*Exploring trends in landings of five representative species in the UK and the changes in the UK’s highest capacity fleet over the last decade (2014 – 2023)*

**Executive Summary**

Overfishing puts pressure on vulnerable fish stocks, with UK fisheries relying on quotas and fleet management to maintain sustainability. This report explores trends in the catch and value of key species (cod, mackerel, cuttlefish, sole, lobster) in UK waters from 2014-2023. The Scottish fleet contributes the greatest catch and value of any country in the UK, therefore, we analyze changes in their landings and fleet characteristics. The quantity of nearly all focal species has declined, however, their value continues to increase. Mackerel are the most lucrative and caught in the greatest amount, however, lobsters and sole are the most valuable per tonne caught. High catches of mackerel in recent years are likely due to higher catches from the Scottish fleet. Despite decreases in the Scottish fleet size, there are more smaller vessels, however, the overall capacity (GT) of the fleet continues to increase. As important fish stocks continue to be at risk, and with new policy and quota management after Brexit, monitoring trends in landings should inform future quotas and fleet management. More sustainable management is essential to ensuring the longevity of the fishing industry and the ecosystem health.

**Introduction**

Overfishing threatens global fish stocks, however, demand continues to increase (FAO, 2024; Thurstan et al., 2010). To prevent stock collapses, accurate data collection and policy are essential. The European Union’s Common Fisheries Policy (CFP), created in 1973, aimed to maintain stocks at Maximum Sustainable Yield (MSY), however, in 2017 69% of Europe’s 397 stocks were overfished (Froese et al., 2018; Stewart et al., 2022).

The UK has access to many of these productive fisheries, mainly in the North Sea, North Atlantic, the Channel, and the West of Scotland (Akbari et al., 2022; Hatcher and Read, 2001). While the fishing industry contributes a small portion of the UK’s economy, it holds cultural and political significance, especially in Scotland, which boasts the highest quantity and value of catch in the UK (Akbari et al., 2022; McAngus et al., 2018). After Brexit, the UK left the CFP and fisheries management is now directed by the Fisheries Act 2020 and UK fisheries administrations (Fox, 2022). Landings data are a reflection of stock biomass and are crucial for setting quotas and assessing stock health, the Landings Obligation, implemented in 2019, ensures all caught quota species are landed (Froese et al., 2012; Harvey, 2019). Changes in total allowable catch (TAC) also drive shifts in fleet composition and capacity, with current global capacity estimated at double what is required for landings, largely due to increased efficiency and better technology (Akbari et al., 2022; Bell et al., 2017).

This report examines trends in UK landings of five focal species—cod, sole, cuttlefish, lobster, and mackerel—over the past decade (2014–2023). These species represent the UK’s primary fishing sectors: pelagic, demersal, and shellfish. Given Scotland’s dominance in UK fisheries, we also assess changes in its fleet composition and landings, using publicly available MMO data to present transparent insights into fishing activity.

**Methods**

Data Collection

The Marine Management Organization is responsible for collecting fisheries data based on Clause 1 of the Fisheries Act 2020 which requires a ‘scientific evidence objective’. The data collection methods are described in the ‘Work Plan for Data Collection in the Fisheries and Aquaculture Sectors’ on the UK Government Website.

Fishing activity data is collected differently depending on vessel size and target species. Vessels over 10 m have logbooks, landings declarations, and sales notes. These contain details on the species, presentation, weight, and value of their landings and are recorded electronically at the local port offices. For vessels under 10 m, buyers and sellers are registered at the point of first sale, and sales notes are reported within 48 hours of the sale. These smaller vessels also provide voluntary logbooks and landing declarations. Data on fleet capacity is collected by the Marine and Coastguard Agency’s Registry of Shipping and Seamen (RSS) who have information on registered fishing vessels, their gross tonnage (GT), and maximum continuous engine power (MCEP).

Data Description

Data on the quantity (landed weight in tonnes) and value (£) of landings for mackerel, cod, sole, lobster, cuttlefish, and the total of all fished species from 2014 to 2023 was downloaded from the MMO website. Only data from landings into the UK by UK administered vessels were used. Data of the fleet size (number of vessels), fleet capacity or gross tonnage (GT), and fleet power (kW) of Scottish administered vessels and the total quality and value of landings into Scotland from 2014 to 2023 were also downloaded.

Data Handling and Analysis

All data was downloaded into Excel directly from the MMO website. The MMO reports catch value at the time of the transaction, with no adjustments made to account for changes in inflation. We used the Consumer Price Index (CPI) to convert historical prices to most recent prices in the data (2023). Further calculations, conversions, and all figures were made in R Studio (V 2024.04.2) using the `tidyverse` package.

