

HOW RETAILERS can be sustainable and profitable in SEAFOOD

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BNP PARIBAS
ASSET MANAGEMENT

The sustainable investor for a changing world

Act for Seafood - a Carrefour Case Study





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KEY TAKEAWAYS

- ➔ Food retailers can improve the sustainability of ocean ecosystems by changing their sourcing evidenced by greater transparency and supported by traceability, but first need to assess the current sustainability of their seafood. Our interactive [Seafood Sustainability Protocol](#) empowers them to do just that.
- ➔ As a real-world case study exemplifying how our Protocol can be used, this report focuses on Carrefour, one of the ten largest food retailers globally, using more than four million non-publicly available datapoints on Carrefour's seafood purchase data from its largest market, France.
- ➔ This research demonstrates that Carrefour has made significant progress in sourcing seafood sustainably and locally or fighting against illegal fishing: out of 13 sustainability indicators we use, Carrefour performs well or is moving in the right direction with room for progress (for instance on overfished species and sustainable aquaculture) on 11 of them.
- ➔ Encouragingly, and this should be noted by all seafood retailers, improving the overall sustainability of Carrefour's seafood sourcing can improve financial returns. For instance, we estimate that the retailer generates some of its lowest seafood margins on the most overfished species.
- ➔ Disclosing details of its seafood supply chain (e.g. on the [Ocean Disclosure Project](#)) would generate net financial benefits for Carrefour equal to 3% of its estimated gross profit on seafood in France. Supporting initiatives on seafood traceability (e.g. [GDST](#)) could also be monetised. This shows [once more](#) how better sustainability practices could improve financial returns.
- ➔ By engaging with food retailers on greater seafood supply chain transparency and traceability and more sustainable sourcing, financial institutions can therefore reduce risks and improve returns.



THE INVESTOR'S VIEW: BNP Paribas Asset Management

In early 2022, scientists announced that the earth has now crossed six of the nine planetary boundaries demarcating the safe operating space for humanity: pollution from 'novel entities', freshwater, climate change, biosphere integrity, biogeochemical cycles and land-system change. This unravelling of nature, now underway, poses an existential threat to humanity.

Planetary boundaries is the lens that more and more investor have adopted, making Planet Tracker a "natural" partner to understand **to which extent the activities of a corporate are contributing to breach those limits or are helping to put earth system back to safer levels.**

Most large investors like BNP Paribas Asset Management are exposed to the seafood value chain via downstream actors (such as food retailers or catering), rather than via upstream actors (such as fisheries or food processors). Overfishing is a socio-environmental threat that the general public is aware of, but investors have not taken enough steps to understand their exposure to this issue. **How to help investors reduce their contribution to overfishing and preserve marine biodiversity?**

The project with Planet Tracker was born to explore some of the above questions. The data gap is currently very big: as opposed to terrestrial and aquatic biodiversity, marine biodiversity is not fully captured yet in investor-friendly biodiversity data.¹ This is mostly due to the fact that the quantification of environmental pressures (direct exploitation, sea-use change, climate change, pollutions, invasive species) on marine biodiversity has not been calculated yet in GLOBIO², the main model used in biodiversity footprint approaches.

But data is not the only one route to bring planetary boundaries thinking from theory to practice. To manage systemic risks, investors also need to bring all of their influence to bear on the problem, including more effective corporate engagement and public policy advocacy.

Just over a year ago, we published our biodiversity roadmap: "Sustainable by nature",³ detailing our views on the nature and urgency of this crisis and how we are actively responding to it. As an asset manager with a broad range of clients who all depend upon a stable biosphere, we have a dual set of responsibilities:

- To understand how our investments depend on, and impact nature – our role in driving this crisis
- How nature loss may translate into financial risks.

1

BNPP AM uses the Corporate Biodiversity Footprint from Iceberg Data Lab to measure the negative impacts represented by the companies in its portfolios.



Several attempts were made in the past to make progress on retrieving better marine biodiversity data, including our seafood and plastics case studyⁱⁱⁱ targeting the consumer sector, in partnership with the Capitals Coalition. Qualitative assessments take time. We have also engaged key companies involved in the seafood value chain,^{iv} launched new ocean-related thematic funds or supported the upcoming UN Treaty on Plastics.^v But this is not enough given the current state of our oceans, as investors have yet to prioritize Sustainable Development Goal 14 in their sustainability strategies.

We couldn't think of a better partner to suggest an open-source seafood protocol to show that sustainability and profitability go hand in hand. Planet Tracker has explored new pieces of the puzzle with rigor and creativity. We are very happy with the results that go beyond our initial thoughts; this is thanks to hard work from Planet Tracker.

We are honoured that Carrefour actively participated in our project. Collaboration requires resource and time. Transparency sometimes requires sacrifice, as it is not easy to be amongst the first to explore and be vocal about its exposure to overfishing for example. Only leading corporates are ready to take the transparency leap of faith. We hope Carrefour's example will be followed by many.

As TNFD stakeholders, we are aware that nature-related disclosure recommendations are being explored currently.^{vi} We hope this case study will contribute to make TNFD a success as we need everyone involved in the seafood value chain to "Act for Seafood".

*Robert-Alexandre Poujade,
ESG analyst, Biodiversity Lead*





EXECUTIVE SUMMARY

A Simple, Open-Source Protocol to Evaluate Seafood Sustainability

Food retailers hold immense power. Those that sell seafood can improve the sustainability of ocean ecosystems by channelling demand for seafood away from unsustainably produced seafood and towards sustainably managed and produced fish. **All it takes is a change in their sourcing decisions evidenced by greater transparency.** It is by no means easy, nor quick to implement, but doable and, as this report shows, might well turn out to be profitable.

Yet before that, it is vital to know how sustainable the seafood offered by food retailers is. To ensure a consistent framework and simple comparison across companies, we have designed a set of publicly-available methodologies that enables every company selling or purchasing seafood to quickly assess the environmental sustainability of their seafood.

By using our interactive [Seafood Sustainability Protocol](#), and based on the type of data they already have, each of these companies can now find out how to obtain data they might miss and how to assess the environmental sustainability of their seafood purchase/sale.

Case study: the benefits of increased transparency at Carrefour

To demonstrate how our Protocol can be used by companies, this report focuses on one **real-world case study**, analysing more than **four million datapoints** on the seafood offering of the largest market (France) of one of **the ten largest food retailers globally (Carrefour)**.

Even though Carrefour France has vastly improved the sustainability of its seafood, our investigation of its non-public data kindly shared with us by the company reveals that Carrefour would benefit from **increased transparency on the actions it takes to source the most sustainable option for each species.**

Our results were derived from a weighted probability-based model combining actual data from Carrefour, with sustainability assessment provided by third parties such as [FishSource](#), [Seafood Watch](#), [the IUCN](#) and [Sea Around Us](#) – see details in the [Methodology](#) section on page 44, or by using our [Seafood Sustainability Protocol](#).

In brief, from the data on fresh and chilled seafood products communicated by Carrefour, we identified the species, then the fisheries or farming areas for each of these species, and then used sustainability scores or assessments attributed by third parties for each of these. We then computed the average and best possible scores for each species: the average score reflects what is the most likely sustainability of the seafood purchased in the absence of any action from Carrefour, whilst the best score indicates the best possible outcome that Carrefour could achieve by carefully selecting only the most sustainable option for each species.

Carrefour has implemented a considerable number of initiatives to favour sustainable options, but most of the sustainability guidance its sourcing teams give to their suppliers is not public, so **the reality is likely to be between the average and the best scores.**

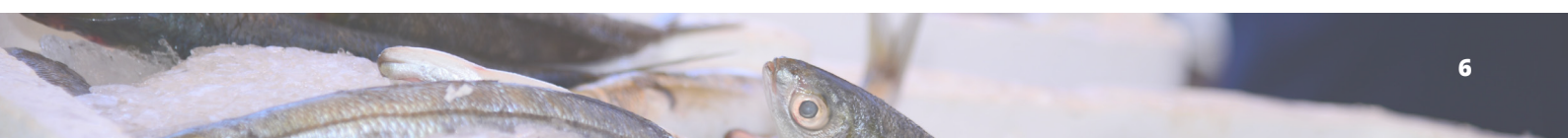
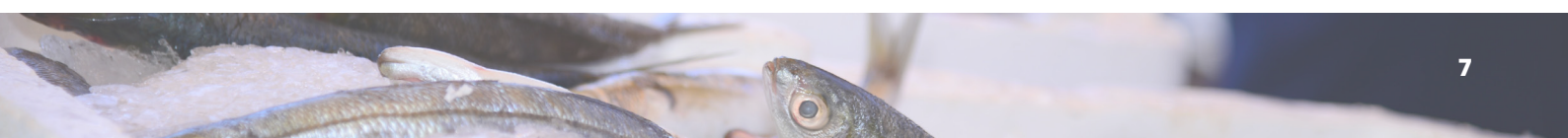




Table 1 below summarises our findings, using indicators to assess the environmental and financial sustainability of Carrefour’s seafood in France. Concentration/diversification indicators relate to the financial sustainability, all the others measure the environmental sustainability. Our results show that on 11 out of these 13 indicators, Carrefour is either performing well (see rows highlighted in green) or moving in a positive direction with room for progress (see rows highlighted in grey) for its seafood in France.

