Declines in the Diversity of Fish Represented in a British Domestic Magazine over the Past 100 Years

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Article

Declines in the Diversity of Fish Represented in British Domestic Recipes Over the Past 100 Years

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Abstract

Fish and shellfish are nutritionally important foods, yet consumption in many high-income countries remains low and concentrated on a narrow set of environmentally costly species. In the United Kingdom, fish consumption is dominated by a small group of fish—the so-called "Big Five"—which is often treated as an inevitable outcome of supply, convenience and ingrained consumer preferences. However, little empirical evidence exists on how and when such preferences emerged, or whether present-day patterns reflect historical continuity or cultural loss. This limits our ability to interpret current consumer behaviour and to design socially and culturally grounded interventions aimed at diversifying fish consumption. Here, I use published recipes sourced from a British domestic magazine, as a consumer-facing archive, to reconstruct long-term shifts in the cultural visibility of fish. While not a measure of consumption, popular media is widely understood to reflect and reinforce prevailing cultural norms, in this case, assumptions about which fish species were considered available and familiar to domestic cooks. I analyse 1,192 fish and shellfish recipes published between 1923 and 2025, documenting changes in species prominence, diversity, and composition. Sixty-six species were recorded, yet representation became increasingly concentrated over time. From the 1970s onwards, the 'Big Five' accounted for more than 60% of all species mentions, coinciding with a statistically significant decline in diversity of species representation and a marked restructuring of species composition. Flatfish, herring, and oysters—once culturally prominent—declined substantially, while salmon, prawns, and tuna became entrenched. Although species richness declined only weakly, diversity fell significantly, indicating increasing homogenisation rather than simple loss of species. These findings demonstrate that contemporary UK fish preferences are historically contingent, shaped by interacting changes in supply, trade, policy, and cultural norms, rather than fixed consumer tastes. By linking supply-side transformations to domestic food cultures, this study reveals how ecological and market changes becomes normalised in everyday consumption. More broadly, it shows how historical perspectives derived from cultural sources can inform strategies to diversify diets, revive under-utilised species, and align future seafood consumption with health and environmental sustainability goals.

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1. Introduction

Fish and shellfish provide vital micronutrients and protein to billions of people, but the quantities of fish consumed per capita is uneven (FAO 2024). Despite rapid increases in global fish production over the past century, many nations continue to consume low quantities of fish compared to other protein forms (Harrison et al. 2023; Willett et al. 2019). In the United Kingdom, the average consumption of fish per capita does not meet national health guidance (Harrison et al. 2023; Thurstan and Roberts 2014), while consumers predominately purchase a narrow range of species known as the 'Big Five' (Future Foundation 2014; Tetley 2016). The 'Big Five' are comprised of cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), salmon (*Salmo salar*), prawns/shrimp (multiple species including *Crangon* and *Panaeus* spp.) and tuna (*Thunnus* and *Katsuwonus* spp.). The dominance of

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these species is of concern due to the high environmental costs associated with their production: cod, haddock and shrimp are predominately caught using bottom-contacting, unselective mobile gears which damage vulnerable seabed habitats (Larsen et al. 2021), while salmon and prawns are commonly produced via intensive aquaculture (Chávez et al. 2019).

Research into understanding the barriers to increasing or diversifying fish consumption has taken place in the context of seeking to improve diets and ecological sustainability, reduce consumers' carbon footprint, and to enhance local economies and food security (e.g. Boase et al. 2019; Govzman et al. 2021; Rathnayaka et al. 2025). Demand for fish differs across countries and cultures and is driven by multiple factors. Within the United Kingdom, income level and age is positively associated with the quantity and choice of fish products consumed at home (Govzman et al. 2021; Rathnayaka et al. 2025), while the convenience, familiarity, and price of the product is also a factor in consumer choice (Garibay-Yayen and Willer 2025a; Menozzi 2020; Supartini et al. 2018). The influence of cookery columns, marketing campaigns, government interventions, and celebrity chefs on consumer choice has also been investigated, although our understanding of their influence on fish consumption preference and choices is lacking (Garnett et al. 2015; Lawley et al. 2016; Proesmans et al. 2022; Wilcox 2024).

