depending on fishery abundance)

Research

The lack of data on whelk has been considered a barrier to effective management and a key focus of recent research has been to investigate the variation in size of maturity (SOM) which has been found to vary on a relatively small geographical scale. Within the Southern Inshore Fisheries and Conservation Authority (IFCA) district alone SOM ranges between 45 - 66 mm and within Wales from ~ 50 mm to over 70 mm. Understanding the regional variability in SOM is important when setting Minimum Landing Sizes for the species.

Research on fishers' experiential knowledge found significant understanding of physical differences between different whelk populations. Scientific research found that variations in environmental conditions correlated with these differences. While fishers' knowledge and scientific knowledge matched in terms of habitat type, there was a mismatch regarding seasonality of growth and spawning. Further research aims to investigate these findings further and ground-truth results through fieldwork. Combining scientific data with experiential knowledge provides a strong opportunity for more effective management.

Collaborative initiatives

A number of UK-wide initiatives have developed in recent years to inform whelk research and fishery management. The Whelk Working Group (WWG), first formed in 2019 in recognition of the increasing growth, and risk of exploitation, of the UK whelk fishery is a cross-disciplinary group led by the Inshore Fisheries and Conservation Authorities. The WWG established a forum for sharing developments with research and management initiatives across the UK.

The Whelk Management Group (WMG), supported by Seafish, focuses on a number of whelk-related management issues, most notably the development of a Whelk Fisheries Management Plan (FMP) for delivery in 2023 in English waters. The WMG will provide an evidence statement on data and knowledge gaps, and a strategy on stakeholder engagement.

Defra is developing a shellfish legislation mapping tool to support the WMG among others, to build a holistic understanding of existing management measures and gaps. With data on international, national, and regional measures, the tool is complete for whelk, and will be updated on a quarterly basis.

Management of French whelk fisheries in the Eastern English Channel provides a non-UK perspective. Data-limited models are currently used to inform management, given the challenges involved in collecting data on whelk stocks and trends. Improved catch and effort data, alongside transnational communications about stock characteristics, should be encouraged to ensure effective joint management.



Whelk pots. Photo © C. Smith

Conclusions

The Whelk Symposium aimed to share information on research, fishery trends and current management to inform measures that support the long-term health of UK whelk populations and sustainable fisheries.

Presentations reflected the complexity of assessing stock status and size of maturity for whelk and the need for adaptive management both geographically to take account of regional variations, and over time to allow the industry to adjust.

This means that regional management measures are typically more appropriate than nationwide measures. However, guidance at the national level remains critical to provide a framework for more bespoke management measures.

Key points drawn from the Symposium:

- **The developing Whelk Fisheries Management Plan** for England provides a key opportunity for more effective whelk management at the national level, as well as accommodating more robust regional measures.
- **Knowledge sharing is essential.** The Whelk Management Group and Whelk Working Group provide spaces to do this, as well as collaborations between management, academia and industry at the regional level.
- **Local fishermen have a vital role** to inform management measures.
- **While national guidance is important,** differences between whelk populations both in space and time indicate the importance of adaptive regional management measures, such as those developed by IFCA's.
- **Measures for sustainably managing offshore fisheries** at the regional level need to be explored to complement existing inshore management measures.
- **Continuation and extension of research** will help inform the most effective measures tailored to the local population dynamics and environmental conditions.

SYMPOSIUM PROCEEDINGS

Sam Fanshawe, from **Blue Marine**, welcomed participants and introduced the symposium, highlighting its focus:

"To review the ecological and fisheries management aspects of safeguarding the long-term sustainability of the whelk fishery."



The aims of the symposium were:

- 1 To **share information** on fisheries status and trends, management measures, and collaborative measures such as whelk working groups.
- 2 To **support inclusive development of the Whelk Fisheries Management Plan (FMP)**.
- 3 To **inform future engagement plans** for the Whelk FMP.

“Looking at the combination of all these factors, we believe they make the fishery at risk of overexploitation without intervention.”

Whelks are an important focal species because:

- 1 Their **sedentary lifestyle** makes them vulnerable to exploitation.
- 2 The **whelk fishery is expanding** as more markets gain interest and prices increase, leading to increased landings from larger, more industrial vessels.
- 3 There is **limited data** on stock status.
- 4 **Inshore management measures** within 6 nautical miles vary around the UK.
- 5 There are **few management measures beyond 6 nautical miles**, with the exception of Welsh waters.



Whelk riddle. Photo © Geoffrey Lee

Research and knowledge sharing

Chloe Smith, Inshore Fisheries and Conservation Officer at the [Southern IFCA](#), gave an **introduction to the Whelk Working Group** (WWG), which she chairs. The WWG was formed by the Eastern IFCA in February 2019, as management bodies had recognised the recent growth of the UK whelk fishery and the risk of exploitation. Members include representatives from IFCAs and other management bodies, as well as government, fishery stakeholders, and academic institutions. The WWG aims to facilitate communication and collaboration between its members, improve working relationships, and improve the quality of management information (Table 3).

“Perhaps most importantly, the group has provided an easy platform for management bodies and research groups to share information, lessons learned, and best practice.”

Table 3 – Whelk Working Group Goals

Whelk Working Group Goals

- To **increase communications** between all the Group members.
- To **facilitate better research** to better support fisheries management.
- To **improve the quality and extent of whelk fisheries management information**.
- To **help standardise research** and technical practices between relevant bodies.
- To **identify and facilitate joint working opportunities** and explore ways of working to support collaborative and comparable data collection.
- To **facilitate collaboration with external organisations** (non-Group members) where appropriate.
- To **improve access to expert advice** and increase learning from each other.

The WWG shares knowledge on topics such as management and research, as well as other whelk-related information such as habitat assessments, parasite data, and stock assessments. The WWG also worked with the [Good Fish Guide](#) to better inform ratings of whelk fisheries.

At each meeting, members share the latest research findings and management developments. Much of this has come about since a [Defra publication in 2014](#) revealed the minimum landing size (MLS) of 45mm used in whelk fisheries was too small in most regions to allow sufficient whelk to reach maturity. This spurred a range of research at the regional level, which found high levels of variation even within regions, and more detailed research into factors such as whelk age, growth, and variations associated with temperature. A number of organisations are also now developing stock assessments for specific whelk stocks.

The WWG will continue as long as it is useful to members and is working with the Whelk Management Group to facilitate the Whelk FMP. Continued collaboration and sharing of information both within the WWG and with other stakeholders makes it an important asset for whelk management.

Dr Natalie Hold, Research Lead for **Sustainable Fisheries Wales at Bangor University**, presented on **research to inform sustainable whelk fisheries and policy in Welsh waters**. As of 2021, Wales has an **Annual Catch Limit (ACL) for whelk** based on permits. The team at Bangor University is building the evidence base, largely “from scratch” given the lack of historical data, to support and further refine this ACL for future years.

“Our initial aims were to ensure biological sustainability of the stock, the sustainability of the livelihoods reliant on whelk fishing within the Welsh zone, and to ensure what we put in place is adaptive, so it’s not stagnated and can be progressed and improved as relevant data arrives.”

Research so far has focused on biological parameters and found that size at different ages, and age of maturity, among different stocks in Welsh waters were reasonably similar for the most part, making the current MLS largely appropriate. However, some stocks varied significantly, in particular signifying the commercial non-viability of one specific stock with smaller individuals (Figure 1). Understanding this variability will help inform the MLS and any need for region-specific measures.

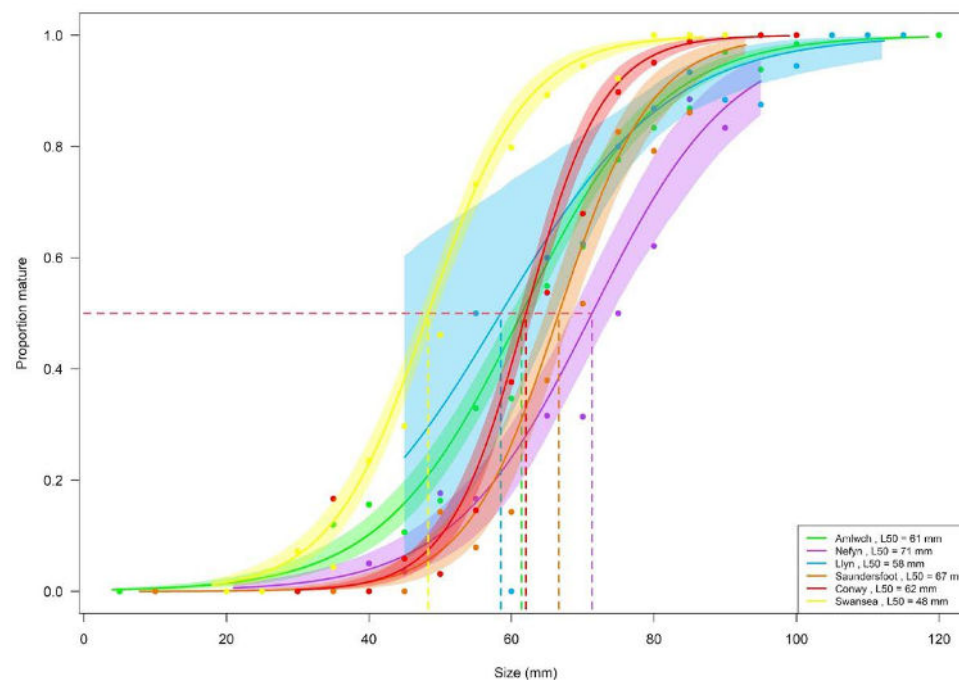


Figure 1 – Size at maturity estimates for six locations around Wales.

The yellow site (Swansea) shows very small size at maturity compared to the majority of other locations.