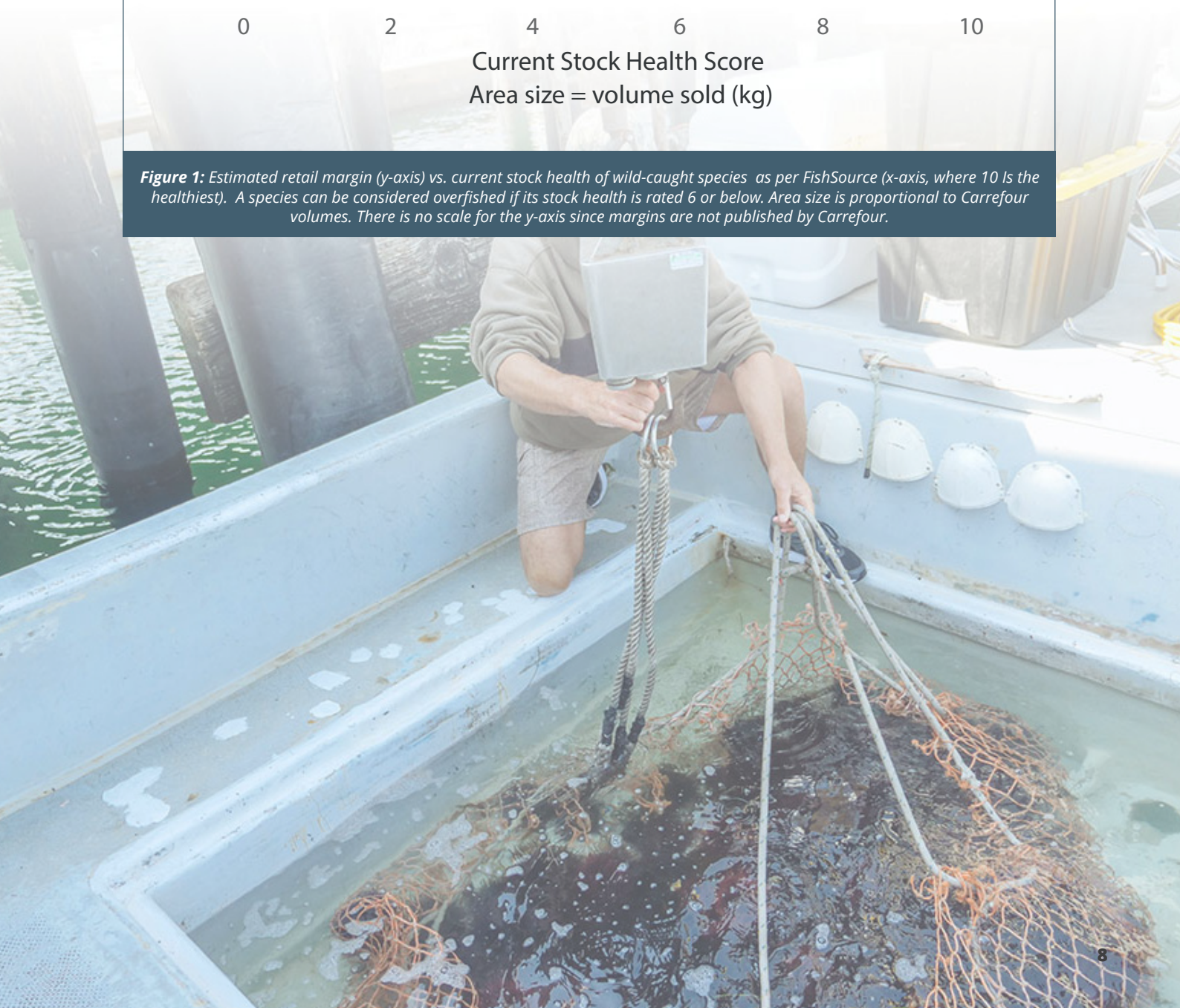
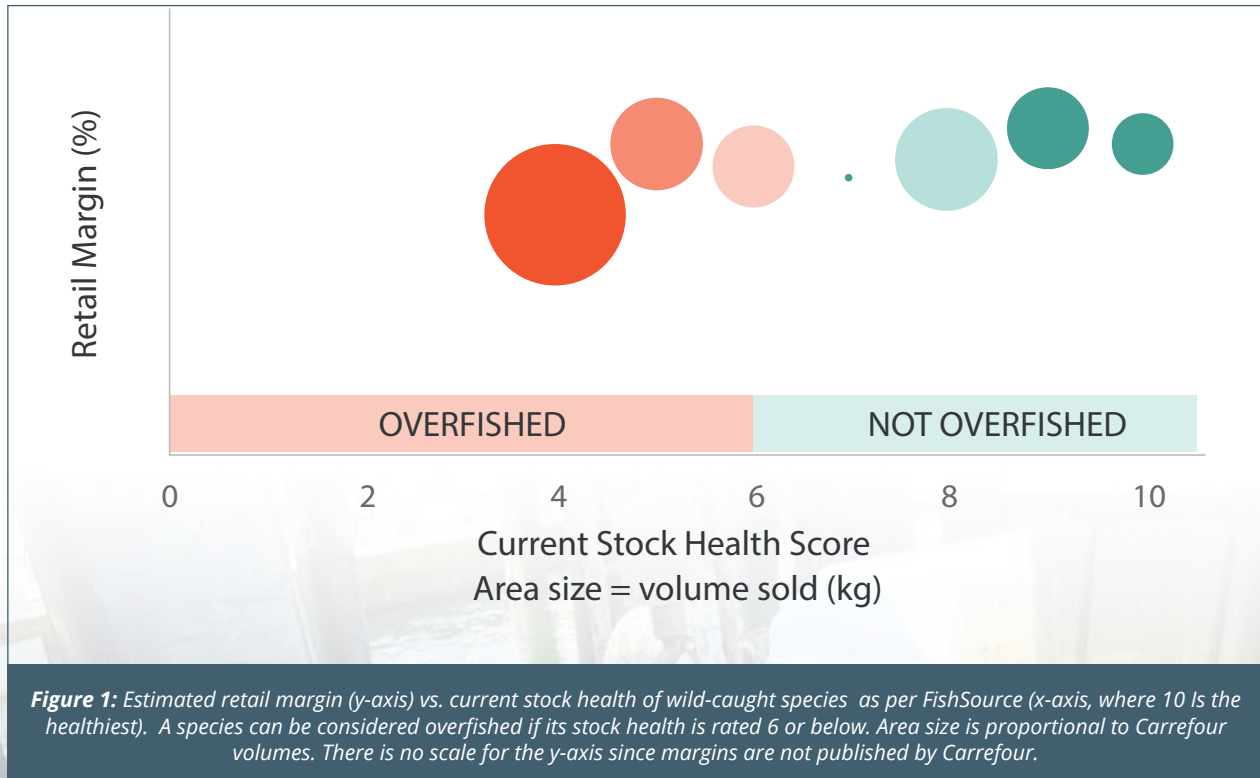
Table 1: Assessing the environmental and financial sustainability of Carrefour’s fresh and chilled seafood in France (Jan. 2020- Sept. 2021).^{vii}

