



*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 catch for is approximately 70,000 tonnes (t) per annum. It is the most valuable species currently landed in the UK, worth more than £50 million annually. 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.

The general status of *Nephrops* stocks is good. However, there are areas of concern. The main 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 (2,3).

##### 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

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<http://tinyurl.com/seafishrsg>

## Status of *Nephrops* stocks July 2011

### Biology and distribution

*Nephrops* are distributed throughout the North East Atlantic from Iceland and north west 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 corresponds 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 ratio (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 increased harvest ratio, if it is above MSY they advise a decrease in harvest ratio. Where a decrease in catches are advised, MSY is reached in stages by 2015. If the biomass (B) is found to be too low -- below  $B_{MSY-trigger}$ , there is a risk of stock depletion, and a further reduction in catches is recommended.

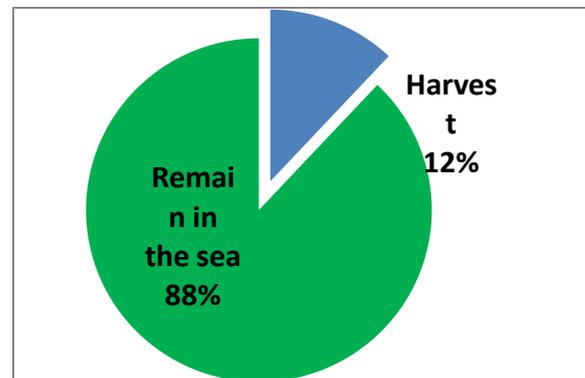


Figure 1: Illustrates harvest ratio for *Nephrops*

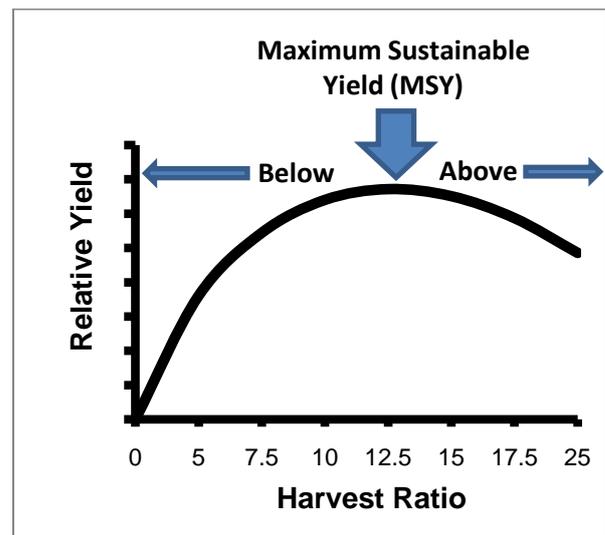


Figure 2: Illustrates Maximum Sustainable Yield (MSY) for *Nephrops*

**Table 2 Status of *Nephrops* stocks July 2011 colour coding**

**Green** = above  $B_{MSY-trigger}$  ; **Grey** =  $B_{MSY-trigger}$  not defined.

Relationship to Maximum Sustainable Yield; MSY (see page 2)

