

Quarterly Logbook & Observer Report

July – September 2014



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20/11/2014

Orkney Sustainable Fisheries Ltd. Quarterly Logbook & Observer Report: July-September 2014

Logbook Report

Overview

A total of 4 boats submitted logbooks over July – September 2014, representing 5% of the Orkney inshore creel fleet of approximately 80 active vessels. Over this time period 37,890 pots were hauled and redeployed by these 4 boats. The average breakdown of pot deployment can be seen in Table 1. Average pots deployed per week are based on an assumed 6 trips per week and monthly deployments estimated based on a 4 week month.

	Per Trip	Per Week	Per Month
Average Total Creels Hauled	526	3,158	12,630

Table 1. Average number of reported creels deployed per week and per month by logbook fleet from July-September 2014.

Catch Per Unit Effort & Undersize Catch Composition

Brown crab (*Cancer pagurus*) made up 69% of landed weight, European lobster (*Homarus gammarus*) 11% and velvet crab (*Necora puber*) 20%. These values reaffirm the relationship observed in the April – June quarterly report, demonstrating that brown crab makes up over 50% of landed weight (58%, April – June OSF Quarterly Report).

Species	Total Weight Landed (Kg)	Average Weekly Weight Landed (Kg)	Average Monthly Weight Landed (Kg)
Brown Crab <i>Cancer pagurus</i>	22,721	1,893	7,574
European Lobster <i>Homarus gammarus</i>	3,525	293.75	1,175
Velvet Crab <i>Necora puber</i>	6,684	557	2,228

Table 2. Breakdown of commercially important Crustacea landed by logbook fleet from July-September

Observed Catch per Unit Effort (CPUE, Equation 1) for brown crab illustrates an average of one in-size crab per creel, based on the average weight of 480g per crab at minimum landing size (Male MLS: 140mm, Female MLS: 150mm). Lobster CPUE is 0.2 per creel (i.e. an average of one every 5 creels), with an average weight of 400g at MLS of 87mm, and within current select weight bracket of 400 – 1.5kg imposed by Orkney Fisherman Society (OFS, 2014). Velvet crab CPUE is 1.6 per creel based on an average weight of 100-116g.

Equation 1:

$$CPUE = \frac{\text{Total Weight Landed (Kg)}}{\text{Total No. Creels Deployed}}$$

Species	CPUE (Kg per creel)
Brown Crab <i>Cancer Pagurus</i>	0.542
European Lobster <i>Homarus gammarus</i>	0.094
Velvet Crab <i>Necora puber</i>	0.187

Table 3. CPUE breakdown of total Kg of reported retained commercially exploited crustacea from July-September 2014

Percentage of undersized (Fig. 2) demonstrates that in the case of velvet crab an average of 15% of catch is under the current minimum landing size, lobster 20% and brown crab 60%. It is important to note that percentage undersize is highly variable (Fig. 2).

Undersized individuals form an average of 20% of the lobster catch. Lobsters are documented as being highly cannibalistic with larger individuals killing and eating smaller ones when confined to a single creel (personal observation, fisherman communication). Such behaviour will reduce catchability of smaller lobsters, with a study in north east England demonstrating that once a creel has been occupied it is highly unlikely another individual will enter (Dan Skerritt, pers. comm.).

Velvet crab demonstrates an average undersize catch of 15%. This could be associated with relatively fast growth in this species, with early recruitment to the fishery. Recommendations concerning MLS suitability are not required due to the study undertaken by Hearn (2004); which deemed current MLS adequate for both sexes. The current reference logbook fleet is comprised of boats that opportunistically fish velvet crabs, therefore the inclusion of vessels that target this species consistently is recommended to provide an accurate representation.

