Assessing the feasibility of a Nephrops creel fishery:

In West of Walney Marine Conservation Zone

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West of Walney Marine Conservation Zone

The West of Walney Marine Conservation Zone (MCZ) is situated in the Irish Sea 8km west of Walney Island. The designation covers an area of 388km^2 and is co-located with five offshore windfarms (Figure 1).

Figure 1. West of Walney Marine Conservation Zone is situated off the Barrow-in-Furness coast. © Crown Copyright (2019)

The features of the MCZ are sea pens and burrowing megafauna, subtidal mud and subtidal sand. Sitting within the eastern Irish Sea mud belt, this site contributes a relatively large area of subtidal mud and sea pen and burrowing megafauna communities to the marine protected area network. Subtidal sand occurs over a small area of the site but provides an important habitat for high densities of burrowing brittle stars and flatfish[1].

Subtidal mud is a vital habitat for crustaceans, molluscs, sea urchins, sea pens and the commercially important Norway lobster, *Nephrops norvegicus* (Figure 2). These burrowing species create a complex network of tunnels beneath the mud which assist smaller species with shelter and allow the oxygenation of deeper sediments[2].

Figure 2. The burrowing Norway Lobster, also known as Langoustine, Nephrops, Scampi, Dublin Bay Prawn and Norway Lobster. Photo: ©Paul Naylor.

The need for research

Historically, the area within the West of Walney MCZ has been heavily fished for Nephrops by vessels using otter trawls. The use of mobile gear, such as trawls, has damaged the sensitive seabed habitats and the MCZ has a General Management Approach to recover to more favourable condition. Trawling damages benthic habitats, reduces biodiversity and can affect ecosystem function[3].

In July 2019, management measures were implemented within this MCZ, prohibiting the use of bottom-towed fishing gear, such as trawls, from the majority of the site. Exploring the feasibility of other, more sustainable fishing methods to target the same species within protected areas could reduce the socio-economic impact of these designations.

Competition for space

The competition for space in the marine environment is ever increasing and the need to balance the interests of multiple sea users is becoming increasingly complex. There is also a growing need and demand for low-carbon energy and with this comes increasing numbers of offshore developments and more competition for the use of the seabed. Along with this, rising environmental concerns have the identified the need for an ecologically coherent network of Marine Protected Areas.

A good example of this complexity is demonstrated by West of Walney MCZ. This unique designation was created to balance the needs of multiple users and reduce the impact of offshore development and MCZ designation on the fishing industry. Fishermen were concerned their fishing grounds would dramatically decrease when the windfarms were built, this concern escalated when the discussions around MCZ designation started. This prompted a proposal for the co-location of the MCZ with the offshore windfarms. This approach reduced the area of fishing grounds that would be restricted by the MCZ designations as the windfarms are already largely inaccessible for trawling.

It is likely that trawling will be restricted or excluded from a number of other locations over the next decade (due to further offshore wind and other developments and/or environmental designations). Creeling could provide an alternative option for local, inshore fishermen to continue to fish in these areas. Although, they are likely to be from a different part of the fishing sector, this would lower the overall socio-economic impact of developments and Marine Protected Areas, by providing a benefit for small-scale fishermen to diversify and secure their economic future.

Challenging environments

The use of creels to target Nephrops (Norway Lobster) has been highly successful in Scottish inshore waters with catches averaging at 1600 tonnes/year (£14 million)[4]. The sheltered sea lochs and bays of Scotland are very different to the exposed waters of the eastern Irish Sea. Although creels have been trialled in other areas of the Irish Sea, the use of creels to target prawns has never been attempted in the north eastern Irish Sea[5].

