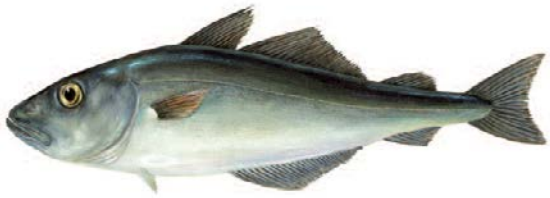
Responsible Sourcing Guide

Coley (saithe)

Version 6 - May 2013



Pollachius virens Image © Scandinavian Fishing Year Book

Coley or saithe (*Pollachius virens*) is commercially important in the UK. In 2011, 17,600 tonnes (t) were landed in UK ports with a first-sale value of approximately £18.5 million (1). UK consumption of coley is estimated at around 1,000 t with a value of £6.5 million (2). According to FAO, the total world catch of coley in 2011 was 345,597 t (3)

Coley stocks in the North East Atlantic range from the Barents Sea and Spitzbergen, around Iceland, and south to the Bay of Biscay. In the western Atlantic they are found from south west Greenland and the Hudson Strait to North Carolina. Juveniles are found mostly in coastal areas, whilst adults tend to aggregate in dense shoals in water depths of around 200m.

Coley marketed in the UK come mainly from four stocks in the North East Atlantic. Current ICES advice is that the stocks found in the North East Arctic /Barents Sea, in Icelandic and Faroese waters, and in the North Sea, Skagerrak and west of Scotland are within safe biological limits, though the Faroese stock is being exploited at a level above Maximum Sustainable Yield (MSY). Eight fisheries landing coley from these stocks - three from North-east Arctic/Barents Sea and five from the North Sea/Skagerrak/west of Scotland - are currently MSC certified (4)

The most recent assessments of Northwest Atlantic coley stocks (Nova Scotia, Gulf of Maine and George's Bank) show that these stocks are being fished at sustainable levels.

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

BUYERS' TOP TIPS

Know your species

Coley (*Pollachius virens*), also referred to as saithe or coalfish, belongs to the same family as cod and haddock. It is also known as pollock in Canada and the USA, but should not be confused with Alaska Pollock (*Theragra chalcogramma)*.

Know your source of supply

The Eastern Atlantic stocks and the Canadian stock component (4) are managed separately by limiting landings, whilst the Faroese stock and the USA stock component are managed by controls on the amount of time spent fishing. To understand sustainability issues concerned with your supply, you need to know the status of the stock corresponding to the area from which the fish has been caught.

Seafish Responsible Sourcing Service

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

This links to other sources of information and the Responsible Fishing Scheme (BSi: PAS 72: 2006), aimed at ensuring best quality and environmental practice onboard vessels.

For further guides and information see:

http://tinyurl.com/seafishrsg

Status of coley (saithe) stocks March 2012

Biology

There is limited knowledge about the biology and migrations of coley. Tagging studies in Iceland indicate there is little emigration from the Icelandic shelf, and migrations are largely restricted to inshore – offshore movements (5). However, coley migrate annually across the North Sea between the west of Scotland and Skagerrak, and the fishery for coley follows this migration. The extent of intermixing of different stocks is unknown.

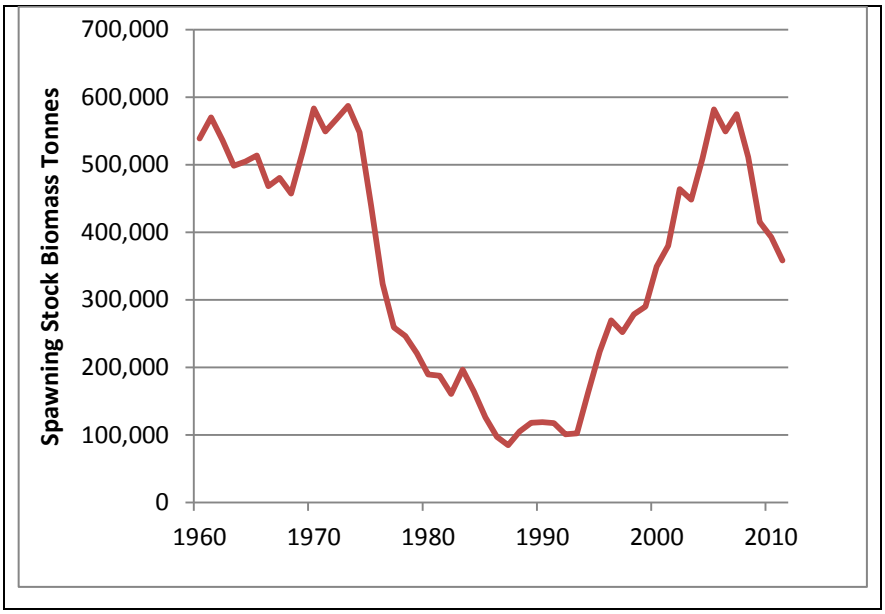
Coley reach sexual maturity at between four and six years, and spawning usually takes place in late winter and spring (8). By mid-summer, young fish can be found close inshore (in fjiords, bays and harbours), before spreading along the coast. Juvenile coley move from inshore waters into deeper offshore waters at around three years. In the North Sea and west of Scotland, coley grow some 15cm in each of the first three years, and about 10cm a year thereafter, to reach around 100cm by age 11.

