

Dicentrarchus labrax IMAGE © Scandanavian Fishing Year Book

The European sea bass is important both to commercial fisheries, where it provides a high value seasonal catch for many inshore fishermen, and to recreational sea anglers who regard it as their premier sporting quarry. In 2012, the total weight landed in the UK was estimated as 800 tonnes (t) with a first sale value of around £5.6 million (1). Sea bass has been a favourite on restaurant menus since the 1970s, and has been the subject of increasing cultivation to the extent that more than 120,000 tonnes (t) of sea bass were farmed in 2010 (2), compared to the total European wild catch of approximately 9,404 t that year (3)

There are two species of sea bass in European marine waters, *Dicentrarchus labrax*, the European sea bass, and *Dicentrarchus punctatus*, the spotted bass (4). The latter is found throughout the Mediterranean Sea and along the Atlantic coasts of the Iberian Peninsula, only occasionally found in UK waters. The European sea bass population also occupies this distribution range, but also extends from the Bay of Biscay into coastal waters of the British Isles and Ireland, and through the North Sea into south and west Norwegian

waters. Sea bass catches are not regulated by Total Allowable Catch (TAC). Recently, after a long period of increase there has been a decline in stock biomass resulting in a proposed 20% reduction in catches. How this will be achieved is currently been discussed.

The purpose of this guide is to outline the status of sea bass stocks, describe measures being taken to protect them and detail European aquaculture production.

BUYERS' TOP TIPS

Know your source of supply and stock status

For assessment purposes, sea bass populations have been divided into stock areas based on studies of their movements and migrations, and the fisheries that exploit them. Find out the stock area from which the fish have been caught.

An informed buying policy

Ocean warming has resulted in more favourable conditions for sea bass, particularly in the northern part of its range. However current evidence suggests that some sea bass stocks are currently being overfished. Further management measures are likely to be introduced in 2014 to improve the conservation of sea bass. The provision of good quality, moderately priced farmed sea bass may relieve pressure on wild stocks

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>

State of knowledge of sea bass stocks 2013

Biology

Adult sea bass usually occupy well defined feeding areas, often inshore, from which they migrate in autumn to offshore spawning areas that tend to be to the south and west (5).

Sea bass larvae drift from spawning grounds towards the shore for up to three months and, from June onwards; first-year sea bass in excess of 15 mm long are found in estuaries and shallow bays (6). Juvenile sea bass remain in these nursery areas for up to five years, depending on growth, leaving them when around 36cm in length, and often dispersing well outside the 'home' range of the parent spawning stock (7). After four to eight years or at approximate lengths of 31- 35 cm for males and 40-45 cm for females, sea bass attain maturity and adopt the migratory movements of the adult fish (8). Ocean warming in recent decades has led to the more northerly distribution of seabass around the UK.

The combination of slow growth, late maturity, spawning aggregation, and strong site fidelity increases the vulnerability of sea bass to overexploitation and localised depletion.

Assessment

In carrying out assessments fisheries scientists use the concept of a 'stock'. This is defined biologically as a self-contained population of one species that inhabits a particular area. However, sea bass display extensive movements within north-west European waters. As of June 2013 ICES now treats sea bass in the North Sea, English Channel, Celtic Sea and Irish Sea as one stock (see Figure 1).

Because there is no discernible relationship between adult biomass and reproductive success, which appears to be largely climate driven (9) it has not been possible to set reference points based on the level of parent stock, to assess when there is a risk of reproductive failure (9).