Based on ICES Working Group guidance as well as other published, peer reviewed resources, a suite of indicators based on factors such as size and age structure have been identified (Table 4). These indicators represent further development by Bangor University from the initial set of indicators used to assess the Welsh whelk fishery. These developments will be published in a peer reviewed journal before incorporating into the management and assessment of the Welsh whelk fishery.

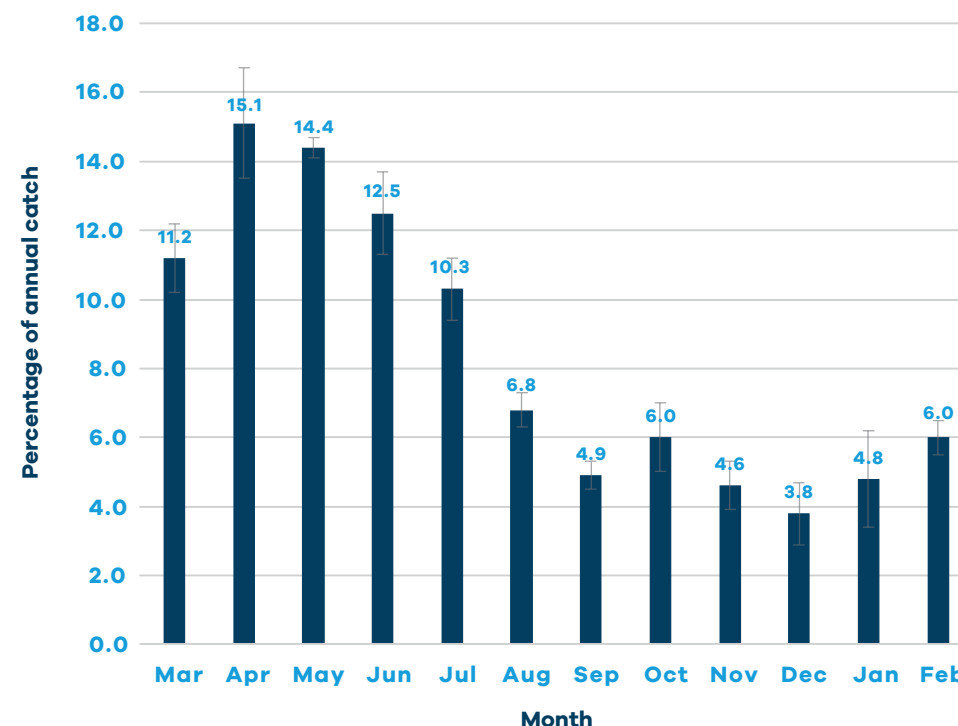
Table 4 – Size-based indicators of whelk stock health.

INDICATOR	DESCRIPTION	CALCULATION	LIMIT	TARGET
L_{25}	The 25th percentile of the landings size should be greater than size at maturity.	L_{25}/L_{mat}	$L_{25}/L_{mat} > 1$	$L_{25}/L_{mat} > 1.2$
L_c	Length at first capture should be greater than size at maturity.	MLS/L_{mat}	$MLS/L_{mat} > 1$	$MLS/L_{mat} > 1.2$
L_{mat}	The mean length in the landed catch should be greater than the size at maturity.	L_{mean}/L_{mat}	$L_{mean}/L_{mat} > 1$	$L_{mean}/L_{mat} > 1.2$
$L_{mat5\%}$	The mean size of the largest 5% in the catch should approach the size within a healthy population.	$L_{max5\%}$	The $L_{max5\%}$ calculated using SPR set at 0.2 of virgin stock	The $L_{max5\%}$ calculated using SPR set at 0.4 of virgin stock
P_{mega}	The proportion of mega spawners in the catch.	Proportion $> L_{opt} + 10\%$	TBD	> 0.3
L_{mean}	The mean size of the landings should approach the size within a healthy population.	Mean shell length in landings	The L_{mean} calculated using SPR set at 0.2 or virgin stock	The L_{mean} calculated using SPR set at 0.4 or virgin stock

Using robust Wales-specific data on whelk life history traits, these indicators help set biological reference points, which can be used to assess biological sustainability in Welsh stocks. A stock will be described “in poor status” if indicators are below limit reference points, “satisfactory” if they are above limit reference points but more than 10% below target reference points and “good” if they are within 10% of the target reference point. Over time, trends in these indicators can also provide insight into the effectiveness of current management measures to re-build or protect stocks.

Given interannual biological variation is high in whelk, as growth is affected by temperature, reference points for biological sustainability of stocks need to be based on averages over several years – advised as being a generation which for whelks is 3-5 years.

To ensure management measures don’t endanger livelihoods, research assessed monthly average landings and number of vessels fishing, finding that fishing patterns for any particular month year-on-year were moderately stable. This monthly catch profile will be used to apportion an Annual Catch Limit across the months of the year, to avoid it being used up or exceeded too early in the year (Figure 2).

**Figure 2 – Monthly percentage of annual landings into Welsh ports.**

The team are investigating further techniques for future stock assessments, such as mark-recapture surveys to estimate abundance and density at 6-8 sites in Wales, surveys of catch and landings per pot and BRUV surveys to identify which of these methods can best inform a relative abundance index for whelk.

Morgane Amelot from **Ifremer** spoke on **perspectives and limitations of data-limited stock assessment models applied to the three French whelk fisheries of the Eastern English Channel**. These stocks vary in how long they have been exploited, with the most recent only being exploited since 2015-16.

Data-limited models have been developed in the last decade for stocks with data limitations, and are based on either catch per unit effort (CPUE), surplus production models, or length-based models. Mollusc and crustacean fisheries are challenging to assess, given the typical absence of dedicated surveys, difficulties in obtaining a representative CPUE, and challenges in ageing and marking them, alongside other biological specificities.

“All these factors, combined with the potential increase of fishing pressure on these species, raises the increasing need for stock assessment.”

Three surplus production models were applied (Figure 3) to three distinct fisheries in the Eastern English Channel (Calvados, Seine Maritime, Haute de France).

The data required to run these models included spatial stock boundaries, catch data, abundance indices (e.g. surveys and/or CPUE), and life history parameters. The quality of these data varies among the three stocks.

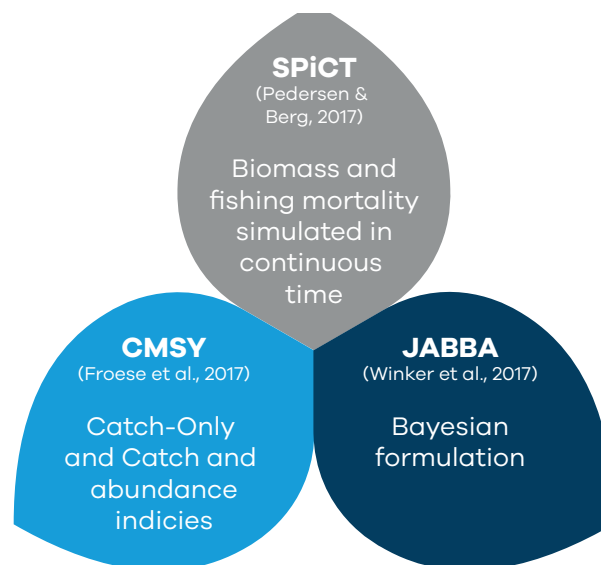


Figure 3 – Three models were applied: Catch MSY; Surplus Production in Continuous Time (SPiCT) and JABBA.

The models indicated that the Calvados stock biomass has been relatively stable for the past 5 years, the two other stock units biomass has been decreasing for the past 5 years (Figure 4).



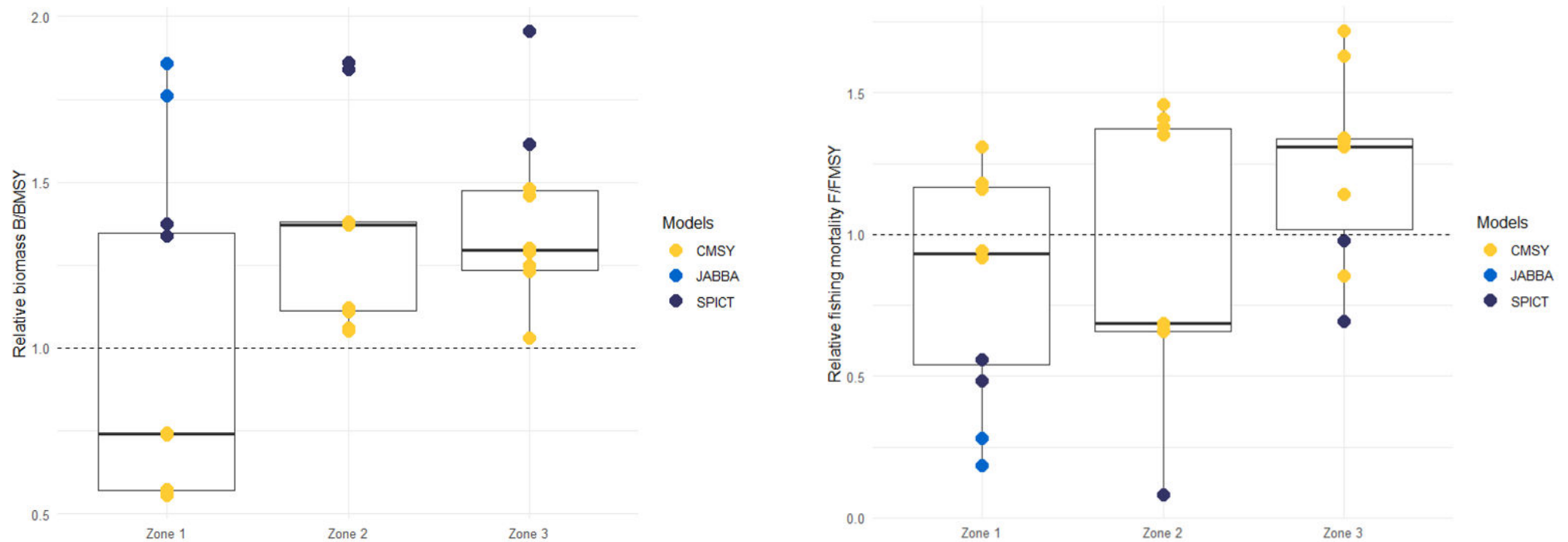


Figure 4 – Whelk relative biomass and fishing mortality production model outputs.