Is Carrefour’s seafood...	Our assessment	Comment (all numbers are estimates by Planet Tracker)
... concentrated geographically?		65% of seafood volumes (in net weight terms) come from just three areas: North-East Atlantic, France, and Norway.
... diversified (in terms of species)?		Six species (mostly farmed) account for half of identified volumes, but the sum of the squared volume shares of each species is only 6%.
... diversified (in terms of suppliers)?		No external supplier accounts for more than 5% of volumes. The sum of the squared volume shares of each of the 265 suppliers is 4%.
... purchased from local companies ?		Carrefour (France) purchases 80% of its seafood from French companies.
... overfished ?		7%-16% of Carrefour (France) seafood revenue comes from overfished species.
... caught with selective fishing gear ?		Bottom trawling is likely to be the main fishing gear for wild-caught species sold by Carrefour in France (up to 30% of the volumes of identified species, above global and French averages)
... at risk of having been caught illegally ?		5% of Carrefour (France) seafood volumes might come from unreported sources, a much lower proportion than the French or the global average.
... expected to see a decline in future stock health ?		The stock health of 30%-43% of Carrefour’s wild-caught fish (in revenue terms) is degrading, but less than the global average.
... coming from species whose populations are declining ?		For wild-caught species sold by Carrefour in France, the proportion of species whose population is declining is similar to those whose population is stable or increasing.
... coming from threatened species ?		Carrefour (France) purchased and sold Atlantic bluefin tuna caught in the wild just before the IUCN deemed the species to no longer be threatened, but the associated revenue contribution is minimal, and this is the only threatened species for which we could find evidence of purchase by Carrefour.
... associated with a significant level of discards ?		For every 100 tonnes of wild-caught seafood sold by Carrefour in France, another five tonnes of seafood were discarded at sea, a lower proportion than the French and global average.
... farmed sustainably ?		Based on SeafoodWatch data, Carrefour’s farmed seafood is rated in line with the global average. Further progress could be made on fish escapes, independence from wild fisheries and chemical use.
... certified by MSC or ASC?		Almost half of Carrefour seafood is MSC or ASC certified (in value terms).





Importantly, our analysis shows that **improving the overall sustainability of Carrefour's seafood sourcing would generally come with improved financial health too**. For instance, we estimate that the retailer generates some of its lowest seafood margins on the most overfished species – see Figure 1, so it would make sense to at least partially replace these with more profitable and more sustainable species.





How Carrefour and its financial backers can improve ocean health

To reap the benefits of this change, Carrefour needs to implement the following actions:

Optimise its internal systems and engage with suppliers to ensure that the methods, location and date of harvest are consistently tracked, along with the exact name of the species.

Educate consumers and engage with suppliers with a view to:

- Reducing the sale of **overfished species**, the sale of species where **stock health is deteriorating**, and the sale of species that contribute the most to Carrefour's total **discards** of seafood or that form the highest sources of **unreported catch**.
- Reducing the proportion of seafood harvested by **bottom trawlers** (we estimate it at up to 30%) to strengthen Carrefour's commitment to offer species caught with selective fishing gear. This would also have positive implications in terms of carbon emissions given the high carbon footprint of bottom trawling.^{viii}

Switch to suppliers of farmed seafood with **lower levels of escaped fish, chemical use and a higher independence from wild fisheries**.

Not solely rely on **certification** as a barometer of sustainability for seafood, but instead use a transparent methodology to assess seafood sustainability, such as the [one in this report](#).

Issue a time-bound target aiming at ensuring that a significant proportion of their seafood is **fully traceable**.

None of this is possible without Carrefour tracking the 'what' (scientific names), 'where' (exact location of farming/capture), 'how' (fishing gear or farming method) and 'when' (date of harvesting) for its seafood.

Disclosing the first three of these indicators publicly, for instance on the [Ocean Disclosure Project](#), would generate one-off estimated net financial benefits equal to 3% of the estimated gross profit made on seafood in France, using conservative assumptions including a 0.1% increase in the value of the Carrefour brand in France

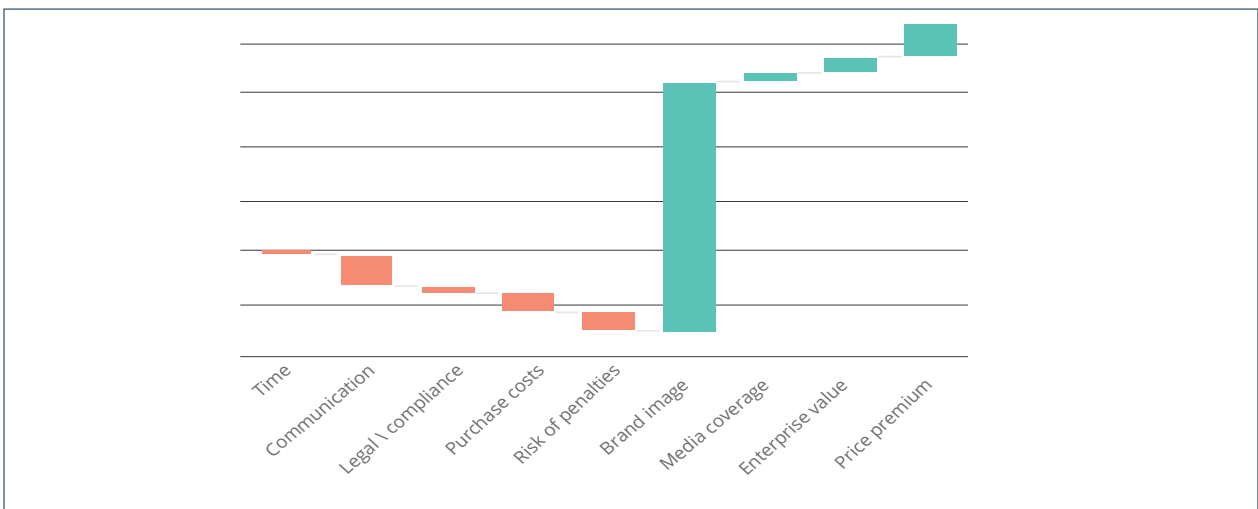
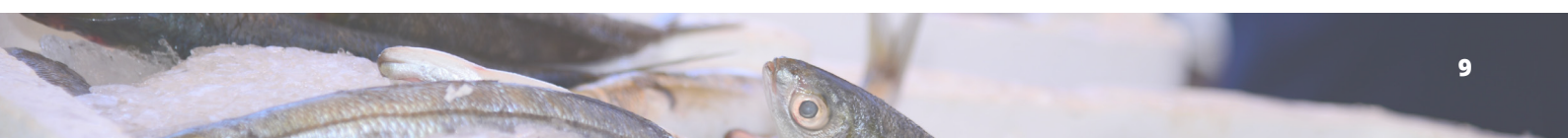


Figure 2: Estimating the net financial benefits of greater seafood supply chain disclosure for Carrefour France (in EUR millions, costs in orange, benefits in green). Numerical values on the scale have been removed since Carrefour does not publish profitability data.





A powerful way to monitor and disclose details on Carrefour's seafood while encouraging greater sustainability earlier in the supply chain would be for Carrefour to give preferential treatment to suppliers of **fully traceable fish**. **Carrefour could signal it is taking seafood traceability seriously by pledging to implement the Global Dialogue on Seafood Traceability (GDST) standards**, as many other food retailers already have,^{ix} and issuing a **time-bound target aiming at sourcing a significant share of their seafood volumes from fully traceable fish**.

Why financial institutions should engage with food retailers on seafood sustainability

By engaging with Carrefour on greater disclosure, transparency, sustainability and traceability of their seafood, a financial institution could win multiple times:

- as a **shareholder**: greater disclosure and more sustainable and profitable seafood sourcing would both translate into higher profits for Carrefour
- as an **issuer**, by issuing a sustainability-linked loan conditioned to e.g. traceability or transparency targets
- as a **lender**, by supporting any initiative aimed at providing financial incentives to suppliers that e.g. implement traceability solutions or disclose more of their seafood supply chains
- as a **sustainable finance institution**, by showcasing that providing capital to increase the sustainability of ocean ecosystems is both the right thing and a good thing to do.

Financial institutions should therefore demand greater seafood disclosure, transparency, sustainability and traceability from food retailers.

*greater disclosure and more sustainable and profitable seafood sourcing would both translate into **HIGHER PROFITS***



INTRODUCTION: The Power of Food Retailers

Fishing companies are rightly blamed for overfishing. They are the ones 'pulling the trigger' on excess catches, i.e. those that push fish biomass below sustainable levels. But what is the role of the food retail sector?