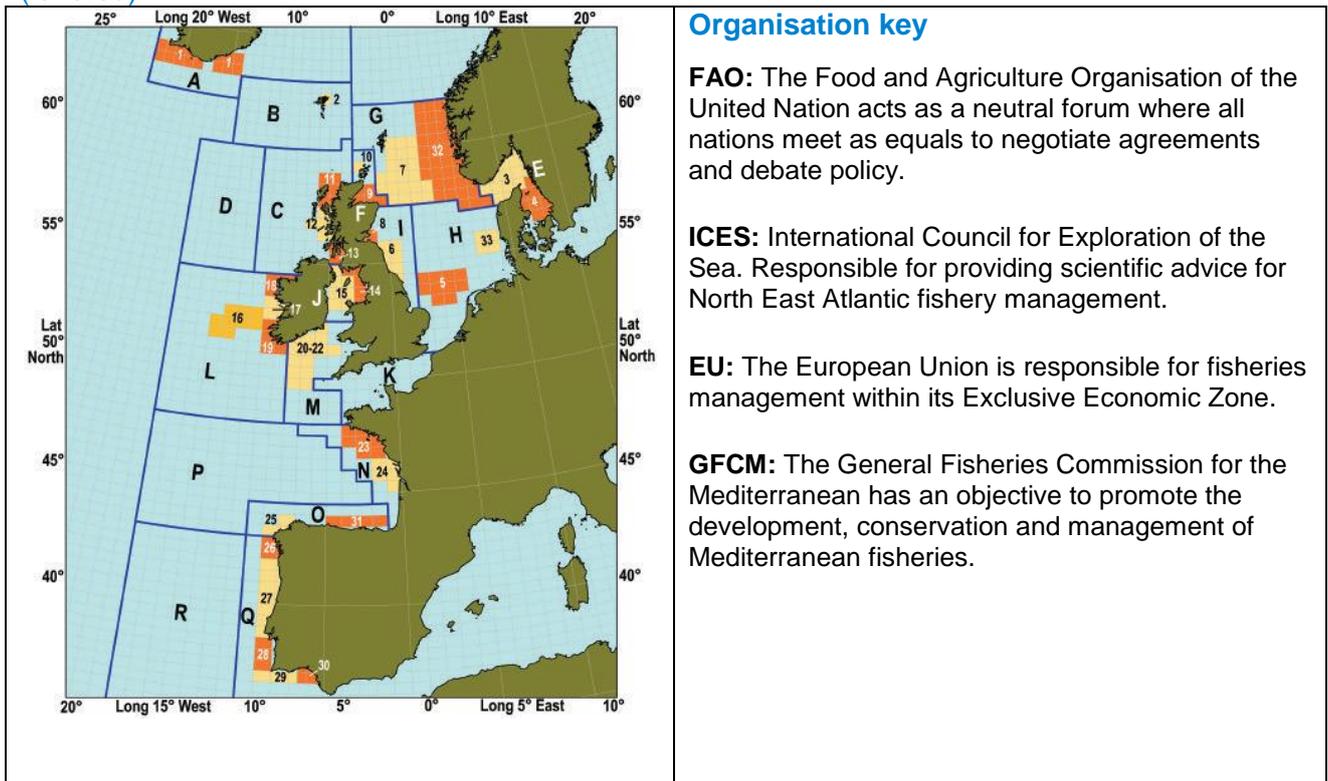
Management Stock areas and Functional Units (FU); see Fig 3	Agreed TAC 2011 (t) (5)	Advisory TAC 2011 (t)	Scientific advice and management (June 2011 ICES advice)
<b>NORTH EAST ATLANTIC NEPHROPS STOCKS (<i>Nephrops norvegicus</i>) <a href="http://www.ices.dk">www.ices.dk</a></b>			
Iceland (FU1)	2,100	2000	Stock biomass has increased in recent years. Recruitment is expected to remain relatively good (6).
North Sea ICES IV (Management areas G,H,I)	23,454	23,020 <sup>1</sup>	The TAC covers all of the North Sea Functional Units (FUs). However, the FUs are assessed separately as described below
Fladen Ground (FU7)		<13,300 (2011) <14,100 (2012)	2010 UWTV survey estimates indicate that the stock is at a high level in relation to historical time series. Harvest ratio estimates indicate that the stock is exploited at below MSY. Advice given corresponds to increasing yield to reach MSY.
Moray Firth (FU9)		1,100 (2011)	2010 UWTV survey for FU9 shows population is stable, but at a lower level than from 2003-2005. Harvest ratio estimates indicate that the stock is harvested below MSY. Advice given corresponds to increasing yield to MSY. There is very little information available for FU10; advice is to reduce catches.
Noup (FU10)		1,100 (2012)	
Farne Deeps (FU6)		1,900 (2011) 1,400 (2012)	2010 UWTV survey indicates that biomass is just above $B_{MSY-trigger}$ . There is a risk of overexploitation. This ground is easily exploited during times of high fuel cost and the overall TAC for Area IV is not limiting. Harvest ratio estimates indicate that the stock is harvested at MSY and catch recommendation corresponds to that level of harvest.
Firth of Forth (FU8)		2,000 (2011) 1,700 (2012)	UWTV survey indicates population has been at a relatively high level since 2003. Harvest ratio is considered to be above MSY and the advice is based on reducing the harvest ratio to MSY by 2015
Botney Gut – Silver Pit (FU5) Off Horn Reef (FU33)		2180 (2011) 1759 (2012)	State of the stock is unknown. There are no strong indications of changes in recruitment or discarding levels. ICES recommends reduced catches under MSY framework.
Norwegian Deeps (FU32)		640 (2011) <800 (2012)	Catch per effort stable over the last 16 years, suggest that current levels of exploitation are sustainable. ICES recommends reducing catches under MSY framework
Skagerrak (FU3) Kattegat (incl Baltic) (FU4) Management area E	8,330	6,000	2010 UWTV survey (1 <sup>st</sup> of the series) indicates MSY would be obtained at a catch of 6,000 t pa in 2011 and 2012.

