



POT FISHING IN NORTHERN IRELAND

Further information

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Pot Fishing in Northern Ireland

Pot Fishing

Fishery

Lobsters and crabs are traditionally fished using pots or creels. In Northern Ireland, *Nephrops*, *Palaemon* and whelks are also fished using pots. Figure 1 shows examples of different types of pots used.

Inkwell pots- These are the traditional style of pots. The animal climbs in to the pot to feed on the bait through the entrance at the top. However, the animal can get back out and therefore these pots have to be checked regularly to prevent loss of catch.

Parlour Pots- Unlike inkwell pots these parlour pots have two chambers which makes it much more difficult for the animal to get back out. These pots are traditionally used in areas where weather can prevent the fishermen getting out to the pot regularly.

***Nephrops* pots** – pots used for fishing *Nephrops* are much lighter than those used for crab/lobster fishing (5-8kg as opposed to 15-30kg). In addition, whilst crab/lobster pots generally have soft eyes (though some fishermen opt for hard eyes), *Nephrops* pots have hard eyes i.e. the entrance netting has a predetermined plastic ring sewn in.

***Palaemon* pots-** cylindrical pots made of plastic. The net at either end of the pot may be of a different mesh size to the rest of the pot to allow smaller animals to escape. Pots used in the *Palaemon* fishery are much lighter in weight than those used to target crab and lobster.

Whelk pots- made from a plastic container, usually a drum. One end is partially removed and covered with netting and the rest of the pot perforated with 2-3 cm holes. The pot usually has sand at the bottom to weigh it down.

A large number of pots may be attached to a single string which is marked by a buoy at each end. The pots are baited and placed on the seabed to soak for a number of days before being hauled. Once hauled, any lobsters which are caught have their claws banded as lobster are aggressive cannibals and would fight to the death if held together. Brown crab which will not be marketed immediately have the tendon at the base of each pincer cut or 'nicked' to stop the crabs from damaging each other.

Whilst mobile gear such as dredges and trawls can damage the sea bed, pot fishing is seen as a relatively benign form of fishing having little impact on the environment (Kinnear *et al.* 1996; Holt *et al.* 1998; Eno *et al.* 2001; Adey *et al.* 2006; OSPAR commission, 2009).

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Indeed, in areas where other forms of fishing have been prohibited, the use of static gear has been allowed to continue.

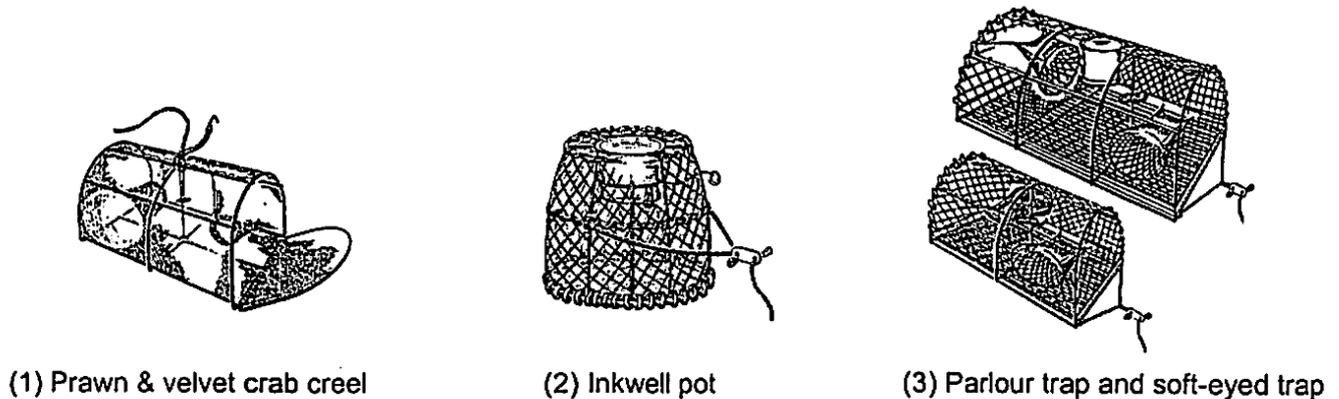


Figure 1 Diagram of the three main types of crustacean pots deployed within Britain and Ireland. Taken from Swarbrick and Arkley, (2002)

Northern Ireland Pot Fisheries

Whilst pot fishing for brown crab and lobster has a long history in Northern Ireland, the velvet crab fishery is relatively new, having only begun in the 1980's when a collapse in the Spanish fishery meant that there was an opportunity to expand the fishery for export to the European markets. The *Palaemon* fishery is the most recent pot fishery in Northern Ireland, having only really taken off commercially in 2008.

As in the rest of Western Europe, the brown crab is the most commercially important species landed by pots. Figure 2 shows how the live weight (tonnes) of brown crab landed by vessels registered in Northern Ireland far exceeds that of any of the other species landed by pot. However, in terms of monetary value, the brown crab has the lowest price per kg (based on DARD valuations). In 2010 the average value of brown crab was 91.8p/kg, the second lowest after whelks which had a DARD valuation of 60.5p/kg. The value of brown crab drops if the meat is poor quality.