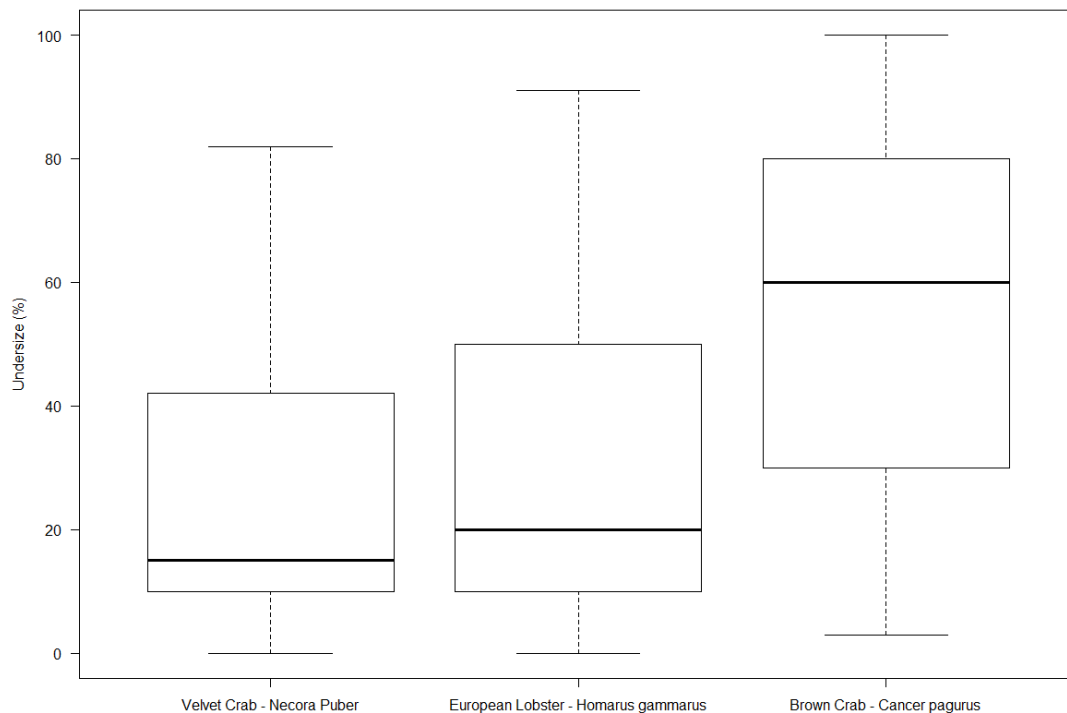


Figure 2. Percentage of Undersized Commercially Exploited Species Caught from July-September 2014.

Non Target Species

Non-target species reported within logbooks represents primarily demersal fish species, one elasmobranch species and the inclusion of V-notched lobsters (Table 4). The description of these species as non-target species is a result of their retention on board as bait (apart from V-notched lobster). Lesser spotted dogfish (*Scyliorhinus caniculus*) and conger eel (*Conger conger*) are scavengers attracted to bait used, whilst in the case of corkwing wrasse (*Symphodus melops*), Atlantic cod (*Gadus morhua*) and rockling (*Gaidropsarus sp.*), crustaceans form a significant part of their diet. Of these species cod represents the only species of conservation concern (Table 4), with a current conservation status of vulnerable (Sobel, 1999; IUCN Red List). Annual interactions of the creel fishery with this species should be forecasted and monitored.

An average of 2 V-notched lobsters per month were recorded by each vessel (Table 4) representing 0.09% of monthly catch. This indicates a relatively low proportion of V-notched lobsters in the fishable stock; a mark recapture study would be needed to ascertain the contribution of V-notched lobsters to the Orkney spawning stock as a whole.

Species	CPUE	Catch Per Trip	Catch Per Week	Catch Per Month	Estimated Total Catch – July – September 2014
Lesser Spotted Dogfish <i>Scyliorhinus caniculus</i>	0.012	3	22.5	90	271
Corkwing Wrasse <i>Symphodus melops</i>	0.005	1	7	28	84
Cod <i>Gadus morhua</i>	0.001	0.3	2	8	24
Conger Eel <i>Conger conger</i>	0.002	0.5	4	16	48
Rockling <i>Gaidropsarus sp</i>	0.00038	0.1	0.7	3	9
V – Notched Lobster <i>Homarus gammarus</i>	0.00031	0.08	0.5	2	6

Table 4. CPUE breakdown in Number of individual non-target species reported over July - September 2014

Conclusion

In conclusion a number of recommendations have been made based upon the information presented.