<sup>1</sup> Includes additional 1,900 t for other areas outside the functional units

<b>Table 2 continued</b>			
<b>Management areas and Functional Units (FU)</b>	<b>Agreed TAC 2010 (t) (5)</b>	<b>Advisory TAC 2011 (t)</b>	<b>Scientific advice and management (June 2011 ICES advice)</b>
<b>NORTH EAST ATLANTIC NEPHROPS STOCKS (<i>Nephrops norvegicus</i>) <a href="http://www.ices.dk">www.ices.dk</a></b>			
ICES Div VIa Management area C	13,681	11,970	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 are below
North Minch (FU11)		3,100 (2011) 3,200 (2012)	The stock has been above $B_{MSY-trigger}$ for 10 years. The harvest ratio estimate indicates the stock is harvested at below MSY. The 2012 recommendation corresponds to an increase to MSY.
South Minch (FU12)		4,000 (2011) 5,500 (2012)	Biomass of the stock has been rising from close to $B_{MSY-trigger}$ in 2007. The harvest ratio indicated that the stock is fished at below MSY. Recommendation for 2012 corresponds to an increase to MSY
Clyde (FU13) And sound of Jura		4,100 (2011) <4,200 (2012) Jura <900	Stock above $B_{MSY-trigger}$ since 1995. The stock is exploited above MSY. The recommended catch for 2012 corresponds to reducing the harvest ratio to MSY by 2015. For sound of Jura recommendation corresponds to MSY.
ICES VII Mgmt Area J,L,M	21,759	19,530	The TAC covers all of the ICES VII FUs. However, the FUs are assessed separately as described below
Irish Sea east (FU14)		680 (2011) 960 (2012)	Three UWTV (2008,2009,2010) surveys indicate a stable stock. However, it is too early to be able to designate a level for $B_{MSY-trigger}$ . The advice given is based on MSY.
Irish Sea west (FU15)		<9,500 (2011) <9,800 (2012)	The stock has sustained catches of around 9,000 t pa for more than 35 years. Biological knowledge of the stock is good. The harvest ratio indicated that the stock is fished at below MSY. Current advice is given in the basis of an increase to MSY.
Porcupine Bank (FU16)		Lowest catch (2011) No increase (2012)	Fishing effort, landings and catch data indicate overexploitation. Good recruitment in 2009 has led to an increased biomass for the first time in years. A closed season for over 75% of the area was introduced in 2010 from 1 <sup>st</sup> May—31 <sup>st</sup> July, to avoid exploitation of emerging females.
Aran Grounds (FU17)		<950 (2011) <1100 (2012)	Abundance of the Aran Grounds (FU17) stock has fluctuated widely since 2002, and it has not been possible to define $B_{MSY-trigger}$ . The stock is currently exploited at just below MSY, which is the basis for the advice.
Ireland north west (FU18)		No increase	There is no information on the Nephrops stocks in this area available to ICES. On this basis ICES advise no increase in catches.
Ireland south west and south east (FU19)		<800 (2011)	There is insufficient information to make an assessment. ICES advice for 2012 on a precautionary basis is to reduce catches
Irish and Celtic Seas-South of 53° North (FU20-22)		<5,300 (2011) 2,300 (2012)	UWTV surveys of FU 22 indicate a stable stock, which is exploited close to MSY. The catch recommendation of 2,300 t is for FU 22 is based on MSY. It is recommended that there should be no catch increase in FU 20-21.