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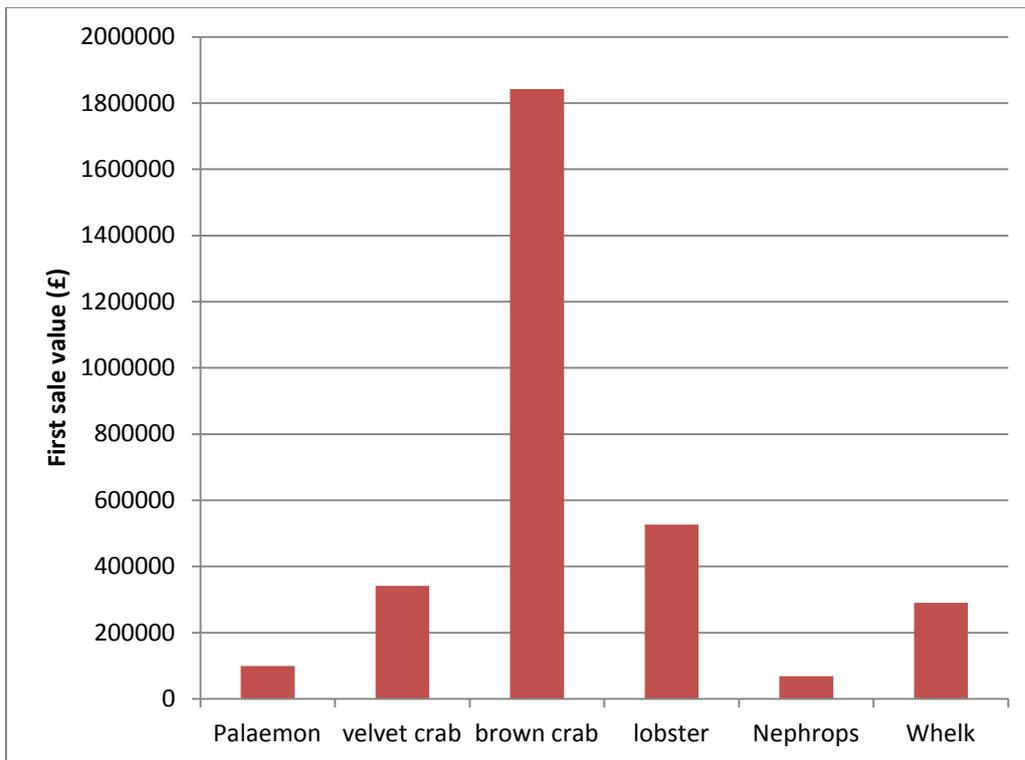
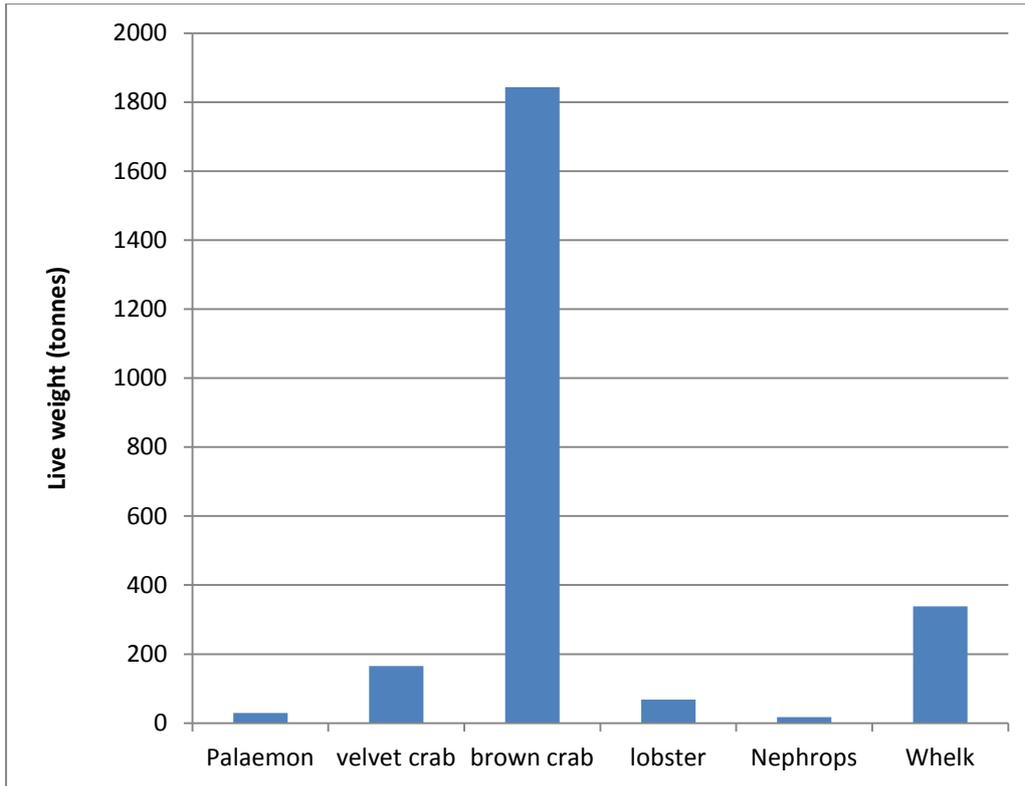


Figure 2 Total landings (tonnes and first sale value) of species landed by pots in Northern Ireland in 2010.

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In 2010 a total of 129 vessels reported landings from pots in Northern Ireland waters. Only 17 of these vessels were greater than 10m in length with the largest vessel being 23m. Using DARD statistics, the number of pots worked at a time in 2010 ranged from an average of 6 to 3801, with 93% of all vessels hauling a maximum of 500 pots. Four vessels, all of which were greater than 10m in length, worked on average more than 1000 pots at a time.

In 2010 a total of 617,340 pots were hauled. The largest percentage of pots was landed in to Kilkeel (154,261 pots, representing 25% of overall effort in Northern Ireland). In 2010 the total first sale value for all landings by pots into Kilkeel was £599,909. This makes an average value per pot of £3.89. Portavogie had the greatest first sale value per pot for Northern Ireland ports. A total of 19,304 pots were landed into Portavogie with a combined first sale value of £294,246 giving an average pot value of £15.24. From 2006 Ballycastle has consistently had the lowest value per pot of, on average from 2006-2010, £2.05.

From 2006 there has been almost a 2.5 times increase in the number of pots which are fished around Northern Ireland (Figure 3). However, the total landings (tonnes) in to Northern Ireland have not followed this pattern and the first sale value of the landings has not varied much in previous years (apart from a slight increase in 2007). This leads to a reduction in the average value per pot cross Northern Ireland from £16 per pot in 2007 to £8.79 in 2010. This decrease in catch per unit effort may be indicative of a fishery that has exceeded its optimum level.

Between 2006 and 2010 the annual landings of brown crab and velvet crab have dropped by 32 tonnes and 81 tonnes respectively (this is linked to a drop in market demand). There have been no significant changes in the annual landings of lobsters and *Nephrops* (apart from a drop in *Nephrops* landings in 2009). The whelk fishery has seen the greatest increase in landings going from 151 tonnes in 2006 to 339 tonnes in 2010.

Although pot fishing is a mixed fishery with pots being unselective as to what they catch, in Northern Ireland there are distinctive patterns in the primary catch from pots (Figure 4). Along the South Down coast the main catch is brown crab. In Strangford Lough and the Ards Peninsula the main catch is velvet crab, whilst, the North coast sees the greatest abundance of lobster. The *Nephrops* pot fishery is based in Strangford Lough.

