UK Biodiversity Indicators 2019

This document supports
B2. Sustainable fisheries

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B2. Sustainable fisheries

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

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

Type: Pressure (a) and state (b) indicator

Indicator Description

Sustainable fisheries help to ensure our marine ecosystems remain diverse and resilient, providing a long-term and viable fishing industry. The indicator comprises 2 measures assessed separately: a) the percentage of stocks fished at or below the level capable of producing Maximum Sustainable Yield (MSY); and b) the percentage of stocks with biomass above the level capable of producing MSY.

Summary

Following on from the previous publication, the indicator uses 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 2017 for both fishing pressure and 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 7% in 1990 to 49% in 2017. 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 percentage of stocks subject to quota management and achieving this goal increased from 32% in 1990 to 60% in 2017. In the final year (2017) there was a 6.7% decrease in the percentage of stocks with fishing pressure < F_{MSY} due to data availability and consequently more stocks classified as "unknown". Overall a positive trend towards a greater proportion of stocks fished sustainably and within safe biological limits is evident in both the long and short term.

Figure B2a. Percentage of marine fish (quota) stocks of UK interest harvested sustainably, 1990 to 2017

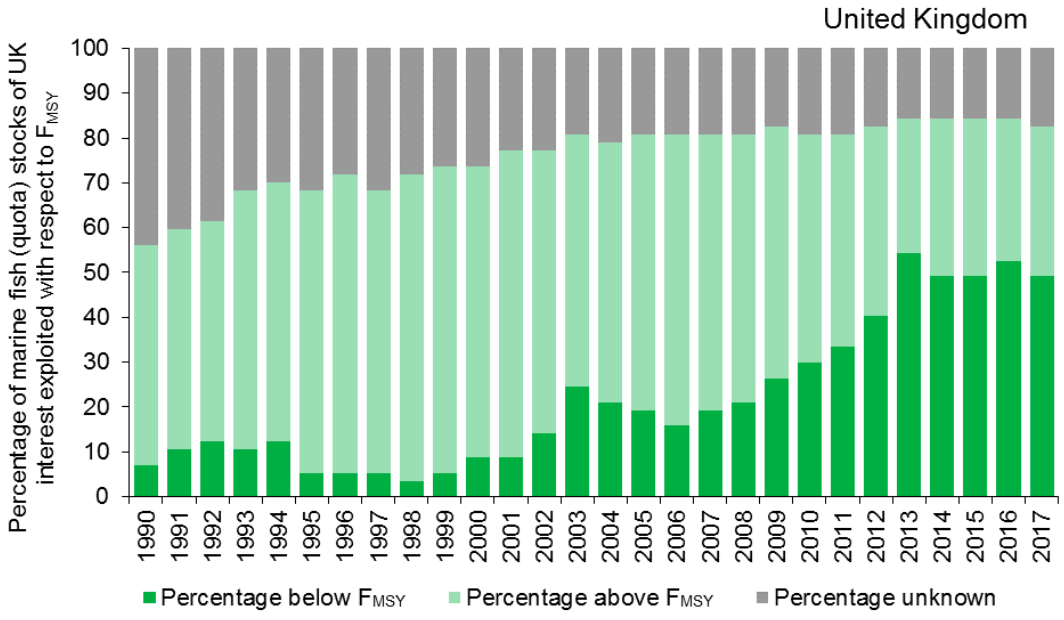
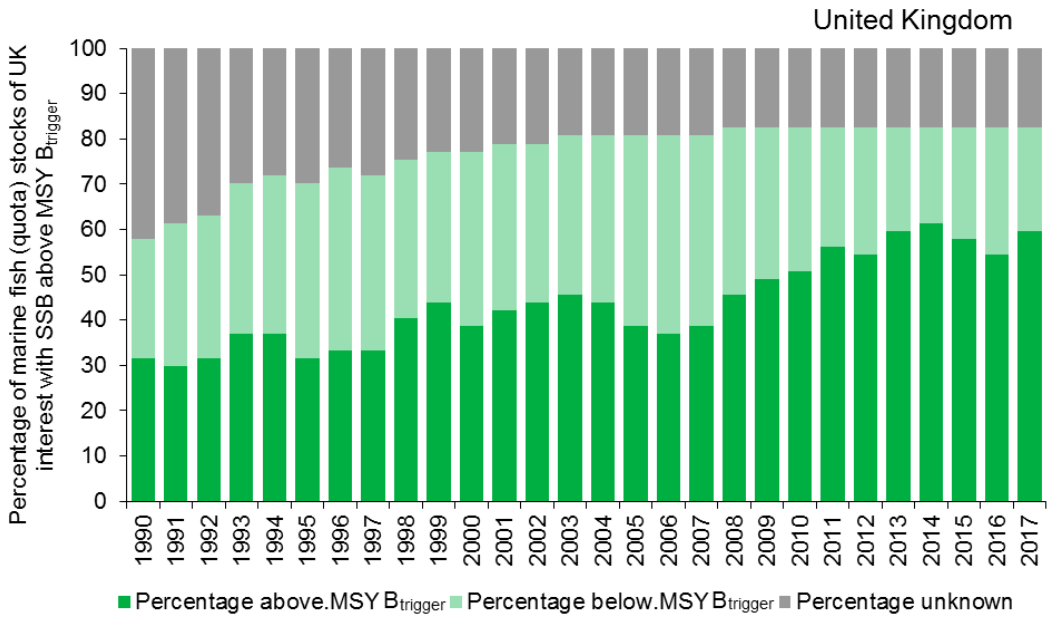


