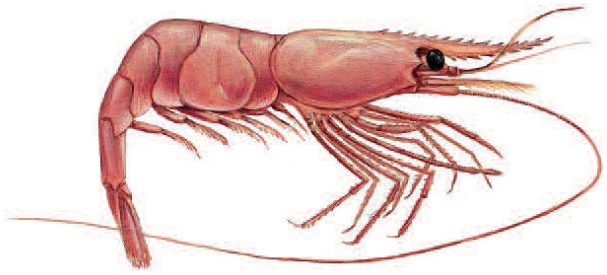
Responsible Sourcing Guide: cold water prawns

Version 5 – March 2012



Pandalus borealis IMAGE © Scandinavian Fishing Year Book

Commercially fished cold water prawns and shrimps are made up of more than eight species (Table 1) found in the waters of the North and South Atlantic, and North Pacific. The predominant method used to capture these species is by trawl and the purpose of this guide is to outline the status of the main trawl caught stocks and measures being taken to manage the fisheries on these species.

The world catch has grown steadily from 200,000 t per annum in the early 1980s to around 450,000 t pa today (1). The principal species is *Pandalus borealis* representing 70% of world landings. Cold water trawl caught species, supply only about 15% of the world market for shrimps and prawns. The remaining 85% is made up of the larger-sized tropical prawns, many of which are farmed (2). Whether the species is called prawn or shrimp depends on size, with larger animals often called prawns and smaller animals described as shrimp. The Food Standards Agency can provide further information on commercial species designations (3).

The main countries catching these species are Canada, Greenland, Norway, Iceland, USA and the European Union. Most of the catches are taken in coastal economic zones and managed by the coastal state.

BUYERS' TOP TIPS

Know your source of supply and stock status

For management purposes, prawns and shrimps are divided into self-sustaining stocks, which inhabit designated geographical areas.

By-catch reduction

Because of the small mesh size used in prawn trawls, there is a risk of a bycatch of small fish of other resource species, such as cod. In many fisheries this can be controlled using technical measures. Ask about the method used in suppliers' fisheries.

Buying policy

For the majority of trawled cold water prawn stocks, the assessments indicate that harvesting is on a sustainable basis. Although some stocks at risk of being outside safe biological limits, legal fisheries remain. In these situations fisheries managers have judged that the fishery should remain open with reduced catches.

Seafish Responsible Sourcing Service

This is one of a series of Responsible Sourcing Guides which can be found on the Seafish website.

For further guides and information see:

http://tinyurl.com/seafishrsg

Table 1: Common and scientific names of main cold water prawn and shrimp species

Common name	Scientific name
Northern shrimp or prawn	*Pandalus borealis*
Common or Brown shrimp	*Crangon crangon*
Pink (smooth or ocean) shrimp	*Pandulus jordani*
Flexed or Humpy shrimp	*Pandalus goniurus*
Sidestripe shrimp	*Pandalopsis dispar*
Dock shrimp	*Pandalus danae*
Humpback or Coonstripe shrimp	*Pandalus hypsinotus*
Pink or Aesop shrimp	*Pandalus montagui*

Status of coldwater prawn stocks March 2012

Prawn fisheries

Prawns are found at depths ranging from the low water mark to 1330m, with the majority harvested at 100m to 700m depth. Bottom trawls are the most common fishing gear.

Biology

The maximum size of *Pandalus borealis* is variable, depending on water temperature. They can live to eight years or more and can reach 36mm carapace length. However, the common harvesting size is 24-30mm carapace length.

After a two to three month free swimming phase, prawns start their life as sexually immature juveniles, developing into males. As the males grow old they undergo a sex change and become females. Since females are older and larger than males, care must be taken not to catch all or most of the females and thus overexploit the fishery. Most species spawn once or twice as females. After spawning they are vulnerable and unlikely to survive beyond their second spawning.

Assessments

Surveys and commercial catch rates and effort are used to assess changes in biomass. Research trawl surveys report similar recruitment over a fairly large areas, thus widespread environmental conditions are important in recruitment of young animals. The status of predator populations such as cod, is an important factor in the assessment and is increasingly included in the modelling of sustainable catch levels.