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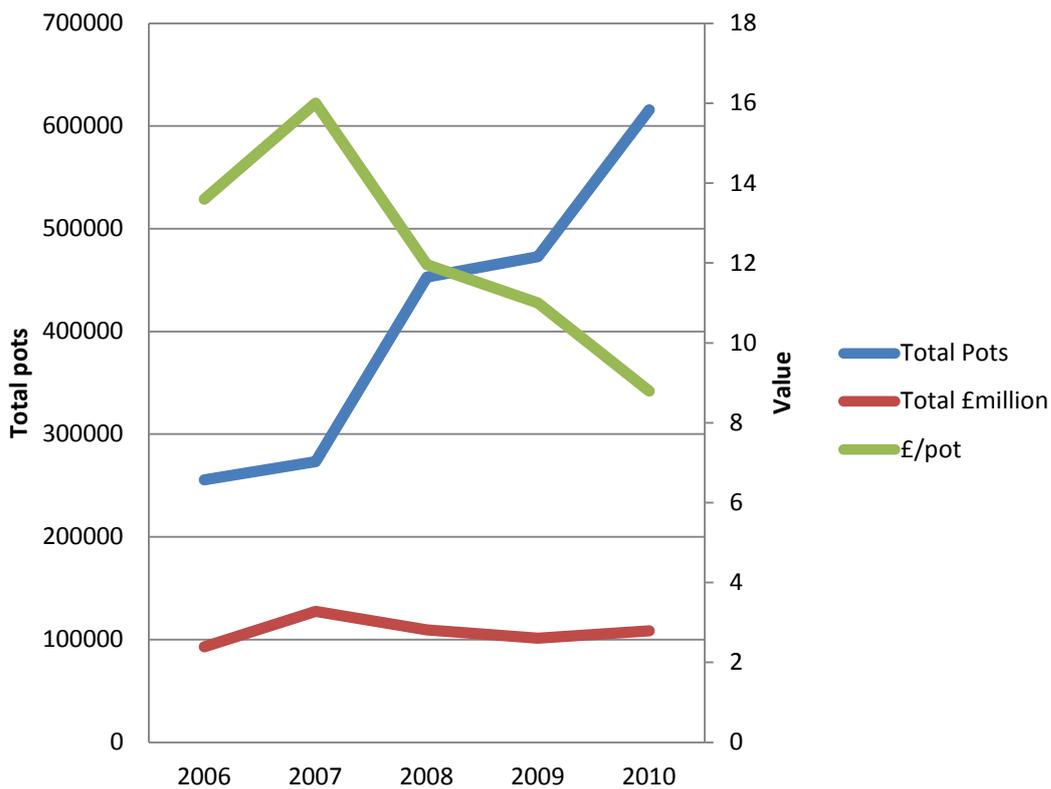
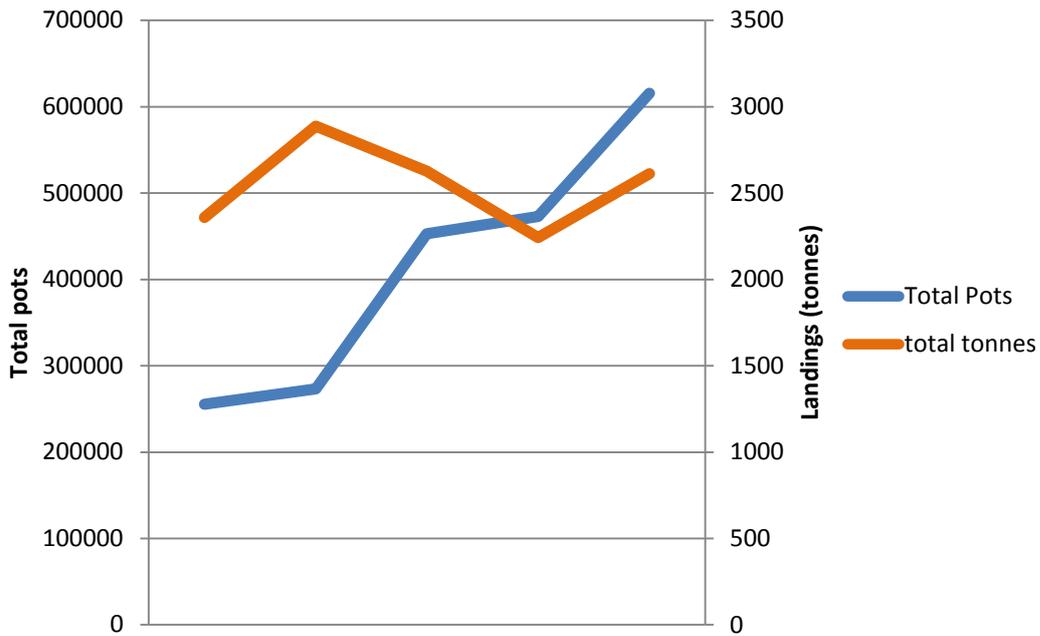


Figure 3 From 2006 there has been a steady increase in the number of pots hauled. However, this has not led to the expected increase in landings. More effort is being placed onto the fishery with very little increase in the value of pot fishing as a whole.

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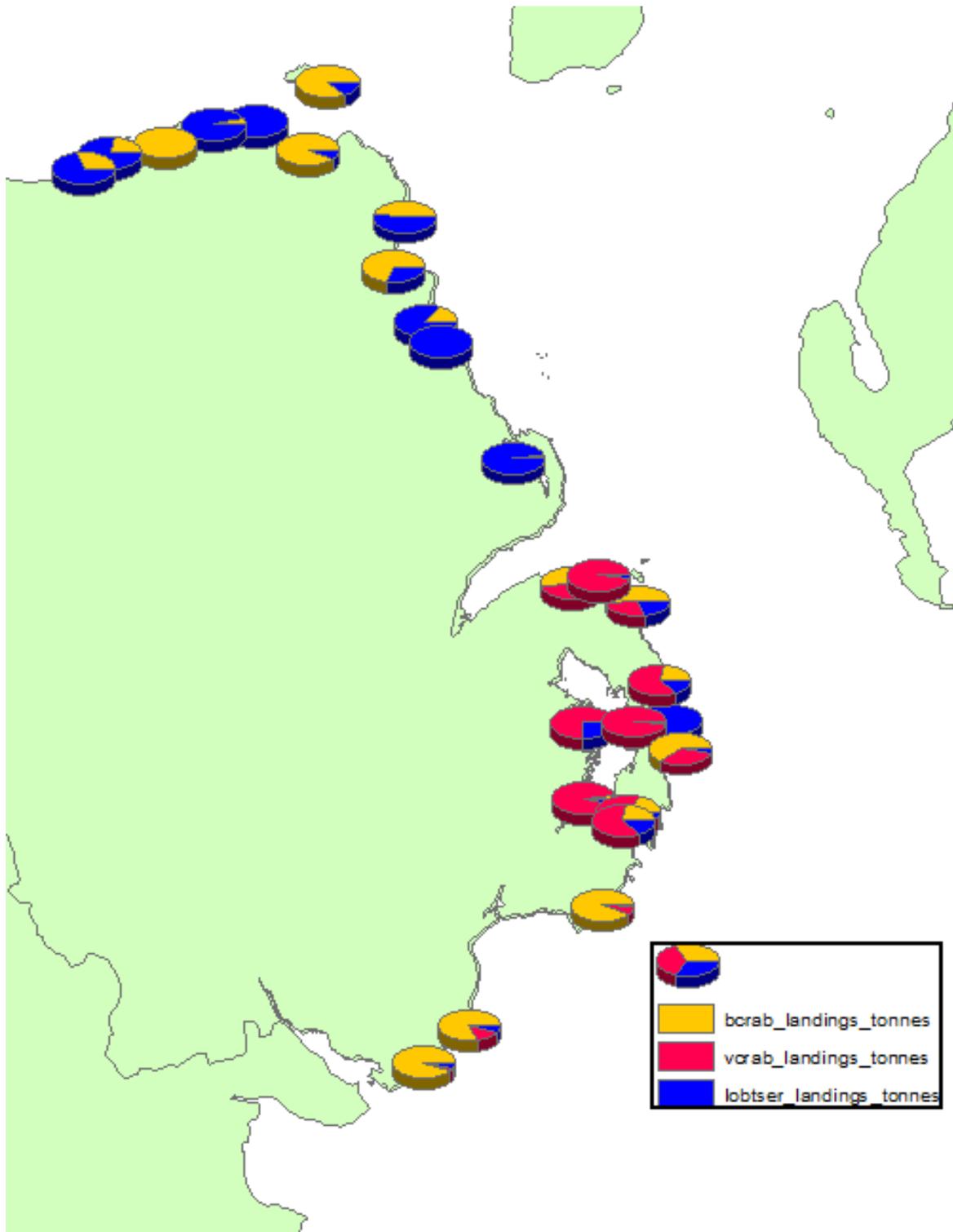