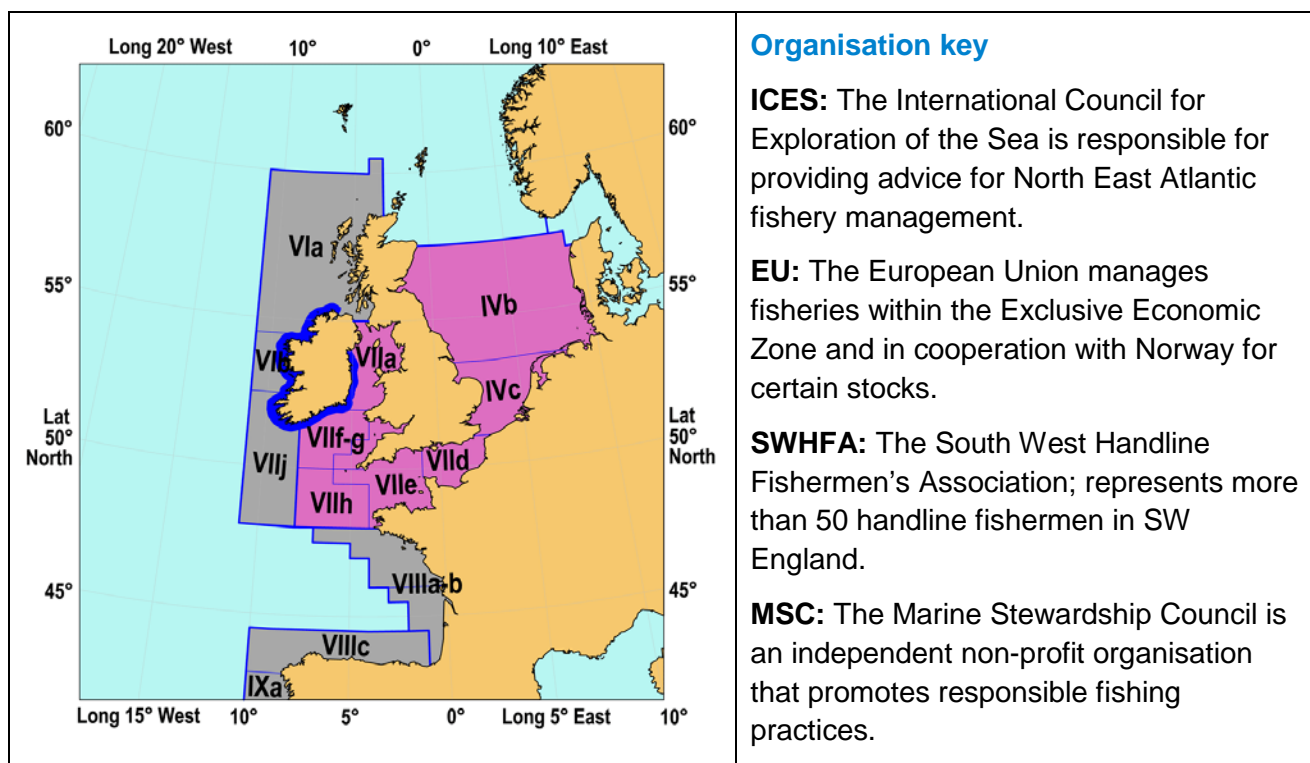
There is limited data on these stocks and up until 2012 ICES provided only qualitative advice regarding the future exploitation of such stocks. In 2012 ICES developed a framework for providing quantitative advice on data limited fisheries (10), and devised 6 categories for stock assessment based on the extent of data available for each stock. For the NE Atlantic, ICES has identified four sea bass stocks each with varying degrees of data (Table 1 Figure 1).

The assessment for ICES divisions IVbc, VIIa, and VIId-h (Table 1 and Figure 1) are based on estimates of relative stock biomass and fishing mortality. The other three stocks of European sea bass have information on catches only, this insufficient for ICES to make an assessment.

Recent ICES assessments suggest that spawning stock biomass is declining for UK sea bass stocks after a long period of increase. This is thought to be due to a combination of high fishing mortality and recent cold winters.