Maximum Sustainable Yield and Precautionary Approach

Maximum Sustainable Yield (MSY) relates to optimising exploitation to obtain the best long term yields. At high biomasses the stock is likely to grow slowly, as the biomass decreases the growth and hence yield increases the maximum is at MSY. If the quantity of female prawns removed from the stock is too high the stock cannot reproduce enough to be able to sustain a fishery; it is described as being outside safe biological limits, shown in red on Figure 1.

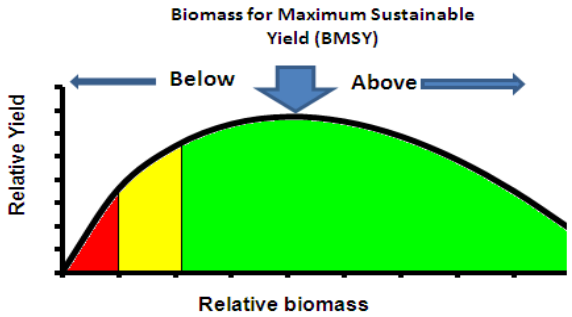


Figure 1: Relationship between prawn stock biomass and MSY. Green indicates inside safe biological limits, yellow at risk and red outside safe biological limits and relates Stocks are colour coded according to status on Table 2 and the map (Figure 4)

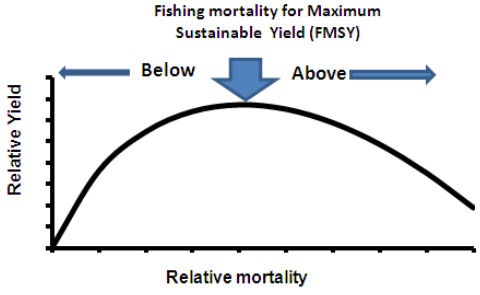


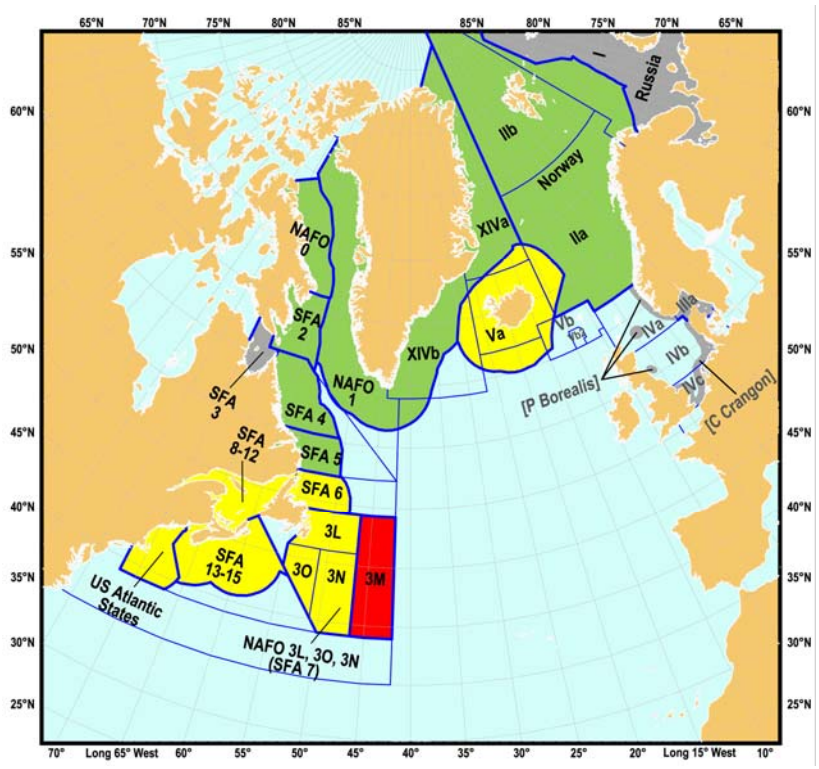
Figure 3 Relationship between mortality and MSY; if mortality due to fishing and predation exceeds MSY, then TACs should be reduced to ensure maximum yields. If the mortality is below than which would enable MSY then catches can be increased. Fishing mortality in relation to safe biological limits is only defined for a limited number of stocks so stocks are not colour coded in relation to mortality on Table 2 and the map Figure 4