An under-developed area of research is to what extent contemporary fish consumption patterns reflect long-standing cultural preferences, and what factors drives stability or changes in consumption norms across generations (Chaloner 1966; Rude 2025). Historical consumption acts as a baseline from which contemporary preferences emerge, persist, or decline over time. Such knowledge situates current patterns as historically contingent rather than inevitable and provides essential context for anticipating how consumption norms may respond to future social, economic, and environmental change. In the United Kingdom, data on fish purchasing and consumption trends exist but are typically collated over multi-annual rather than decadal scales (e.g. Kantar 2025; Seafish 2018; Future Foundation 2014). In longer-term consumer datasets, fish products are often not resolved to species-level (e.g. the National Food Survey, now Family Food statistics; Defra 2017). In contrast, fishery landings and trade data have been published since the 1880s and provide information on patterns of supply and availability of fish species to British consumers (Harrison et al. 2023; Thurstan and Roberts 2014). Studies of these datasets emphasise the persistent availability of species such as cod, salmon and haddock to consumers despite declines in home waters, showing that dwindling home supplies were replaced by distant water fisheries, which in turn were supplanted by imports (Harrison et al. 2023). The shift to import dominance also increased supplies of species from distant waters from the 1970s onwards (Heard et al. 2025).

Taken together, existing datasets provide insights into long-term changes in supply, trade, and availability, but reveal far less about how British consumers understood, valued, and selected fish across time. What remains largely absent is evidence on how changes in availability translated into everyday consumption preferences, meaning that links between supply-side change and consumer behaviour are often assumed rather than demonstrated. Beyond social and environmental histories, which typically focus upon culturally prominent fish species or products (e.g. fish and chips, Walton 1992; oysters, Neild 2001; herring, Smylie 2011) we do not know to what extent different species were culturally familiar or acceptable to past generations, and why some fish exited domestic diets while others persisted. This limits our ability to interpret contemporary preferences and to design interventions that are grounded in the cultural and historical realities of fish consumption.

Recipes have been published in book form for centuries (Notaker 2017) and became a feature of domestic magazines and newspapers, typically within women's pages, from the 19th century (Warde 1997). These sources function as a link to past and present domestic spheres and the people – often women and domestic workers – who determined food preparation and consumption choices, both of which are largely invisible within formal historical records (Andrews et al. 2023; Bishop 2023). Scholars have argued that cookery columns and books are (were) created not only to provide helpful and practical information to the reader (Rude 2025; Warde 1997), but also to set societal standards and aspirations in the performative act of preparing and presenting food (Andersson and Eriksson

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2022; McKie and Wood 1992). While potentially propagating an idealised version of reality, these sources are likely to reflect the prevalent attitudes and practices of their readership at the time of publication (Barnes 2019; Keating and Mac Con Iomaire 2018; Kitch 2018). Supporting this, a study of New Zealand cookbooks published in the mid-20th century showed that the content of these books reflected national concerns and changes in emphasis around nutrition during the same period (Mitchell 2008). A study by Eidner et al (2013) showed that the calorific content of popular recipes in a series of Danish cookbooks, published throughout the 20th century, increased alongside rates of obesity in the Danish population.

