B2. Sustainable fisheries

a. Proportion of marine fish (quota) stocks of UK interest harvested sustainably

b. Proportion of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity

Type: Pressure (a) and state (b)

Indicator Description

Sustainable fisheries help to ensure marine ecosystems remain diverse and resilient, providing a long-term and viable fishing industry. The indicator comprises two measures assessed separately: a) the proportion of stocks fished at or below the level capable of producing Maximum Sustainable Yield (MSY); and b) the proportion of stocks with biomass above the level capable of producing MSY.

Summary

Changes have been made to the indicator since the previous publication; using quota-fish assessments for UK good environmental status (GES) developed to meet the needs of the Marine Strategy Framework Directive (MSFD). Data have been updated to 2015 for fishing pressure and to 2016 for spawning stock biomass.

The percentage of fish stocks (including *Nephrops*) fished at or below levels capable of producing maximum sustainable yield (F_{MSY}) has increased from 12% in 1990 to 53% in 2015. To maintain the reproductive capacity of stocks, each stock's spawning biomass (SSB) should be at or above the level capable of producing maximum sustainable yield (i.e. MSY $B_{trigger}$). The proportion of stocks subject to quota management and achieving this goal increased from 28% in 1990 to 56% in 2016. In the final year (2016) there was a slight (3%) decrease in the proportion of stocks with SSB > MSY $B_{trigger}$ due to data availability and consequently more stocks classified as "unknown". Overall a positive trend towards a greater proportion of stocks fished sustainably is evident in both long and short term. There is also a positive trend for fish within safe biological limits in the long term, and no change in the short term.

Figure B2a. Proportion of marine fish (quota) stocks of UK interest harvested sustainably, 1990 to 2015.

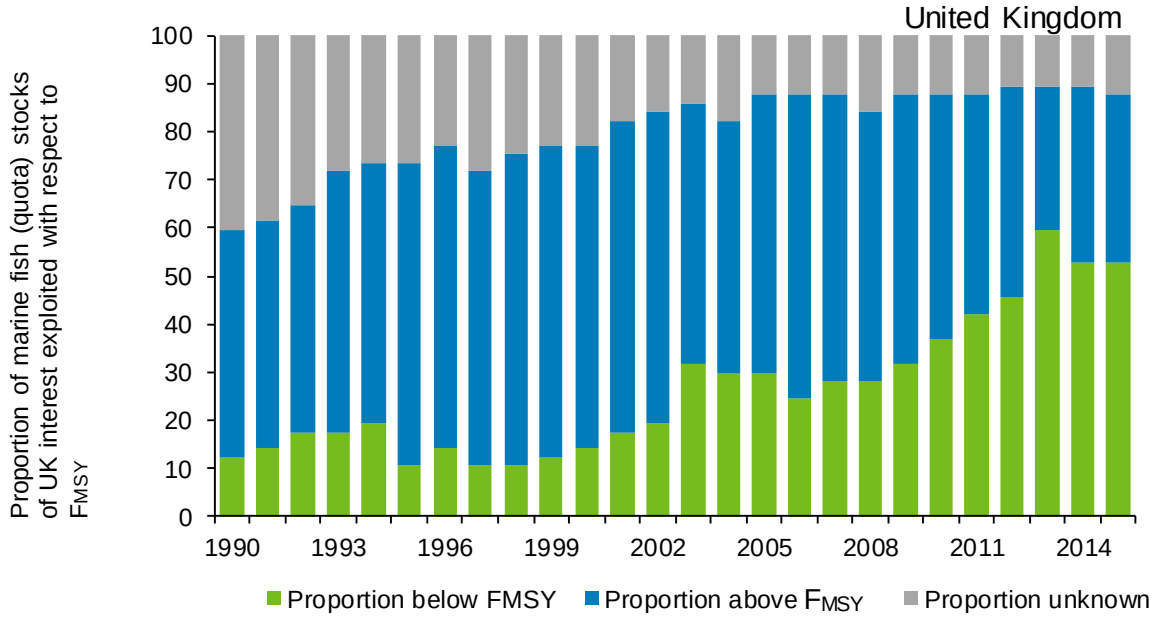
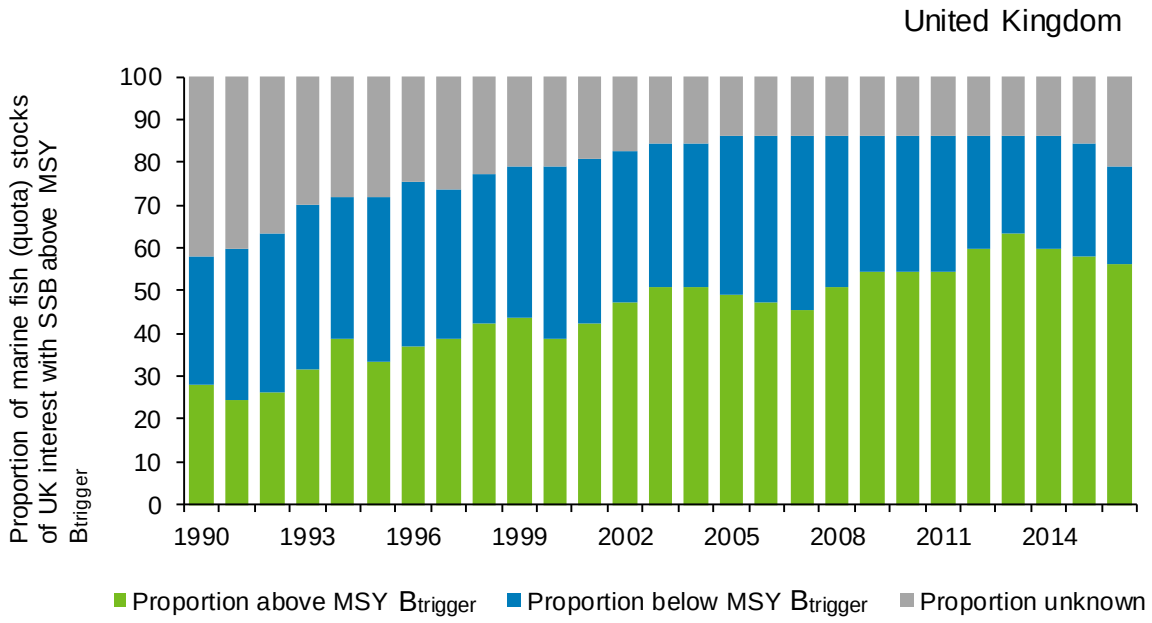