Benefits of Creel Fishing for Nephrops

Conservation

Creel fishing is a sustainable, low-impact fishing method that will reduce pressure on sensitive benthic habitats and allow them to recover from past damage. At present, the predominant method of fishing for Nephrops is trawling. Mud habitats are low-energy environments that are highly sensitive. Sea pens and burrowing megafauna are sensitive and not resilient to this kind of disturbance. Trawling also disturbs extremely important ecosystem services, such carbon storage. Trawling causes the resuspension of sedimentary organic carbon and reduces the depth of organic carbon burial[6]. Creels sit on top of the seabed and cause minimum disturbance due to their relatively small footprint. A switch from trawling to creeling would allow for the recovery of previously trawled habitats.

The International Council for the Exploration of the Sea (ICES) reported that the bycatch for trawl-caught Nephrops is 25% by weight (between 2014-2017), which is categorised as ‘substantial’[7]. Creel fishing for Nephrops could reduce this bycatch is limited and can be easily removed from the creels and released back into the sea

alive. This will reduce the impact that fishing for Nephrops is having on other commercial fish populations and sensitive mud-dwelling species[8].

Coexistence

The implementation of low-impact fishing methods will improve the health of sensitive marine habitats, the long-term sustainability of fish stocks, and the economic resilience of local fishing communities. The use of fishing techniques that are able to safely co-exist with offshore windfarms, other offshore developments, and Marine Protected Areas will become increasingly important as the competition for space in the marine environment continues to increase.

Benefits to Fisherman

Creel fishing will increase the opportunities for local fisherman to benefit from targeting a higher-value and quality product that is caught through using lower-impact methods. Creeling for Nephrops could yield a higher unit price due to larger target sizes and better condition of the catch[9].

A switch to creeling for Nephrops would allow: the recovery of associated habitats and other marine organisms; reduced bycatch; increased bycatch survival; increase the areas fisherman can utilise; and increased biodiversity. Creel fishing could introduce a fishery that targets higher-quality catch, reduces environmental impacts and increases the economic sustainability of inshore fishing fleets.

Brief Overview of Methods

The study area for this trial was the northernmost corner of Ørsted's Walney 2 windfarm (Figures 3 and 4). This lies in the central to western area of the West of Walney MCZ. This area was selected for the initial trials as a high number of Nephrops burrows had been identified in the area from previous benthic survey work[10]. An alternate location further south, just outside of the West of Duddon Sands windfarm was trialled briefly, however, the ground was found to be unsuitable.