- It is advised that in addition to the reporting of brown crab, European lobster and velvet crab green crab (*Carcinus maenas*) should also be included. This species is fished throughout the year but becomes of commercial importance in the winter months due the movement of gear into sheltered water. The first record of green crab landed this year was October; however this does not mean that this species is not targeted throughout the year by other vessels outside of the logbook fleet.
- The undertaking of a brown crab size at maturity study to investigate geographic specific minimum landing sizes is recommended.
- It is recommended that there be continued monitoring of the creel fishery and its interaction with Atlantic cod within Orkney waters through logbook data. Additional information on this non-target species population ecology (morphometric, age/growth, and sex rations) would be advantageous within Orkney waters.
- A lobster mark recapture project is proposed, allowing for greater understanding of sex ratio, v-notching impact, distribution and density and how this effects the inshore Orkney fishing Fleet.

The inclusion of additional vessels highlights the variability of catches in Orkney in comparison to April – July report. It further highlights the benefit of increased sample size and it is recommended that the scheme is continued to developed in 2015.

Observer Report

Overview

A total of four observer trips were made on board four different vessels over the time period of July – September 2014, with a total of 1,332 creels observed. Two trips were undertaken in West Orkney and two in East Orkney (Fig. 1). These vessels represent 5% of the Orkney Inshore creel fleet of approximately 80 active vessels.

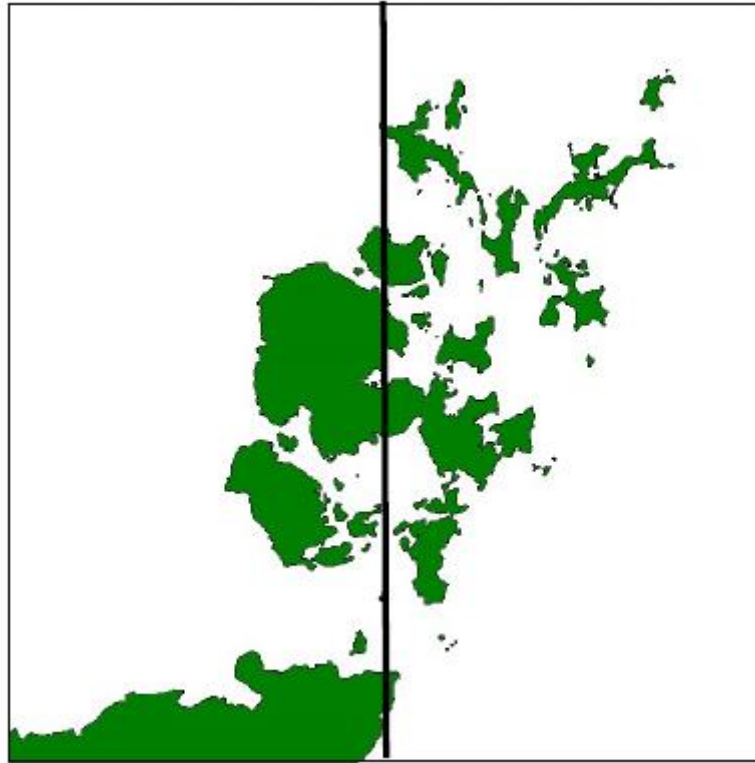


Figure 1. The Division of the Orkney Archipelago into East and West Fishing grounds.

There was an observed average of 333 creels hauled per trip. Creels were arranged on average 32 creels per rope (Table 5), with an average 10 ± 0.8 ropes per trip, however high variability in these averages are observed (Table 5). This can be attributed to the two larger vessels sampled being capable of deploying greater numbers of creels per rope. Further consideration should therefore be taken in the future analysis to divide data in accordance to vessel size as well as existing divisions.

	Per Rope	Per Trip
Average Creel No. Hauled	32 ± 2.2	333 ± 95

Table 5. Average Number of Creels Hauled per Rope & Trip July – September 2014(\pm SE).