While not a measure of fish consumption, recipes provide a complementary source of evidence on the cultural visibility and assumed availability of fish species. As cultural artefacts, recipes provide insight not into what was eaten in aggregate, but into what was considered normal, desirable, and achievable within domestic life at a given time. The species and products that readers were exposed to via editorial and writers' choices were those the writers of these columns expected readers to have access to (or to aspire to access), be interested in, and be willing to buy, prepare, and consume. Changes in the frequency of species within published recipes have previously been demonstrated to reflect species availability due to environmental, economic or structural drivers (e.g. Jones 2008; Levin and Dufault 2011; Van Houten et al 2013; Ng and Cheung 2022; Rude 2025). For example, changes to the species listed in Hawaiian restaurant menus reflected changes in regional fishery landings over the same 50-year period (Van Houten et al 2013). Alternatively, changes in the representation of species can be the result of shifting consumer demand driven by political, societal or cultural events (Levin and Dufault 2011). For example, the consumption of rare or higher trophic-level fish species can become viewed as a symbol of wealth or high social status (Fabinyi 2012), or conversely, consumption of certain products may be viewed as symbols of lower social status (e.g. the British working class's long association with fried fish and chips; Walton 1992). Ecological and social drivers also interact, as was the case with the eastern oyster (*Crassotrea virginica*) in the USA, which became less prevalent in published recipes during the 20th century due a combination of overharvesting and pollution scares. Both harvesting and pollution pressures influenced the availability and price of oysters and consumer perceptions, but in complex ways dependent on the method by which oysters were processed and sold, and who was consuming them (Rude 2025).

Understanding how fish preferences were formed, narrowed, or lost through time is essential for designing interventions that seek to diversify diets in ways that resonate with cultural memory rather than work against it. Here, I investigate patterns in the representation of fish species within recipes published in a British domestic magazine over a period of one-hundred years. I document shifts in the prominence of fish species through time to generate insights into historical preferences situated within known patterns of supply. Examining these sources builds towards a more nuanced reconstruction of historical fish consumption preferences than can be derived from purchasing, landings, or trade data alone, thus helping to bridge the knowledge gap between supply-side change and consumer-facing norms.

2. Methods

2.1. Research Context and Sources

Cookery books containing recipes and explanations for how to prepare, cook and present food products have been published for centuries, but many of these exist in isolation or were published only sporadically. In contrast, cookery and domestic columns in newspapers and magazines published recipes on a semi-regular basis. The 19th century was a period of technological and social transformation in Britain: education became increasingly available, and literacy standards among women and the working class improved (Warde 1997). The aspirational lower and middle classes became important consumers of print media, with some newspapers publishing sections marketed specifically at women and/or domestic staff, which included recipe suggestions. Towards the end of

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the 19th century, increasing quantities of print media were produced for the domestic sphere, and newspapers and magazines dedicated to home life, including cookery, proliferated.

The serial 'British Good Housekeeping' was first published in 1922 on a rolling monthly basis, following the format of its United States namesake. Today, the serial continues to publish monthly issues as 'Good Housekeeping UK'. The serial was originally aimed at middle-class housewives, and included recipes, explanations and tips relating to cookery and other domestic chores, product advertisements and reviews. Digitised copies of British Good Housekeeping (hereafter named 'Good Housekeeping') published from 1922-2025 were sourced through the Proquest (2025) and the PressReader (2025) databases.

2.2. Data Extraction

Beginning in the 1920s, issues published in three consecutive years of each decade were searched, specifically the years ending in *-3*, *-4* and *-5*. An exception was made for the 1940s, as the years 1945-6 were missing from the archive. Instead, recipes from 1947-1949 were collated. Issues published from 2003-05 were unable to be accessed and hence this decade was not included in the analysis.

To search Good Housekeeping UK issues available from the Proquest database (1922-2005), the following search string was applied, with searches taking place between 9-27 September 2025.

((fish OR seafood OR shellfish OR anchovy OR "Arbroath smokie" OR bass OR bream OR brill OR bloater OR carp OR catfish OR cod OR coley OR conger OR crab OR crawfish OR crayfish OR dogfish OR dory OR eel OR flounder OR grayling OR gurnard OR gurnet OR haddock OR herring OR hoki OR kedgeree OR kipper OR lobster OR mackerel OR megrim OR "mock turtle" OR monkfish OR mullet OR mussels OR octopus OR oyster OR perch OR pike OR pilchard OR plaice OR pollock OR pollack OR prawn OR roach OR salmon OR saithe OR sardine OR scallop OR "scotch woodcock" OR shrimp OR skate OR smelt OR sole OR "solomon gundy" OR sprat OR stargazy OR "starry gazy" OR sturgeon OR squid OR swordfish OR tench OR tilapia OR trout OR turbot OR tuna OR tunny OR whitebait OR whiting) AND (recipe OR ingredient)).