**Results (244)**

Landings in the UK by UK administered vessels

The maximum and minimum quantity and value of each species landed and the percent change from 2014 to 2023 is reported in Tables 1 and 2. Of the five focal species, Mackerel had the highest landing quantity (201,600 tonnes) and the highest landing value (£ 201,690 million) in 2023. The value and quantity of landings of the five focal species from 2014 – 2023 are plotted in **Figures 1 and 2**. A closer comparison of value and quantity of landings for each species and the total of all species are plotted in **Figure 3**. The value per tonne landed over the time period is plotted in **Figure 4**.

**Table 1.** Maximum and minimum value of landings and corresponding years. The percent change of the value from 2014 to 2023 was also calculated. All focal species have increased in their value since 2014.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Max Value (‘000 million £)** | **Max Year** | **Min Value (‘000 million £)** | **Min Year** | **Percent change % (2014-2023)** |
| **Cod** | 90.2 | 2019 | 42.03 | 2014 | 82.82 |
| **Sole** | 41.35 | 2022 | 15.64 | 2015 | 93.06 |
| **Mackerel** | 201.69 | 2023 | 91.47 | 2015 | 28.33 |
| **Cuttlefish** | 38.46 | 2017 | 9.81 | 2014 | 167.62 |
| **Lobster** | 80.51 | 2022 | 48.62 | 2015 | 57.28 |
| **Total All Species** | 1231.32 | 2023 | 835.10 | 2015 | 32.63 |

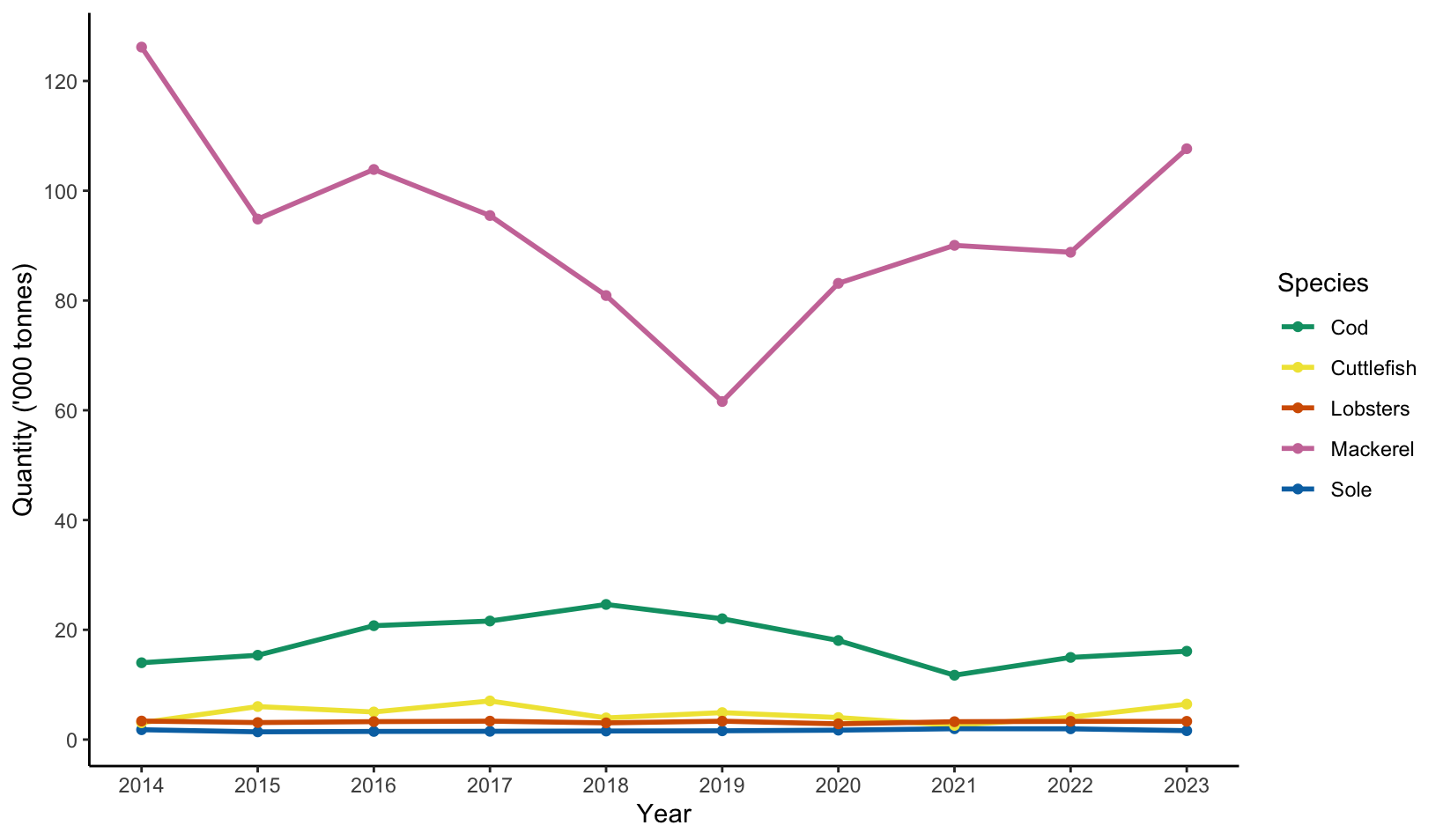
**Table 2.** Maximum and minimum quantity of each species landed and their corresponding years. The percent change of quantity landed was calculated, and rows highlighted in red identify species with a lower catch in 2023 compared to 2014 and therefore a negative percent change.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Max Catch (‘000 tonnes)** | **Max Year** | **Min Catch (‘000 tonnes)** | **Min Year** | **Percent change % (2014-2023)** |
| **Cod** | 24.62 | 2018 | 11.72 | 2021 | 14.97 |
| **Sole** | 2.0 | 2021 | 1.41 | 2015 | -9.63 |
| **Mackerel** | 126.17 | 2014 | 61.59 | 2019 | -14.67 |
| **Cuttlefish** | 7.04 | 2017 | 2.58 | 2021 | 110.48 |
| **Lobster** | 3.37 | 2014 | 2.87 | 2020 | -1.56 |
| **Total All Species** | 449.15 | 2014 | 380.26 | 2020 | -1.92 |