Functional Units (FU)	Agreed TAC 2010 (t) (5)	Advisory TAC 2011 (t)	Scientific advice and management (June 2011 ICES advice)
Biscay North (FU23) & South (FU24)	3,899	3,400 (2011) 3,400 (2012)	Status uncertain but appears stable. Selective devices have been implemented (Figure 5) to counter discarding.
North Galicia (FU25) Cantabrian Sea (FU31)	91	Zero (2011-12)	Both stocks have suffered severe recruitment failure and population decline. A recovery plan was put in place in January 2006 (8). Catches at 34 t in 2010 were very much lower than the TAC of 101 t.
West Galicia FU26 Portugal N FU27 South West FU28 South FU29 Gulf of Cadiz FU30	303	FU26/27 Zero FU28/29 <200 FU30= 200 (2011-12)	The status of FU26 and 27 is severely depleted and the management of these stocks is included in the recovery plan (8). FU28 and 29 are in a better state and should be managed separately. Stock in FU30 appears to be relatively stable. The fishery has been redirected onto other crustacean species as a result of effort controls and economic factors, these fisheries have not achieved their agreed TACs in recent years.
<b>MEDITERRANEAN STOCKS GFCM</b>			
Adriatic, western and central Mediterranean	5,307 (FAO 2009)		A coordinated approach to assessment of <i>Nephrops</i> in the Mediterranean using UWTM methods is being initiated.

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



**Organisation key**

**FAO:** The Food and Agriculture Organisation of the United Nations 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. Creels result in high value catches, whereas trawl fisheries generally catch larger quantities of *Nephrops* at a price suitable for processing into scampi and other products.

The main management issues for *Nephrops* are:

### 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 parent stock. Juvenile *Nephrops* also remain in their burrows most of the time.

### Management Units

The management areas, within which TACs are allocated, do not coincide with Functional Units in which the stocks are assessed. ICES considers this could lead to uneven exploitation and localised depletion; the overall TACs do not limit catches in the specific Functional Units.

### Assessments

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

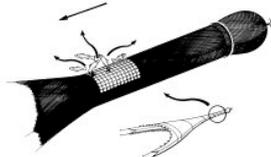
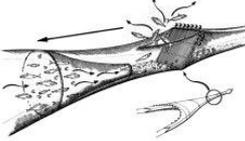
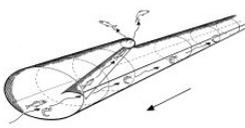
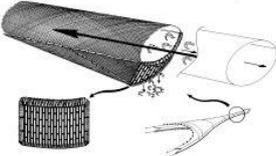
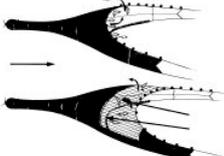
Discards of cod, hake, haddock, whiting and some flatfish species are

significant in most *Nephrops* trawl fisheries. This has led to the development of a number of devices designed to improve *Nephrops* trawl selectivity. See Figures 4-8 and references 9 & 10.

### 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 (11). 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 (12). However, productive *Nephrops* fisheries remain in many heavily fished areas.

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

		
<p><b>Figure 4</b> Square mesh panel. Statutory measure for release of haddock and whiting in EU <i>Nephrops</i> trawls; fish escape by swimming upwards through the panel.</p>	<p><b>Figure 5</b> Swedish grid. Fish pass through the upper window of the trawl. <i>Nephrops</i> pass through the grid into the cod-end.</p>	<p><b>Figure 6</b> Inclined separator panel, as used in Irish sea fisheries, to separate cod, haddock and whiting from <i>Nephrops</i>.</p>
	<p><b>Figure 8</b> Coverless trawl. This is a non-statutory measure in which the trawl (above) is designed to avoid capture of haddock</p>	
<p><b>Figure 7</b> Flexible grid systems, as used in French fisheries, for improving <i>Nephrops</i> size selectivity (13).</p>	<p>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).</p>	

**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/>

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