Due to differences in database search capability, the issues extracted from the PressReader database (Dec 2022-November 2025, the latest issue to be published at the time of data extraction) were read in full.

Recipes that named fish, shellfish, or fish parts as an ingredient or as a viable substitution, were extracted for analysis. Species occurrence was recorded when a fish species was named as an ingredient or as a suitable substitution within a recipe.

2.3. Data Analysis

To analyse changes in species representation through time, the frequency of occurrence was compared across decades by calculating the proportion of recipes containing each species per decade. Interdecadal differences in the composition of represented species were analysed using the following measures: (a) species richness (with rarefaction applied to standardize richness to the smallest sample size among decades), (b) Simpson's Diversity Index (1 – D; range 0-1) was calculated using all species mentions per decade as a denominator, with higher values indicating a more even distribution of species across recipes, and (c) permutational multivariate analysis of variance (PERMANOVA; 999 unrestricted permutations) based on Bray–Curtis dissimilarities. For (a) and (b), statistical significance was tested using linear regression analysis. For (c) non-metric multidimensional scaling was performed to assess the overall structure of the community data and to calculate dissimilarities. Pairwise comparisons between decades identified which decades differed significantly, with p-values adjusted for multiple comparisons using the Bonferroni correction.

All analyses were carried out in R version 4.5.1 (R Core Team 2025). Simpson's index was calculated using the diversity function in the 'vegan' package (Oksanen et al. 2025). Rarefied richness was calculated using the rarefy function from the 'vegan' package, using the number of recipes per decade as the sampling unit. Permutational multivariate analysis of variance was calculated using

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the adonis2 function in the 'vegan' package (Oksanen et al. 2025). The R package "ggplot2" was used for figure creation (Wickham 2016).

3. Results

Thirty years of magazine issues published between 1923 and 2025 were sampled, from which, 1,192 recipes containing fish or shellfish were extracted, equating to a mean of 40 published fish recipes year^{-1}, or 3.3 fish recipes issue^{-1}. The greatest number of recipes containing fish (n = 180) were published in the 2000s, with the lowest number (n = 63) published in the 1940s (Table 1). On average, each recipe mentioned 1.3 species (range: 1-10), either as listed ingredients or as substitutions. The total number of species mentioned per decade ranged from 19-36 species. Throughout the timeseries 67 species were identified, nearly half of which (n=32) were initially mentioned in the first decade of publication (Table 1).

Table 1. Number of recipes including one or more fish or shellfish species, species occurrences, total number of species, and the number of new species mentioned, per three years sampled for each decade.

Decade	N recipes	N mentions	N species	N new species
1920	74	138	32	32
1930	85	123	31	9
1940	63	79	19	3
1950	89	116	32	4
1960	132	162	30	1
1970	149	181	27	4
1980	141	188	31	5
1990	178	264	36	8
2000	180	220	28	1
2020	99	114	23	2
Total	**1192**	**1585**	**67**	**67**

The species with the most frequent mentions throughout the time series were salmon (number of recipes=207; percentage of recipes=17%), prawns (n=207; 17%), haddock (n=112; 9%), anchovy (multiple species from the Engraulidae family) (n=109; 9%), cod (n=96; 8%) and tuna (n=81; 7%). Species groups more frequently mentioned in earlier decades but which then declined included sole (most likely *Solea solea*, but could include species from the Soleidae, Pleuronectidae and Scophthalmidae families), herring (*Clupea harengus*) and oyster (*Ostrea* or *Crassostrea* spp.) (Figure 1).