Figure B2b. Proportion of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity, 1990 to 2016.



Notes: Based on 57 stocks for which data are available, derived from stock assessment reports. For spawning stock biomass (SSB) the final year will typically show an increase in 'unknown' status due to the cycle by which updates are made to stock assessments.

Source: Centre for Environment, Fisheries and Aquaculture Science; International Council for the Exploration of the Sea.

Overall assessment of change in stocks harvested sustainably and at full reproductive capacity			
	Long term	**Short term**	**Latest year**
Proportion of fish stocks harvested sustainably	1990–2015	2010–2015	No change (2015)
Biomass of stocks at full reproductive capacity	1990–2016	2011–2016	Decreased (2016)

Indicator description

The indicator comprises of two measures: the percentage of fish stocks in seas around the UK that are harvested sustainably; and those at full reproductive capacity. It is based on a group of 20 species in 57 stocks for which there are reliable estimates of fishing mortality and spawning biomass, together with MSY reference points for fishing mortality and biomass that allow the sustainability of the stocks to be evaluated. The indicator stocks include a range of local and widely distributed species of major importance to the UK fishing industry.

The measures are assessed as follows:

1. an evaluation of the temporal trends in the exploitation level of stocks of UK interest with respect to the fishing mortality target F_{MSY}. The aim is to increase the proportion of stocks fished at or below F_{MSY} and reduce to zero the number of stocks of unknown status relative to F_{MSY}.

2. an evaluation of the temporal trends in the spawning stock biomass (SSB) of stocks of UK interest with respect to safe biological limits. The aim is to increase the proportion of stocks with SSB at or above MSY $B_{trigger}$ and reduce to zero the number of stocks that have unknown status relative to MSY reference points.

The assessments of change were made by applying a 3% rule of thumb to each measure (state and pressure) separately. The arithmetic mean of the first three years of the data series was compared with the last point to determine the assessment for the long-term trend, and an arithmetic mean of the year five years back in the time series and the year either side calculated to compare with the last point to assess the short-term trend.

Stocks that meet both the pressure and state thresholds (F_{MSY} and MSY $B_{trigger}$) are harvested sustainably and delivering the largest possible catches, on average that the stocks can provide under the prevailing environmental conditions. While pressure is directly manageable through implementation of management measures, the change in state is not wholly manageable. State changes are dependent on environmental conditions and predator-prey interactions and although conditions for recovery of stocks may be in place (i.e. through reductions in pressure) recovery time may still be extensive (many years).