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**Figure 1.** Value of landings by species for UK vessels into the UK from 2014 - 2023.



**Figure 2.** Quantity (tonnes) landed by species into the UK by UK vessels from 2014 -2023.

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**Figure 3.** Quantity and value of catch of five focal species, and all species landed in the UK by UK vessels.

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**Figure 4.** Value of catch per tonne caught of the five focal species.

Scottish fleet and landings

The maximum and minimum quantity landed, value landed, fleet size, fleet capacity, and fleet power with corresponding years and percent change from 2014 – 2023 are reported in **Table 3**. The quantity and value of landings into Scotland by UK vessels from 2014 – 2023 is plotted in **Figure 5**. **Figures 6 and 7** shows the size, capacity, and power of the fleet made up of vessels administered in Scotland from 2014- 2023, split by different sized vessels. After 2021 there has been a decrease in fleet size, but capacity and power have increased. 75.06% of vessels were in under 10 m in length in 2023, while in 2014, 71.19% of the fleet was under 10 m. In 2023, 95.03% of the total fleet capacity was contributed by vessels over 10 m length, while in 2014 it was 94.06% of the total fleet capacity. The over 10 m vessels contributed 75.9% of the total fleet power in 2023, and 78.3% in 2014.

**Table 3.** Overview of the maximum and minimum values for the Scottish fleet characteristics and for landings into Scotland by UK vessels.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Metric** | **Max Value** | **Max Year** | **Min Value** | **Min Year** | **Percent change % (2014-2023)** |
| **Total landings (‘000 tonnes)** | 318.04 | 2023 | 257.36 | 2020 | 1.63 |
| **Total landings value (‘000 million £)** | 584.70 | 2019 | 448.42 | 2015 | -0.40 |
| **Total fleet size** | 2,130 | 2020 | 2,001 | 2023 | -2.29 |
| **Total fleet capacity (GT)** | 123,414 | 2022 | 102,933 | 2017 | 13.0 |
| **Total fleet power (kW)** | 381,861 | 2020 | 347,908 | 2017 | 3.53 |

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**Figure 5**. Total catch (green) and value (yellow) of landings into Scotland by UK vessels from 2014- 2023. The value has been converted for each year using the CPI to be equivalent to the GBP value in 2023

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(a)

(b)

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**Figure 6**. Capacity of the fleet (a) and size of the fleet (b) under Scottish administration from 2014 – 2023 by different size class.

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**Figure 7.** Power of the fleet under Scottish administration from 2014 – 2023 by different size class.

**Discussion**

Evaluating trends in species catch and value is essential to understanding fisheries trends and the stocks they exploit. Over the past decade (2014 -2023) , nearly all the focal species in this study have declined in landings quantity, yet their value has increased (**Fig 1 and 2**). Maximum landing years were generally towards the beginning of the time series (**Table** 1), while peak value occurred more recently (**Table 2**).