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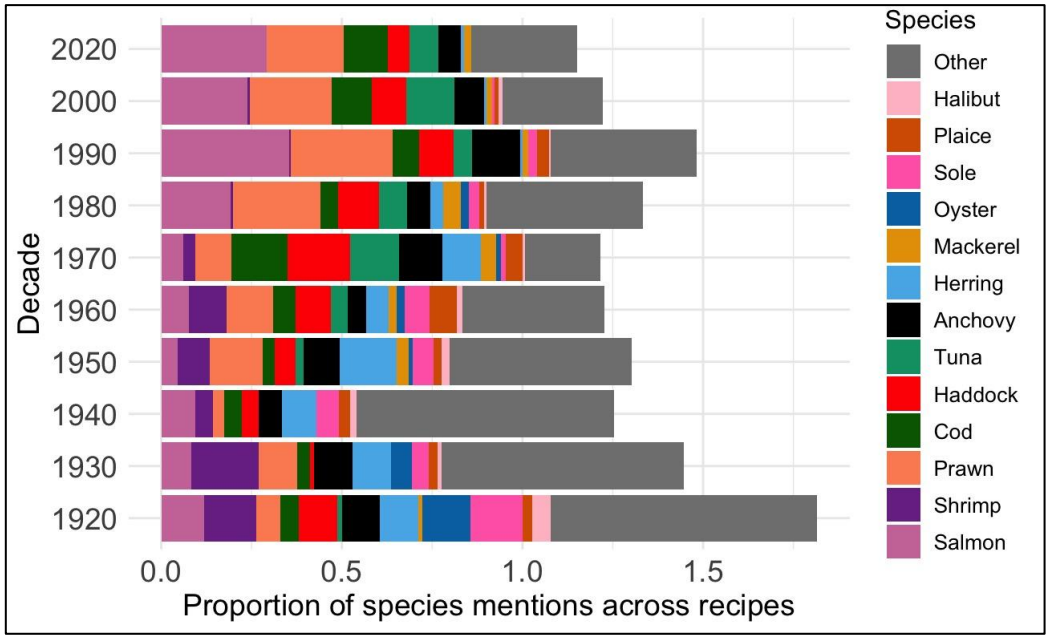

Figure 1. Proportion of mentions per decade. The 13 most frequently mentioned species categories are listed individually, while the remaining species are listed as 'Other'. Proportion of species mentions sums to >1 due to an average of >1 species being mentioned per recipe.

The 'Big Five' species groups (salmon, prawns and shrimp, cod, haddock and tuna) were mentioned throughout the time series but became more dominant (>60% of species mentions) from the 1970s onwards (Figure 2a). An exception was shrimp, which largely disappeared after the 1970s, replaced by increasing occurrences of prawns. The prevalence of flatfish in recipes exhibited variability throughout the time series but underwent a sustained decline in visibility after the 1960s (Figure 2b). Forage fish displayed differing trends among species, with anchovies maintaining a frequent presence in recipes through time, while mackerel (*Scomber scombrus*) exhibited an increasing frequency, in contrast to herring which declined (Figure 2c). In the shellfish and crustacea category, mussels (*Mytilus edulis*) increased in frequency whereas oysters and lobsters declined (Figure 2d).