Assessment

Coley stock assessments are undertaken using either analytical models or by estimating how much fish is caught per hour of fishing to indicate trends in stock abundance. Analytical models use information on the size or age structure of the catch, and fishery-independent information from research trawl surveys, to estimate population structure, yield and stock status in relation to biological reference points (see below). Both methods monitor how the abundance of a stock is changing in response to fishing pressure and other potential variables, such as environmental change.

The largest coley stock, in the North East Arctic, has shown cyclical changes in abundance, peaking in the early 1970s, declining to historically low levels in the early 1990s, before recovering and falling again in the last decade (Figure 1).

Figure 1. North East Arctic coley spawning stock biomass (weight of mature fish in the stock - SSB)



Maximum Sustainable Yield (MSY) and the Precautionary Approach (PA)

Current ICES advice on coley (saithe) stocks is given on the basis of MSY and the precautionary approach (7). MSY means fishing at a level that takes the maximum catch (yield) that can safely be removed from a fish stock, on a continuous basis, whilst maintaining its long-term productive capacity, and is achieved by keeping the Spawning Stock Biomass (SSB) above the biomass action point $\mathbf{MSY_{Btrigger}}$. The precautionary approach aims to limit fishing mortality (F) and catches to levels that avoid depleting the stock's reproductive capacity, keeping its SSB above its biomass reference level (defined as $\mathbf{B_{pa}}$).

These concepts are illustrated in the schematic (Fig. 2), which shows how catches from an unfished stock would increase in line with exploitation (or fishing mortality, F), up to a point where the total mortality on the stock causes so many fish to be caught at a relatively small size (and discarded or landed) that the potential production of the stock based on growth of individual fish is not realised ('growth overfishing'). The peak of this curve represents MSY and indicates where $\mathbf{F_{MSY}}$ lies.

However, providing sufficient fish survive to become adults and spawn, they may still have the reproductive capacity to replace themselves. Stock collapse can occur when fishing mortality reaches a level ($\mathbf{F_{lim}}$) where removals from a stock are so high, and its spawning capacity is so diminished, that fewer and fewer juveniles are produced. So, not only is the size of the stock being reduced by too high a level of exploitation, but there are fewer juvenile fish to replace those that are caught, and stock levels are likely to fall even lower ('recruit overfishing). The yellow area between the green (inside safe limits) and red (outside safe limits) zones in the schematic and stock trajectories (Figs 3 & 4, p 5) represents levels of F or SSB that management should seek to avoid to ensure that the stock has a high probability of remaining sustainable.

Scientific advice given under the twin MSY/PA strategy will aim to either achieve catches consistent with fishing levels that would result in $\mathbf{F_{MSY}}$, or reduce fishing mortality to return the stock to within safe biological limits (>$\mathbf{B_{pa}}$). For many North Sea fish stocks, including coley, parties exploiting the stock have management plans, and ICES also provides advice on catches compatible with such plans. Where there is insufficient information to evaluate the status of the stock, ICES advice is given on its approach for data-limited stocks (usually taking the precautionary approach by advising that catches should decrease by 20% in relation to the average landings of the last three years).