Table 2: Management Stock	**Catch (tonnes) Year as indicated (1)**	**Advisory TAC (tonnes)**	**Scientific advice and management**
NORTH ATLANTIC PRAWN STOCKS (*Pandalus borealis* and other *Pandalus sp*)			
Inside safe biological limits			
Barents Sea: ICES I & II	23,000 (2011)	60,000 (2012)	**Nov 2011.** This stock is in good condition inside safe biological limits and fished at below Maximum Sustainable Yield. The recommended TAC has a less than 1% risk of fishing mortality exceeding maximum sustainable yield or causing detrimental effects on the biomass. Recruitment indices declined from 2004 to 2008, but has since been higher (4)
East Greenland ICES Div XIVb and Va	1,084 (2011)	12,400 (2012)	**Oct 2011.** Since 2008, annual assessments of the stock biomass has taken place. Stock densities were highest in the region north of 65^{0}N. The biomass of shrimp in 2011 is estimated to be at a relatively high level and to have been there since 1998. The catch per unit effort was stable at a relatively high level during the period 2000 - 2009; in 2010 and 2011 it is back to a level seen at the beginning of 2000. The overall catch has decreased which may be related to economic viability (4).
East Canada and West Greenland – international waters NAFO 0 and 1	128,000 (2011)	90,000 (2012)	**Oct 2011** Catch per unit effort data has generally been used to give an index of the biomass densities available to the fishery, supported by bottom trawl surveys since 1988. The record high biomass in 2003 was followed by decline to 2011. Although the biomass is above BMSY (Figure 1), the rate of mortality caused by fishing and predation has been above that which would yield MSY since 2005 (4); see Figure 2. Cod predation is considered to be an important factor
Canadian Atlantic EEZ; Shrimp Fishery Areas (SFAs) 0,2 (*P.borealis* only in SFA 2), 4, 5, 8-12	Total Atlantic Canada EEZ= 164,218 (2010)	Most recent advised TAC= 0,2,4,5, 8-12 92,735	**Feb 2012** There are 15 shrimp fishery areas in the Canadian Atlantic ranging from SFA 0 in the Arctic to SFA 15 south of Nova Scotia, each with its own TAC. The TACs for two of these fishing areas (SFAs 1 and 7) are agreed jointly with NAFO (Div 0a (see above) and Div 3L (see bellow)) based on shared research SFA0 (west of NAFO 0a) and SFAs 2-15 are agreed unilaterally. The basis for the TACs is catch per unit effort and spawning stock biomass assessment. Rises of sea temperature have a yet unknown effect. Overall the fisheries in these areas are inside precautionary limits. Some of the fisheries have MSC certification (16)
At risk of being outside safe biological limits			
NAFO 3L, 3N, 3O SFA 7 for Canadian	11,000 (2011)	12,000 (2012)	**Oct 2011**. Catch effort and biomass survey data are available. Fishing has been restricted to Div 3L. The stock has declined since 2007 and the female biomass at the end of 2011 is predicted to be close to the minimum limit. The decreased levels of biomass call for caution in setting future TACs (4).