Global demand for seafood has doubled on a per capita basis since the 1960s, and the share of overexploited fish stocks is at an all-time high. Aquaculture has surpassed wild capture production globally, and while it has to some extent alleviated the pressure on wild fish populations, farmed seafood has come with a plethora of environmental issues.^x

Despite that, sustainable management and recovery of ocean ecosystems is possible, but it requires change. **Food retailers have an immense power to drive that change**, by channelling demand for seafood out of unsustainable farmed seafood and overexploited wild stocks and towards sustainably managed and produced fish. **All it takes is a change in sourcing decisions.** It is by no means easy, nor quick to implement, but doable, and as this report shows, might well turn out to be profitable.

Introducing Planet Tracker's [Seafood Sustainability Protocol](#)

Yet before that, it is vital to know how sustainable the seafood offered by food retailers is. To ensure a consistent framework and simple comparison across companies, we have designed a set of publicly-available methodologies that enables every company selling or purchasing seafood to assess the environmental sustainability of their seafood.

By using our interactive Seafood Sustainability Protocol, and based on the type of data they already have, each of these companies can now find out how to obtain data they might miss and how to assess the environmental sustainability of their seafood purchase/sale.

For instance, companies that possess sale data on seafood by species but without origin or mention of the harvesting method used will be shown how to estimate the missing data and how to use it to determine how sustainable their seafood is.

Through a case study of our Seafood Sustainability Protocol applied to Carrefour (a large food retailer) in France, this report shows how any food retailer could assess the sustainability of its seafood products, link it to its sustainability and therefore implement profitable actions that would not only improve the health of oceans but also the company's financial health.





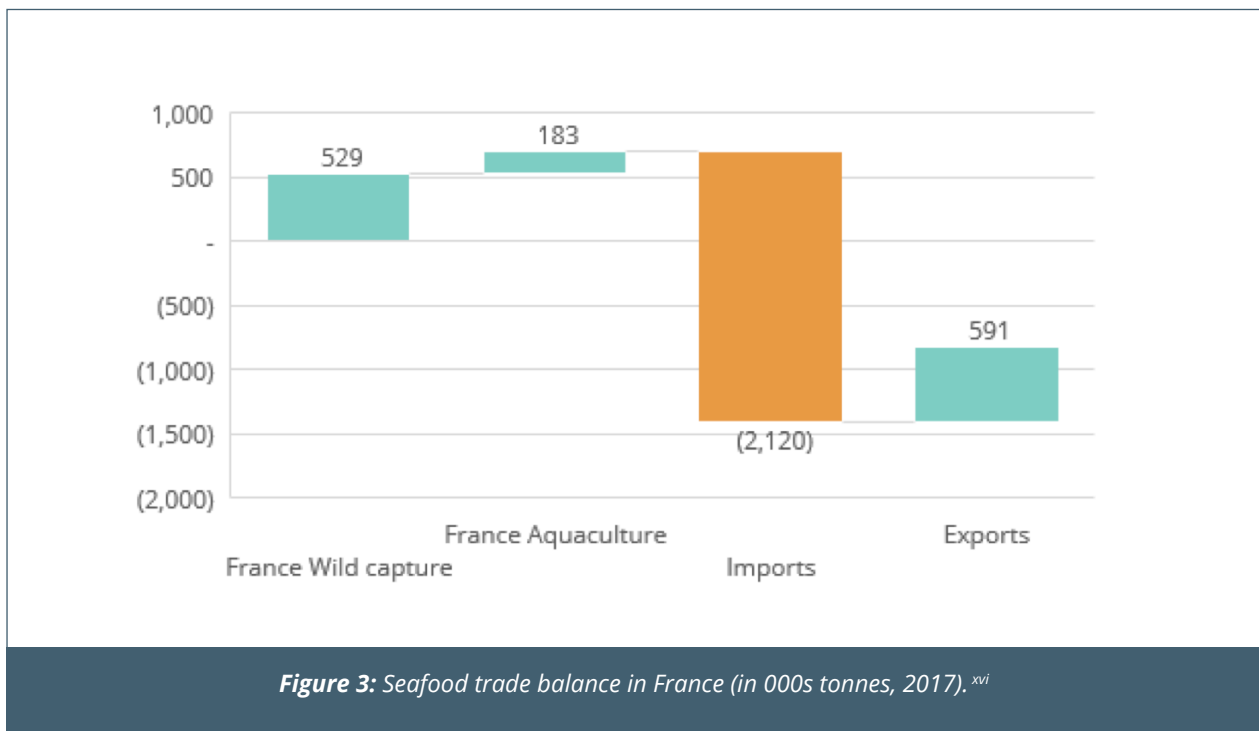
Why Carrefour, and why France?

Carrefour is one of the ten largest food retailers globally by revenue,^{xi} with net sales of EUR 70.7 billion in 2020. The group operated 13,048 stores in 2020 in over 30 countries globally, of which 5,592 in France, its main market, accounting for 48% of sales. The key other markets are Spain, Italy, Belgium, Romania, Poland, Brazil, Argentina and Taiwan.^{xii}

Carrefour is therefore a good candidate to understand the links between sustainability and profitability at large, global food retailers. In December 2020, for the fourth consecutive year, Carrefour's CSR policy was ranked first among French retailers and in the top five global retailers by the DJSI² index, a benchmark index evaluating the results of CSR policies of more than 3,500 companies worldwide.^{xiii}

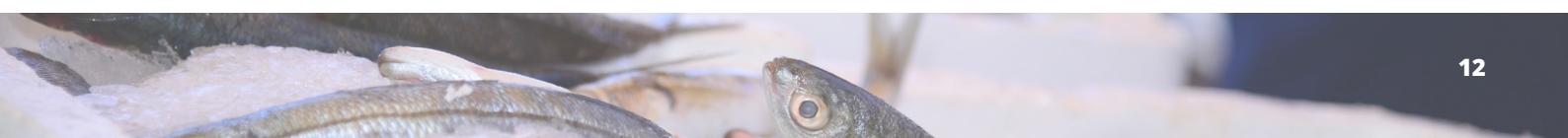
Carrefour is the second largest food retailer in France, with a value share of 20.7% in 2020 as per Nielsen,^{xiv} behind E. Leclerc Group.

France is now a relatively mature seafood market, with seafood per capita consumption of 34 kgs in 2017, stable throughout the previous decade, but up 64% in fifty years, when global seafood per capita consumption doubled. France imports more seafood than it produces and therefore **demand from French consumers ultimately affects fish stocks globally** – see Figure 3. The proportion of overexploited fish stocks³ globally is at an all-time high – see Figure 4.^{xv}



2 Dow Jones Sustainability Indices

3 i.e., those where abundance is below the level that can produce the maximum sustainable yield (MSY). The proportion of fish stocks within biologically sustainable levels constitutes indicator 14.4.1 of the Sustainable Development Goals (SDGs).



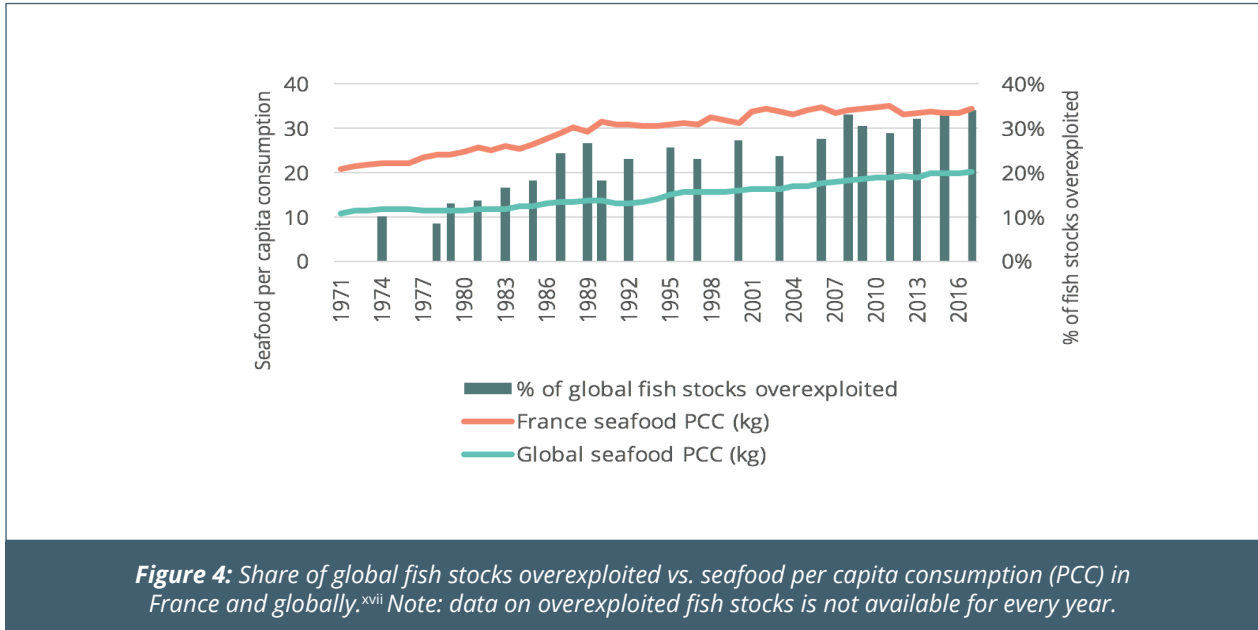


Figure 4: Share of global fish stocks overexploited vs. seafood per capita consumption (PCC) in France and globally.^{xvii} Note: data on overexploited fish stocks is not available for every year.

