Responsible Sourcing Guide: Nephrops

Version 6 – October 2013

Nephrops norvegicus Image © Scandinavian Fishing Year Book

Nephrops norvegicus, referred to as _Nephrops_ in this guide, is the scientific name for the species that is sold under the names Norway lobster, Dublin Bay prawn, langoustine or, for the tail meat, scampi (1). In Scotland and the north of England they are colloquially known as prawns.

The total annual landings for *Nephrops* in the UK is 33,000t (2). It is the most valuable species currently landed in the UK, worth more than £111.2 million annually (2). The UK accounts for about half of the total world landings for *Nephrops* and is allocated the majority of the North Sea and Scottish west coast catches.

In past years *Nephrops* stocks have been resilient. However, in recent years some *Nephrops* stocks have shown evidence of over exploitation. This is of concern where the TACs are not limiting on individual stocks or 'Functional Units (FUs). The TACs cover group of these FUs but do not limit catches on specific units.

An important issue in the management of *Nephrops* fisheries is undesirable mortality of whitefish species which are caught as by-catch. Measures, including use of selective gears and control of fishing effort, are being taken to reduce these effects.

Most *Nephrops* are caught by trawling although, in some waters, creeling or trapping is also used. They are sold live, chilled, frozen or as scampi. The emerging live trade is also of importance, supplying a high value product to the European market.

The purpose of this guide is to outline the status of _Nephrops_ stocks and describe some of the measures being taken to protect them.

BUYERS' TOP TIPS

Know your stock status

Nephrops distribution is divided into stocks known as Functional Units (FU), located in areas with muddy sediment. Find out the Functional Unit from which the fish has been caught. See also traceability (3, 4).

Enquire about by-catch reduction

Trawl fisheries for *Nephrops* can result in significant quantities of by-catch species, including fish from recovery stocks, such as cod and hake, and also juvenile haddock and whiting. This does not mean that these fisheries should be closed, provided that suitable management measures are in place. The European Union has implemented measures to reduce these by-catch species by implementing selectivity and other management measures.

Buyers should enquire about the methods used in suppliers' fisheries. Both statutory and non-statutory methods are available (see page 7).

Seafish Responsible Sourcing Service

This is one of a series of Responsible Sourcing Guides produced by Seafish.

For further guides and information see:
http://tinyurl.com/seafishrsg

Status of *Nephrops* stocks October 2013

Biology and distribution

Nephrops are distributed throughout the North East Atlantic from Iceland and northwest Norway, to the Atlantic coast of Morocco and the western and central Mediterranean, from sheltered sea lochs to the European continental shelf edge, in 20-800 m. Adult *Nephrops* inhabit burrows in muddy seabeds and emerge only to forage for food and to mate. Whilst incubating their eggs, berried (egg carrying) females rarely emerge from their burrows (4). The females emerge to moult and mate during the spring and summer months. The adults do not migrate, but planktonic larvae are dispersed with water currents.

Stock assessments

The stocks are assessed as Functional Units (FU numbers 1-33) which correspond to a specific area of muddy habitat. However they are managed in larger areas; originally 'Management Units' A-G were used (Figure 3) but the EU currently agrees Total Allowable Catches (TACs) by ICES Sub-area or division (Table 1).

Scientists have devised an approach based on independent biomass estimates, using a sled with an underwater television (UWTV) camera and lights that is towed by a research vessel, across the *Nephrops* grounds. The numbers of visible burrows per unit area are counted to assess the biomass of *Nephrops* in a given Functional Unit (FU). The quantity captured by the fishery is divided by the estimated biomass, to obtain the harvest rate (Figure 1) (expressed as a percentage) for that Functional Unit.

Maximum Sustainable Yield (MSY)

Knowledge of growth and mortality rates enables the scientists to calculate a Maximum Sustainable Yield for the *Nephrops* in that Functional Unit (Figure 2). If the yield is below MSY scientists advise an increased harvest rate, if it is above MSY they advise a decrease in harvest rate. Where a decrease in catches is advised, MSY is reached in stages by 2015. If the biomass (B) is found to be too low -- below MSYB-trigger, there is a risk of stock depletion, and a further reduction in catches is recommended.