Figure B2b. Percentage of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity, 1990 to 2017



Notes:

1. Based on 57 stocks for which data are available, derived from stock assessment reports.
2. The data series has been updated to 2017 and are different to the previous publication. When new stock assessment data are incorporated into the model to compile this time series, all data are subject to minor revisions.

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**
Percentage of fish stocks harvested sustainably	✓ 1990–2017	✓ 2012–2017	Decreased (2017)
Biomass of stocks at full reproductive capacity	✓ 1990–2017	✓ 2012–2017	Increased (2017)

Note: Long and short-term assessments are based on a 3% rule of thumb. Where possible, the base years for these assessments use a 3-year average. See Assessing Indicators.

Indicator description

The indicator comprises of 2 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 percentage

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 percentage 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 3 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 5 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 5 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, mackerel) and shellfish (*Nephrops*). Table B2i shows the species included. Many of these stocks are extremely valuable or have a high conservation profile. 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 the International Council for the Exploration of the Sea (ICES) 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 percentage 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.

All stock data are derived from ICES advice except for cod (*Gadus morhua*) in Division 6.a (West of Scotland), where estimates are derived from the ICES 2018 Report of the Working Group on Celtic Seas Ecoregion (WGCSE), ICES CM 2018/ACOM:13.

Table B2i. Fish species and stocks included in this indicator

Species

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

Stocks

Anglerfish (*Lophius budegassa. Lophius piscatorius*) in subareas 4 and 6. and Division 3.a (North Sea. Rockall and West of Scotland. Skagerrak and Kattegat)
Black-bellied anglerfish (*Lophius budegassa*) in divisions 7.b-k. 8.a-b. and 8.d (west and southwest of Ireland. Bay of Biscay)
Cod (*Gadus morhua*) in Subarea 4. Division 7.d. and Subdivision 20 (North Sea. eastern English Channel. Skagerrak)
Cod (*Gadus morhua*) in Division 6.a (West of Scotland)
Cod (*Gadus morhua*) in Division 6.b (Rockall)
Cod (*Gadus morhua*) in Division 7.a (Irish Sea)
Cod (*Gadus morhua*) in divisions 7.e-k (western English Channel and southern Celtic Seas)
Spurdog (*Squalus acanthias*) in subareas 1-10. 12 and 14 (the Northeast Atlantic and adjacent waters)
Haddock (*Melanogrammus aeglefinus*) in Subarea 4. Division 6.a. and Subdivision 20 (North Sea. West of Scotland. Skagerrak)
Haddock (*Melanogrammus aeglefinus*) in Division 6.b (Rockall)
Haddock (*Melanogrammus aeglefinus*) in Division 7.a (Irish Sea)
Haddock (*Melanogrammus aeglefinus*) in divisions 7.b-k (southern Celtic Seas and English Channel)
Herring (*Clupea harengus*) in subareas 1. 2. 5 and divisions 4.a and 14.a. Norwegian spring-spawning herring (the Northeast Atlantic and Arctic Ocean)