Relevance

Fish are an integral component of marine biodiversity. They are an important element of the food chain for seabirds, seals and cetaceans and are a source of food and employment for people. Sustainable fisheries will help to ensure marine ecosystems remain diverse and resilient and provide a long-term and viable fishing industry.

In 2004, the Royal Commission on Environmental Pollution advised significant and urgent action to avoid collapse of fisheries or harm to the marine environment. The assessments indicate an increase in the last five years in the percentage of fish stocks being harvested sustainably. However, substantial further improvements in stock status would be needed to ensure that all UK fish stocks are fished sustainably and attain biomass levels that maintain full reproductive capacity.

The Marine and Coastal Access Act was introduced in 2009 to ensure clean, healthy, safe, productive and biologically diverse oceans and seas. As a result, better systems for delivering sustainable development of marine and coastal environment are being put in place.

Background

This UK indicator is based on a consistent set of 57 stocks since 1990. A ‘stock’ refers to a population of a species occurring in a defined sea area; a particular species may occur in multiple stocks in waters around the UK. The stocks represent a wide range of different stocks and fisheries including demersal roundfish (e.g. cod, haddock, saithe), flatfish (sole, plaice), pelagic fish (blue whiting and mackerel) and shellfish (*Nephrops*). Table B2i shows the species included. Many of these stocks are extremely valuable or have a high conservation profile. The list of stocks used within the indicator has been expanded, so previous publications of the indicator are not directly comparable. The indicator is intended to provide a relative trend over time. The indicator includes stocks with ‘unknown’ status if data are not adequate to allow estimation of historical biomass and fishing mortality, or for which ICES (International Council for the Exploration of the Sea) does not provide MSY reference points.

ICES classifies a stock’s status by comparing the quantity of mature fish (the spawning stock biomass) and the rate at which the stock is exploited (fishing mortality), in relation to agreed

reference levels. The stock trends and reference levels are obtained from fishery and survey data from each zone. The UK indicator shows the proportion of the 57 stocks of UK interest that are at full reproductive capacity and harvested sustainably in each year.

Each year ICES updates the assessment of each stock with another year of fishery and survey data, or may revise an assessment to include new time-series of data or adopt an improved method of analysis. This can result in substantial changes to the trends in spawning stock biomass and rate of exploitation, causing changes to the historical values in the UK indicator series. On the basis of new evidence, ICES may also provide advice in relation to reference points for stocks for which the assessments were previously considered unreliable, or stop providing such advice for stocks for which the assessments or reference points are no longer considered reliable.

Table B2i. Fish species and stocks included in this indicator

Species

Black-bellied anglerfish (*Lophius budegassa*)
Blue whiting (*Micromesistius poutasso*)
Cod (*Gadus morhua*)
Haddock (*Melanogrammus aeglefinus*)
Hake (*Merluccius merluccius*)
Herring (*Clupea harengus*)
Horse mackerel (*Trachurus trachurus*)
Ling (Molva molva)
Mackerel (*Scomber scombrus*)
Megrim (*Lepidorhombus whiffiagonis*)
Norway lobster (*Nephrops norvegicus*)
Plaice (*Pleuronectes platessa*)
Pollack (*Pollachius pollachius*)
Roundnose grenadier (*Coryphaenoides rupestris*)
Saithe (*Pollachius virens*)
Sole (*Solea solea*)
Sprat (*Sprattus sprattus*)
Spurdog (*Squalus acanthias*)
White anglerfish (*Lophius piscatorius*)
Whiting (*Merlangius merlangus*)

Stocks

Anglerfish in Subareas IV and VI and Division IIIa
Black-bellied anglerfish in Divisions VIIb,k and VIIIa,b,d
Blue whiting in Subareas I-IX. XII and XIV (Combined stock)
Cod (Gadus morhua) in Division VIa (West of Scotland)
Cod (Gadus morhua) in Division VIIa (Irish Sea)
Cod (Gadus morhua) in Divisions VIIe-k (Western English Channel and Southern Celtic Seas)
Cod (Gadus morhua) in Subarea IV and Divisions VIId and IIIa West (North Sea. Eastern English Channel. Skagerrak)
Cod in VIb Rockall Plateau
Haddock in Division VIb (Rockall)
Haddock in Division VIIa (Irish Sea)
Nephrops in Divisions IVb and IVc Botney Gut/Silver Pit (FU5)
Nephrops in the Firth of Clyde + Sound of Jura (FU 13)
North Sea Megrim in Divisions IVa and VIa
Plaice in Division VIIa (Irish Sea)
Plaice in Division VIId (Eastern Channel)
Plaice in Division VIIe (Western Channel)
Plaice in Divisions VIIf,g
Plaice Subarea IV (North Sea)
Pollack (Pollachius pollachius) in Subareas VI-VII (Celtic Seas and the English Channel)
Roundnose grenadier (Coryphaenoides rupestris) in Subareas VI and VII, and Divisons Vb and XIIb