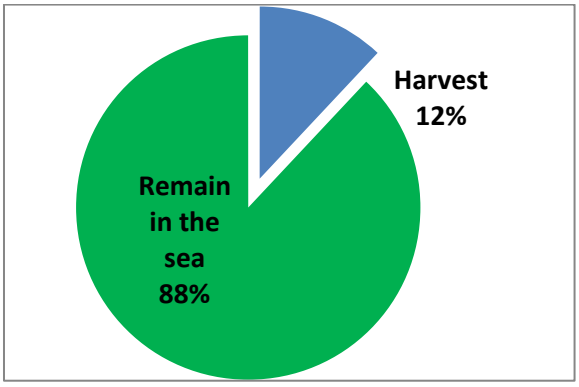


Figure 1: Illustrates harvest rate for *Nephrops*

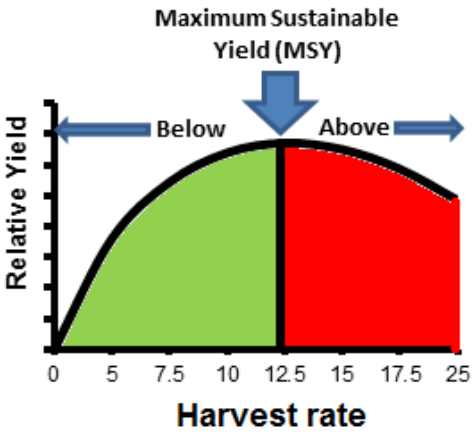


Figure 2: Illustrates Maximum Sustainable Yield (MSY) for *Nephrops*

Table 1 Status of Nephrops stocks July 2011 colour coding
Green = above $MSYB_{trigger}$ Red below MSYBtrigger or Harvest rate above MSY; Grey = $MSYB_{trigger}$ not defined. Relationship to Maximum Sustainable Yield; MSY (see page 2)

Management Stock areas and Functional Units (FU); see Fig 3	Agreed TAC 2014 (t) (5)	Advisory TAC 2014 (t)	Scientific advice and management (June 2011 ICES advice)
NORTH EAST ATLANTIC *NEPHROPS* STOCKS (*Nephrops norvegicus*) www.ices.dk			
Iceland (FU1)		1,750	In 2012, 1,914 t of *Nephrops* were landed, compared to 2 240 t in 2011. The survey biomass index has decreased since 2008 and is now below the long-term average (6).
North Sea ICES IV (Management areas G,H,I)	Not available yet		The TAC covers all of the North Sea Functional Units (FUs). However, the FUs are assessed separately as described below
Fladen Ground (FU7)		<8,959	The stock has declined from the highest observed value in 2008 and is now just below the MSY Btrigger. The harvest rate has fluctuated in recent years, and fell to approximately 4% in 2012 which is below FMSY.
Moray Firth (FU9)		<739	The stock is declining but remains just above MSY Btrigger. The harvest rate was above MSY in 2011 and decreased in 2012, although it is still above MSY.
Noup (FU10)		<50 (2013)	The 2012 advice for this stock is biennial and valid for 2013 and 2014
Farne Deeps (FU6)		<1,173	The UWTV survey indicates that the stock status has declined since 2005 and has been fluctuating near MSY Btrigger since 2007. There is some evidence of too high a harvest rate for males, which may affect reproduction. Changes in survey methodology in 2007 make exact comparisons with the preceding series difficult, but the general trend is considered reliable.
Firth of Forth (FU8)		<1,417	The stock remains above MSY Btrigger but has declined since 2008. The harvest rate remains above MSY.
Botney Gut – Silver Pit (FU5) Off Horn Reef (FU33)		<1000 (2013)	Biannual advisory TAC under the ICES data limited assessment method. Result based on commercial catch and UWTV survey. Advisory landings similar to 2012.
Norwegian Deeps (FU32)		<800 (2013)	Catch per effort stable over the last 16 years, suggests that current levels of exploitation are sustainable. ICES recommends catches under the data limited framework.
Skaggerak ICES Division IIIa		7,578	ICES advisory catch is on the basis of the MSY approach with a discard ban in place as is planned.