Figure 2: Schematic of ICES' MSY and PA reference points in relation to fishing mortality and yield

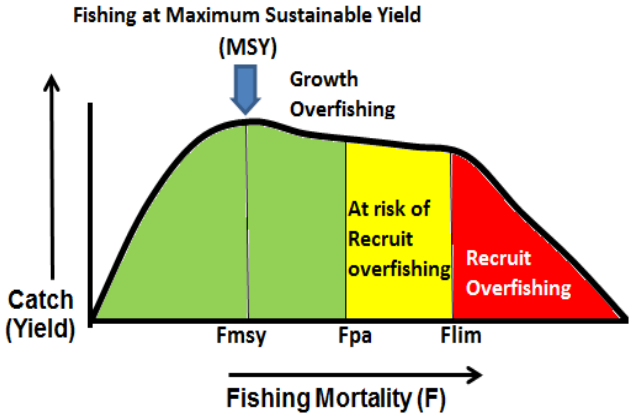
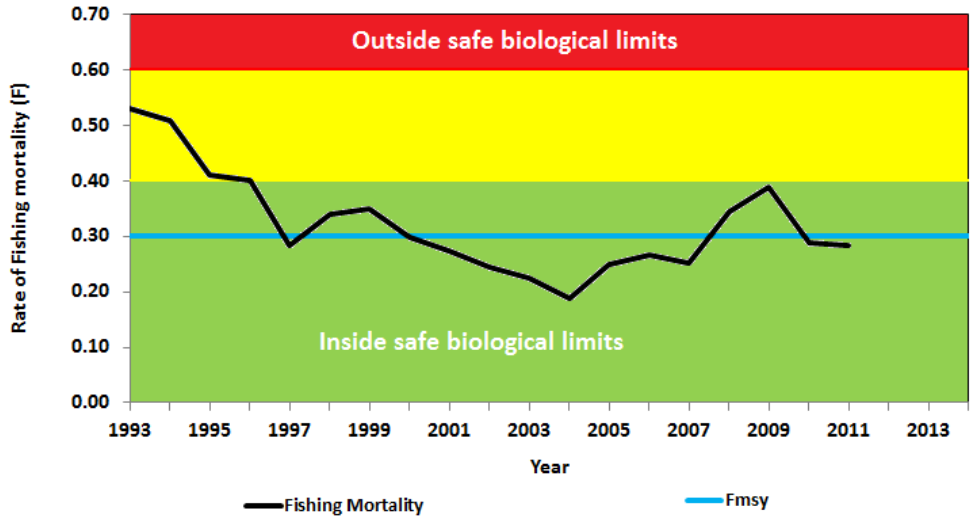