Among the five focal species analyzed, mackerel was the most lucrative and landed in the highest quantity (Davis et al., 2023). Mackerel’s value trend mirrored its landing quantity, while other species showed greater disparities in value compared to quantity (**Fig. 3**), likely driven by demand and trade (Harrison et al., 2023). Sole, lobster, and mackerel have increased in value landed since 2015, whereas cod and cuttlefish declined in value, but began recovering in 2021 (**Fig. 1**). Cuttlefish, sole, and cod have experienced the greatest value increase from 2014-2023, however, only cod and cuttlefish were caught in greater quantities (**Table 1 and 2**). The recovery of cod landings are significant given the decline in landings and value in 2021, raising concerns for the Northeast Atlantic stock viability (Bjørndal et al., 2021).

Regulatory measures have affected species availability and value. The low quantities of sole (**Fig. 2**) are likely a reflection of reduced supply since the Sole Recovery Zone (SRZ) established in the Western Channel in 2004 to protect depleted stocks (Davis et al., 2023; ICES, 2010). However, sole remains highly valuable and in high demand, alongside lobster- two of the most valuable species per tonne landed (**Fig. 4**). Lobsters are one of the few species to have increased in landings since 1938, as the shellfish fisheries have fewer restrictions (Davis et al., 2023). Demersal species like sole and cod are typically caught by trawlers, which have high rates of bycatch and are expensive, relying heavily on fuel subsidies (Basurko et al., 2013; Bjorndal and Bezabih, 2010; Davis et al., 2023). While the value of landings is a good indication of the demand, subsidies provided by the UK incentivize these high intensity and destructive practices (Abernethy et al., 2010). To decrease the cost, effort, and intensity of fishing, reduction in fleet sizes have taken place, however, in cases such as Scotland’s fleet, actual vessel capacity has increased since 2014 (Fig. 6) (Abernethy et al., 2010).

Changes to fleet composition highlight shifts in fishing efficiency. Scotland is responsible for the greatest quantity and value of catch in the UK, landing more than double the quantity of England’s fleet (Davis et al., 2023). Scotland’s fleet has decreased in vessel numbers, yet capacity has risen by 13% since 2014 (**Fig. 6**). While vessels under 10 m have increased, fleet capacity and power remain driven by larger vessels which target high volume and low value species with pelagic trawling and purse seine vessels (**Fig 6-7**) (Davis et al., 2023). This indicates that larger vessels are responsible for increases in landings to Scotland from 2014- 2023, likely due to quota increases of pelagic species in 2022 and 2023 (**Fig. 4-5**) (Davis et al., 2023).Vessel capacity has been used as a proxy for fishing effort, however, it assumes that vessels will fish proportionally to their gross tonnage (Pauly and Zeller, 2016). A more robust estimate of the Scottish fleet’s effort would incorporate AIS to track fishing activity spatially and temporally (Rousseau et al., 2024). The large capacity of the Scottish fleet likely allowed total landings into Scotland have increased since 2014, however, value decreased after steep declines in 2019, coinciding with changes in regional policy, as the UK left the EU (**Table 3 and Fig. 5**).

Post-Brexit policy shifts have impacted quotas and fleet dynamics. The UK’s departure from the EU Common Fisheries Policy (CFP) and subsequent introduction of the Fisheries Act 2020 affected quota allocations for key fisheries, such as the Northeast Atlantic cod 2020 (McAngus et al., 2018; Stewart et al., 2022). While higher regulatory autonomy was expected, negotiations on Total Allowable Catch (TAC) and increased barriers to trade have been consequences of exiting the EU and CFP (Stewart et al., 2022).

Future research should refine landings assessments to inform sustainable management of fisheries that the UK controls and accesses. Analyzing catch size distributions would help detect violations of size regulations and indicate stocks which are declining in biomass. Additionally, distinguishing between quota and non-quota species, or species with different regulations, would allow for better quota management and allocations. As the ‘right to fish’ remains a contentions policy issue, involving multiple stakeholders, future efforts should focus on fleet dynamics, gear efficiency, trade markets and employment impacts (Forse et al., 2021). Fleet capacity remains greater than what is required for given landings problems (Pout et al., 2008). Stock biomass modeling should be prioritized to prevent overestimating sustainability and guide evidence-based policy guided by historical catch trends (Harrison et al., 2023; Pauly and Zeller, 2016). These measures are crucial to balancing the UK’s economic interest, ecological sustainability, and coastal livelihoods.

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