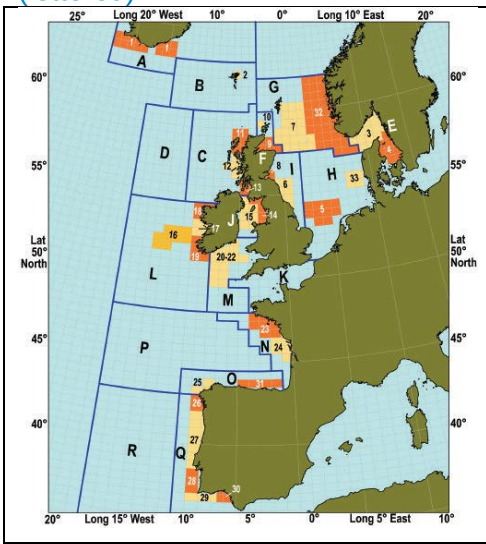
Table 2 continued

Management areas and Functional Units (FU)	Agreed TAC 2014 (t) (5)	Advisory TAC 2014 (t)	Scientific advice and management (June 2011 ICES advice)
NORTH EAST ATLANTIC *NEPHROPS* STOCKS (*Nephrops norvegicus*) www.ices.dk			
ICES Div VIa Management area C	Not available yet		The TAC covers all of the West of Scotland Functional Units (FUs).The TAC has decreased by 15% since 2010, in line with EU policy (7). Individual FU assessments below.
North Minch (FU11)		<3,485	The stock has been above MSY Btrigger for more than 15 years. The results from the UWTV survey indicate that the abundance has decreased in 2012 and recovered in 2013 to an abundance similar to those observed in 2010–2011. The historical harvest ratios (removals/UWTV abundance) have fluctuated around MSY but are currently above.
South Minch (FU12)		<5,211	The stock fell below MSY Btrigger in 2012 but increased in 2013 and is now above MSY Btrigger. The results from the TV survey indicate that the abundance has decreased in 2012, and recovered in 2013, to levels similar to those observed in 2011, but is being exploited at harvest rates above MSY.
Clyde (FU13)		<5,744	UWTV abundance remains above the MSY Btrigger. Harvest rates (removals/UWTV abundance) for *Nephrops* in the Firth of Clyde have increased in 2012 to 26.0% and remain above the proposed MSY proxy.
Sound of Jura (FU13)		<521	Harvest rates (removals/UWTV abundance) for *Nephrops* in the Sound of Jura have been well below the proposed MSY proxy in recent years. UWTV abundance remains higher than observed at the start of the series, but the series is too short and patchy to propose a MSY Btrigger.
ICES VII Management area J,L,M	Not available		
Irish Sea east (FU14)		<951	The abundance of *Nephrops* in FU 14 is stable with the exception of 2012, where there has been an increase. There is not a long enough time-series to determine a candidate for MSY Btrigger. The current harvest rate (removals/UWTV abundance) is below the FMSY proxy.
Irish Sea west (FU15)		<8,244	Since 2003 stock abundance has been above MSY Btrigger. Recent harvest rates (removals/UWTV abundance) have fluctuated around the MSY proxy and are now above it.
Porcupine Bank (FU16)		<1,848	UWTV surveys for FU 16 were carried out in 2012 and 2013; these provide abundance estimates for this stock. The 2012 harvest ratio (removals/UWTV abundance) is estimated to be 3.2%, which is below the MSY proxy (5%). Other indicators show that the exploitation rates increased during the 2000s but declined significantly in 2011 and remain low. Bottom trawl survey cpue increased significantly in 2010 and this has been linked to a stronger recruitment first observed in the survey in 2009.

Table 2 continued

Management areas and Functional Units (FU)	Agreed TAC 2014 (t) (5)	Advisory TAC 2014 (t)	Scientific advice and management (June 2011 ICES advice)
Aran Grounds (FU17)		<591	The abundance decreased significantly in 2012 and the 2013 survey estimate is not significantly different (although it is the lowest in the time-series). The harvest rate (removals/UWTV abundance) has increased significantly to 19.2% in 2012 and is now above the MSY proxy.
Ireland north west (FU18)		<235	No information.
Ireland south west and south east (FU19)		<521	Recent harvest rates (removals/UWTV abundance) are around the FMSY proxy. The time-series of reliable abundance estimates is too short to detect a significant trend within the uncertainty bounds, but appears to be decreasing.
Celtic Sea and West Coast of Scotland (FU20-21)		<2,500	The area of the *Nephrops* habitat in FUs 20–21 is uncertain. There seems to be a geographically broad distribution of the population (broader than the fishery), but the habitat is particularly complex and heterogeneous; this may lead to problems assessing the actual area.
The Smalls (FU22)		<2,700	The FU 22 stock component is considered to be stable. Harvest rates (removals/UWTV abundance) have decreased since 2007 and are below the FMSY proxy.

Figure 3: North East Atlantic *Nephrops* Functional Units (numbered) and Management areas (lettered)



Organisation key

FAO: The Food and Agriculture Organisation of the United Nation acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policy.

ICES: International Council for Exploration of the Sea. Responsible for providing scientific advice for North East Atlantic fishery management.

EU: The European Union is responsible for fisheries management within its Exclusive Economic Zone.

GFCM: The General Fisheries Commission for the Mediterranean has an objective to promote the development, conservation and management of Mediterranean fisheries.