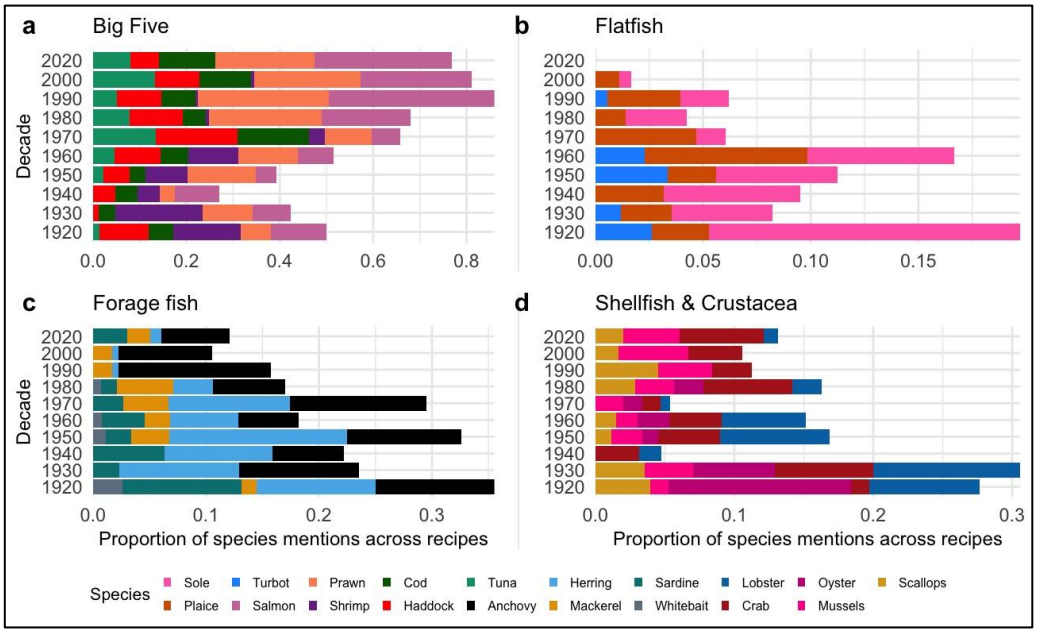

Figure 2. Proportion of mentions by decade of 18 key species, split into the following groups: (a) Big Five, (b) Flatfish, (c) Forage Fish, (d) Shellfish & Crustacea. Note varying x-axes.

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Rarefied species richness showed a declining, but non-significant, trend over time (linear regression β = -0.067 ± 0.030 species per decade, t_8 = -2.20, p = 0.059; Figure 3a). The linear model explained 38% of the variation in richness (R^2 = 0.38, adjusted R^2 = 0.30), suggesting most of the variation came from within-decade rather than across decade variability. In contrast, Simpson's Diversity showed a statistically significant declining trend (β = -0.00067 ± 0.00022, t_8 = -3.03, p = 0.016; Figure 3b) while the linear model explained 53% of the variation (R^2 = 0.53, adjusted R^2 = 0.48). Non-metric multidimensional scaling ordination revealed a statistically significant separation of community composition among decades (PERMANOVA: $F_{9,1182}$ = 6.02, R^2 = 0.044, p = 0.001). Pairwise tests indicated significant differences in species composition among multiple decades (Table S1, Supplementary Materials). After Bonferroni correction, early decades (1920s–1930s) were shown to differ significantly from later decades (1970s–2000s; adjusted p ≤ 0.045), while the post-war decades (1940/1950) were also distinct in terms of their species composition. In contrast, adjacent decades were rarely significantly different from each other (Table S1).