Table 1 Summary of ICES advice for sea bass in the NE Atlantic. Colours

Stock	Advised TAC	Scientific advice and management www.ices.dk
Reference points not defined: data limited assessment		
Irish Sea, Celtic Sea, English Channel, and southern North Sea (ICES Div IVbc, VIIa, and VIId-h)	Advisory TAC of 2707t in 2014	June 2013. Reference points not defined but adult biomass is estimated to have decreased by >20% between the periods 2008-2010 (3yr average) and 2011-2012 (2yr average). Fishing mortality considered to be above F_{MSY} . ICES advice is to reduce catches by 36% for 2014.
Insufficient information		
West of Scotland and Ireland (ICES Div VIa, VIIb and VIIj)	Advisory TAC of 18t in 2014	June 2013. ICES advise a precautionary reduction of catches because of missing or non-representative data.
Bay of Biscay (ICES Div VIIa,b)	Advisory TAC of 1890t in 2014	June 2013. ICES advise a precautionary reduction of catches because of missing or non-representative data.
Atlantic Iberian waters (ICES Div VIIIc and IXa)	Advisory TAC of 598t in 2014	June 2013. ICES advise a precautionary reduction of catches because of missing or non-representative data.

Figure 3 Map of stock areas. Stocks coloured according to Table 1.

Fishing and cultivation methods

Fishing methods

Commercial sea bass fisheries in north west Europe developed rapidly in the late 1970s and 1980s, partly because of the high price the species attracted (11). The main fisheries exploiting sea bass as a target species take place inshore, where small boats use a wide variety of fishing methods. Generally, sea bass are taken as part of mixed fisheries in fixed and drift nets, on long-lines, by trolling and in bottom trawls. They are fished in estuaries, along the open coastline, and around wrecks, rock outcrops, reefs and on offshore banks by commercial fishermen and rod-and-line anglers (12).

The largest targeted sea bass fishery takes place between November and April in the western English Channel and Bay of Biscay, where mainly French, but some Scottish and Danish mid-water pair trawlers target sea bass shoaling offshore prior to spawning. In recent years, sea bass have been taken as a by-catch by purse-seiners targeting pelagic species, mainly from September until March in the Bay of Biscay (Villa and b). Commercial exploitation of sea bass in the Republic of Ireland has been prohibited since 1990 (13-15).

Sea bass cultivation

Sea bass are cultivated on the Atlantic coast of France. Modern sea bass farming that guarantees regular supplies of high quality, size-selected fish at a stable price is primarily confined to the warmer waters of the Mediterranean, with some land based culture in Northern Europe. There are three main sea bass cultivation systems:

Extensive cultivation

Extensive cultivation utilises larvae and juvenile sea bass that move naturally into tidal lagoons and inlets from which their escape is prevented by screens or traps at sluice gates. The sea bass are fed on both wild and artificial food during the two to three year period before being harvested. This method has been practiced locally in France, Spain, Italy and other countries for many years.

Sea-cage culture

Intensive sea bass farming has increased rapidly since the early 1980's. The general practice today is to use natural and artificial photoperiod and temperature regimes to encourage spawning by captive broodstock, although some may be induced to spawn with hormones.

After five to nine days, the larvae are transferred to rearing tanks and fed on cultured microscopic live food before being weaned onto commercial pellets from 30 days onwards. From 5g plus, the young sea bass are transferred to sea cages where, at water temperatures of 12–25°C, they will take 16–24 months to reach the standard marketing size of 400g.

Land-based culture

Sea bass have also been cultivated intensively in heated water, initially in power station cooling water, but more recently in temperature controlled recirculation systems.

Modern seawater recirculation systems enable sea bass to be cultivated with minimal environmental impact on the marine ecosystem as discharges can be re-cycled and escapes minimised. These land-based systems produce 400g fish in 9–12 months from the juvenile, and can be located in areas close to markets where sea temperature may make cultivation otherwise uneconomic. All these systems are subject to regulation in Europe under relevant environmental and fish health legislation.

Management and conservation

Currently there are no TACs set for bass in European waters. European countries regulate their fisheries nationally:

In England and Wales

Research on sea bass in the UK in the mid-1980s identified too many small fish were being caught, reducing the potential yield from the fishery (16). The scientific recommendation was to increase the size and age at which sea bass were first exploited, and in 1990 a package of technical measures was implemented in England and Wales.