Herring (*Clupea harengus*) in Subarea 4 and divisions 3.a and 7.d. autumn spawners (North Sea. Skagerrak and Kattegat. eastern English Channel)
Herring (*Clupea harengus*) in divisions 6.a and 7.b-c (West of Scotland. West of Ireland)
Herring (*Clupea harengus*) in divisions 7.a South of 52°30'N, 7.g–h, and 7.j–k (Irish Sea, Celtic Sea, and southwest of Ireland)
Herring (*Clupea harengus*) in Division 7.a North of 52°30'N (Irish Sea)
Hake (*Merluccius merluccius*) in subareas 4. 6. and 7. and divisions 3.a. 8.a-b. and 8.d. Northern stock (Greater North Sea. Celtic Seas. and the northern Bay of Biscay)
Horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a. 4.a. 5.b. 6.a. 7.a-c.e-k (the Northeast Atlantic)
Megrim (*Lepidorhombus spp*.) in divisions 4.a and 6.a (northern North Sea. West of Scotland)
Megrim (*Lepidorhombus spp*.) in Division 6.b (Rockall)
Ling (*Molva molva*) in subareas 6-9. 12. and 14. and divisions 3.a and 4.a (Northeast Atlantic and Arctic Ocean)
Mackerel (*Scomber scombrus*) in subareas 1-8 and 14 and Division 9.a (the Northeast Atlantic and adjacent waters)
Megrim (*Lepidorhombus whiffiagonis*) in divisions 7.b-k. 8.a-b. and 8.d (west and southwest of Ireland. Bay of Biscay)
White anglerfish (*Lophius piscatorius*) in Subarea 7 and divisions 8.a-b and 8.d (Celtic Seas. Bay of Biscay)
Norway lobster (*Nephrops norvegicus*) in Division 6.a. Functional Unit 11 (West of Scotland. North Minch)
Norway lobster (*Nephrops norvegicus*) in Division 6.a. Functional Unit 12 (West of Scotland. South Minch)
Norway lobster (*Nephrops norvegicus*) in Division 6.a. Functional Unit 13 (West of Scotland. the Firth of Clyde and Sound of Jura)
Norway lobster (*Nephrops norvegicus*) in Division 7.a. Functional Unit 14 (Irish Sea. East)
Norway lobster (*Nephrops norvegicus*) in Division 7.a. Functional Unit 15 (Irish Sea. West)
Norway lobster (*Nephrops norvegicus*) in divisions 7.b-c and 7.j-k. Functional Unit 16 (west and southwest of Ireland. Porcupine Bank)
Norway lobster (*Nephrops norvegicus*) in divisions 4.b and 4.c. Functional Unit 5 (central and southern North Sea. Botney Cut-Silver Pit)
Norway lobster (*Nephrops norvegicus*) in Division 4.b. Functional Unit 6 (central North Sea. Farn Deeps)
Norway lobster (*Nephrops norvegicus*) in Division 4.a. Functional Unit 7 (northern North Sea. Fladen Ground)
Norway lobster (*Nephrops norvegicus*) in Division 4.b. Functional Unit 8 (central North Sea. Firth of Forth)
Norway lobster (*Nephrops norvegicus*) in Division 4.b. Functional Unit 9 (central North Sea. Moray Firth)
Plaice (*Pleuronectes platessa*) in Subarea 4 (North Sea) and Subdivision 20 (Skagerrak)
Plaice (*Pleuronectes platessa*) in Division 7.a (Irish Sea)
Plaice (*Pleuronectes platessa*) in Division 7.d (eastern English Channel)
Plaice (*Pleuronectes platessa*) in Division 7.e (western English Channel)
Plaice (*Pleuronectes platessa*) in divisions 7.f and 7.g (Bristol Channel. Celtic Sea)
Saithe (*Pollachius virens*) in subareas 4. 6 and Division 3.a (North Sea. Rockall and West of Scotland. Skagerrak and Kattegat)
Pollack (*Pollachius pollachius*) in subareas 6-7 (Celtic Seas and the English Channel)
Roundnose grenadier (*Coryphaenoides rupestris*) in subareas 6-7 and divisions 5.b and 12.b (Celtic Seas and the English Channel. Faroes grounds. and western Hatton Bank)
Sole (*Solea solea*) in Subarea 4 (North Sea)
Sole (*Solea solea*) in Division 7.a (Irish Sea)
Sole (*Solea solea*) in Division 7.d (eastern English Channel)
Sole (*Solea solea*) in Division 7.e (western English Channel)

Sole (*Solea solea*) in divisions 7.f and 7.g (Bristol Channel. Celtic Sea)
Sprat (*Sprattus sprattus*) in Subarea 4 (North Sea)
Sprat (*Sprattus sprattus*) in Subarea 6 and divisions 7.a-c and 7.f-k (West of Scotland. southern Celtic Seas)
Blue whiting (*Micromesistius poutassou*) in subareas 1-9. 12. and 14 (Northeast Atlantic and adjacent waters)
Whiting (*Merlangius merlangus*) in Subarea 4 and Division 7.d (North Sea and eastern English Channel)
Whiting (Merlangius merlangus) in Division 6.a (West of Scotland)
Whiting (*Merlangius merlangus*) in Division 6.b (Rockall)
Whiting (*Merlangius merlangus*) in Division 7.a (Irish Sea)
Whiting (*Merlangius merlangus*) in divisions 7.b-c and 7.e-k (southern Celtic Seas and eastern English 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: jncc.gov.uk/ukbi-B2

Last updated: September 2019

Latest data available:

Percentage of marine fish (quota) stocks of UK interest harvested sustainably – 2017;

Percentage of marine fish (quota) stocks of UK interest with biomass at levels that maintain full reproductive capacity – 2017.