Table 2: Management Stock	**Catch (tonnes) Year as indicated (1)**	**Advisory TAC (tonnes)**	**Scientific advice and management**
Canadian Atlantic EEZ SFA 2 (*Pandalus montagui* only in 2) 3, 6 and 13-15	See above for total Atlantic Canada EEZ	Total Most recent advised TAC 2,3,6 and 13-15 61,687	**June 2011 SFA 2** *Pandalus montagui* only; distributional shift likely because of an increase in water temperature. Spawning stock biomass declining and inside precautionary zone. **Sept 2011 SFA 6** Female spawning stock biomass assessed declining and inside the precautionary zone **Feb 2012 SFA 13-15** Biomass downturn, decrease in shrimp size, unfavourable ecosystem indicators and a shift in fishing effort indicate a requirement for precaution to prevent the stock being at risk.
US Atlantic States EEZ	5,944 (2011)	2,211 (2012)	**Oct 2011**. Early Season closures occurred in 2010 and 2011 because landings were greater than anticipated. Untimely reporting resulted in overharvesting of TAC by 28% and 48% respectively in these two years. Currently the stock is overfished with fishing mortality estimated at above the target, and biomass is estimated at only 72% of the target. Future management allows options to slow catch rate throughout the season (7).
Iceland EEZ	7,741 (Sept 2011-August 2012)	7,850 (Sept 2011/August 2012)	**Aug 2011** Scientific recommendations and TACs are based on the assessment of different stocks. Most of the inshore stocks have collapsed in recent years due to predation by cod. As a result the inshore fishery has been closed with minor exceptions. The offshore stocks have also declined considerably since 1997 due to increased cod predation (8).
Outside safe biological limits			
NAFO 3M	0 (2011)	0 (2012)	**Oct 2011.** Catch effort and survey data are available. The 2011 survey biomass index indicates that the stock is below minimum limit. Recommends that fishing for 2013 be set as close to zero as possible. It is noted that factors other than fishery may be involved in the current decline of the stock (4)
Reference points not defined			
Barents Sea: Russian Fed EEZ	675 (2010)	na	Catch is principally Humpy or Coonstripe shrimp. Status of stocks are unknown
S. Norway and Skagerrak ICES IIIa and IVa (west)	3,058 (2010)	Less than 8,300 (2012)	**Nov 2011.** Survey biomass indices have declined since 2007. Recruitment indices have also declined since 2006, although 2011 saw an increase, but numerically still low. Natural mortality due to predators is probably substantially higher than fishing mortality. The main regulatory measure is a TAC, which is not fully utilised by all countries participating in the fishery (9).
Fladen Ground Farne Deeps ICES IVa	0 (since 2006)	0 (2012)	**Nov 2011.** The available information is inadequate to evaluate stock trends. Management advice is that no catch should take place unless there is evidence that this will be sustainable (9).

Table 2: Management Stock	**Catch (tonnes) Year as indicated (1)**	**Advisory TAC (tonnes)**	**Scientific advice and management**
Canadian EEZ SFA 3		4,700	Limited data means that prospects are uncertain
Brown shrimp : (*Crangon crangon*) N. Sea ICES IVb, IVc	36,000 (2010)	na	**May 2011.** No TAC is set ,but the fishery is subject to national control within territorial waters. An ICES working group meets annually (10).
NORTH WEST PACIFIC PRAWN STOCKS (*Pandalus borealis* and other species)			
Russian Federation EEZ	9,740 (2010)	na	Stock status not known.
NORTH EAST PACIFIC PRAWN STOCKS (*P. jordani*, *P. hypersinotus*, *Pandalopsis dispar*)			
Canadian Pacific EEZ	640 (2009/10)	3,674 (2010/11)	**March 2012**.Catch ceilings are defined for 15 fishing zones using reference points linked to indices of stock biomass based on fishery trawl surveys. Harvesting rates are defined according to whether the biomass is in the critical, cautious or healthy levels. Overall the recent shrimp catches have been well below TACs set, mainly due to poor market conditions (12)
US Pacific EEZ *Pandalus jordani*	20,318 (2010)	No TAC set	The fishery is taken off the coast of California, Oregon and Washington State. Management is passive, based on a fixed season (April to October), Regulations are based on net mesh size, average size of individuals caught, and restrictions on by-catch. (11) The Oregon fishery is MSC certified (16)
At risk of being outside safe biological limits			
Bering Sea, Aleutian Islands, Gulf of Alaska	880 (av 2000-2005)	No TAC set	**Dec 2011.** The populations of shrimp declined due to climatic changes in the early 1980s. Changes in populations continue to occur due to changes in predation. The fishery is constrained by number of licences and catch capping (13).

Figure 4: Map of North Atlantic prawn stock locations (colour keyed to table)



Organisation key

ICES: International Council for Exploration of the Sea; the international body responsible for stock assessment in the North East Atlantic. It advises international fisheries management organisations such as the Joint Russian Norwegian Commission on Fishing (JRNC), and the European Union (EU) where appropriate.