Catch Per Unit Effort & Undersize Catch Composition

A breakdown of observed interactions of commercial species through observer trips (Table 7) demonstrates that brown crab has a CPUE of 1.5 crabs per creel, and 499.5 crabs per trip, making up 75% of total landed catch composition. Lobster is seen to compose 10% of landed catch composition with a CPUE 0.2 per creel and 66.5 per trip. Velvet crab comprises 15% of landed catch composition with a CPUE 0.3 per creel and 99.9 per trip. In comparison to logbook landings observer trips illustrates similarity in catch composition of both brown crab and lobster, both in the spread of percentages landed and weights estimated from observer data compared to actual report weights within logbooks (Table 7). However variability between observer reporting of velvet crab, is significantly different, this can be attributed to two observer trips being carried out on vessels >10m, making it not financially viable to fish for this low value species.

The interaction of species specific undersized is high variable (Table 8), with undersized brown crab comprising 75% of total species catch composition, lobster 23% and velvet crab 75%. These results are similar to those reported within logbook undersize catch composition in the cases of brown crab and lobster (Fig. 2), with the differences between species being attributed to catchability, environmental variables and behaviour. Velvet crab however demonstrates a higher percentage undersize compared to logbook reporting, this can again be attributed to size of boats samples but also the discarding of soft velvet crabs observed. In comparison there are only 24 accounts of soft velvets reported within logbooks, illustrating that the fisherman may not incorporate percentage soft within undersize reporting due the current wording of logbooks. Based on these 24 reported figures an average of 24% of catch was soft over the time period of July – September, increasing the percentage velvet crab discarded to 39%.

Species	Total No. Caught	CPUE Per Creel	CPUE Per Rope	CPUE Per Trip	Estimated Total Catch July – September 2014	Estimated Weight (Kg) July – September 2014	Logbook Reported Weight (Kg) July – September 2014
Brown Crab <i>Cancer pagurus</i>	1952	1.5	48	499.5	35964	23,412.564	22,721
European Lobster <i>Homarus gammarus</i>	242	0.2	6.4	66.6	4795.2	2,733.264	3,525
Velvet Crab <i>Necora puber</i>	419	0.3	9.6	99.9	7192.8	834.36	6,684

Table 7. CPUE breakdown in numbers of individual commercially important crustacea landed from July-September 2014. Estimated total catch calculated on a 6 day working week for 12 weeks. Estimated weight of catch based of Orkney Sustainable Fisheries average weight of individuals: Brown Crab *Cancer pagurus* – 0.651g, European Lobster *Homarus gammarus* – 0.570g, Velvet Crab *Necora puber* - .0116g.

Species	Total No. Caught	CPUE Per Creel	CPUE Per Rope	CPUE Per Trip	Estimated Total Catch July – September 2014
Brown Crab <i>Cancer Pagurus</i>	6138	4.6	147.2	1532	110,304
European Lobster <i>Homarus gammarus</i>	84	0.06	1.86	19.56	1408
Velvet Crab <i>Necora puber</i>	1228	0.9	28.8	299.7	21578

Table 8. CPUE breakdown in numbers of individual's discarded/undersized of commercially important crustacea from July- September 2014. Estimated total catch calculated on a 6 day working week for 12 weeks.

Non – Target Species

A total of 16 species were observed as non-target species during observer trips from July – September 2014, comprising of 8 demersal fish species, 5 invertebrate species and 1 elasmobranch species.

The degree of differences observed in the number non-target species during observer trips and reported bycatch in logbooks is significant, however 5 species are observed across both. These species include: lesser spotted dogfish, corkwing wrasse, European cod, conger eel and rockling. The lack of reporting of these other species (Table 9) cannot be interpreted as a no-interaction event, but could be attributed to their lack of value as bait hence their absence from logbooks. Due to the nature of creel fishing these other species are predicted to have high survival rates and therefore a limited effect on mortality through incidental capture.

As previously mentioned, it is recommended that the interaction of cod should be monitored with estimates of annual interaction forecast.