Improving data collection will rely upon sharing information between jurisdictions, such as stock boundaries, life history parameters, and catches. There is also a need to improve effort data collection (number of pots, soak time, and type of pots used). To improve the models used, a variety of models should be tested and assessed against real-world data, and the most robust outputs of different models combined.

Session 1: Q&A

Q: Do biological reference points take into account the ecological status of the species within the ecosystem, and do these reference points for whelks differ from finfish biological reference points?

A: This work originated with finfish and has evolved to apply to whelks, though more work is needed to ensure whelk reference points are as robust as possible. In Wales, researchers have compiled large amounts of data on whelk life history traits. Research has progressed from solely using reference points that were developed for finfish. Theoretical models have lately been run according to the biological parameters for whelks.



Photo © J. Small

Q: Were fishers invited to attend the Whelk WG and what is the potential role of fishers within that group?

A: Fishers were not invited as the whelk WG was not set up to advise on management of whelk fisheries, but rather as a knowledge sharing facility for organisations conducting whelk research and stock assessments. There are now other whelk groups involving fisheries stakeholders.

Q: In years when the catch per unit effort (CPUE) was low, was overall fishing effort reduced as a direct response?

A: In the whelk fishery in the Calvados region of France (eastern English Channel), fishermen target both whelks and crustaceans, so when the CPUE for whelk declined, most fishers switched to catching other species of crustacean. The CPUE for whelk then remained low for around 10 years.

Q: Has the Ifremer team been back to monitor small populations of whelks that were below sexual maturity and minimum landing size (MLS), to see if they are now maturing at a large size, which might be indicative of recruitment overfishing?

A: The stock in question has been revisited in 2022, following the initial survey in 2015. The size at maturity was almost exactly the same in 2022 as it was in 2015; the reasons for this are not fully understood. There has been a lot of participatory research with fishers, but this incorporates an element of site selection bias. Therefore, Ifremer are exploring additional funding opportunities to investigate this fishery further. Researchers think temperature might be playing a role in stagnating juvenile growth in this population, but this theory needs further exploration.

Fishery trends and status

Andrea O'Shaughnessy, Principal Fisheries Manager at the [Marine Management Organisation](#) (MMO), presented on **UK whelk landings data and management**. The data presented included UK and foreign vessel landings in UK ports, but no landings into foreign ports.

"Whelk is a non-quota stock currently. The MMO holds landings data going back to around 2008."

Out of the four UK administrations, England lands the most whelks by monetary value, and the over-10m non-sector lands the most in all jurisdictions bar Wales (Figure 5).

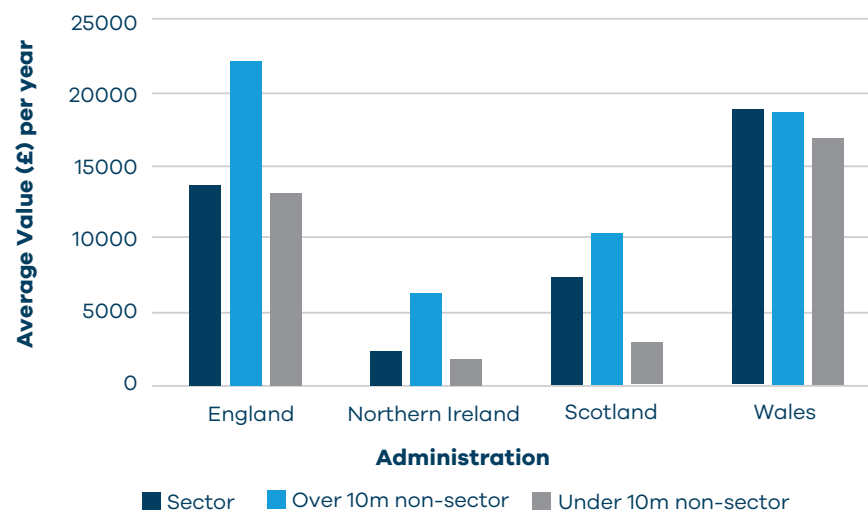


Figure 5 – Average annual landings value by jurisdiction and sector over 2008-2021

By weight, the ports of Whitehaven, Eastbourne, and Shoreham saw the most whelk landings on average over the period 2008-2021 (Table 5).

Table 5 – Average annual weight (,000 tonnes) of whelk landings into top ten ports (2008-2021)

PORT	AVERAGE WEIGHT (TONNES) PER YEAR
Whitehaven	58.2
Eastbourne	45.0
Shoreham by sea	43.3
Saundersfoot	37.8
Morfa Nefyn	33.3
Weymouth	30.4
Portsmouth	30.4
Wells-next-the-Sea	29.7
Lyme Regis	29.6
Fishguard	28.3

By month, the whelk season runs from March to July, with landings peaking in May.

In England, there is no whelk quota for over-10m vessels and no specific mention of whelks within MMO licences. Vessels transferring to England from other fishing administrations are required to put a fishing plan in place; this does not apply to under-10m vessels.

Dr Sarah Birchenough, Deputy Chief Officer at the **Southern IFCA**, presented on the **AIFCA/NEFC report covering recent trends in England's whelk fisheries**. The report looked at regional inshore Fisheries Management Plans, and changes regarding the Fisheries Act 2020.

Whelk landings in English ports from 2009-19 showed strong representation on England's south coast, especially from the inshore sector.



Figure 6 – Whelk landings into English ports (2009-2019). Figure reproduced with permission from: *Towards inshore fisheries management plans – opportunities for change. AIFCA/NEFC Report Jan 2022.*

Annual landings from under-10m vessels rose from around 4,500 to over 7,000 tonnes from 2009 to 2013, before slumping to under 4,000 tonnes in 2018, and then rising to over 6,000 tonnes in 2019. Annual landings from over-10m vessels showed a more stable general increase, from around 3,000 tonnes in 2009 to 7,000 tonnes in 2019 (Figure 7).

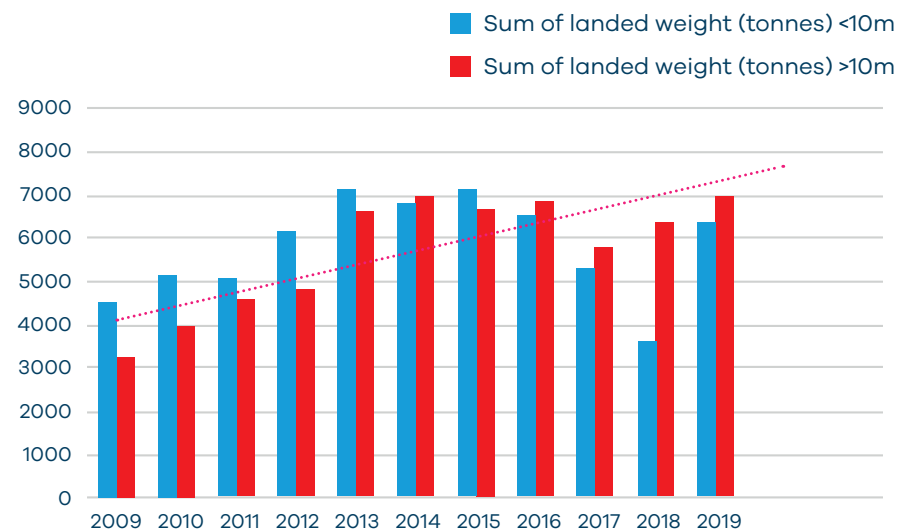


Figure 7 – Whelk landings by <10m fleet (blue) and >10m fleet (red) 2009-2019. Figure reproduced with permission from: *Towards inshore fisheries management plans – opportunities for change. AIFCA/NEFC Report Jan 2022.*

Average first-sale prices for the under-10m fleet have increased from 2009 to 2019 by 40%, from around £1/kg to £1.40/kg. The over-10m fleet has seen a similar, slightly greater increase from 80p/kg to £1.40/kg (Figure 8). This is believed to be as a result of high demand and prices paid by exporters such as South Korea.

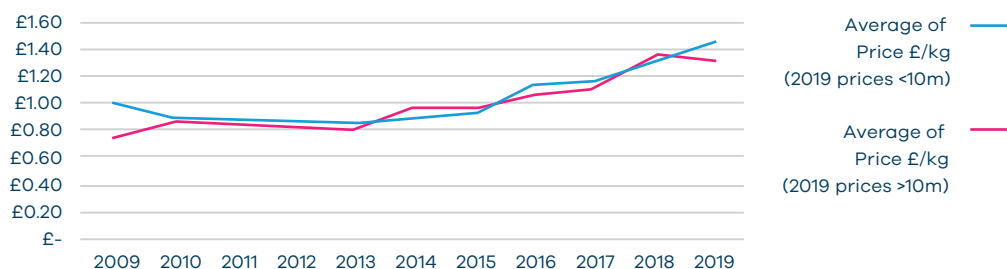


Figure 8 – Average whelk price for landings by <10m fleet (blue) and >10m fleet (red) 2009-2019. Figure reproduced with permission from: *Towards inshore fisheries management plans – opportunities for change. AIFCA/NEFC Report Jan 2022.*

Hannah Fennell, PhD candidate at **Heriot-Watt University**, presented on research carried out for the Whelk Management Group run by Seafish, using fishers' experiential knowledge to inform management strategies for non-quota species. The work aims to increase understanding of the **physical variation in whelk populations using knowledge from fishermen**.