Figure 4 Proportion of landings made up of the three main species targeted by pot fishermen around Northern Ireland.

Management throughout the UK and Ireland

Anyone fishing for shellfish on a commercial scale must have a license (which registers the vessel as a fishing vessel under the Merchant Shipping Act 1995), with a shellfish entitlement. This entitlement was granted by the 2003 UK Restrictive Shellfish Licensing Scheme which was set up to cap levels of crab and lobster fishing. Through this scheme a fisherman was granted a shellfish entitlement based on track record (if they had landed or sold more than 200kg lobsters or 750kg crabs during any 12 month consecutive period between 1 January 1998 and 31 December 2002). Anyone who now wants a shellfish entitlement can only do so by transferring the license from a fisherman who is leaving the sector or by buying a vessel which has a shellfish entitlement.

Fishing for crab and lobster is not subject to European total allowable catch regulations and there are no national quotas. The primary means of managing stocks is through a minimum landing size (MLS) which is the minimum size at which it is legal to keep or land an animal. This is an effective way of managing the reproductive population. Whilst a minimum landing size may not be as effective for fish species which are usually dead when returned, for shellfish a minimum landing size is an effective tool as the shellfish usually survive when returned and can re-enter the population where they can reproduce until they have reached the MLS and can be landed.

In 1875 it was reported that Cromer fishermen imposed a voluntary size restriction of 108mm carapace length on brown crabs to try and restore stocks after heavy fishing of small crabs the previous year caused a considerable decrease in landings. This then went to Parliament as the 1876 Crab and Lobster Fisheries (Norfolk) Act. The act also prohibited the sale of berried crab and lobster. However landing sizes were only introduced at an EC level through Council Regulations (EC) 850/98 (as amended). The current MLSs are:

Brown Crab*

- 140mm north of 56°N to West of Scotland and in North Sea
- 130mm in remainder of North Sea except the Eastern Sea Fisheries District
- 115mm in the Eastern Sea Fisheries District
- 140mm in the Channel and around the Southwest Peninsula
- 130mm elsewhere

**The MLS for brown crab show vary with area due to regional variations in growth rates*

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Lobster

- 87mm everywhere

Whelk

- 45mm everywhere

Whilst these EC MLS apply, around the UK and Ireland national legislation and byelaws have been installed to increase the MLS. In England under a Byelaw made by the Cornwall Inshore Fisheries and Conservation Authority, it is illegal to retain a cock brown crab of less than 140mm and a hen of less than 150mm. In addition, Cornwall IFCA has also increased the MLS of lobster to 90mm for their district. In the Republic of Ireland, whilst they have retained the EC MLS for lobster, they have increased the brown crab MLS to 140mm, and under the Whelk (Conservation of stocks) Order 1994, increased the MLS of whelks to 50mm. The Whelk (Conservation of stocks) Order 2006 sets out a minimum width of whelk, prohibiting the landing of any whelk with a shell diameter less than 25mm.

The English IFCA's have set a number of additional byelaws for the management of the crab and lobster fishery (refer to Table 1). In some areas pot limits have been introduced to control the effort placed on the fisher. Pot limits also prevent large scale fishermen from blanketing an area with their pots which would subsequently prevent other fishermen from laying their pots on the productive ground. In some instances a limit has been decided directly by the IFCA. For example Sussex IFCA set a standard pot limit at 100 pots per crew, up to a maximum of 300 pots per vessel (a similar scheme was introduced in France in 1997 with an allowance of 200 pots per crew member, with a cap of 1000 pots per vessel). Other IFCA's have set a pot limit by putting it out to consultation with the fishermen and letting them decide on the maximum number of pots allowed. Whilst there will be grievance from some fishermen who currently fish over the limit, fishermen with a large number of pots tend to have larger vessels capable of going further offshore where the pot limit does not stand. Pot limits may also be varied according to the distance from the shore. In the Isle of Man the pot limit within 3nm is set at 300, whilst between 3-12nm it is set at 500. Defra have considered an alternative method to control fishing effort - rights based management - whereby fishing rights are allocated to those who have been active within the fishery during a set reference period. The fishing rights would entitle the fisherman to a percentage share of a total allowable catch based on a track record.

Another byelaw set by some the IFCA's is the banning of soft shelled crab, also known as white crab. When a crab molts its shell remains soft for a period. At this time the quality of

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the meat is low and therefore the crab is worth a lower value. If a soft shelled crab is landed it may die before being sold due to damage from the other crabs. By landing soft animals fishermen are removing animals which may not survive to market and which get a lower price. An article in Fishing Focus reported mortality of brown crab of 30% during export from the UK to France, with the French market considering only buying UK crab for the cooked whole crab market during October and November to guarantee quality (Crab and Lobster Strategy Group meeting April 2008 cited in Nautilus Consultants, 2009). By returning soft shelled crab, it gives a chance for the shell to harden and the meat quality to improve which would then yield a better price at sale.

Escape gaps are used to allow undersize animals to get back out of the pots. In the Isle of Man, from September 2011 the use of escape panels is compulsory on all pots fished within the 3 mile limit. Fishermen have reported that escape panels mean fewer undersized are caught leaving more room for legal sized lobster, pots are easier to lift and there was less damage to lobster.