Whilst France’s seafood production and exports have remained relatively stable since the turn of the century, imports have risen steadily. Norway, the UK and Spain are the main origin markets, followed by Ecuador, the Netherlands, Iceland, China and Denmark. Salmon, prawn, tuna and cod were the most imported species in value terms.^{xviii}

Overall, French consumers spent EUR 7.4 billion (USD 8.3 billion) on seafood for at-home consumption in 2019 and supermarkets are by far the most used distribution channel for seafood products, with a c. 70% value share.^{xix} We estimate that Carrefour captured a c.10% value share of at-home seafood consumption expenditure in France in 2020.^{xx}

Investigation: How Sustainable is Carrefour’s Seafood?

Planet Tracker is very grateful to Carrefour for having shared their dataset on fresh and chilled seafood sourcing in France (most frozen and canned seafood products are not included), covering the period from January 2020 to September 2021. In the remainder of this document, we will use the words ‘Carrefour’s seafood’ or ‘Carrefour’s seafood in France’ to refer to these products.

We first provide details on the seafood sold by Carrefour in France, then assess its sustainability and its profitability using a weighted-probability model and finally issue recommendations on how Carrefour could profitably improve the health of the ocean. Please see the Methodology: How We Investigated section for important details on how our estimates and associated conclusions were derived.



What seafood does Carrefour France sell?

Carrefour France seafood: half wild-catch, half farmed

In volume terms, we estimate that mariculture (seafood farmed in the sea) accounts for the largest proportion (49%) of Carrefour's offering, closely followed by marine wild-caught fish (45%) – see [Methodology](#) for details on how we computed this. However, wild-catch accounts for almost two-thirds of Carrefour's offering in terms of number of products – see Table 2.

Table 2: Estimated split of Carrefour France Seafood origin by habitat (marine / freshwater / unclear) and capture technique (wild catch / aquaculture / unclear):^{xxi}

Split of Carrefour seafood in volume terms (kg)				
	Aquaculture	Wild Catch	Unclear	Total
Marine	49%	45%	3%	98%
Freshwater	2%	0%	0%	2%
Unclear	0%	0%	0%	0%
Total	51%	46%	3%	100%
Split in purchase value terms (EUR)				
	Aquaculture	Wild Catch	Unclear	Total
Marine	44%	49%	4%	98%
Freshwater	2%	0%	0%	2%
Unclear	0%	0%	0%	0%
Total	46%	50%	4%	100%
Split in number of SKUs ⁴				
	Aquaculture	Wild Catch	Unclear	Total
Marine	30%	65%	3%	97%
Freshwater	2%	0%	0%	2%
Unclear	0%	0%	0%	1%
Total	32%	65%	3%	100%

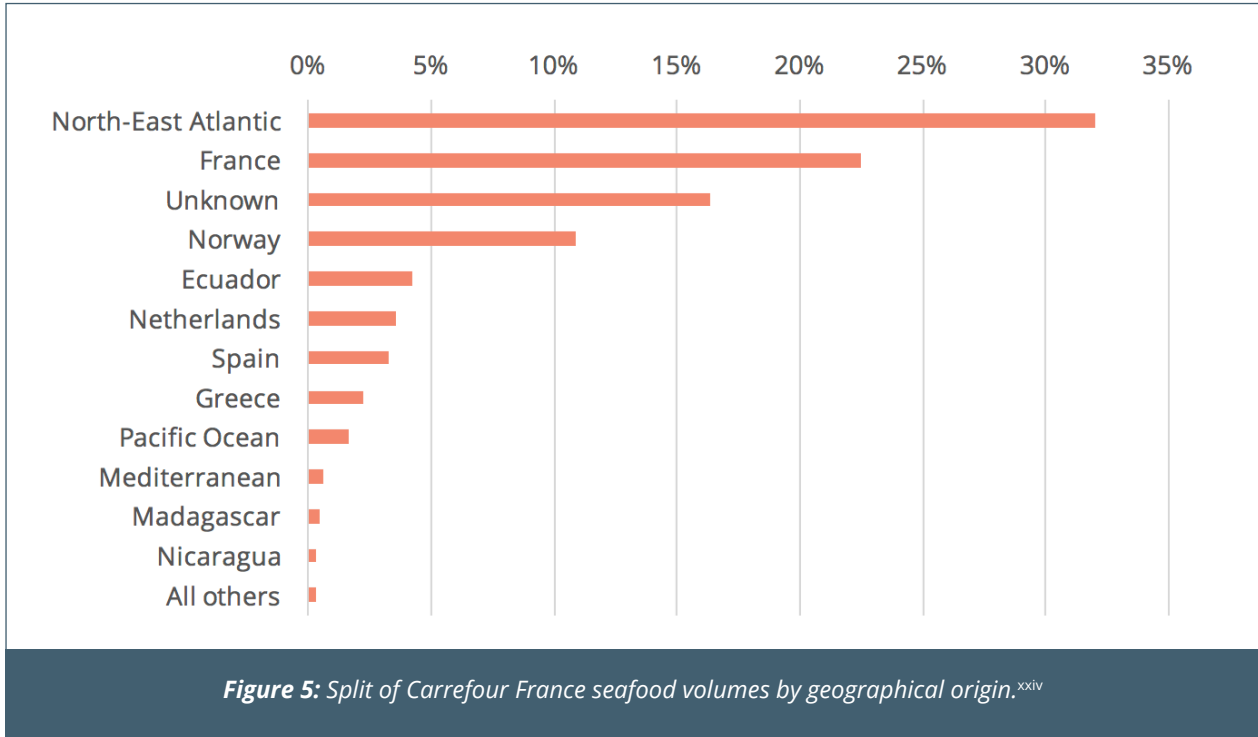
Note: for some products (especially heavily processed ones), it was impossible to attribute an origin. These are referred to as 'Unclear'.

In comparison, farmed seafood represents only a third of seafood consumption in France,^{xxii} meaning that Carrefour is relatively more skewed to aquaculture.

A highly concentrated sourcing geographically

In volume terms, 84% of the products analysed have an indication of geographical origin. 65% of these come from just three areas: North-East Atlantic, France and Norway^{xxiii} – see Figure 5.

4 A number (usually eight alphanumeric digits) that retailers assign to products to keep track of stock internally, once it arrives from a warehouse or distributor.



With up to 65% of its volumes coming from the EU, Carrefour (France) is particularly sensitive to any change in EU regulations on fisheries and aquaculture.^{xxv}

Note: the indications of origin are not harmonised – there are both countries (e.g. Ecuador) and areas (e.g. North-East Atlantic). As a rule of thumb, countries indicate the country where the species were farmed or the country where the product was processed and areas indicate where the product was caught, but there can be exceptions.^{xxvi}

Low level of supplier concentration

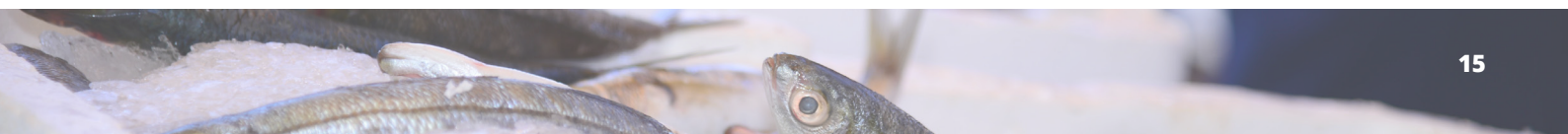
No external supplier (i.e. not controlled by Carrefour) accounts for more than 5% of total seafood volumes. This is a positive for Carrefour in terms of its financial sustainability, and in particular its ability to negotiate favourable purchase prices on its seafood.