NAFO: Northwest Atlantic Fisheries Organisation, the intergovernmental organisation responsible for science and management in the North West Atlantic International Waters.

Key;

	Inside safe biological limits		At risk of being outside safe biological limits		Outside safe biological limits

Management and conservation measures

An important environmental effect of trawling for cold water prawns and shrimp is the potential for by-catch of undersized fish of other species. Fisheries' managers can approach this problem by controlling the overall catch of prawns to reduce the total by-catch of fish, or by closing areas where there are known to be high by-catches of fish. However, technical modification of the gear is an approach taken by nearly all prawn fisheries, including the sorting grid or sieve (Figure 4). These devices expel young fish before they enter the cod end, allowing just the prawns to be caught.

Ecosystem effects

Trawling inevitably disturbs the seabed, which has some effect on the ecosystem. However, the most commonly caught species (*Pandalus borealis*) lives on or above muddy sand seabeds. The trawls used do not dig into the bottom and sandy seabeds are less affected by fishing gear than other habitats The seabed environment is dynamic, with natural disturbances masking the effects of trawling and obliterating the trawl tracks over time. Therefore, impacts of moderate amounts of cold water prawn trawling should be minor.

depleted a surplus of prawns occurred (14). Ultimately, as knowledge of the interactions between cod and prawns improves through better ecosystem modelling, it may be possible to achieve a balance between the two species. However, there remain many unknowns and stocks of cod and prawns may vary due to environmental factors, or the presence of other predators.

Nordmøre grid

Sieve

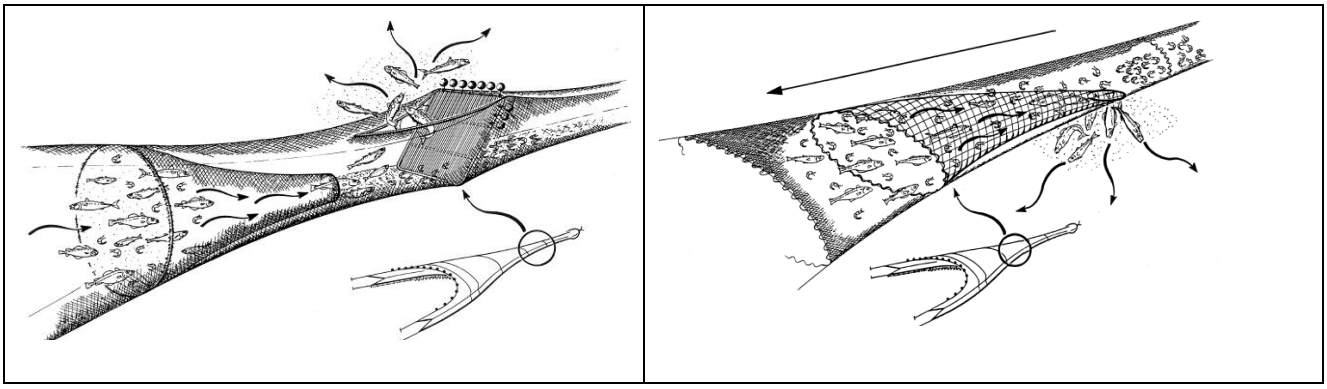


Figure 4: Nordmøre grid (15) and sieve (16) for preventing by-catch of fish in prawn trawls; arrows show direction of towing.

Product characteristics and seasonal cycles

Cold water prawns are generally already cooked and peeled at the point of purchase, making them one of the world's most convenient seafood to eat. Cooked peeled prawns and shrimp need particular care during processing, as they are produced ready to eat. Care has to be taken to control bacterial growth, as these species have a large surface area relative to weight. In ice, they only have a shelf life of four to five days.

Trade disputes relating to quality are rare in the trawled prawn industry. Most regulatory authorities use Hazard Analysis Critical Control Point (HACCP)(19) programmes to ensure satisfactory food safety. The implementation of HACCP has played an important role in this situation**.**

The International Cold Water Prawn Forum is held biennially. It is a useful source of information on all aspects of cold water prawns (19).

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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