A high interaction rate of lesser spotted dogfish is seen. Current classification by IUCN red list as a = “Species of least concern” and is regarded as a pest by some fisherman due to its high abundance.

V-notched lobster in the observer data make up 20% of all lobsters caught from July - September. This is significantly higher than those reported by logbooks; reasons behind this marked difference could be attributed to limited reporting within logbooks, and observer calculation could be deemed as a more accurate representation.

Conger eel represents the second most frequent non-target species caught within the creel fishery. This could be attributed to behavioural patterns with eels being attracted to both bait and crustaceans within creels. Currently conger eel is labelled as a least concern species under ICUN Red List; however continuous harvest of this species should be monitored.

It is important to note that those fish observed as bycatch are those for which crustaceans forms a significant component of their diet, limiting the effect of creel fishing on other fish species out of those encountered. It is recommended that the landings of these species be monitored due to their ecological importance and to monitor the effect of indirect exploitation.

Species	CPUE	CPUE Per Trip	Estimated Total Catch July – September 2014 per Vessel
Butterfish <i>Pholis gunnellus</i>	0.0007	0.2	14.4
Common Starfish <i>Asterias rubens</i>	0.003	0.9	64.8
Sun Star <i>Crossaster papposus</i>	0.002	0.7	50.4
Common Hermit Crab <i>Pagurus bernhardus</i>	0.0007	0.2	14.4
Common Whelk <i>Buccinum undatum</i>	0.014	4.6	331.2
Lesser Spotted Dogfish <i>Scyliorhinus caniculus</i>	0.09	29.4	2116.8
Corkwing Wrasse <i>Symphodus melops</i>	0.01	3.2	230.4
Cod <i>Gadus morhua</i>	0.017	5.5	396
Conger Eel <i>Conger conger</i>	0.03	9.8	705.6
Rockling <i>Gaidropsarus sp.</i>	0.02	6.5	468
Curled Octopus <i>Eledone cirrhosa</i>	0.0007	0.2	14.4
Sea Urchin <i>Echinus esculentus</i>	0.008	2.6	187.2
Sea Scorpion <i>Taurulus bubalis</i>	0.008	2.6	187.2
Spider Crab <i>Maja squinado</i>	0.008	2.6	187.2
Ling <i>Molva molva</i>	0.005	1.6	115.2
Goldsinny Wrasse <i>Ctenolabrus rupestris</i>	0.0007	0.25	18
V – Notched European Lobster <i>Homarus gammarus</i>	0.012	4	288

Table 9. CPUE breakdown in Number of non-target species observed .Estimated Catch per trips refers to CPUE multiplied by average No. pots hauled per trip (Table 7). Estimated Total CPUE refers CPUE per trip Multiplied by a 6 days fishing week, multiplied by time frame July – September (12 weeks).

Summary

Both this report and the logbook report have highlighted a number of additional issues that need to be addressed. In addition to those already stated, it would be useful to break down the data in accordance to boat size, divided into <10m and >10m vessels. This would allow for the comparison of vessel size and its effect on fishing activity and CPUE, in addition to a better understanding of the inshore fleet and the role of larger offshore crabbers on brown crab stocks. Such a change would require additional logbook enrolment also.

Secondly a revision of the existing logbook should also be considered for 2015, with the inclusion of green crabs. Such an inclusion would also facilitate the need for market sampling of this species within the summer sampling period of May – October 2015. Additionally the re-wording of the logbook should be considered, specifically the reporting of undersized in order to incorporate the reporting of soft individuals within catch composition.

A number of recommendations have been put forward concerning minimum landing size (MLS). Orkney Sustainable Fisheries Ltd. has put forward recommendations for precautionary increases in MLS of lobster and the enforcement of a new MLS for green crab to Marine Scotland. In addition research into the suitability of current MLS is underway for both lobster and brown crab.

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References:

Sobel, J. 1996. *Gadus morhua*. The IUCN Red List of Threatened Species. Version 2014.2. <www.iucnredlist.org>. Downloaded on **14 November 2014**.