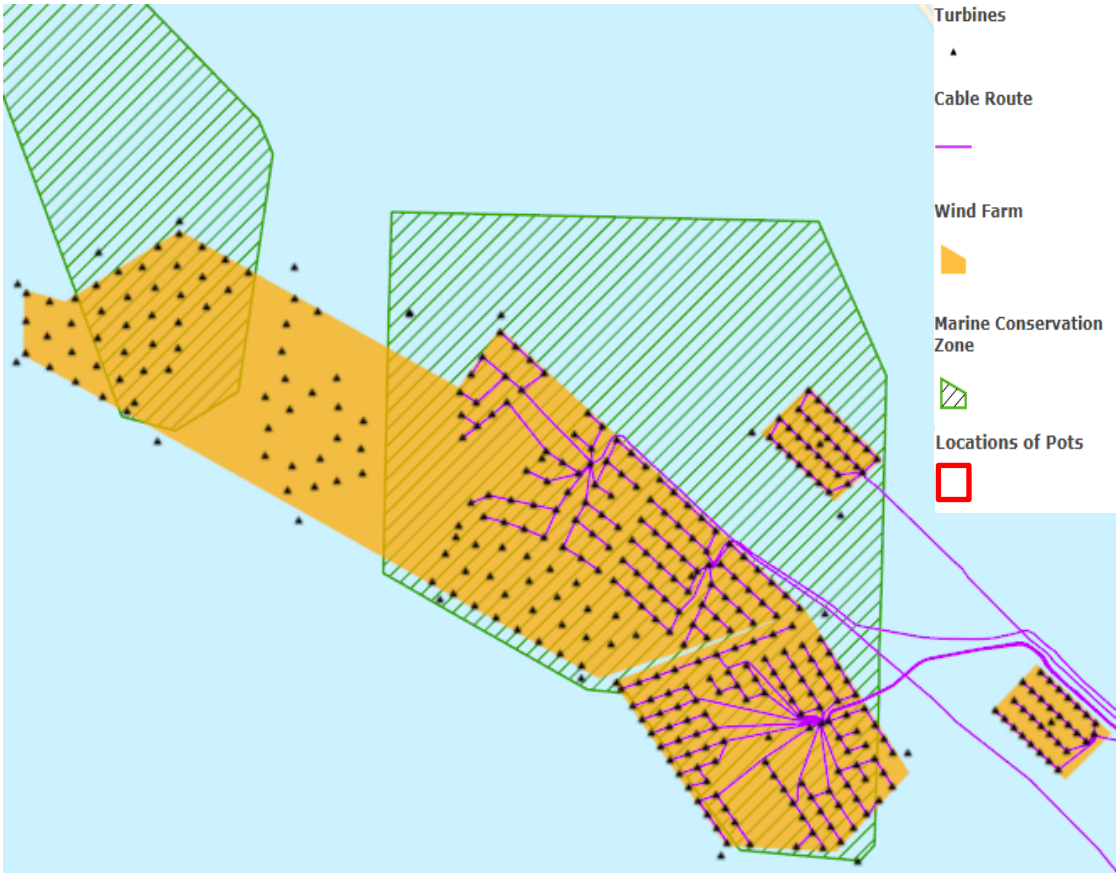


Figure 3. The creels were located in top corner of Walney 2 wind farm. © Crown Copyright (2019)

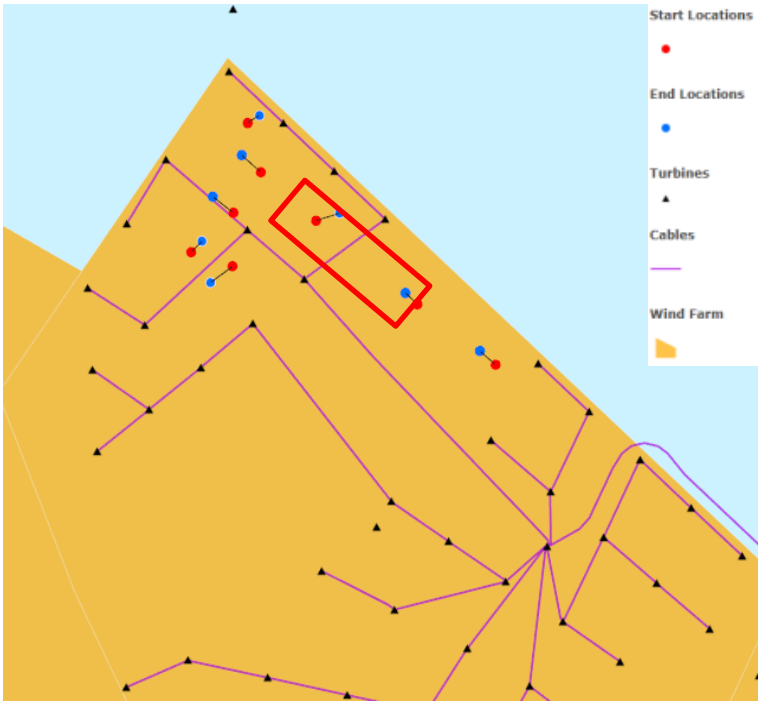


Figure 4. Start and end locations of the creels situated in Walney 2 windfarm. © Crown Copyright (2019)

A 6.4m vessel based out of Barrow-in Furness, was chartered for this study as it is currently used to fish static gear (lobster pots) in the area. A total of 44 creels (22"x16"x12.5") were fished over 4 strings of between 8 and 14 creels. Creels were set approximately 15m apart and strings were marked with buoys at each end. The co-ordinates of the string locations were sent through to Ørsted's Offshore Co-ordination Team to ensure that the fishing gear did not affect their windfarm maintenance operations.