The study arose from concerns that the EU MLS of 45mm was insufficient to safeguard stocks, so needed a better understanding of local whelk populations.

Responses were mainly from southern England and Wales, with over 70% of respondents working on day boats fishing full-time, with over 55% catching predominantly whelks. 77% of respondents had the ability to differentiate where whelks came from based on their physical characteristics.

Fishers reported that the likelihood of large catches was more important than any environmental factor when choosing a fishing ground. Whelks were identified as preferring sandy or gravel seabeds, which tallied with scientific knowledge. Larger whelks and more eggs were reportedly found on fishing gear during colder months (Figure 9 and Figure 10), though other research has suggested more eggs are present during summer months, so this is an area of further investigation.



Whelks © Geoffrey Lee

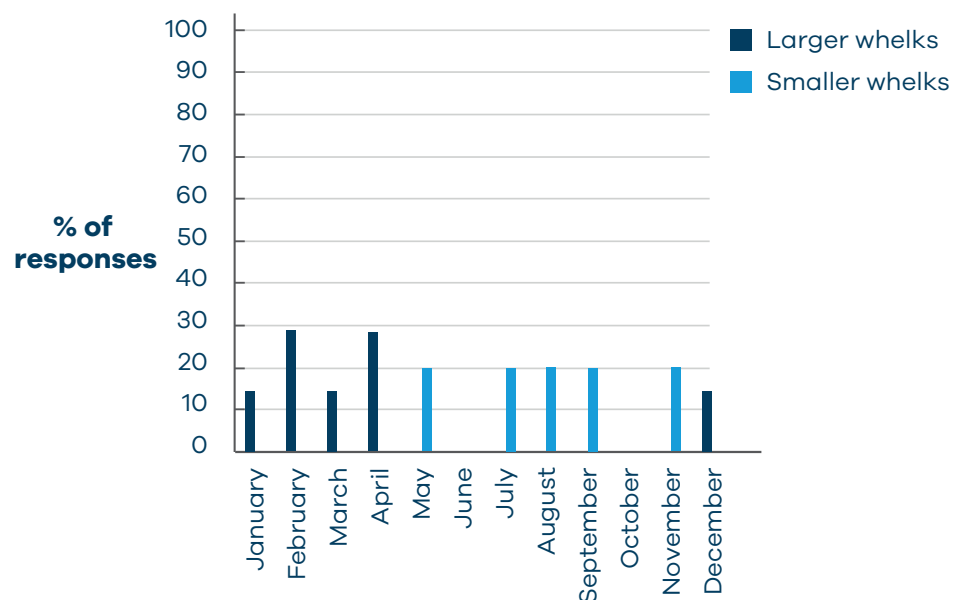


Figure 9 – Size of whelk across months of the year

The study identified a range of environmental variables that can affect whelk distribution (bathymetry, substrate, currents, salinity, temperature and acidity). A species distribution model was used alongside the environmental variables to understand the relationship between the two and the legitimacy of fishermen observations. The analysis found:

- Variables in currents, salinity, and bathymetry link to shell colour variation
- Correlation between pH and salinity to whelk size
- Correlation between temperature and currents and presence of fouling organisms
- Temperature, pH and bathymetry have a relationship with the colour and yield of whelk meat

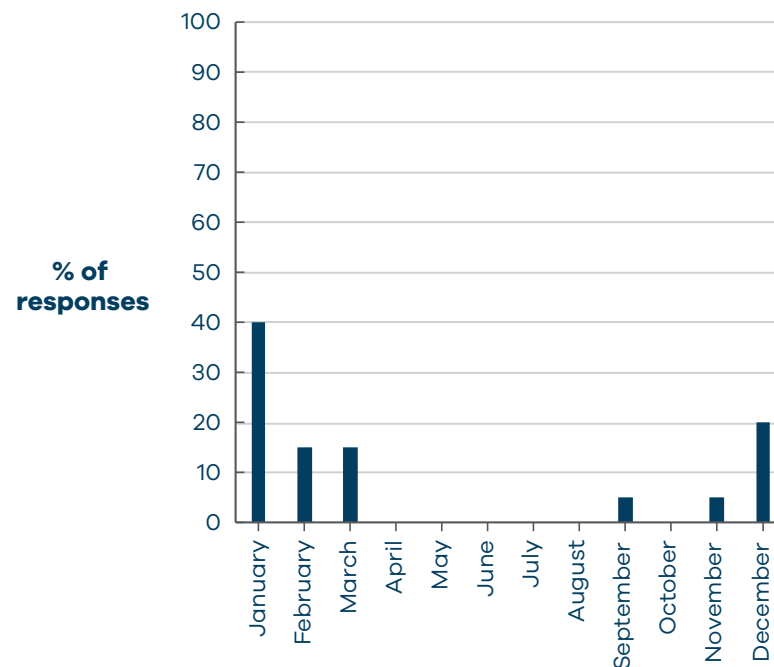


Figure 10 – Months of the year when whelks' eggs are found on gear/pots

Fisheries Industry Science Partnership (FISP) funding has been secured to continue this work. Next steps are to expand the survey area, seek fishers' responses from all across the UK, and aim to hold in-person interviews with fishers. Further into the future, there are hopes to carry out fieldwork to ground-truth the results found.

Session 2: Q&A

Q: Why was the survey asking fishers to identify areas where distinct populations of whelks could be identified based on their physical characteristics limited to the South West of England and Wales?

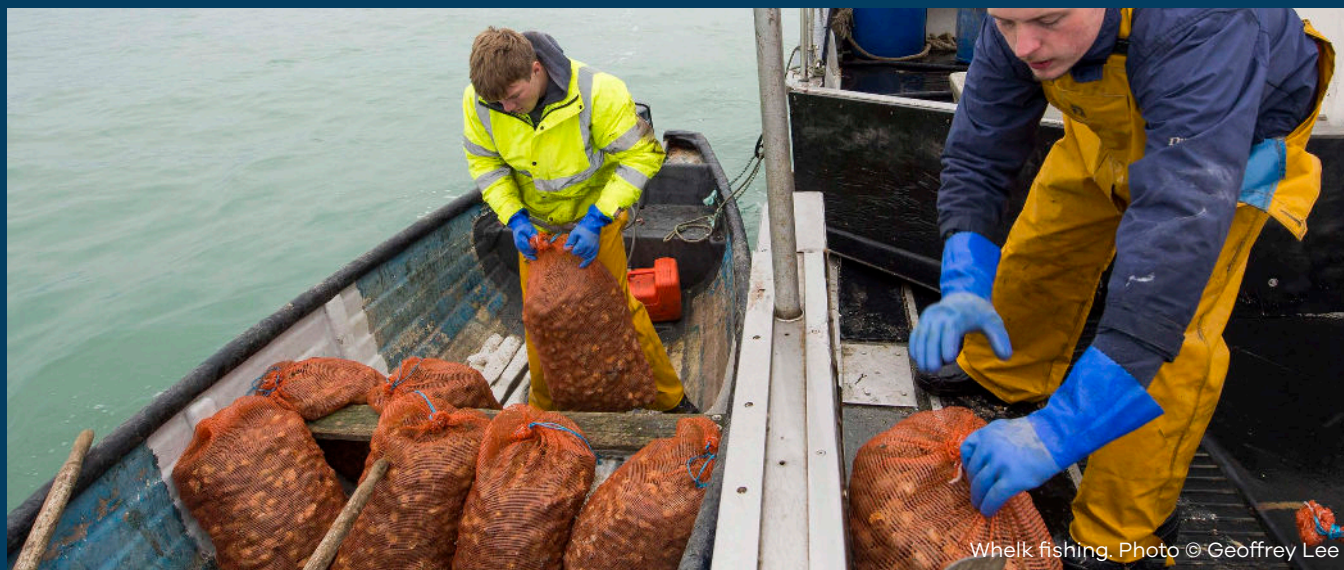
A: The survey was circulated to fishers throughout the country, and responses were highest from the South West of England and Wales. It was suggested there could have been an element of survey fatigue among fishers from other areas. In addition, the project was progressed through the Whelk Management Group, which has strong representation from industry in these areas, thus, they were able to leverage their networks and encourage relevant contacts to complete the survey as well. Researchers from Heriot-Watt University hope the publication of the results will encourage other fishers to participate in future surveys that are distributed.

Q: What was the correlation between pH, salinity, and whelk size? How do you predict climate change will affect whelk size in the future?

A: At a higher pH, whelk size was generally smaller, most likely due to the composition of the shells. It is suggested that climate change could have a significant impact on these populations, the fishers, and communities that rely on them. It is the intention of researchers at Heriot-Watt University to increase the level of research into the impacts of climate change on whelk populations.

Q: Were the results and methodology of the surveys affected by the Covid-19 pandemic?

A: In theory, responses were not affected as questions were based on general activities as opposed to fishers' current activities at the time of asking. Nevertheless, the researchers are interested in comparing the results with the next round of in-person surveys conducted, post-pandemic. The methodology was impacted because responses were gathered online rather than in person due to the lockdowns, which might have reduced the number of responses received.



Whelk fishing. Photo © Geoffrey Lee

National and regional management

Lewis Tattersall, Head of Fisheries Management at **Seafish**, gave an update on the **Whelk Management Group (WMG) and Whelk Fisheries Management Plan (FMP)**. The WMG is a subgroup of the **Shellfish Industry Advisory Group**, for which Seafish provides independent chairs, bespoke economic analyses and guidance, support with communications, and encouragement of stakeholder participation.

“The WMG was formed in early 2020 in response to industry stakeholder concerns about increasing fishing effort on the fishery and the long-term sustainability of the stock.”