In 2003 Council Regulation (EC) No 1954/2003 established a Biologically Sensitive Area (BSA) off the South West of Ireland as it was deemed to have high importance as a spawning and/or nursery area for species including mackerel, horse mackerel, hake, herring and megrim. In addition, the area also has important stocks of brown crab, spider crab and scallops. Within the BSA fishing effort is managed differently from outside the area. In 2005 S.I. No 705/2005, S.I. No. 728/2005, S.I. No. 736/2005, S.I. No. 789/2005 and S.I. No. 790/2005 (all titled Crab (Fisheries Management and Conservation) Regulations 2005), set out a number of regulations for the management of crab within and around the BSA. These included:

- Prohibiting vessels greater than 10m from fishing for, transshipping or having on board edible crab or spider crab within the BSA
- Prohibiting vessels greater than 15m from fishing for, transshipping or having on board edible crab or spider crab in ICES sub-area VII
- Allowing vessels greater than 15m to fish for edible crab and spider crab in ICES sub-area VII (excluding BSA) between 29 November 2005 and 12 December 2005
- Prohibiting vessels greater than 10m from fishing for, transshipping or having on board edible crab or spider crab within the BSA prior to 1 January 2006
- Prohibiting any vessel from fishing for, shipment or having on board edible crab or spider crab in ICES sub-areas V and VI during period 16 December 2005 and 1 January 2006

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In Ireland there is a closed season for fishing *Palaemon* between 1st May and 1st August (S.I. No. 253/2006 Shrimp (Fisheries Management and Conservation) Regulations 2006). In addition there is voluntary grading at sea. In 2006 a Welsh *Palaemon* workshop recommended a closed season, extending from 1st May to 1st October and grading at sea. The workshop also recommended an introduction of a 14mm mesh size for both end cones of the prawn pots.

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Table 1 Summary of the Byelaws used by the English Inshore Fisheries and Conservation Authorities to regulate pot fishing

Byelaw	North Western	Northumberland	Eastern	Southern	Devon and Severn	Kent and Essex	Cornwall	Isles of Scilly	Sussex
Effort Control									
Permit		YES	YES				YES		
Pot Limitations		800							100 pots per crew. Capped at 300
Size vessel			16m	12m within 6nm	15.24 within 3 miles	17m	15.24m		
Technical Measures									
Protection of V-Notched	YES	YES	YES		YES		YES		
Increase brown crab MLS					140mm		150mm female 160mm male		
Increase lobster MLS					90mm		90mm	90mm	
Ban on use of crab as bait		YES	YES			YES			

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Marking pots	YES	YES					YES		
Quality Measures									
Ban on soft shelled crab/lobster		YES	YES		YES	YES			
Ban on berried crab		YES	YES		YES	YES			
Ban on berried lobster		YES	YES	YES	YES	YES	YES		
Ban on crab/lobster which can't be measured		YES	YES		YES	YES	YES		
Conservation									
Escape gap			YES		YES	YES	YES		

Current Management of Pot Fishing in Northern Ireland

The Unlicensed Fishing for Crabs and Lobster Regulations (Northern Ireland) 2008 was introduced by the Department of Agriculture and Rural Development to improve the management and conservation of crab and lobster and to prevent the increase in fishing by hobby fishermen who did not hold a license. Under the regulations it prevents anyone without a license from:

- Landing more than five crab and one lobster per day
- using more than 5 pots
- using a stock cage

Currently, there are no restrictions placed on pot fishing for whelks (other than the EU MLS), *Nephrops* and *Palaemon* in Northern Ireland.

V-notching

For many years, V-notching has been used as a tool in the management of lobster stocks. V-notching involves the notching of the tail of any berried female before returning it the sea. Any female which has been v-notched should not be landed. This reduces the harvest rate on reproductive females, and, as the v-notch can last several moults, it means the female is protected for a number of years. The aim of v-notching is to increase the total number of reproductive females in the population and hence increase the total egg production of the population. V-notching has now become common practise throughout the UK and Ireland.

In Northern Ireland there are two V-notching schemes running in parallel. The North Coast Lobster Fishermen's Association (NCLFA) run a scheme whereby any berried female is brought back to port where it is verified before being v-notched. The lobster is then returned to sea.

The North-East Lobster Cooperative (NELCO) run an alternative scheme whereby any lobster which is berried is V-notched at the site it was caught. In addition a small subsample of eggs are removed and placed in preservative along with the v-notch. The lobster is returned to the site it was caught and the eggs and v-notch are sent to Queen's University Belfast where they undergo DNA profiling. The profiling produces a genetic identity for the v-notched female and her eggs. From this the genetic profile of the unknown male who fertilised the eggs can be extrapolated. This scheme has led to the creation of a genetic database for lobster from the County Down coast. This can be used to determine the parentage of future lobsters which are caught. Lobsters caught in future years can then have

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their genetic profile checked against the database to identify if they have come from the v-notching scheme. By identifying the percentage of lobsters which are present due to the v-notching scheme (i.e. which are the progeny of a v-notched female), this scheme can be used to prove the effectiveness of v-notching. In an independent report carried out during the Northern Ireland Brown Crab Strategy, developing measures to determine the recruiting size classes that are likely to be the progeny of v-notched animals was outlined as one of the desirable qualities, and the most challenging, of a good v-notching programme. To date, the NELCO v-notching scheme is the only scheme to meet this criterion.

Northern Ireland Brown Crab Strategy

In 2011 the Northern Ireland Brown Crab Strategy was developed (Cappell *et al.*, 2011). This report identified a number of potential management options (Table 2) which were put to industry for consultation. Through the consultation process the report identified a number of potential management recommendations (Table 3). The following measures were ruled out following industry consultation and cost benefit analysis:

- **Shellfish entitlement** - Fishermen did not want NI to alter the shellfish entitlement as it could make purchasing of vessels and licences unattractive to other UK fishermen.
- **Permit system** – When this was discussed during the Northern Ireland Brown Crab Strategy there was mixed reaction with fishermen from areas which were organised into an association showing more support to a permit system. All fishermen were concerned how a permit would affect future generations entering the fishery.
- **Pot limits** - Insufficient information available for setting pot limits as well as a high cost needed to enforce the limit.
- **Locally set TAC and Quotas** - Insufficient information available for setting TAC and quotas alongside enforcement issues.
- **Ban landing of crippled/diseased crab** - Animals not expected to return to high quality and by returning diseased animals could increase the spread of disease in the stock.
- **Closed season** - Insufficient information available on crab stocks to set closed seasons
- **Closed areas** - Insufficient information available on crab stocks to set closed areas

However, there are still a number of issues relating to the final recommendations. Fishermen are not in agreement with the banning of parlour pots. Parlour pots have two chambers which make it difficult for animals to get back out meaning that pots can be left out longer.