Two different types of creels used were used: plastic and net (Figure 5). Initially, the plastic creels were set with small hard-eyes but these were removed due to low catch rates after the first two trips leaving a large hard-eye of 80mm in all creels.

Creels were baited with frozen herring and all catch was recorded per creel and string. All Nephrops were counted, sexed, and the carapace length was measured (Figure 6).

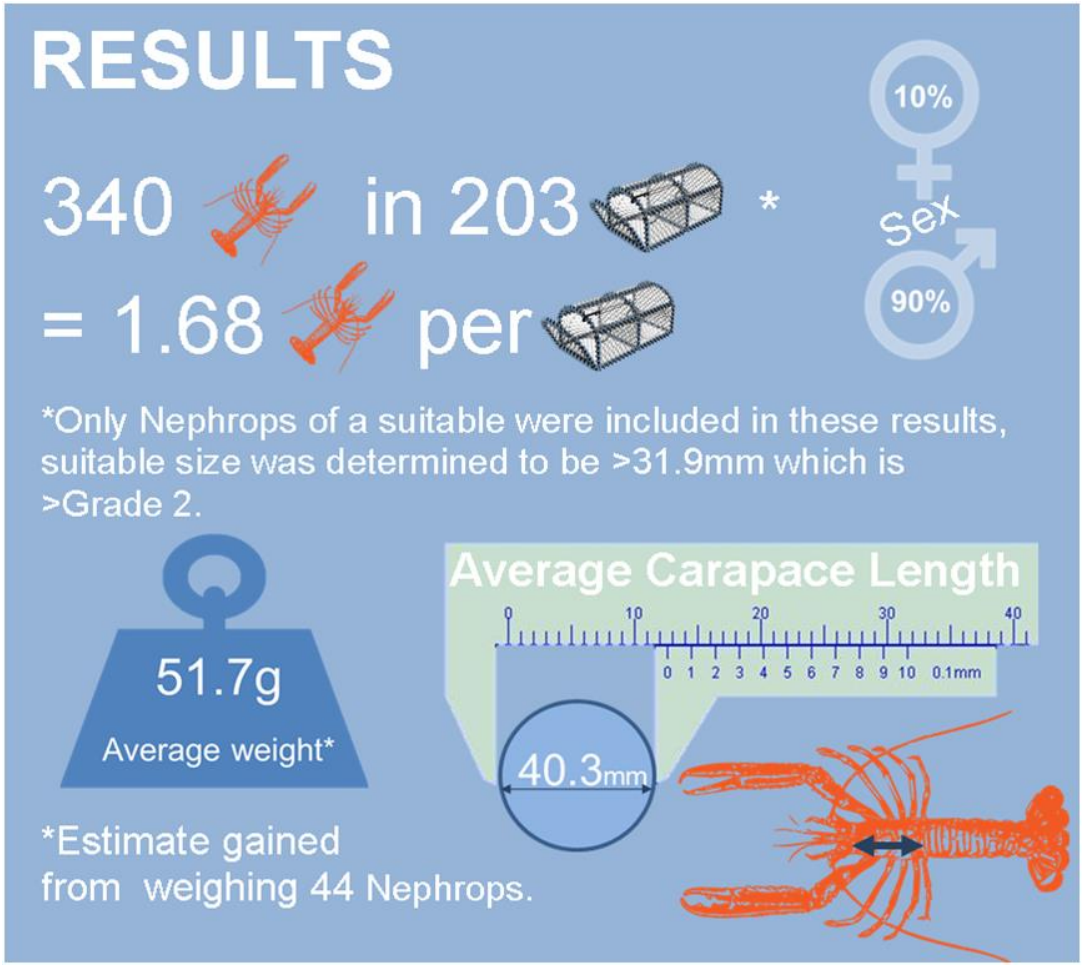
Figure 5. The carapace length of each Nephrops was measured using Vernier callipers and recorded.

Figure 6. Plastic creel pots (left) and net creel pots (right) were using to fish for Nephrops.