Management and conservation measures

Fishing methods

The majority of *Nephrops* are trawl caught. Traditionally, single net otter trawls have been used. However, since the early 1990s there has been an increasing trend towards the use of twin rigged trawls, particularly by more powerful vessels. Baited traps or creels are also used, particularly in inshore west coast Scottish waters.

The main management issues for *Nephrops* are:

Management Units

The management areas, within which TACs are allocated, do not coincide with Functional Units (FUs) in which the stocks are assessed. This means that there is an increased risk that some FUs will be overexploited. This is particularly important as more FUs become overexploited.

Sustainability

In general, *Nephrops* stocks have been very resilient over recent decades. This is partly attributed to the berried female *Nephrops* being unavailable to trawlers, for most of the year, allowing the maintenance of a healthy female parent stock. However, in the Farne deep FU there is evidence of a shortage of males. Juvenile *Nephrops* also remain in their burrows most of the time which helps protect them.

Assessment methods

The assessment of *Nephrops* stocks has improved substantially with the use of independent estimates from underwater television surveys (UWTV).

Nephrops size selectivity

Size selectivity of *Nephrops*, through cod end mesh, can be inconsistent, probably due to the animals' uneven shape. This has led to the search for other ways of increasing selectivity, including all square mesh cod ends in the Skagerrak-Kattegat fishery and French flexible grid systems (Figure 5).

By-catch and discards

Discards of cod, hake, haddock, whiting and some flatfish species are significant in most *Nephrops* trawl fisheries. This has led to the development of a number of devices designed to improve *Nephrops* trawl selectivity (Figures 4-8 and references 7 & 8). There are increasing incentives for using these and other selective devices in Nephrops trawls

Environmental effects

The passage of trawlers' ground gear over *Nephrops*' burrows may close up their entrances. Provided the animals are not injured, they have been observed to be able to open up the burrows again (9). Thus apart from the small energy cost in burrow maintenance, the effect of trawl passage on uncaught *Nephrops* is minimal. It is clear that there are ecological effects due to *Nephrops* trawling (10). However, productive *Nephrops* fisheries remain in many heavily fished areas.

Technical conservation measures; arrows indicate direction of travel; see also reference 9

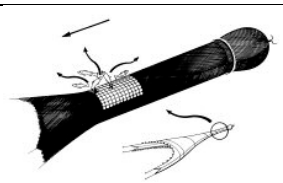


Figure 4 Square mesh panel. Statutory measure for release of haddock and whiting in EU *Nephrops* trawls; fish escape by swimming upwards through the panel.

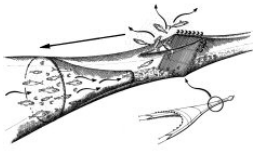


Figure 5 Swedish grid. Fish pass through the upper window of the trawl. *Nephrops* pass through the grid into the cod-end.

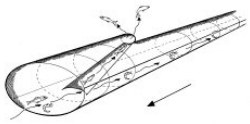


Figure 6 Inclined separator panel, as used in Irish sea fisheries, to separate cod, haddock and whiting from *Nephrops*.

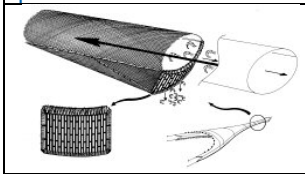


Figure 7 Flexible grid systems, as used in French fisheries, for improving *Nephrops* size selectivity (11).

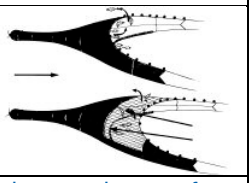


Figure 8 Coverless trawl. This is a non-statutory measure in which the trawl (above) is designed to avoid capture of haddock and whiting - the fish can swim over the top of the trawl. This is more effective than the conventional arrangement (below), where the 'cover' in the top of the trawl extends forward of the footrope and is made of large mesh (10).

Supply chain standards

Responsible practice in the chilled and frozen supply chain depends on correct catching, gutting, washing, chilling or freezing, processing and handling practices throughout the chain. There are standards which cover these aspects from capture to retailer:

• **Seafish Responsible Fishing Scheme.** Sets best practice standards for fishing vessels, based on British Standards Institution specifications (BSi: PAS 72:2006).

• **British Retail Consortium (BRC) Global Standard & Safe & Local Supplier Approval (SALSA) certification.** Designed to raise standards in the seafood processing and wholesaling sectors.

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*European legislation available on: http://europa.eu/

For further information contact:

Bill Lart **T:** 01472 252323 or **E:** w_lart@seafish.co.uk

Karen Green **E:** k_green@seafish.co.uk