The WMG meets quarterly and now has over 70 members, including representatives from across the whelk supply chain, catch sector and processors, fishing organisations, government, management organisations, and academia.

The WMG key work areas were determined by the members:

- Development of Fisheries Management Plans through:
 - FMP working groups
 - Science sub-groups
- Guidance to reduce post-release mortality
 - Production of best practice guidance on responsible handling*
- Bait sourcing and provisioning from economic and sustainability perspective
- Data improvement to address the lack of appropriate data for evidence-based management
- Fisheries Industry Science Partnership research projects (FISP)
 - Progressing anecdotal whelk data collection
 - Whelk pot design trials to minimise catch of juvenile whelk
 - Trialling bait alternatives to reduce reliance on natural bait

*The guidance, prepared by Prof. Michel Kaiser, can be found here: www.seafish.org/document/?id=7e923b95-e142-46d7-8bf0-0dbf997ec66e

The Whelk FMP is part of Defra’s front-runner phase, meaning it will be one of six FMPs for delivery in 2023 for English waters. The WMG and Seafish are responsible for this delivery, namely through providing an evidence statement on whelk fisheries, what data assets exist, where knowledge gaps exist and how to address them, and deliver a stakeholder engagement strategy. The FMP will also lay out aims and objectives for the English whelk fishery and propose initial management measures which could be implemented to deliver on these aims.

Two working groups have been established including a FMP Working Group and a Science subgroup to develop a scientific research plan to underpin the FMP objectives and ensuring that the right research is carried out to support the fishery.

The stakeholder engagement plan will involve raising awareness of the FMP process, ensuring it is delivered collaboratively, and engaging all relevant stakeholders through informal engagement prior to public consultation in early to mid 2023.

Any stakeholders with an interest in joining the Whelk Management Group or engaging in the Whelk FMP were encouraged to make contact: fisheriesmanagementplans@seafish.co.uk.

Joanna Messini, Policy Adviser in **Defra**'s Non-Quota Species Team, spoke on the development of the **shellfish legislation mapping tool**. This tool was initiated to support the **WMG** and **CMG** (Crab & Lobster Management Group).

"When these groups were first set up, we started thinking about what sort of management measures we could introduce to protect the whelk, crab and lobster fisheries, but very quickly we realised that we need to understand first what existing management measures we already have in place, and then identify any gaps we may need to address."

The tool contains information on retained EU law, as well as national and local management measures via Devolved Administrations, Crown Dependencies, and IFCAs. It is currently complete for whelk and three crab species (edible, spider and velvet), with further shellfish to be added in due course. The aim is to update the tool on a quarterly basis, with advice and support from stakeholders across the UK.

The tool consists of two tables (Table 6). The first gives a summary of any particular measure, such as a byelaw or statutory instrument, divided by jurisdiction. The second provides a reference guide of all legislative measures to identify how frequently various measures are used across the UK.

The tool is being regularly updated, so anyone wishing to receive a copy of the latest version can email Joanna.Messini@defra.gov.uk.

Table 6 – Shellfish Legislation Mapping Tool extract

WHELKS - EU / UK MANAGEMENT MEASURES		
SUMMARY: Whelk fisheries in the UK are subject to a Minimum Landing Size (MLS) of 45mm set by legacy EU legislation. Some IFCAs and Devolved Administrations have introduced a higher MLS. No other EU management provisions. Most whelk fisheries are predominantly inshore fisheries and subject to local controls and restrictions.		
MEASURE	CONTENT	LINK
EU		
Regulation (EU) 2019/1241 on the conservation of fisheries resources and the protection of marine ecosystems through technical measures.	This Regulation sets up an MLS of 45mm in UK waters. No quota restrictions. No other management plans under the EU Common Fisheries Policy (CFP).	www.legislation.gov.uk/eur/2019/1241/contents
ENGLAND		
English SIs	None currently	
SCOTLAND		
Shetland Islands The Shetland Islands Regulated Fishery (Scotland) Order 2012	MLS 75mm This Order regulates a fishery for oysters, mussels, cockles, clams, lobsters, scallops, queens, crabs, whelks and razorshells on the bed of the sea adjacent to the Shetland Islands for a period of 15 years until 31st January 2028 .	
WALES		
The Whelk Fishing (Wales) Order 2019 (MLS)	MLS 65mm from July 2020 for UK vessels in the Welsh zone.	www.legislation.gov.uk/wsi/2019/1042/made
The Whelk Fishing Permit (Wales) Order 2021	No permit is required for a vessel less than 10m in length not propelled by an engine or an electric motor; or used recreational fishing. No need for track record. Non transferrable permit.	The Whelk Fishing Permit (Wales) Order 2021 (gov. wales)
Byelaw 30-Conditions for Fishing for lobster, Crawfish, Crab, Prawn and Whelk.	Annual catch limit for permit period before 2027 is 5298 tonnes but annual catch limits may be adjusted. Flexible monthly landing cap of 50 tonnes for each authorised vessel. The permit periods begin on 1 March 2022, 2023, 2024, 2025 and 2026. Fishers to provide monthly catch returns for each fishing day : Weight of retained catch in Kg; Number of pots lifted; Soak time in days; Location of fishing activity (ICES Sub Rectangle). No fee for first permit period beginning 1 March 2022-annual fee thereafter. Recreational, non-transferrable permit. 5kg max daily recreational limit. 5 pots or traps max which must be marked with the permit number.	https://gov.wales/sites/default/files/publications/2020-12/apply-to-fish-for-lobster-crawfish-crab-prawn-and-whelk-byelaw-30-for-recreation-conditions-permit.pdf

Phillip Langlois, Marine & Fisheries Assistant Officer at the **Government of Jersey**, gave an **overview of the Jersey whelk fishery**. Jersey’s fisheries bring in around £7 million annually, with over 85% of landings by weight accounted for by shellfish. Whelks accounted for 17% of total landings by weight in 2020, at 200 tonnes worth around £240,000 down from 800 tonnes in 2018, which could partially be due to a drop in effort during Covid.

Brexit has presented a number of issues, namely that Jersey has been given third country status, which prevents direct landings into Europe, so catch is now predominantly limited to the local market with some exports via the UK.

The Jersey whelk fishery began in the early 1990s and currently is fished by 3-7 Jersey vessels which are not restricted by any catch limit and catch between 0.9 and 1.4 tonnes per vessel per day and 27 French vessels (catching up to 900Kg – the daily limit per French vessel). Landings per unit effort (LPUE) have varied since 2007, showing a slight overall decline. The Gulf of St Malo is at the southern edge of the whelk range, limiting its ability to repopulate if overfished and the whelk population is considered to be under pressure.

Current management measures include a MLS of 50mm for Jersey vessels and 45mm for French vessels, a fixed number of permits, and limits on the number of pots or weight caught per vessel or per person, among others (see Table 7).

Table 7 – Comparison of whelk management measures in Jersey and France.

JERSEY 0-3	JERSEY 3-12	FRANCE
MLS 50mm	MLS 50 Jersey boats	MLS 45mm
Fixed number of permits	Fixed number of permits	Fixed number of permits
1800 pot cap (down from 2683)	900 pots per vessel	240 pots per person
12mm max, vessel length	12m max. vessel length	720 pots per boat
Minimum grader bar spacing of 22mm	Minimum grader bar spacing of 22mm	Minimum grader bar spacing of 22mm
SE coast only open November to February		300kg daily quota/person
		900kg daily quota/boat
		Weekend and bank holiday closures
MLS = minimum landing size		January closure

In 2019, Marine Resources consulted with industry stakeholders on methods for protecting the stock, with one suggestion including closing an area of south-east Jersey waters between 0-3 nautical miles to protect a good fishing ground. A further result of the consultation was the introduction of pot tags with a 1,800 limit within the 0-3 nm and beyond 3-12 nm a limit of 900 pots per vessel.

Different pots used by Jersey and French vessels were assessed showing a similar catch in terms of whelk size, but the French pots showed a higher level of dogwhelk bycatch.

Annual whelk trial stock assessments have been carried out since 1996, when the stock was relatively unexploited. Judging from catch data, populations initially fell but then reached a stable exploited level. However, though catch rates have been similar over the last 15 years, a greater proportion of undersized whelks have been caught in the last five years (Figure 11).

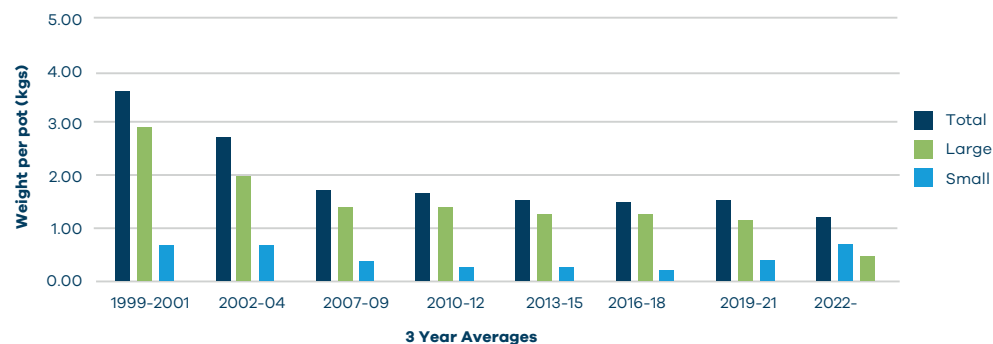


Figure 11 – Average weight of large whelks versus undersized whelks per pot (1999-2022)

Trials in February 2022 found high variability between sites in northern and southern areas, suggesting the presence of numerous subpopulations within the fishery. Subsamples taken from within these locations have found a general shift towards smaller whelks.