Findings

Overall, 390 Nephrops were caught in 298 creels. Although the Minimum Landing Size for Nephrops in this region is 20mm carapace length or 70mm overall length, small Nephrops have limited value in the whole or live market. As such, a subset of the catch was used to work out the average number and weight of Nephrops that could be used to get an idea of the potential to scale up the creel fishery to a commercial scale in the future. For these calculations (see Figure 7), only saleable condition (intact Nephrops) and those of a suitable size were counted (EU Size Grade 2 and above: >31.9mm). From this subset of the data, a total of 340 Nephrops were caught in 203 creels, giving an average catch of 1.68 Nephrops per creel. Around 90% of all Nephrops caught were male. The average carapace length was 40mm and the estimated average weight was 51.7g per individual or less than 20 individuals per kg.

Figure 7. Results of the pilot study using a subset of the data.



The bycatch has been reported using the data as a whole (Table 1) and edible crab was the most common bycatch. Also, a few practical observations were made (Table 2) including the best creel type and hard eye size.

Table 1. Bycatch caught in 298 creel over 8 trips.

Bycatch Species	Total Number
Spider crab	1
Edible crab	178
Lobster	20
Hermit crab	201
Whiting	83
Pouting	132
Pipefish	2
Angular crab	1
Palemon sp.	16
Common starfish	32
Dogfish	26
Red mullet	2
Velvet swimming crab	11
Dab	4
Long spined bullhead	1
Dogfish eggs	6
Sole	3
Cod	1

Table 2. Ad-hoc practical observations were made by the fisherman, these were reflected in the results.

Practical Observations...	
Creel Type	Net creels better than plastic
Hard eye	Large hard eyes (80mm) gave best catch rate
Bait Type	Herring was bait of choice and worked well
Size Class	Grade 2 Nephrops or above is >31.9mm — higher value & smaller individuals can be returned to contribute to population = sustainable fishery
Soak Time	Optimum time 2-4 days