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However during the Northern Ireland Brown Crab Strategy whilst some fishermen agreed to a ban on the use of parlour pots, others disagreed insisting that they aim to haul them daily and therefore their fishing capacity is not significantly different from other types of pots or creels. They are primarily used on the North coast where, on occasion, weather prevents the fishermen getting out on a daily basis.

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Table 2 Proposed management options as raised by the Northern Ireland Brown Crab Strategy and whether they were included in the final strategy

Management Measure	Sub-options	Proposal included
Fishing capacity		
1 Shellfish entitlement	Attached to fishing license	No
	With sunset clause	No
	Crab permit for active vessels	No
	Crab permit with sunset clause for active vessels	No
2 Limit type of vessels inshore	Size of vessel	Yes
	Type of gear e.g. tank on board (vivier)	No
3 Pot Limits	Flat rate per vessel	No
	Based on track record	No
4 Gear measures	Ban on parlour pots	Yes
Outputs		
5 Introduce TACs and quotas	Flat rate per vessel	No
	Based on track record	No
6 Increase minimum landing size		Yes
7 Limit for hobby fishermen		Yes
8 Curfews		No
Quality		
9 Ban landing cripple crabs		No
10 Ban landing crab claws		Yes
11 Ban landing white/diseased crab		Yes/No
12 Ban on landing berried crab		Yes
Conservation		
13 Closed seasons for spawning		No
14 Closed areas	Complete closure for all fishing activity	No
	Closure to fishing activities with significant impacts	No
15 Escapement	Escape gap	Yes
	Biodegradable panels	Yes
Other suggestions		
16 Certification	Marine Stewardship Council	No

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Table 3 Management options for the brown crab fishery as proposed by the NIFPO brown crab strategy (Cappell *et al.* 2011)

Management Measure	Change in legislation	Local Management Plan
Increase MLS to 140mm		
Limit size of vessels permitted inshore		
Limit of hobby fishermen (in addition to current legislation)		
Ban landing of soft shelled crab		
Ban landing of crab claws		
Ban on landing berried crab, velvets and lobster		
Control on Parlour pots		
Escape gap in pot		
Biodegradable fastening		

Potential Regulatory Measures for Pot Fishing

As a number of potential management measures have already been through the consultation process during the Northern Ireland Brown Crab Strategy and ruled out by industry (Table 2), these will not be examined further. In addition, this report has examined and, through direct discussions with stakeholders, ruled out:

- **Biodegradable panels/fastening:** “Ghost fishing” is the term used to describe instances whereby lost fishing gear continues to fish indiscriminately without the control of the fisherman. The main causes of pots ghost fishing are the removal of pots through collisions with towed fishing gear and pots breaking free due to bad weather conditions. The potential impacts of ghost fishing can be reduced through the use of a biodegradable panel. There are, however, a number of issues arising from fishermen with regards to biodegradable panels/fastenings. The primary concern is the cost of constantly having to replace the panels. There is also the potential that the panel breaks down whilst the pots are fishing, leading to a loss of catch. In addition, the use of a biodegradable bungee to secure pots closed comes with its own environmental issues. At the end of each bungee is a plastic hook. If the bungee was to break down whilst the pot is in the water, then the plastic hook will be lost on the sea bed with the potential to cause damage to bottom dwellers. Due to these reasons there would not be industry support for the use of biodegradable panels/fastening.
- **Increase Lobster MLS:** Whilst, for lobster, an increase in MLS has stock benefits by increasing the fecundity, it has the potential to negatively affect the market demand. Unlike for crab and other shellfish species, there is not necessarily a greater demand for larger lobsters. In fact the opposite may be true. Restaurants want to sell lobster which fit the plate and which they can make the most profit from. Therefore they don't want to be spending more money on a large lobster which, in the restaurant is going to be sold for the same price as a smaller lobster which has cost less. During the last increase in MLS, the price per kilo decreased. This increase was also a European increase and therefore everyone was impacted. However, if Northern Ireland increases the MLS of lobster there may be a decrease in demand as the market could potentially stop buying from Northern Ireland. For this reason an increase in lobster MLS will not receive stakeholder support. In addition, through the v-notching scheme, lobsters are already receiving significant protection.

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In addition to the general measures proposed for all inshore fisheries, Table 4 suggests possible actions for pot fishing. Table 5 relates these actions to those proposed in the Northern Ireland Brown Crab Strategy

Table 5 Relationship between proposed actions highlighted in both this strategy and the Northern Ireland Brown Crab strategy

Challenge	Proposed Management Actions	NI Brown Crab Strategy report
Influx of new entrants	Limit vessel size	Final proposed measure
Sustainability of stocks	Limit number of pots	Ruled out
	Ban berried crab	Final proposed measure
	<i>Palaemon</i> mesh size regulations	Not discussed
	Increase MLS	Final proposed measure
	Ban landing crab claws	Final proposed measure
Optimising economic return	Ban soft shelled crab	Final proposed measure (brown crab)
Obligations to protect marine environment	Escape panel	Final proposed measure
Marine spatial planning	Inshore monitoring system	Not discussed
Lack of data	Review of log sheets	Not discussed
	Stock Assessment	Required

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Table 4 Possible actions for the management of Northern Ireland inshore pot fishing

Challenge	Resolution	Possible Action	Reasoning
Spatial pressures	Reduce latent capacity of fleet	Limit vessel size	In 2010 94% of the 129 vessels which laid pots around Northern Ireland were less than or equal to 12m in length. Whilst larger vessels are more likely to fish further offshore there is nothing preventing them from moving to the inshore. By setting a size limit it prevents the latent capacity of larger vessels moving inshore. A clause may be installed into the legislation that if a vessel is greater than 12m but has a track record in the inshore, it is exempt to the legislation.
Sustainability	Reduce effort placed on fishery	Limit number pots	In 2010 the average number of pots for all vessels was 512 (ranging from 6 to 3801). By setting a limit to the number of pots it restricts the effort placed on the fishery and prevents 'blanketing' of grounds by fishermen with large numbers of pots.
	Protect reproductive animals	Ban landing berried crab	Banning the landing of berried crab will increase the reproductive output of the stock (berried lobsters are protected through the v-notching scheme).
		Maximum landing size for lobster	Larger lobsters tend to be more fecund than smaller lobsters and therefore are important to the sustainability of a population. Introducing a maximum landing size would retain these animals in the population. Whilst some larger animals may have remained in the population due to the success of the v-notching scheme, a maxLS would protect these animals even after the v-notch has grown out.
	Protection of undersized animals	Regulation on mesh size for the <i>Palaemon</i> Fishery	Increasing the mesh size used for <i>Palaemon</i> fishing would allow undersized animals to escape thus ensuring the sustainability of the stock. In Wales a 14mm cone in the mesh was proposed as it was shown in trials not only to reduce the volume of undersized <i>Palaemon</i> by 33% but pots with 14mm mesh size also had 35% more marketable sized <i>Palaemon</i> than standard pots thus actually increasing the economic yields.
Increase Minimum		Following on from the brown crab report there appears to be overall acceptance amongst fishermen with increasing the MLS of brown crab to	