Sea water temperatures are noticeably increasing, which may affect recruitment, especially given Jersey waters represent the southernmost part of the whelks' range. Gear conflicts, such as between whelk fishers and scallop dredgers and spider netters, are also ongoing. The development of a Jersey-wide spatial management plan in the future may help understand these interacting effects further and help address them.

Sarah Clark, Deputy Chief Officer of the **Devon & Severn IFCA**, spoke about **research on size and sexual maturity of whelk** to inform inshore management. Ilfracombe on the North coast and Brixham, and Exmouth on the south coast represent the IFCA's three major landing ports. Both Ilfracombe and Exmouth have seen a decline in whelk landings since 2016 (Table 8).

Table 8 – Whelk landings and value to key Devon ports 2012-2019

	ILFRACOMBE		EXMOUTH	
	TONNES	VALUE £	TONNES	VALUE £
2012	661	479,000	242	170,599
2013			401	300,646
2014	716	564,646	301	238,605
2015	874	818,401	315	282,674
2016	533	640,877	302	328,080
2017	237	284,880	148	170,820
2018	290	363,050	177	224,720
2019	228	297,504	104	135,495

Prior to 2018, there was no quota and no closed season for whelk in the IFCA's jurisdiction, and the EU MLS of 45mm was the only management measure used. Since then, the IFCA has introduced a Potting Permit Byelaw as an adaptive management for potting and other activities which allow for future changes in management. Within the Lyme Bay Reserve, voluntary limits of 500 pots maximum and 30 pots per string have also been in place for a number of years.

Previous Cefas research investigated if the MLS of 45 mm was sufficient to protect spawning populations. Estimates of Size of Maturity (SOM) were carried out at ports across England, including Ilfracombe and Exmouth. The D&S IFCA built on this study to determine more accurate estimates of SOM within the district, to assess whether a minimum size based on shell width rather than shell height was viable, and to identify peak breeding and spawning times.

D&SIFCA met with the fishing industry in both north and south Devon, to discuss their concerns about the fishery and their support for some additional measures. Three skippers volunteered to collect monthly survey samples over a year from Exmouth, Ilfracombe and Start Bay. Sub-samples of these were analysed to assess physical characteristics such as size and stage of maturity. Findings indicated the MLS was insufficient to protect spawning stocks, with Exmouth SOM of ~70mm; Ilfracombe at ~76mm and 58-64 mm in Start Bay. The information indicated that recruitment overfishing may have been occurring and informed recommendations for management measures including an increase to the MCRS to 65 mm, with a phased approach of 10mm increase in 2018 and a further 10mm in 2020 through permit conditions under the Potting Permit Byelaw.

“We did a phased approach to reduce the immediate impact on the industry.”

Data was also used to provide guidance on the relationship between shell height and shell width to inform the setting of the riddle spacing and escape gaps to minimise the catch of undersized whelks and minimise the loss of sizeable catch.

In the future, the IFCA hopes to assess the impact of these management measures, and potentially review the spawning period which will require further data to be collected through the permit conditions.

George Balchin, Fisheries and Conservation Research Officer at the [Sussex IFCA](#), spoke on the **science behind the IFCA’s Shellfish Permit Byelaw**. The commercial byelaw was introduced in 2015 for a range of shellfish, including whelk, the most significant pot fishery in Sussex. For commercial whelk fisheries, the Byelaw requires purchase of a permit, maximum 300 pots per vessel within 3 nm and a further 300 pots between 3-6 nm, escape hole specifications, and a whelk-specific measure of a 25mm riddle to ensure whelks meet the 45mm MLS. A recreational permit also applies to whelk with a limit of 5 pots.

“The byelaw is flexible, which puts the IFCA in a position to be able to react to changes in the fishery in near-real time.”

Year-on-year trends indicated a substantial increase in landings from 2018-19, followed by a smaller slump the year after, likely due to the pandemic. Landings per unit effort has increased overall, which is positive.

In terms of spatial trends, landings are twice as high in the middle of the district, which is largely matched by effort. The western and eastern edges of the district may act as a spatial refuge due to lower fishing effort in these areas. Shoreham and Eastbourne, both in the middle of the district, recorded the vast majority of whelk landings. The data indicates spatial and temporal patterns in effort that are not always associated with Landings Per Unit Effort, which may warrant further investigation.

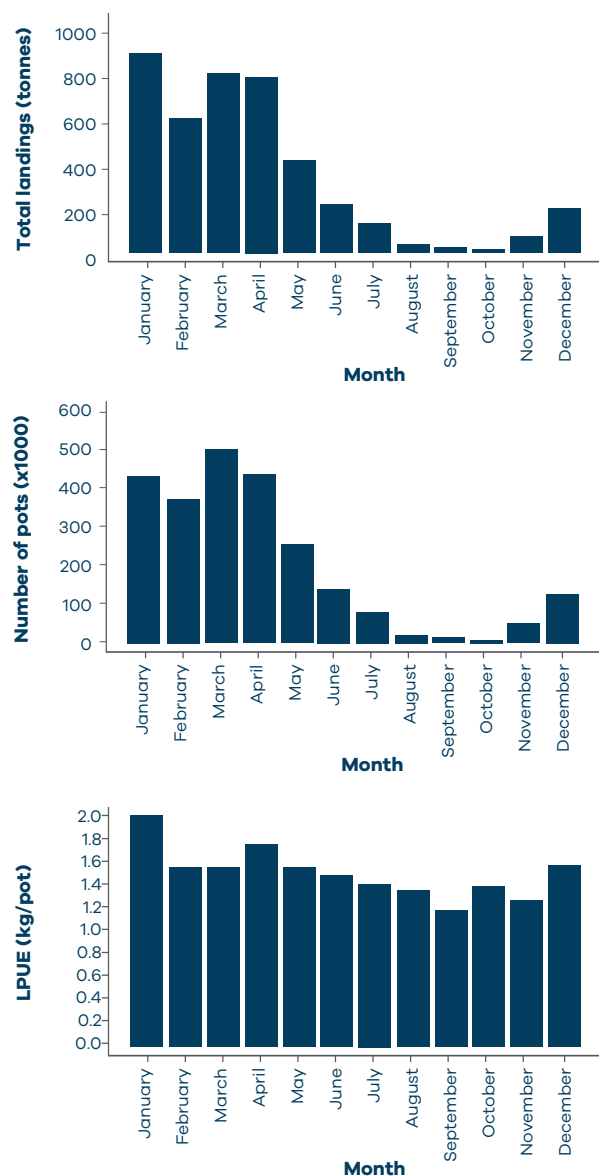


Figure 12 – Comparison of total landings, total effort, and LPUE of the whelk fishery in Sussex

Seasonal trends (Figure 12) indicated that landings peak between January to April when whelks migrate inshore, with very few landings between August and October, when effort is also at a minimum. It was suggested this low season was a possible 'temporal refuge', due to the persistence of relatively high LPUE when total landings are extremely low, perhaps assisted by the fishery moving further offshore.

Overall, the whelk fishery in Sussex inshore waters appears to be stable or growing, and seasonal. The byelaw appears to be working well and provides valuable data on the fishery, though there remains space for further analysis.

Annabel Plumeridge, former Science Officer at the [Kent & Essex IFCA](#), spoke on **research to determine a suitable MLS and inform riddle guidance**.

The district saw a dramatic rise in whelk landings from 2009-2012, influenced by the ease with which vessels can enter the fishery with a large number of nomadic vessels fishing a large number of pots (up to 1,000). This, combined with the knowledge that the MLS was likely to be inadequate led to concerns of recruitment over-fishing and the introduction of an Emergency Byelaw in 2013. This included a requirement to have a permit, pot limits of 300, riddle specifications which increased to 25mm in 2016, escape gaps, and a permit requirement.

Two complementary research studies have been carried out in recent years to look at the differences between size of maturity between Kent and Essex. The main research questions were 1) average size in the district, 2) relationship between weight and length, 3) size at maturity, 4) annual reproductive cycle, 5) age at maturity, and 6) difference between areas.

"We wanted to know if our current management is appropriate and if the current riddle size is providing enough protection for our juvenile stocks."

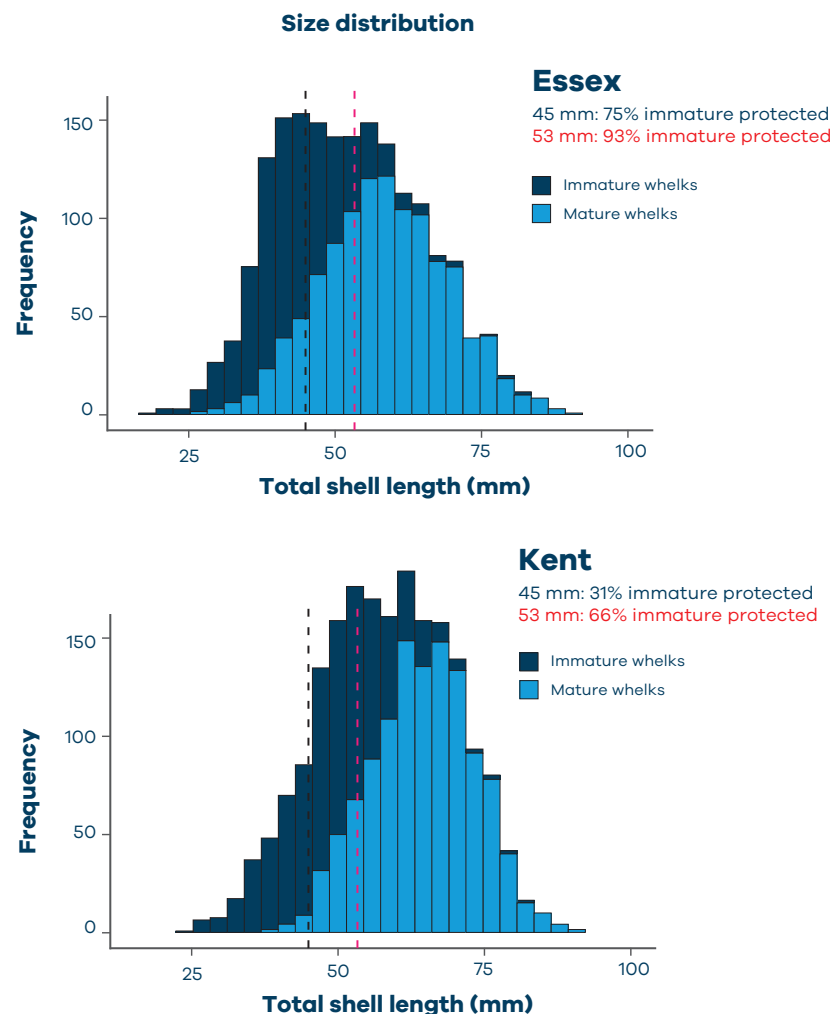


Figure 13 – Size distribution for whelks in Kent and Essex showing immature (dark blue) and mature (light blue) whelks with the MLS of 45mm (black dotted line) and 53 mm (red dotted line).