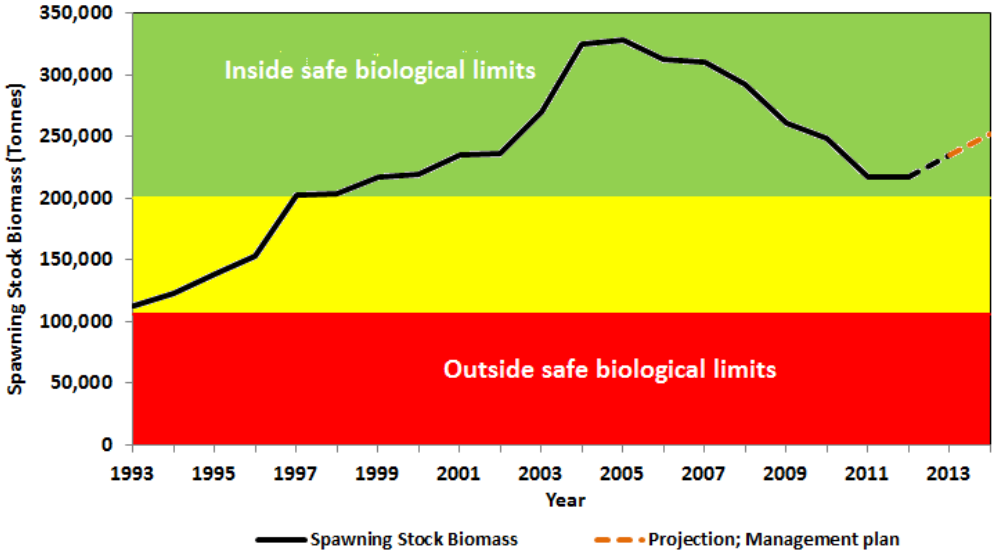
Table 1: Management Stock (colour keyed to Figure 5 map)	**Agreed TAC 2013(t) (8)**	**Advisory TAC 2013(t)**	**Scientificadvice and management (November 2012 ICES advice) (9)**
NORTHEAST ATLANTIC COLEY STOCKS (*Pollachius virens*) www.ices.dk			
Inside safe biological limits			
North east Arctic ICES Sub-areas I and II	140,000	164,000 Mg'ment plan	Spawning Stock Biomass (SSB) has been well above B_{pa} since 2000, though has decreased in recent years, when recruitment has been around average. Fishing mortality has been well below precautionary levels since 1996, but has increased after 2005 to F_{pa} in 2010 and 2011. ICES advice is based on the management plan implemented by the Norwegian authorities in 2007, which ICES judges to be consistent with the precautionary approach. MSY reference levels are not defined.
Iceland ICES Division Va	50,000 2012 Aug-2013	49,000	Recruitment in recent years has been around the long-term average and though SSB has been declining since 2006 it is still well above $MSY_{Btrigger}$. Fishing mortality has fluctuated around F_{MSY} since 1998. ICES advice is given on the basis of the MSY approach, for which a management plan is under development.
North Sea, Skagerrak, west of Scotland and Rockall ICES Sub-areas IV,VI & Division IIIa	100,683	100,684 (EU/ Norway agreement)	Recruitment has been below average since 2006 and SSB, which has been above $MSY_{Btrigger}$ since 1997, has declined since 2005. Fishing mortality has fluctuated around F_{MSY} since 1997. ICES considers that the EU–Norway management plan (updated in 2008) is consistent with the precautionary approach in the short term (< 5 years), and provides advice on this basis - see Figures 3 and 4 (p5)
At risk of being outside safe biological limits and below biomass action point MSYBtrigger			
ICES Division Vb -Faroe Islands	Effort limitation	29,100	Recruitment has been relatively high since the mid-1990s and SSB increased to well above $MSY_{Btrigger}$ by 2006, since when it has decreased substantially but remains above $MSY_{Btrigger}$. Fishing mortality has increased since 1998 and has recently decreased, but continues to be above F_{pa} and F_{MSY}. The Faroese management system sets a total number of fishing days allowed (linked to the haddock stock) which ICES considers to be inconsistent with both the PA and MSY approaches. The Faroese administration has developed a management plan based on MSY principles developed by ICES, though this has yet to be agreed politically. ICES advice, given on the basis of the MSY approach, is that fishing mortality in 2013 should be reduced to F_{MSY}.
NORTHWEST ATLANTIC COLEY stocks www.dfo-mpo.gc.ca, www.nefsc.noaa.gov			
Inside safe biological limits			
Canadian (NAFO Divisions 4VWX)	Landing ave 6,000		The most recent assessment (2009;ref. 10) indicated the stock is not being overfished and is inside its fishing mortality reference point
USA (NAFO Sub-areas 5 & 6)	Landings 7,400 in 2009		The most recent assessment (2010; ref. 11).shows the stock has rebuilt from an historic low in 1990, peaking in 2006, and SSB in 2010 was above $MSY_{Btrigger}$. The stock is being harvested at sustainable levels, probably well below F_{MSY}. New measures end overfishing and continue to rebuild overfished groundfish stocks.

Figure 3. Fishing mortality trajectory for coley in the North Sea, Skagerrak, West of Scotland and Rockall, ICES Sub-areas IV,VI & Div.IIIa, ICES 2012 assessment.