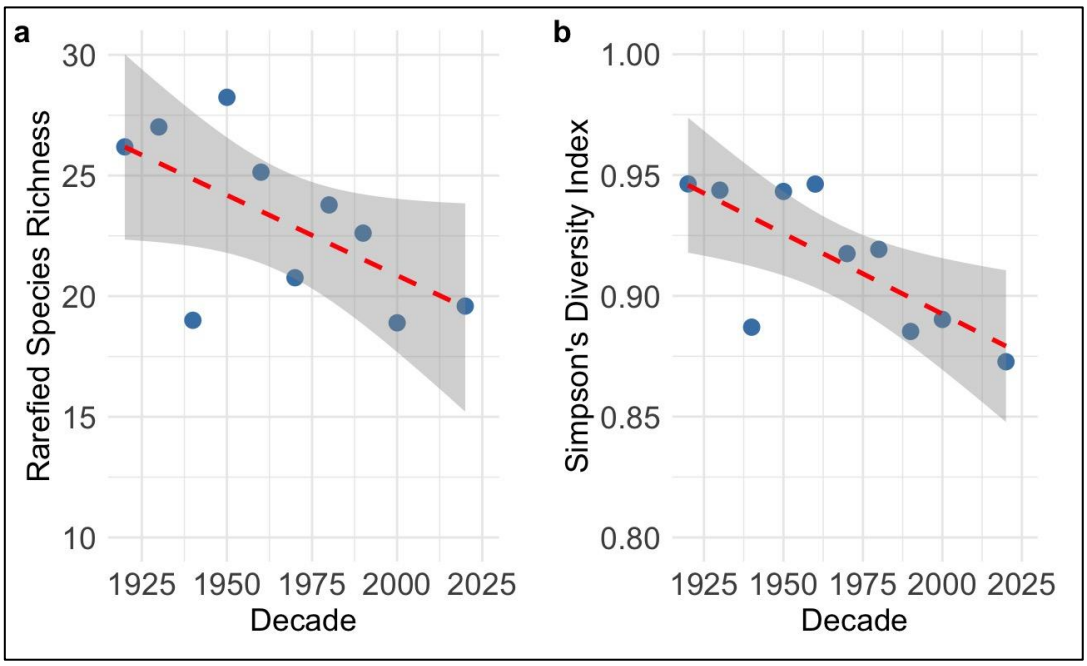

Figure 3. (a) Rarefied species richness and (b) Simpson's Diversity Index by decade. Showing decadal data points (blue), linear trend lines (red) and 95% confidence intervals (grey).

4. Discussion

There is increasing interest in promoting consumption patterns that support human health and environmental sustainability, while ensuring food security in an era of rapid climate and ecological change (Garcia et al. 2020; Springmann et al. 2021; Stentiford et al. 2020). Fish and shellfish are widely recognised as important sources of protein and essential micronutrients (Golden et al. 2021; Hicks et al. 2019), yet concerns remain about the sustainability of many fisheries and aquaculture systems, particularly where production relies on habitat-disturbing gears or intensive farming practices (Chávez et al. 2019; Hiddink et al. 2017). In the United Kingdom, a narrow range of species dominates consumer purchases (Tetley 2016), many of which are imported or sourced through industrialised supply chains associated with substantial environmental impacts (Thomas et al. 2017; Wang et al. 2020; Larsen et al. 2021).

Understanding how such narrow consumption patterns emerged is critical, yet we lack long-term datasets on consumer behaviour. Consumption patterns are driven by individual preferences, cultural norms, and systemic factors that control the availability, accessibility and exposure of consumers to fish products, many of which are historically contingent. Yet, research into fish

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consumption has largely focused on recent trends (Richter and Klöckner 2017) and often treats (or implicitly assumes) current preferences as stable or inevitable. This study instead situates a longer historical trajectory, using published recipes as a cultural archive to explore how fish species were made visible, normalised, and rendered acceptable within domestic life over the past century. While recipes cannot be treated as direct measures of consumption, they reflect the species that writers expected readers to recognise, access, aspire to, and prepare, and therefore offer insight into prevailing norms and assumptions surrounding food choice (Barnes 2019; Floyd and Forster 2003; Rude 2025).

Across the sampled period, this study reveals a clear shift in the cultural representation of fish species within a British domestic magazine. From the 1920s to the 1960s, recipes featured a relatively broad and even mix of species, with no single group consistently dominating (Figure 1). From the 1970s onwards, however, representation became increasingly concentrated, with a small number of species—the contemporary "Big Five"—accounting for the majority of mentions. This shift was accompanied by a significant decline in diversity and a restructuring of species composition, indicating cultural homogenisation rather than simple loss of richness. Species such as sole, oysters, and herring, which were more prominent in recipes published in earlier decades, declined sharply or disappeared altogether, while salmon, prawns, cod, haddock, and tuna became entrenched (Figure 2).

While the decline of oysters and herring coincides with well-documented regional stock collapses and fishery restructuring (Coull 1988; Thurstan et al. 2024), yet these products did not disappear entirely from British markets and remained available through imports or aquaculture. In contrast, cod and haddock—species that also declined in UK waters—retained a strong presence in recipes throughout the time series, supported by increasing reliance on imports and distant-water fisheries from the late 20th century onwards (Harrison et al. 2023; Heard et al. 2025). The post-World War II period provides further insight into the plasticity of fish preferences. Although wartime rationing temporarily increased fish consumption as an alternative protein source (Harrison et al. 2023), overall consumption declined rapidly once rationing ended, leading some commentators to argue that fish has never been culturally favoured in Britain (Franklin 1997). However, while the post-War period may be an outlier in terms of the quantities of fish consumed, the continued representation of a high diversity of fish species represented in recipes from pre-WWII until the 1960s, challenges this narrative. Instead, the data suggest that contemporary narrow preferences are a relatively recent phenomenon, emerging alongside structural changes in supply, trade, and food provisioning systems rather than reflecting deep-rooted cultural aversion. This historical perspective indicates that present-day consumption patterns may be less culturally entrenched—and therefore more malleable—than is often assumed.