For the Essex stock 75% of immature whelk were protected by the 45 mm MLS, whereas up to 93% would be protected by increasing the MLS up to 53mm. For the Kent stock, only 31% of immature individuals were protected by the 45 mm MLS, whereas up to 66% would be protected by increasing the MLS up to 53mm (Figure 13).

For age, it was found through statolith analysis that it would take 2.7-3 years for whelks to reach maturity with a 10-20% likelihood of having reproduced. Given that it is optimal for individuals to breed at least once before being harvested, harvesting them at four years old was suggested which would give a 50-70% likelihood that they would have reproduced before removal. Given whelks continue to grow past reaching maturity, increasing the MLS to 53mm would help protect a greater proportion of whelk that have not reproduced.

In terms of management, KEIFCA have reviewed the guidance for riddling. Whelks are passed over a 25mm riddle at the quayside, which removes whelks smaller than 25 mm, but this is not 100% effective and is difficult to enforce. Following input from the fishing community the byelaw was changed to sort by length (of 50mm) rather than width, through stop-go gauges rather than riddles, to make it easier to enforce.

Annabel Plumeridge, Senior Scientist at the **North West IFCA**, spoke on **implementation of new whelk management in the NWIFCA district**. Until recently, the whelks in the district had been managed by two different byelaws, a legacy of the Sea Fisheries Committees, the IFCA's predecessors. While whelk fishing was managed under a permit byelaw in the southern half of the district, it was effectively impossible in the northern half of the district through a requirement for all pots to have an escape gap of 75mm, which was relevant for catching mature crabs and lobsters, but made it impossible to fish for whelk.

To open the northern whelk fishery responsibly when introducing new effort limits, a track record scheme was used where applicants seeking permits could apply for 400 pots or a maximum of 1,000 pot permits, but could only be granted the maximum if they could prove a legitimate interest by way of historical landings and fishing in the area (red dotted line in Figure 14) over a set period. Only those that applied within the deadline were given permits and the permit scheme will be closed for 18 months before any review of additional permits.

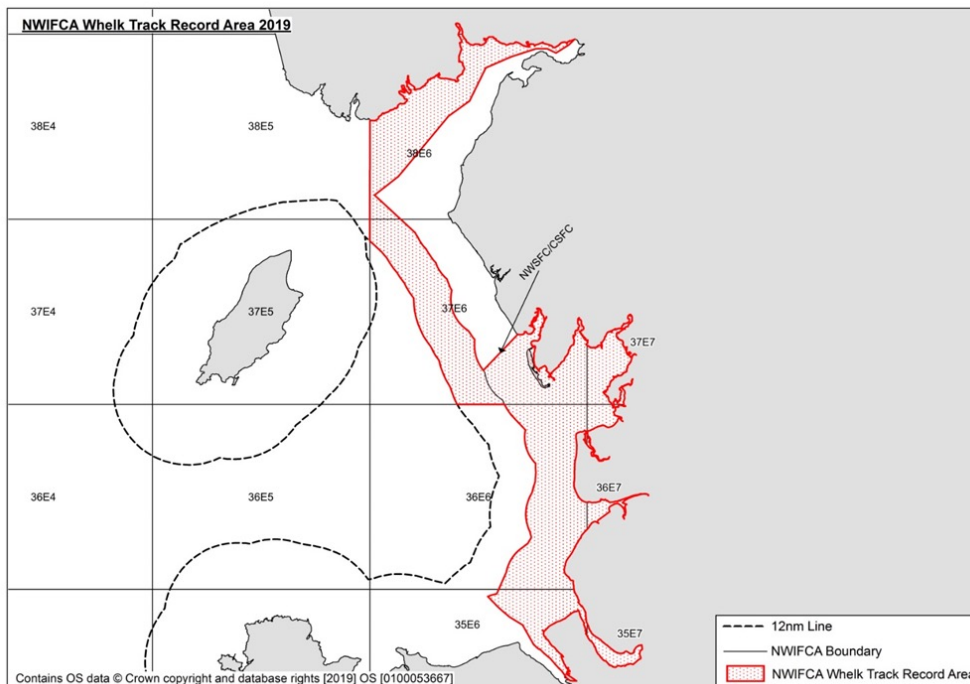


Figure 14 – Track record area (red dotted area) within which fishermen had to prove a legitimate historic fishing interest to apply for a 1,000 pot permit.

Size at maturity research in the Irish Sea led by Cefas indicated a MLS of 75mm was appropriate. Consultation with fishermen suggested preference for an incremental increase in the MLS to 55, 65 and 75 over 3 years. The byelaw also introduces a new permit scheme to bring in consistent regulation, limit effort, maximum pot limits, and specific escape gap requirements and incremental increase in the MLS.

“Although this research is in its infancy, it offers a unique opportunity for opening new ground with a rare insight into a baseline assessment of what is maybe virgin stock.”

The IFCA plans to conduct research into the whelk populations and landings data and collect data collaboratively with fishermen as the fishery develops.



Session 3: Management Q&A

Q: Is there any evidence that stock numbers of bait species like crab affect fishing effort for whelk? Or is the bait species varied enough that it doesn't affect the whelk fishery?

A: Evidence suggests that fishermen largely use crab waste for bait, so scarcity of crab may increase the cost of bait. Sustainability considerations relating to landings of crab for bait tend to be localised and legislation has prevented this.

Q: What can Jersey do to tackle those future issues for the whelk fishery? Particularly around gear conflict and the third country status.

A: Jersey is at the evidence gathering stage to assess gear conflict and produce a marine spatial plan that will take this into account and help address this issue. Third country status is a political issue outside the remit of Jersey Marine Resources.

Q: Where a SOM has differed across a region but the minimum size has been applied across the district, has this led to any differences in where catch is being landed to land to ports where the MLS may be lower?

A: There hasn't been an assessment of this in D&SIFCA district. In Kent and Essex where there was a difference in SOM across the two areas, the MLS was set in the middle. Monitoring of landings to assess where these had come from would be very difficult.

Q: The slower growth rate in the Thames is interesting - a genetic difference was also found in the Thames but we are confused as to why that may be - does anyone have an idea why Thames whelks have slower growth than those north and south?

A: There is some work on the effect of environmental factors on whelk growth, but an area of further research. The Thames has historically been a very productive ground based on historic records. Temperature extremes are most likely to affect growth and salinity is also likely a factor.

Q: On the Solent, whelks mature rather small and there is a history of over-exploitation, so is there any evidence that fishing effort impacts on growth rate and maturity and any evidence that SOM bounces back?

A: There isn't direct scientific evidence that fishing has caused reductions in SOM, but theoretical models suggest that if you fish at sizes below the average SOM this could lower the landing size. There are latitudinal changes in SOM that are not directly related to fishing effort.

Q: What is the importance of large individual whelks to recruitment?

A: While there has not been much work on fecundity, it does appear that larger females have greater reproductive output. The ovary egg mass has multiple eggs and embryos, but some of these are nurse embryos that are eaten by other embryos. The ovary egg mass is not directly related to reproductive output.

Q: A lot of data presented is based on whelk landings - so how concerned are we about fisheries independent data - do we have any real data on whelk sizes?

A: Bangor University are investigating different ways of undertaking a fisheries independent study, for example using baited underwater cameras versus potting surveys to assess the actual density on the ground. They are also investigating working with fishermen inshore and offshore to assess areas where they don't normally fish for whelk.

Future engagement

Attendees were asked for their preferences for future engagement on whelk fisheries management.

How do you want to be engaged in development of the Whelk Fisheries Management Plan?



21 of 26 (80%) participated. 21/21 (100%) answered.

Closing remarks

Sam Fanshawe (Blue Marine) closed the Symposium highlighting some key points:

- This is a **really important fishery around the entire UK coast** and one that we need to make great efforts to safeguard for the long-term and those fishing communities that depend upon it.
- The research presentations explained very well how **challenging and complex some of the considerations are for assessing stock status and size of maturity**.
- Reference to **adaptive management is particularly pertinent to this fishery** both in terms of time and also regionally flexible management measures informed by local evidence and research.
- A lot of effort is needed to provide the evidence base behind formulating **effective management measures at the appropriate scale**.



- The **Whelk Management Group and Whelk Working Group have a vital role** in sharing knowledge and engaging stakeholders in developing the Fisheries Management Plan.
- **Local fishermen have a vital role** to inform that management.
- Some issues that had only been touched upon, are **worthy of further discussion including the impact of climate change and the management options for dealing with nomadic vessels and gear conflict**.
- **Stakeholder engagement is key** and the preferences noted in the poll would inform future engagement plans and webinars.