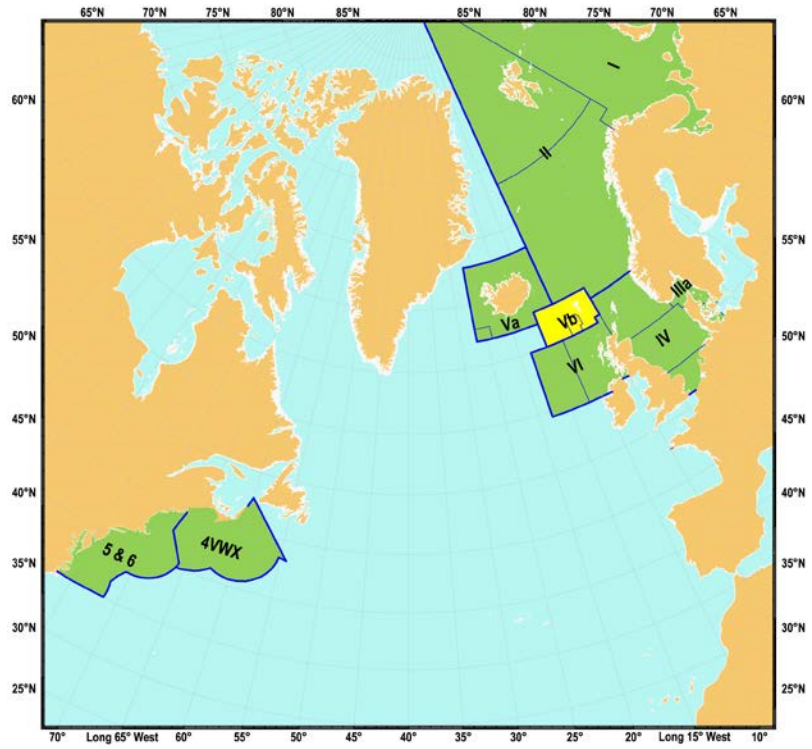
The stock has been exploited sustainably since 1997 a rate close to F_{MSY} -at 0.3 - (blue line).

Figure 4.Spawning Stock Biomass (SSB) trajectory for coley in the North Sea, Skagerrak, West of Scotland and Rockall, ICES 2012 assessment.



$MSY_{Btrigger}$ and B_{pa} are at 200,000 t and the safe biological limit (B_{lim}) is at 106,000 t. The stock has been inside safe biological limits since 1998. The projection (orange line) indicates that this trend will continue, based on the agreed TAC for 2013, which is compatible with the EU/Norway management plan.

Figure 5: Management areas for coley (colour keyed to Table 1)



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

Organisation key

ICES: The International Council for Exploration of the Sea is responsible for providing scientific advice for management of North East Atlantic fisheries.

EU: The European Union manages fisheries within the Exclusive Economic Zone.

DFO: Fisheries and Oceans Canada is the lead federal Government department responsible for developing and implementing policies and programmes to support Canada's economic, ecological and scientific interests in oceans and inland waters.

MRI; Iceland: Marine Research Institute assesses marine stocks around Iceland and advises the Icelandic government on fisheries management. It participates in ICES stock assessments.

MSC: The Marine Stewardship Council is an independent, non-profit organisation that promotes responsible fishing practices and certifies sustainable fisheries.

NAFO: The Scientific Council of the Northwest Atlantic Fisheries Organisation is responsible for providing scientific advice for fishery management. Decisions are either the responsibility of NAFO or the relevant Coastal State(s).

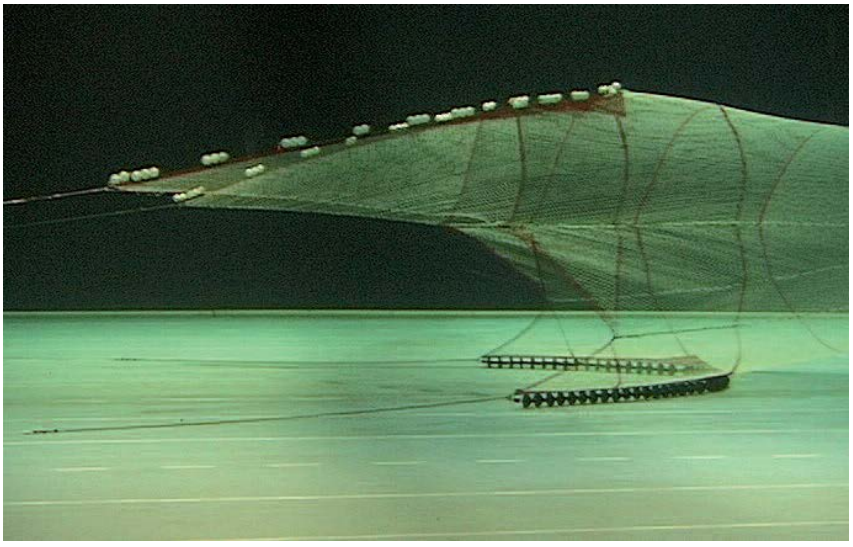
NEFMC: The New England Fishery Management Council manages fisheries resources within the 200 mile limit (coasts off Maine, New Hampshire, Rhode Island, Massachusetts and Connecticut.