The sum of the squared volume shares of each of the 265 suppliers is 4%, indicating a low level of supplier concentration⁵. Indeed, looking at the 462 categories of seafood products Carrefour uses in its classification, there are on average 6 suppliers per category (the median is 3).^{xxvii}

Carrefour purchases 80% of its seafood from French companies

Analysis of the nationality of Carrefour suppliers of seafood (265 companies) shows that the vast majority of them are French-based. We estimate that 80% of Carrefour's purchase on seafood in France (in EUR) goes to French-based companies, including overseas France. This is a positive in terms of sustainability as EU-based companies are subject to sustainability-related rules that are more stringent than the global average.

5 A market where the sum of the squared market shares of each participant is below 15% is considered a competitive one (US Department of Justice). So at Carrefour France, the 'market shares' of each species are not high enough to consider Carrefour France a consolidated seafood market.





The proportion of French-owned companies that supply Carrefour France is lower, though. For instance, Mowi Boulogne is a French subsidiary of Norwegian listed salmon producer Mowi and Cité Marine is owned by Nippon Suisan Kaisha.^{xxviii}

In 2020, Carrefour made a commitment to wholesalers to support French fishing by guaranteeing volumes and purchase prices on ten major species. In Spain, the group signed an agreement with the local fishing sector “to remove the uncertainty of auction prices by guaranteeing fishermen sustainable prices”.^{xxix}

Six species (mostly farmed) account for half of identified volumes

Out of the 97.6 million kg of products in the universe analysed (in net weight terms), we have been able to attribute 84.4 million kg to a specific species of seafood. Within the rest are either seaweed, frogs, snails, or heavily processed seafood products with no indications of the species used (e.g. fish soup).

We identified 622 species of seafood likely to be contained in these products (see [Methodology](#)). Only six species together account for 51% of the identified volumes as per our estimates: Atlantic salmon, Whiteleg shrimp, Atlantic cod, Blue mussel, Mediterranean mussel and Gilthead seabream. Within these, Atlantic cod is the only one that is not predominantly farmed – see Figure 6.



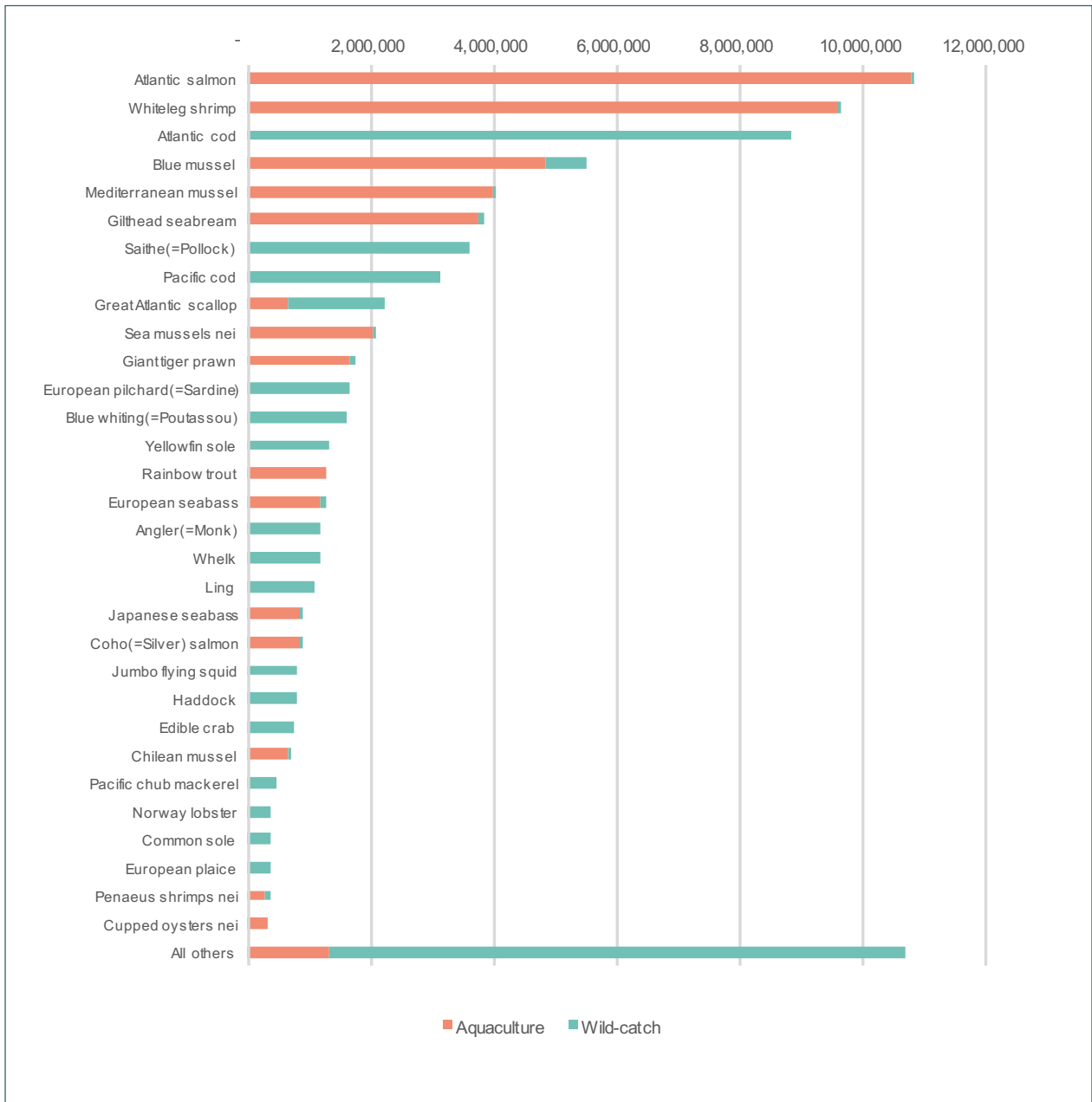


Figure 6: Estimated split of Carrefour France seafood volumes (in tonnes)^{lxxxix} by species and harvesting method⁶.

This is not to say that Carrefour’s seafood offering is highly concentrated: only four species account for more than 5% of total volumes each and the sum of the squared volume shares of each species is only 6%.^{lxxxix}

A high level of species concentration would jeopardise the financial sustainability of Carrefour’s seafood business, as it would make it more exposed to any natural capital-related risk that could affect a species in particular (for instance, the closure of one fishery due to diseases or a marine heatwave).

6 The absence of Alaska pollock in the top 30 is likely to be a limitation of our methodology, where we relied on indications in each product name. It is very likely that a significant portion of fish fingers contains Alaska pollock, but we have excluded from our analysis products without any indication on the potential species.





Now that we know what Carrefour sells, we can assess the sustainability of its seafood. How sustainable is Carrefour's seafood?

To assess the sustainability of the seafood sold at Carrefour, we followed a process described in the [Methodology](#) section on page 37, assessing different environmental indicators, with a focus on those which Carrefour pledged to work – see below.

Does Carrefour abide by its own sourcing commitments?

Since 2005, Carrefour has “committed to the responsible sourcing of wild-caught and farmed seafood”. In particular, Carrefour pledged to:^{xxx}

1. Offer species that are **not overfished**, caught with **selective fishing gear** and with a **low impact** on marine ecosystems.
2. Develop a **responsible aquaculture** that ensures more environmentally friendly farming practices, GMO-free feed, limits industrial fishing of small pelagics used as feed, reduces stress factors and prohibits the use of antibiotics as soon as possible.
3. **Diversify the seafood species** offered.
4. Fight against **illegal fishing**.
5. Support **local fishers and ban all threatened species**⁷.

Having shown (page 13) how diversified the seafood species offered by Carrefour are, and how Carrefour supports local fishers (page 12), in the following chapters, we review the sustainability of Carrefour's seafood and compare the results to the group's own commitments.