Together, these findings demonstrate that current UK fish consumption patterns are historically contingent outcomes of interacting supply, market, and cultural processes. Changes in supply were not simply mirrored by changes in preference; rather, some species were culturally retained despite ecological decline, while others faded from domestic visibility even when still available. By tracing how certain fish became normalised within everyday cooking while others exited domestic repertoires, this study helps bridge the gap between supply-side change and consumer-facing behaviour, which is often assumed rather than empirically demonstrated.

Limitations and Further Research

A key limitation of this approach is that the representation of fish species within published recipes cannot be assumed to mirror patterns of consumption. Recipes reflect editorial choices, cultural norms, and aspirations as much as realised behaviour, and the relationship between cultural visibility and actual consumption is unlikely to be linear. This limitation is further shaped by historical shifts in the media through which recipes are disseminated. During much of the period analysed, domestic magazines and newspaper cookery columns acted as dominant, mass-circulation sources of culinary guidance, offering relatively standardised representations of "everyday" food.

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Over time, however, these outlets have been supplemented—and potentially displaced—by specialised cookery books, niche food media, and, more recently, online recipe platforms (Garibay-Yayen & Willer 2025b). As a result, changes in recipe representation through time may reflect not only shifting food cultures but also changes in where, how, and for whom culinary knowledge is produced and accessed.

Nevertheless, representation matters: repeated exposure to species and products helps normalise their use, shapes familiarity, and sets expectations around what constitutes appropriate or desirable food. Even when recipes do not translate directly into consumption, they contribute to the cultural landscape within which food choices are made. The extent to which shifts in representation translated into realised consumption patterns thus warrants further investigation using complementary datasets. Future research that explicitly links recipe content to purchasing, landings statistics, or household consumption surveys would help to clarify how cultural exposure and material availability interact to shape long-term food preferences, and whether homogenisation in cultural representation precedes, results from, or is decoupled from changes in consumption.

Recipes also reflect the norms of their intended readership, in this case predominantly British, female, and middle class, and therefore do not represent all social groups or regional practices. Unlike restaurant menus, which are often assumed to reflect the local availability of species (e.g. Ng and Cheung 2022; Van Houten et al. 2013), cookery columns within magazines and newspapers are generally directed at a much wider readership. This necessarily masks regional and societal variation but presents us with a broad view of the cultural acceptability and availability of species. The reach and longevity of magazine cookery columns thus provide a lens into mainstream cultural visibility, complementing scales at which landings, trade, and purchasing data are collated. Future research could extend this approach by comparing recipes from alternative sources, such as specialised cookbooks, regional sources, or explicitly linking recipe trends with contemporaneous supply data to disentangle cultural drivers from structural constraints. Such work would help clarify how shifts in media, alongside exposure, familiarity, and memory shape the persistence or decline of food preferences over time.

5. Conclusions

This study shows that the dominance of a narrow range of fish species in the United Kingdom since the 1970s is reflected in—and likely reinforced by—certain contemporary domestic media outlets, while earlier decades were characterised by a broader and more even representation of fish species. These findings suggest that current consumption patterns are not timeless or inevitable, but the product of historically contingent processes that have progressively narrowed the prevailing British seafood culture. Recognising this contingency is essential for designing interventions aimed at diversifying diets, reviving under-utilised species, and promoting seafood consumption pathways that are both environmentally sustainable and culturally resonant.

Supplementary Materials: The following supporting information can be downloaded at the website of this paper posted on Preprints.org.

Data Availability Statement: Data available from the Figshare repository upon publication.

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