Fisheries and fishing methods

Coley are targeted on the continental shelf primarily using demersal trawls, but they are also caught by demersal seines, long-lines and gill nets. Vessels using trawls are usually able to target coley by fishing in certain areas and depths, at specific times of the year. Since coley do not enter the fishery until after they migrate offshore at age three, and are usually found in dense shoals of fish of similar size, there is rarely a problem with catching fish below the minimum legal landing size. This varies between 35-45cm in the North East Atlantic and 40cm in Canada, depending on national legislation.

Research

Research on coley has tended to focus on biology and distribution (6), migration and stock identity (5, 12), as well as on the selectivity, escapement and survival of coley from trawls. This has been used to provide improved information for the assessment and management of coley stocks (13,14). Because it is an important predator, the diet of coley was investigated in two major ICES fish stomach sampling programmes, in 1981 and 1991, to provide information on multi-species fish interactions in the North Sea. The food and parasite fauna of coley were also documented relatively recently (15, 16).



Model of a high lift demersal trawl used for coley being tested in the Seafish flume tank.

Management and conservation measures

North Atlantic coley is an important resource for Iceland, Faroe Islands, Germany and Norway, where targeted fisheries have existed for many years. Coley fisheries are managed using a combination of TAC and fishing effort controls. This has included area closures, gear restrictions and minimum size limits.

The main issues for management of coley stocks are:

Improvements in information on catches

While the landing statistics reported for coley are thought to represent true landings, the actual catch and the amount of coley discarded at sea are not well known. Discarding undersized fish is relatively uncommon, but discarding due to a shortage of quota and low demand resulting in low prices does occur. Better estimates of the numbers of fish discarded would lead to improved estimates of stock size and exploitation rates.

Recruitment estimation

In order to predict future catches, fisheries scientists need to estimate how many young coley are likely to become available (recruit) to the fishery when they migrate offshore from coastal areas. There are no surveys that provide the means to predict future recruitment, so catch forecasts are based on an assumption of average levels of recruitment. A reliable index of future recruitment (for example inshore trawl survey juvenile catch rate) would allow scientists to give better advice on future fishing opportunities and sustainability. A Norwegian survey of young coley was initiated in 2006 to enable better estimates of the quantity of young fish entering the North Sea stock.

Environmental impacts

The environmental effects of the coley fishery are usually lower than of other trawl fisheries, though mechanical disturbance of the seabed may be caused by bottom trawls. The fisheries directed at coley have a relatively low by-catch of other species. However, coley aggregate in dense shoals and vessels targeting other species such as cod and haddock can find their catches dominated by coley, for which they may not have sufficient quota to land legally, hence discarding occurs.

Environmental effects from gill netting are likely to include incidental by-catch of non-target species. ‘Ghost fishing’ of lost or discarded gear may be an issue in areas of deep water, where ocean currents are weak and wave action is negligible (17). The physical effects on seabed habitats of gill nets and long-lines is thought to be small.

Ecological interactions

Coley feed on small pelagic fish species such as sandeel, sprat, herring, mackerel, horse mackerel and Norway pout. Changes in the abundance of coley may have an influence on the mortality rate of these species (18).

Product characteristics and seasonal cycles

Coley are usually presented for first sale gutted with either the head on or head off, as frozen blocks, or as fillets. The main exporters (Norway, Iceland and the Faroe Islands), export coley products as salted, whole, frozen blocks or frozen fillets. Coley spawn throughout the autumn, winter and spring. The seasonality of spawning in different sea areas is shown below.

	J	F	M	A	M	J	J	A	S	O	N	D
NorthEast Arctic												
Iceland												
Faroes												
North Sea												
North West Atlantic												
	Spawning					Peak spawning						

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:

• **SeafishResponsible Fishing Scheme.** Sets best practice standards for fishing vessels, based on British Standards Institution specifications (BSi: PAS 72:2006) (19).

• **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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For further guides see: http://tinyurl.com/seafishrsg

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