7%-16% of Carrefour France seafood sales comes from overfished stocks

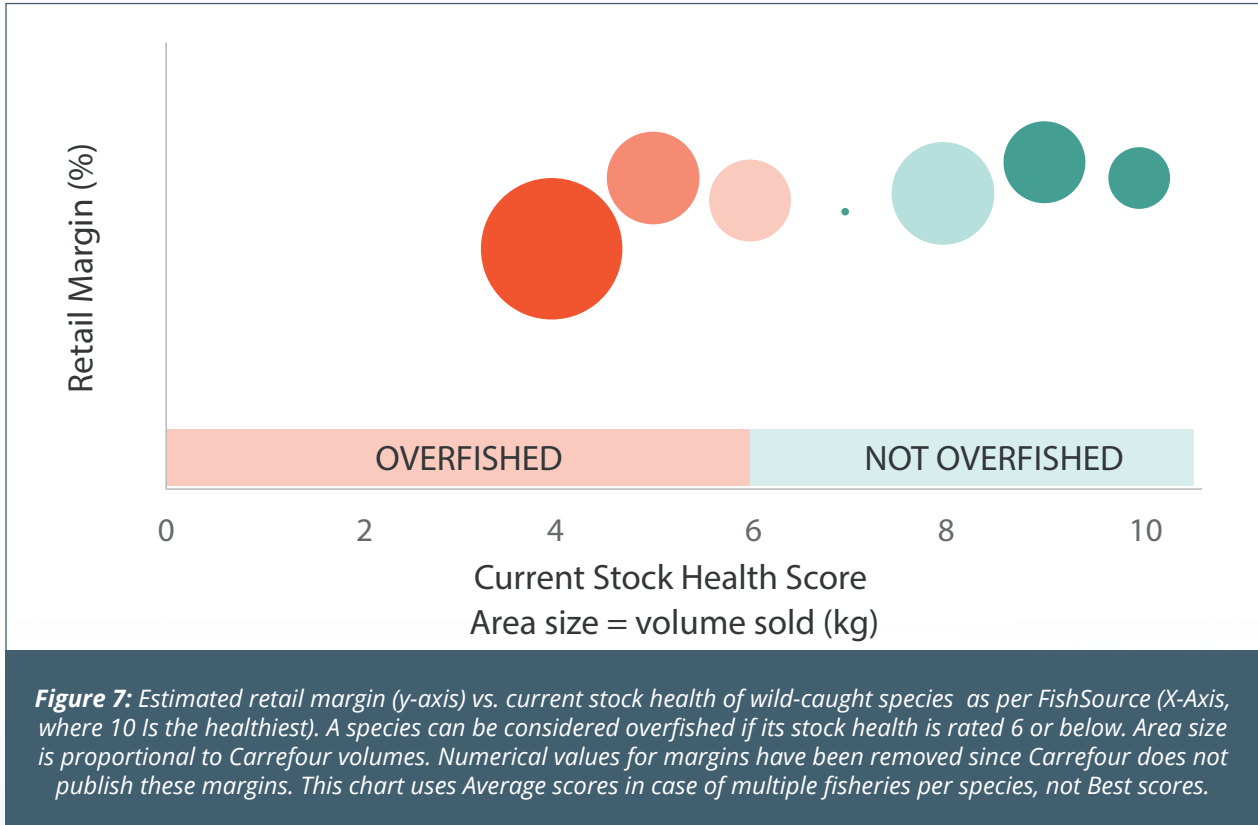
Assessment by FishSource on current stock health exists for half of the wild-caught seafood sold at Carrefour in France (in volume terms), in the form of a 0-10 grade, where 10 is the best.

Within these, 53% have a grade lower than 6 out of 10 in volume terms (net weight). The proportion is lower in retail revenue terms (32%) and retail profit terms (30%). This is because Carrefour generates lower prices per kg and the lowest margins on species with the worst stock health in our estimates – see Figure 7.^{xxx}

Whilst no universal definition of overfishing exists⁸, according to FishSource, stocks scoring 6 or below on current stock health can be considered to be overfished (under some definitions even some fisheries scoring 8 can be overfished).^{xxxii}

7 Note: sometimes Carrefour uses the words 'vulnerable species' instead (in French: 'espèces sensibles') - <https://www.carrefour.com/fr/rse/engagements/peche-aquaculture-responsables>

8 Some define overfished as being below the target biomass, others as below 80% of that target, or 50%.



However, if we assume that for each species, Carrefour only selects the fish stock that is in the best state (which we call 'Best scenario' or 'Best scores' in the remainder of this document), results vary radically: only 13% of revenue and 14% of retail profit on wild-caught seafood would come from overfished species.

Overall, factoring in the diverse actions Carrefour has implemented to ensure it favours species and fisheries with the best stock health, this means that between 13% and 32% of the group's wild-caught seafood revenue in France comes from overfished species. As a proportion of total seafood sales (including farmed species), the range is 7%-16%.

Disclosing actions taken to ensure only the stocks in the best health are selected would help refine the range above. Continuing to reduce the sale of overfished species would likely improve the average margin realised by Carrefour.





The future stock health of Carrefour's wild-caught fish is better than the global average

Perhaps even more important than current stock health is future stock health, as it ultimately drives future catches and therefore future revenue.

For 30% (using best scores) to 43% (using average scores) of current Carrefour revenue for which assessment of current and future stock health exists, the health of the stock of the underlying species is deteriorating – see Figure 8 and Figure 9.^{xxxiii}

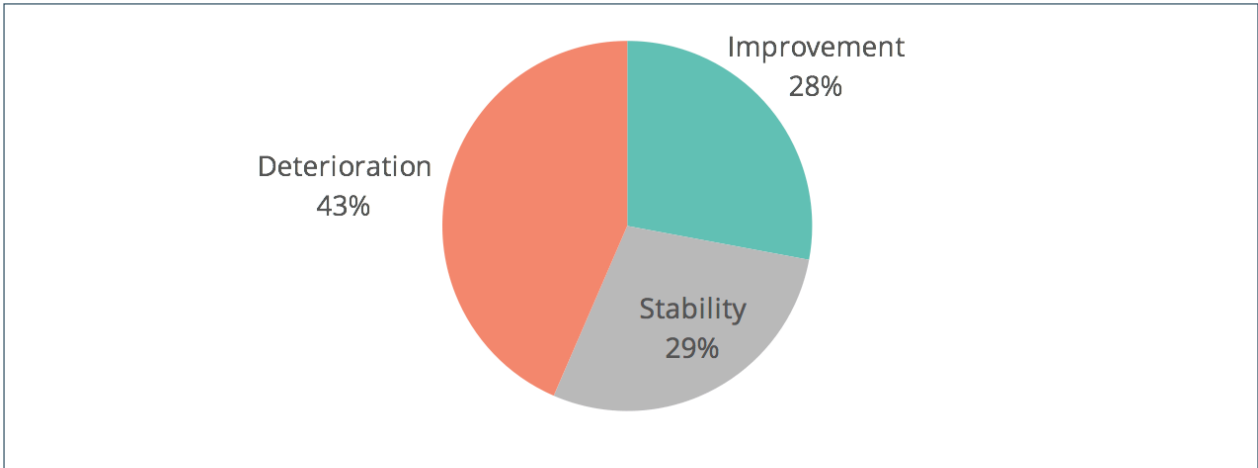


Figure 8: Estimated breakdown of retail revenue by stock health evolution – assuming **Average** scores.^{xxxiv}