Sam concluded by thanking speakers for their excellent presentations and participants for their input and encouraged participants to **"actively engage and input to the research and the Whelk Fisheries Management Plan as it develops over the next 18 months and ensure that we can safeguard this very important fishery for the long-term"**.

Appendix: Further recent research

The following provides a summary of some recent research from invited speakers that were unable to attend the Whelk Symposium.

Factors affecting whelk shell growth and repair

Abstract from recent paper:

C.N. Colvin, P.R. Hollyman, C.A. Richardson, S.R.N. Chenery, J.J. Waggitt, I. D. McCarthy (2022). *The effect of environmental factors on shell growth and repair in Buccinum undatum*. Journal of Experimental Marine Biology and Ecology. 551. March 2022.

The processes and factors which affect shell growth and repair in molluscs are poorly understood. In this study, the capabilities of shell growth and repair in the marine gastropod *Buccinum undatum* were investigated experimentally by implementing laboratory-controlled mechanical damage to the shell margin/lip. Three key factors, life stage (juvenile or adult), seawater temperature (5–15 °C) and food availability (unfed, weekly, or daily feeding), were investigated in a series of controlled laboratory experiments to establish their roles in the processes of shell growth and repair. Significant

differences in rates of shell growth and repair between food and temperature regimes were observed, with the greatest difference occurring with different life stages. Rates of shell growth in non-damaged whelks were slightly faster but not significantly different from damaged individuals in any of the experiments. Tank-reared juveniles maintained in the highest seawater temperature regime (15 °C) displayed significantly faster rates of shell repair ($F = 6.47$, $p < 0.05$) than conspecifics held at lower seawater temperatures. Through characterising both biological and environmental factors affecting shell growth and repair, it is demonstrated that there are multiple aspects influencing shell growth and shell repair. It is important to be able to understand and establish differences in rates of growth to better manage this commercial species.

Cefas – Whelk stock assessment models

Andy Lawler and Bella Voak, Cefas

In 2019 Cefas used surplus production methods (SPiCT) to conduct exploratory assessments around England and Wales. This method is recommended by the International Council for the Exploration of the Seas (ICES) for stocks that are data poor. It has modest data requirements, needing only a time series of abundance indices

and landings data (which were available from national statistics). Commercial Landings per unit Effort (LPUE, kg/kWdays) were used as a proxy for abundance, and the stocks were spatially defined using ICES divisions (albeit slightly modified to accommodate known fishery distributions). Six stocks were defined: Irish Sea, Bristol Channel, Western English Channel, Eastern English Channel, Southern North Sea and Central North Sea. Model fits were unsatisfactory, which were suspected to be due to the proxy abundance indices being disproportionate to abundance. Cefas also considered that the assessment areas chosen were too extensive, not taking account of finer spatial structure. Cefas are unlikely to revisit this method until more informative abundance indices and a better idea of stock boundaries are available.

Cefas is currently carrying out a pilot study in the Norfolk fishery to investigate stock boundaries and to determine what a suitable monitoring programme might look like. The study is relying primarily on fisher sampling to provide size structure information. A mark-recapture experiment is planned in June as a possible alternative to statolith ageing as a means to determine growth rates. If successful, the sampling could be expanded to monitor other fisheries in English waters.

University of Essex – semi-continuous whelk population in the English Channel and southern North Sea

Declan Morrissey, Jake Goodall, Rita Castilho, Tom C. Cameron, and Michelle L. Taylor (2022). *Population genomics reveals a single semi-continuous population of a commercially exploited marine gastropod*. Fisheries Research 254. June 2022. <https://doi.org/10.1016/j.fishres.2022.106418>

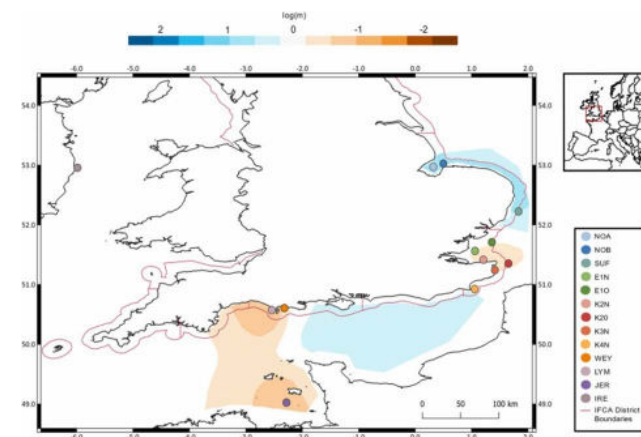
The University of Essex has recently published a paper on new research estimating connectivity and relatedness between whelk samples taken across IFCA management boundaries. Research was carried out in collaboration with Kent & Essex IFCA, with help and support from other IFCAs and fishermen, and was funded by the Thames FLAG European Maritime and Fisheries Fund. A weak population substructure was identified and found to broadly correspond to four groups: Southern North Sea, English Channel, Jersey Island, and South East Ireland. There was evidence of a single continuous whelk population along the southern coast of England and up into the southern North Sea. This weak structure is likely due to whelks having a low dispersal potential, with genetic coherence of the semi-continuous population

maintained by stepping-stone dispersal of a very large population over time. Evidence was found of barriers to dispersal or connectivity across the Channel and across the Thames. In the English Channel, cold, fast-moving water may provide an oceanographic barrier and in the Thames estuary, pollution, overfishing, and the oceanographic and bathymetric setting may have reduced gene flow (see Figure). Limited dispersal and the stepping-stone model of connectivity means that care must be taken not to overfish large portions of this network of whelks to ensure population resilience.

The identified lower-than-average gene flow clusters indicate that there should be collaboration between IFCAs in managing what might be a semi-continuous whelk population. Currently, KEIFCA operates whelk management across four zones within their local government areas. Other IFCAs also have sub-management units, and these smaller-scale units may be appropriate for management – but the semi-continuous nature of whelk populations across the Channel or in the Southern North Sea must be acknowledged. If research is suggesting different life-history strategies for whelks in different areas – e.g., variation in local size at maturation – it must be asked why that is, given the very weak population substructure and suggestion from

our results that this is largely a single population without much genetic differentiation. This will be important to consider in the contexts of applying different fishery management rules, of environmentally determined differences in growth rates (if it is not genetic), and in thinking about recovery from over-harvest if connectivity and dispersal is weak. The authors are planning to increase the range of this work to cover more UK and European sites. For anyone who could help provide samples, please contact Dr Michelle Taylor at michelle.taylor@essex.ac.uk.

Figure: Estimated Effective Migration Surfaces (EEMS) analysis. EEMS assumes isolation by distance as the null model and reports deviations from the null as lower-than-average (red) and higher-than-average (blue) gene flow. Image reproduced from: Morrissey et al. Fisheries Research 2022 CC BY 4.0



Citation

Blue Marine Foundation (2022). Whelk Symposium 2022 Proceedings Report.

The Symposium is available to view on Blue Marine's YouTube channel [here](#).

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References/Further Information:

- **Defra 2022.** Fisheries Management Plans [Fisheries management plans - GOV.UK \(www.gov.uk\)](#)
- **MRAG Ltd.** 2018. [Management recommendations for English non-quota fisheries: Common whelk](#). Final Report commissioned by Blue Marine Foundation. London.
- **New Economics Foundation Consulting Ltd/ Association of IFCA.** 2022. Towards regional inshore fisheries management plans – opportunities for change.
- **Seafish Whelk Management Group:** [Whelk Management Group — Seafish](#)
- **Southern IFCA Key species - Whelk:** [Key Species: Southern IFCA \(southern-ifca.gov.uk\)](#)



Symposium Agenda



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14:00 Introduction by Blue Marine Foundation

14:05 Session 1: Research

- Whelk Working Group and research overview - Chloe Smith, Inshore Fisheries and Conservation Officer, Southern IFCA and Chair of the Whelk Working Group
- Research to inform sustainable whelk fisheries in Welsh waters - Dr Natalie Hold, Research Lead Sustainable Fisheries Wales, Bangor University
- Perspectives and limitations of data limited models applied to the French whelk fisheries of the Eastern English Channel - Morgane Amelot, Ifremer

14:50 Session 1: Q&A

15:00 Session 2: Fishery

- Whelk UK landings data and management - Andrea O'Shaughnessy, Principal Fisheries Manager, Marine Management Organisation
- Recent trends in England whelk fisheries: AIFCA/NEFC report - Sarah Birchenough, Inshore Fisheries and Conservation Officer, Southern IFCA
- Using fisher experiential knowledge to provide insight into management strategies for non-TAC species - Hannah Fennell, PhD candidate and Thomas Fortier, Heriott-Watt University

15:45 Session 2: Q&A

16:00 Break

16:15 Session 3: Management

- Whelk Management Group / Whelk Fisheries Management Plan update - Lewis Tattersall, Head of Fisheries Management, Seafish
- Shellfish legislation mapping tool - Joanna Messini/Matthew Johnson, Policy advisers in Non-Quota Species Team, Defra
- Jersey whelk fishery: an overview - Phillip Langlois, Marine & Fisheries Assistant Officer, Government of Jersey
- England inshore management:
 - Devon & Severn IFCA – Overview of research to inform management - Sarah Clark, Deputy Chief Officer, D&SIFCA
 - Sussex IFCA – Overview of research and management - George Balchin, Fisheries and Conservation Research Officer
 - Kent & Essex IFCA – Determining a minimum landing size using size and age for whelks in the Kent and Essex IFCA district - Annabel Plumeridge: Senior Scientist at NWIFCA (previously at KEIFCA as a Science Officer)
 - North Western IFCA – Implementation of new whelk management in the NWIFCA district - Annabel Plumeridge, Senior Scientist, NWIFCA

17:20 Session 3: Q&A

17:30 Open forum and discussion

17:55 Next steps and Close

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