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		Landing Sizes	140mm (currently some fishermen already exceed the 130mm MLS due to market demand). An increase in MLS would also have economic benefits, with larger animals receiving a greater price.
	Protection of animals	Ban landing claws	Whilst toeing of crabs at sea is prohibited, the claws of crab may be removed at the port. Under Council Regulation EC 850/98 crab claws can account for 1% by weight of catches made by pots and creels and 75kg by any other fishing method. When removing crabs from pots or through handling of the crab, a claw may drop off. If a ban was implemented, a claw which had been naturally shed would need to be retained with the rest of the animal as confirmation that it had not been physically removed.
	Increased value for product	Ban landing soft shelled crab/Lobster	After moulting brown crab and lobster have a soft shell which not only is representative of poor meat quality due to the high water content, but which will also greatly reduce their survival rate if landed.
Obligations to protect Marine Environment	Protection of undersized and non-target species	Escape Gaps	<p>Escape gap allow undersized animals to escape from pots and thus they don't have the stress of being hauled up and then returned to sea. This has a number of benefits for the fisherman including a reduction in sorting time on deck as well as reducing the amount of bait that is needed.</p> <p>A potential issue with the use of escape gaps is in relation to velvet crabs. In areas where escape gaps are currently being used, there is no velvet crab fishery. However, Northern Ireland has significant landings of velvet crab. Using certain escape gaps would allow velvets to escape, therefore it would need careful analysis before deciding on the best type of escape to use.</p>
Lack of Data	Improved data collection	Scientific survey	A stock assessment should be carried out for all species targeted by the pot fishery so that the state of the stock can be determined and to ensure that fishing is being carried out at a sustainable level.
		Marking of pots	Currently there is no definitive way of marking pots to know which fisherman a pot belongs to. By ensuring that all pots are labelled in a consistent manner it ensures that they are easily identifiable. This can be used in terms of enforcement, gear conflict, or if a fishermen's pots are moved by

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weather etc. as a way of identifying the owner. In addition, pots may be labelled so that it is easy to establish if they are part of the commercial fishery or if they belong to a hobby fisher by, for example, using different colour markers for the different types of fishing.

References

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Appendix 1 Monthly shellfish activity return

Serial Number

Port of landing

Month

Year

Name of vessel

PLN

1 Day	2 Area (Rectangle) Sub Rectangle)		3 Gear pots (no)/nets (m)		4 Edible Crabs (kgs)				5 Lobster (Kgs)	6 Other (kgs)	7 S'ford Lough Y/N	8 Larne Lough Y/N	9 Rathlin Y/N (see notes)
	Rect	Sub Rect.	Total set	Total Hauled	Green	Brown	Velvet	Claws					
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
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20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
Monthly Total													

Submitted by: Name in BLOCK LETTERS

I have read the DATA Protection statement contained in the Notes for Guidance Signed

Appendix 2 Species Biology

Homarus gammarus

Also known as the common lobster or European lobster, *Homarus gammarus* is a shelter seeking animal locally common around all coasts of Britain and to depths of about 50m (although they can be found deeper). Their distribution ranges from the Lofoten Islands to western Baltic, North Sea, English Channel, Atlantic and Mediterranean coasts of Europe, south to North-West Africa and east to the Black Sea (Gibson *et al.* 2001). Due to their aggressive and solitary behaviour lobster are rarely abundant. *H. gammarus* are variable in length with larger specimens reaching 500mm. The carapace of these animals is generally granular but lacking spines or ridges. The dorsal is dark blue-black often with paler yellow or orange spots ventrally. The claws on the first pair of legs are large and powerful, with the right claw being larger than the left and used for crushing whilst the left claw is much sharper and used for slicing. The sex of a lobster is determined by its first pair of swimmers (Figure A2.1). In males these are hard and grooved to pass sperm cells into the body whilst those of a female are soft and feathery (Taylor, 1975). Lobsters mature around 5-7 years with females being around 75-80mm in length and males slightly smaller.

Lobsters grow by moulting their shell in summer or early autumn. As they moult water is absorbed by the body tissues and this causes the lobster to swell and rupture its exoskeleton which allows further swelling to occur and the new exoskeleton to begin to harden. The lobster eats its old exoskeleton which provides some of the calcium needed for the new shell. During each moult the lobster can increase by 10-15% in length, however, the rate of moulting decreases with age. It is during moulting that the soft bodied female mates with a hard bodied male. The female can retain the male sperm for up to a year, until needed to fertilise the eggs. The eggs are extruded from the base of the second pair of walking legs along with a sticky substance which cements the eggs in place under her tail. At this stage the female is referred to as being 'berried' (figure A2.2). A female lobster may produce 10-15 thousand eggs. The eggs are carried by the female for 9-12 months during which they go through different phases. Initially, the eggs are dark green then black. As they ripen they will turn reddy-brown before turning paler with an 'eyed' appearance. Once the eggs are matured the female will release them in bursts each night. The larvae remain planktonic for 5-10 weeks and go through three moults before moving to the sea bed to begin their life as bottom dwellers.

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Figure A2.1 Female (top) and Male (bottom) lobster



Figure A2.2 Berried female lobster

Cancer pagurus

Cancer pagurus, commonly known as the brown crab or edible crab, has a heavy oval reddish-brown carapace. The margin of the carapace is distinctively crimped and is sometimes referred to as a 'piecrust'. The large claws are black tipped. Typically brown crabs are around 90mm in length and 150mm in width however they can grow up to 250mm. The sex of a brown crab is determined by the shape of the abdomen with males having a narrow pointed abdomen whilst females have a broad and bee-hived shaped abdomen for carrying eggs (figure A2.3). Males (or cocks) are generally larger than females (or hens). Males tend to mature around 110mm (5 years old) whilst females mature at 127mm in carapace width (Edwards, 1979). Growth is brought about by moulting. A study investigating the increase in size after moulting found that, in females moulting increased the

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carapace width by 15-25% whilst in males the increase was between 9-23% (Edwards, 1979).

Brown crab are found throughout Western Europe from Norway southwards, in the Mediterranean and south to West Africa (Gibson *et al.* 2001). Adults can live at depths of 6-200m, typically on rock but also on mixed coarse ground and sand. The brown crab is thought to undergo extensive seasonal migrations associated with reproduction, with large males moving the greatest distances.