Looking into the future…

Possibilities for scaling up

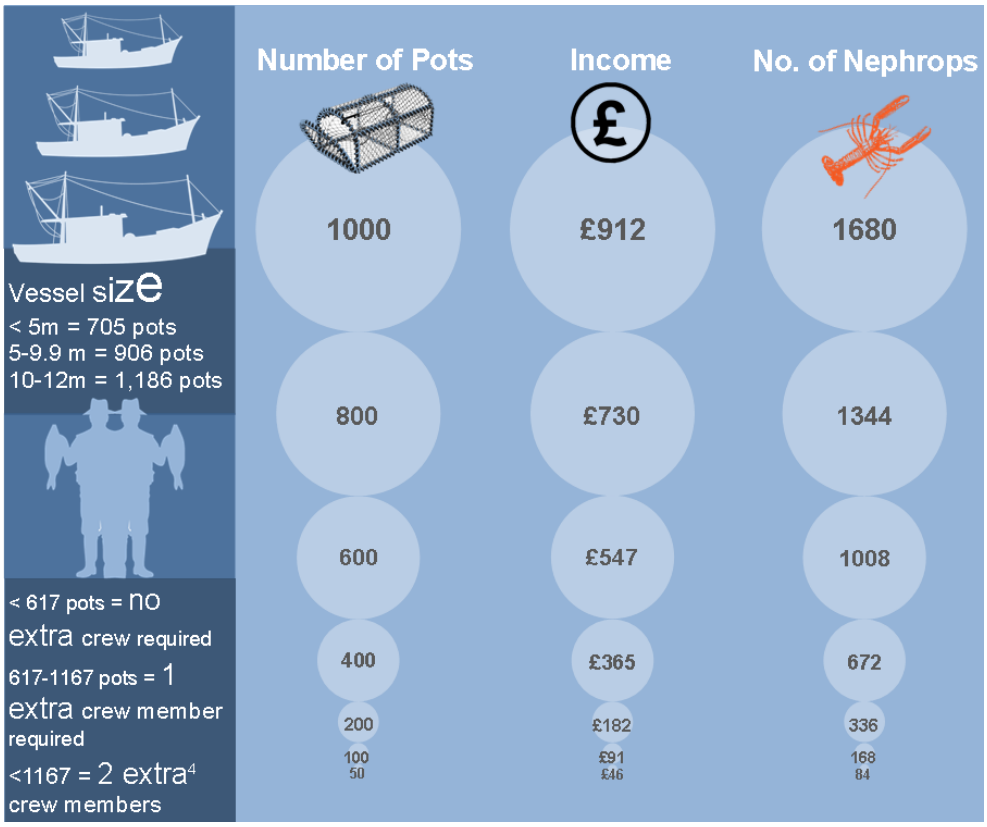


Figure 8. The possibilities for scaling up based on 1.68 Nephrops per creel. The income is based on a nominal value of £15 for 1kg of live Nephrops

Marketing of Nephrops

Grade 2 (Carapace Length >31.9mm) live Nephrops are likely to sell for at least £15 per kg. If these Nephrops could be marketed as a local and sustainable product, they could potentially demand an even higher value with local fishmongers, restaurants and consumers. Gaining accreditation (such as Marine Stewardship Council) or developing branding to highlight the sustainable source of the product would no doubt help with market value due to the demand for traceable and sustainable food. There is a clear need for local market development, this will give a better idea of the potential value and demand for sustainably caught Nephrops in the local area.

The need for more research

At present (September 2019), Cumbria Wildlife Trust is working with the North West Inshore Fisheries and Conservation Authority to trial the creels and collect a more data on the feasibility of creel fishing for Nephrops off Whitehaven (see Appendix I). A large-scale research, marketing and awareness raising project will be vital to: improve the

reliability of data presented to the fishing community; increase the likelihood of fisherman undertaking this fishery; and develop local awareness and a market for locally-caught, sustainable produce.

References

[1]ISCZ project (2011). Final Recommendations, Part 3.1 Selection Assessment Documents for recommended MCZs, pg 59 http://jncc.defra.gov.uk/PDF/120718_MCZAP_Pages_from_ISCZ_final_recommendations_FULL_REPORT_part_3.1_1.pdf

[2]West of Walney Marine Conservation Zone (Specified Area) Bottom Towed Fishing Byelaw 2018 Impact Assessment

[3]Roberts, S. (2005). *Deep sea life: On the edge of the abyss*. Oceana.

[4]Analytical Unit, Marine & Jones, Estelle. (2017). Creel Fishing Effort Study Marine Scotland Science. 10.13140/RG.2.2.26948.12167.

[5]ANIFPO, 2007. A pilot pot fishery for *Nephrops norvegicus* off the Northern Ireland coast, 15 pp.

[6]Duplisea, D. E., Jennings, S., Malcolm, S. J., Parker, R., & Sivyer, D. B. (2001). Modelling potential impacts of bottom trawl fisheries on soft sediment biogeochemistry in the North Sea. *Geochemical Transactions*, *2*(1), 112.

[7]ICES (2017). Advice on fishing opportunities, catch, and effort Celtic Seas Ecoregion Published 31 October 2017 nep.fu.19 http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/nep.fu.19.pdf

[8]Adey, J. M. (2007). Aspects of the sustainability of creel fishing for Norway lobster, *Nephrops norvegicus* (L.), on the west coast of Scotland (Doctoral dissertation, University of Glasgow).

[9]Leocádio, A. M., Whitmarsh, D., & Castro, M. (2012). Comparing trawl and creel fishing for Norway lobster (Nephrops norvegicus): Biological and economic considerations. *PLoS One*, *7*(7), e39567.

[10]CMACS (2009). Walney and Ormonde Offshore Windfarm, Benthic Survey Report

Appendix I

Since this report was written additional data had been collected which has allowed a comparison between two areas (Barrow-in-Furness and Whitehaven).