Haddock in Divisions VIIb.c.e-k

Haddock in Subarea IV and Divisions IIIa West and VIa (North Sea. Skagerrak and West of Scotland)

Hake in Division IIIa. Subareas IV. VI and VII and Divisions VIIIa.b.d (Northern stock)

Herring (Clupea harengus) in Divisions VIa and VIIb.c (West of Scotland. West of Ireland)

Herring in Division VIIa North of 52° 30N (Irish Sea)

Herring in Subarea IV and Divisions IIIa and VIId (North Sea autumn spawners)

Herring in Subareas I. II. V and Divisions IVa and XIVa (Norwegian spring-spawning herring)

Herring in the Celtic Sea and South of Ireland

Horse mackerel (Trachurus trachurus) in Divisions IIa. IVa. Vb. VIa. VIIa-c. e-k. VIII (Western stock)

Ling in Subareas VI-IX, XII, and XIV, and in Divisions IIIa and IVa

Mackerel in the Northeast Atlantic (combined Southern. Western and North Sea spawning components)

Megrim in Division VIb

Megrim in Divisions VIIb,k and VIIIa, b, d

Nephrops in Division IVa (Fladen Ground. FU 7)

Nephrops in Division IVa (Moray Firth. FU 9)

Nephrops in Division IVb (Farn Deeps. FU 6)

Nephrops in Division IVb (Firth of Forth. FU 8)

Nephrops in Division VIa (North Minch. FU 11)

Nephrops in Division VIa (South Minch. FU 12)

Nephrops in Division VIIa (Irish Sea East. FU 14)

Nephrops in Division VIIa (Irish Sea West. FU 15)

Nephrops in Division VIIb.c.j.k (Porcupine Bank. FU 16)

Saithe in Subarea IV (North Sea) Division IIIa West (Skagerrak) and Subarea VI (West of Scotland and Rockall)

Sole in Division VIIa (Irish Sea)

Sole in Division VIId (Eastern Channel)

Sole in Division VIIe (Western Channel)

Sole in Divisions VIIf. g (Celtic Sea)

Sole in Subarea IV (North Sea)

Sprat in Subarea IV (North Sea)

Sprat in Subarea VI and Divisions VIIa-c and f-k (Celtic Sea and West of Scotland)

Spurdog in the Northeast Atlantic

White anglerfish in Divisions VIIb,k and VIIIa, b, d

Whiting in Division VIa (West of Scotland)

Whiting in Division VIb (Rockall)

Whiting in Division VIIa

Whiting in ICES Division VIIb. c. e-k

Whiting Subarea IV (North Sea) and Division VIId (Eastern Channel)

Source: International Council for Exploration of the Sea (ICES) Advisory Committee on Fisheries Management reports; Centre for Environment, Fisheries and Aquaculture Science (Cefas).

Goals and targets

Aichi Targets for which this is a primary indicator

Strategic Goal B. Reduce the direct pressures on biodiversity and promote sustainable use.

Target 6: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Aichi Targets for which this is a relevant indicator

Strategic Goal A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B. Reduce the direct pressures on biodiversity and promote sustainable use.

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Web links for further information

Reference	Report Title	Website
Centre for Environment, Fisheries and Aquaculture Science	Sustainable Fisheries Management	http://www.cefas.co.uk/Publications/marketing/fisheries.pdf (PDF, 517kb)
International Council for the Exploration of the Sea	Fisheries Statistics	http://www.ices.dk/marine-data/dataset-collections/Pages/Fish-catch-and-stock-assessment.aspx
Royal Commission on Environmental Pollution	Turning the Tide: Addressing the Impact of Fisheries on the Marine Environment. (2004) London, the Stationary Office.	http://webarchive.nationalarchives.gov.uk/20110322143804/http:/www.rcep.org.uk/reports/25-marine/documents/Turningthetide.pdf (PDF, 8.2Mb)

Full details of this indicator, including a datasheet and technical documentation are available at: http://jncc.defra.gov.uk/page-4244

Last updated: July 2018

Latest data available:

Proportion of marine fish (quota) stocks of UK interest harvested sustainably – 2015;

Proportion of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity – 2016.