In late spring females move inshore in order to moult. Shortly afterwards copulation occurs. In late summer the females move offshore again, storing the sperm until winter when the eggs are fertilised. Eggs are carried under the abdomen. Whilst berried, females remain in pits or under rocks and do not feed so are less likely to be caught by pots. Six to nine months after copulation (late spring/early summer) larvae are released into the water column where they remain in the plankton for 2 months. Juveniles then settle in the intertidal zone in late summer/early autumn where they remain for up to 3 years before migrating to subtidal areas at approximately 60-70mm.

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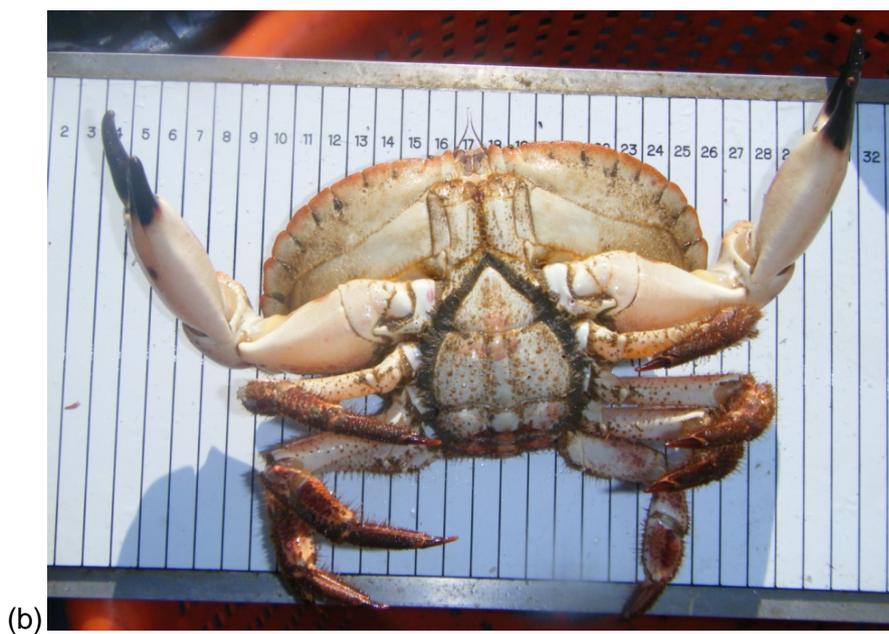


Figure A2.3 Examples of a male (a) and female (b) brown crab. Males have a narrow pointed abdomen whilst females have a broad and bee-hived shaped abdomen

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Necora puber

Commonly known as the velvet crab, this crab has quite a flat carapace and is much smaller than *Cancer pagurus* with an average length of 50-65mm and width of 60-70mm. Females tend to be smaller presumably due to the energy used for egg production instead of growth. At either side of its distinctive red eyes are 5 anterior pointing teeth and between the eyes are up to 10 unequal teeth. The dorsal surface of the crab is blue but is masked by a brown velvety texture with red prominences. The hind legs have sections which are flattened, fringed with hairs and oval in shape for swimming. This species is fast moving and can also be quite aggressive explaining the alternative name of "Devil crab".

Velvet crabs can be found on rocky shores but are most abundant sublittorally to depths of 80m where they feed on both animal and plant material. Their distribution extends from west Norway to North Sea, English Channel, Atlantic, Mediterranean and Black Sea coasts of Europe south to West Africa (Gibson *et al.* 2001). As with *Cancer pagurus* the sex of the animal can be determined by the shape of the abdomen. Velvet crabs reach maturity at around 40mm carapace width (around 1-2 years of age). Growth is by moulting with males moulting in April-July, whilst females tend to moult from May-August. Unlike brown crab, velvet crabs are thought to remain in the same area, not undergoing migrations.

Palaemon serratus

Palaemon prawns are commonly referred to as shrimp due to their small size. Under the Food labelling Regulations 1996 any species of Palaemonidae which, when cooked, has a count less than 1,323 per kg can be described as prawn or shrimp.

Palaemon serratus is found all around the British Isles and Ireland from the intertidal to depths of 40m. *P. serratus* has a cylindrical body of which the head and thorax are protected by a thin carapace which is drawn in to an upturned rostrum between the eyes. The rostrum has 6 or 7 teeth along its dorsal surface and 4 or 5 on its ventral surface. This species is translucent with reddish lines on the carapace and abdomen. *P. serratus* can reach up to 100mm in length although they are generally less than this. *P. serratus* has a short life span of approximately 2 years.

P. serratus have separate sexes with males being smaller than females. Reproduction occurs between October and December when the female releases eggs. Fertilisation occurs as the eggs leave the female. The female then carries the eggs attached to hairs on her pleopods for around 4 months before hatching in April. After hatching the larvae are carried

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in the currents before settling in July or August. These young shrimp have a rapid growth rate and by October of their first year they have reached a length of approximately 5cm (Kelly *et al.* 2008). By this stage they are of a size which will be landed in the fishery.

Buccinum undatum

Also known as a Buckies or the common whelk, *Buccinum undatum* is common around Britain and Ireland. Buckies have a large (up to 10 cm), sturdy shell with coarse undulating ribs crossed by spiral ridges. The shell consists of 7-8 whorls with the body whorl the largest, making up most of the shell length. The aperture of the shell is oval with flared edges and a short siphonal canal.

Buckies are found on muddy sand, gravel or sometimes rock from the low water to depths of greater than 1000m. Whelks are active predators feeding on worms or bivalve molluscs.

Whelks live to 10-15 years, reaching sexual maturity at around 7 years old. Females attract males by releasing pheromones into the water. The timing of this differs between areas. Males deposit spermatozoa into the female's bursa and this is transferred to the seminal receptacle where it may be stored for up to 8 weeks (Martel *et al.* 1985). Due to this storage of sperm, the eggs may be fertilised by different males. Eggs are laid on hard substrata with juveniles emerging after 3-5 months.

Nephrops norvegicus

Commonly referred to as the Dublin Bay Prawn in Ireland and Langoustine in the Mediterranean, the term *Nephrops* can be translated as 'kidney eye'. *N. norvegicus* is pale orange in colour and may grow up to 240mm long. The rostrum at the front of the carapace is long whilst at the rear of the abdomen, the uropods and telson form a broad flattened tail fan, the posterior margins of which are covered with dense short bristles.

N. norvegicus is distributed from the Mediterranean and Morocco northwards to Atlantic, English Channel, and North Sea coasts of Europe, Norway and Iceland (Gibson *et al.* 2001). They are entirely sublittoral living in soft sediments such as fine and silty mud, at depths of 14-800m (Briggs, 1997) and inhabit burrows, only emerging to feed or mate, usually at dawn and dusk.

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Mating and molting generally occur in Spring, with females reaching maturity at around 21mm carapace length and males being around 15mm carapace length (McQuaid *et al.* 2006). Eggs are usually extruded in summer hatching in late winter/early spring.