This included: a 36cm minimum landing size (MLS) also adopted in European waters (17); closure of 37 key sea bass nursery areas to boats fishing for sea bass (18); and a ban on stretched mesh sizes between 65 and 89mm (those most selective for 30–36cm bass) (19).

In France

For marketing reasons, France introduced a national regulation in 1996 to limit sea bass landings by pelagic trawlers fishing for sea bass in the English Channel between December and April, to 2 t/week/boat. Since 1998, this measure has been extended to all trawlers and currently limits each boat to landing 5

tonnes per week between 1 January and 30 April (also adopted by the UK in 2000).

In Ireland

In 1990, the Republic of Ireland introduced measures to close commercial fishing for sea bass to conserve dwindling stocks and promote recreational angling. The measures prohibit Irish-registered commercial fishing vessels having sea bass on board, or using nets in their capture. It is also an offence to sell sea bass (14); there is a MLS of 40cm; a daily bag limit of two sea bass; and a closed season for angling for sea bass between 15 May and 15 June (15).

Response to ICES advice

Without a TAC regime for bass, the EU cannot respond immediately with a reduction in catch. As a response to the advice France has suggested TACs and quotas based on previous track records. However, the UK is opposed to this approach, preferring restrictions on targeted offshore bass fishing between January and April in the key South West spawning areas and phasing out targeted pair trawling for bass. The UK also suggests setting up juvenile nursery areas in all relevant Member States.

Environmental impacts

The main environmental impacts by sea bass fisheries are mortality of other species taken incidentally as bycatch in fishing gear and 'ghost' fishing by lost enmeshing nets. The latter is unlikely to be a significant issue in most sea bass fisheries (20). Sea bird by-catch has been an issue in the past, but legislation to constrain netting activities at the most vulnerable times and places has largely ameliorated the problem (21). The introduction of measures to protect sea bass stocks coincided with (and to some extent complemented) similar measures to protect adult salmon and sea trout from inshore netting (Salmon Act 1986 (22)). There is concern is for common dolphin deaths in the winter offshore pair-trawl fishery (23). The introduction of pingers in this fishery has coincided with a reduction in dolphin bycatch rates by a factor of 10, but it is not clear whether this is due to pinger use or some other factor (SMRU pers com).

Contact:Bill Lart - Tel: 01472 252323 Email: w_lart@seafish.co.ukKaren Green - Email: k_green@seafish.co.uk**Product characteristics and seasonal cycles**

European sea bass and spotted bass are normally separated for marketing purposes. Though juvenile sea bass may have spots on their flanks, these are seldom present on fish above 20cm. The market size of farmed fish is not limited by MLS regulations, and smaller fish offered for sale are usually of farm origin. Enforcement of MLS regulations can be difficult in a small boat fishery where landings may be opportunistic and do not always pass through markets, though methods to distinguish wild and farmed sea bass have been developed (24). Sea bass are usually presented entire, un-gutted and on ice, though large catches taken by pair trawlers may be processed at sea. Sea bass quickly lose condition during the spawning season, when fat content may decline from over 10% to near zero (5).

The main known spawning areas for sea bass are in the central Bay of Biscay (January – March), in the English Channel and Celtic Sea (February – May) and in the southern North Sea (April – June). Spawning in other areas, such as the Irish Sea, could be inferred from the abundance of juvenile fish in surrounding estuaries. After spawning, at the end of April/early May, the spent fish move north and east to summer feeding grounds.

	J	F	M	A	M	J	J	A	S	O	N	D
Southern North Sea												
English Channel												
West of British Isles												
West Coast of France												
			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. Seafish has developed standards which cover these aspects from capture to retailer:

- **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 and Safe & Local Supplier Approval (SALSA) certification.** Designed to raise standards in the seafood processing and wholesaling sectors.

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