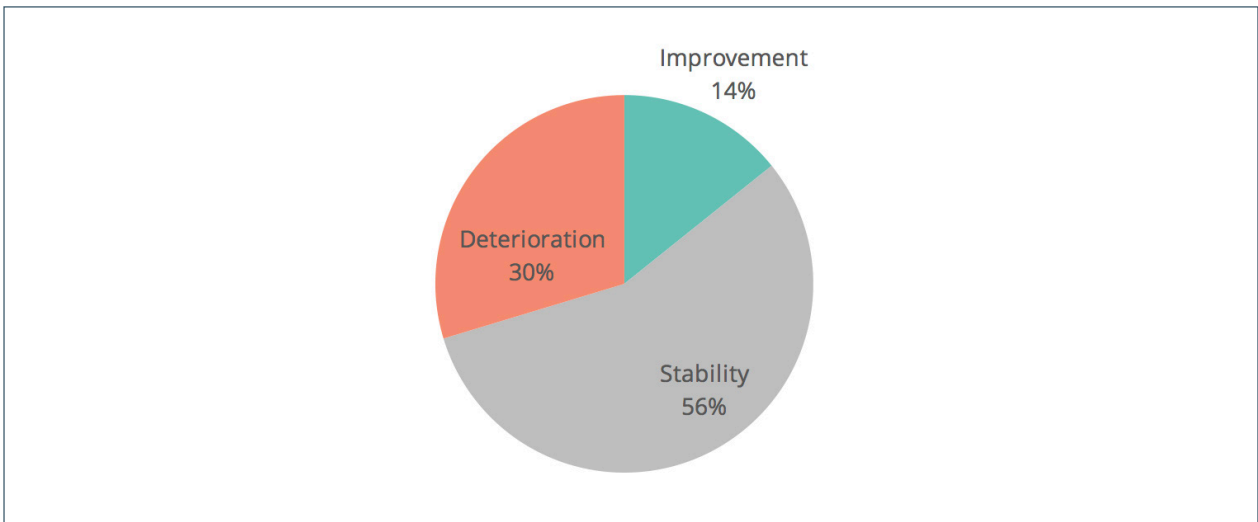
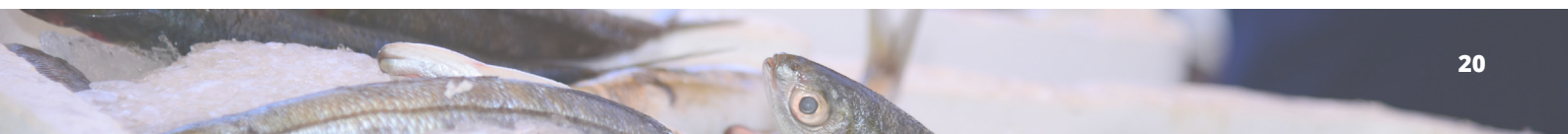
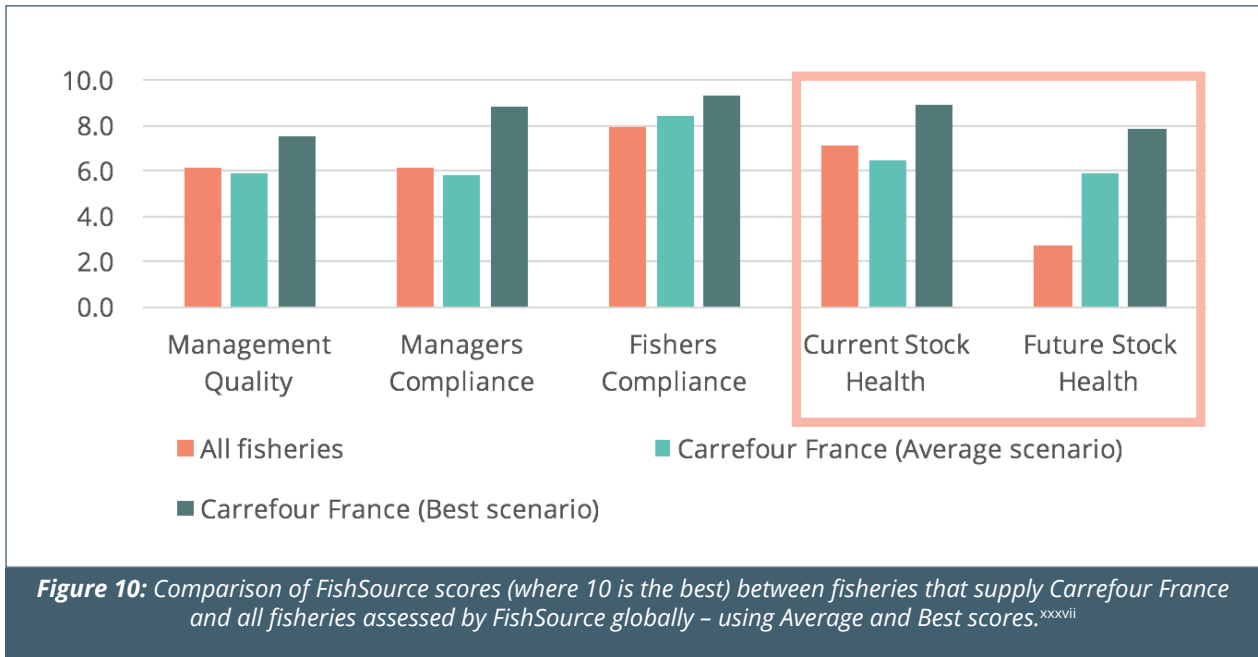


Figure 9: Estimated breakdown of retail revenue by stock health evolution – assuming **Best** scores.^{xxxv}

Whilst this constitutes a key risk for the future long-term supply of Carrefour wild-caught seafood, it needs to be put in the context of an **overall global decline in future stock health**. On average, future stock health is rated much worse than current stock health for all the fisheries assessed by FishSource. The magnitude of that decline is much worse than when looking only at fisheries that supply Carrefour^{xxxvi} – see Figure 10.





This means that whilst Carrefour France is likely to be negatively affected by the deterioration of future fish stocks, it is likely to be affected to an extent that is below the global average.

Any action taken by Carrefour France to mitigate that risk must therefore be replicated by other food retailers if they want to remain competitive





Fishing Gear Used: Not so Selective

Analysis of the fishing gear used for each species identified shows that **bottom trawling is likely to be the most used type of gear for wild-caught species sold by Carrefour in France** (up to 30% of the total volumes of identified species) – see Figure 11.



Figure 11: Estimated split of Carrefour France wild catch seafood volumes by fishing gear and species (using average scores - see Methodology section).^{xxxviii}





This proportion is higher than the average share of seafood caught by bottom trawlers, whether globally or in France – see Figure 12.

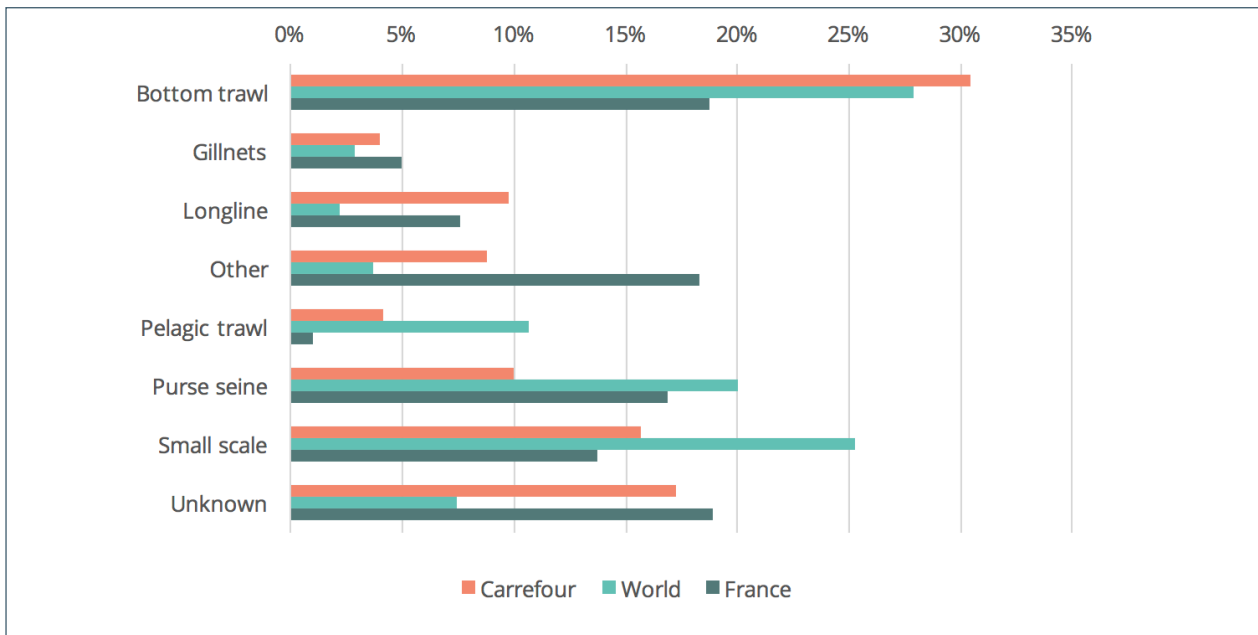
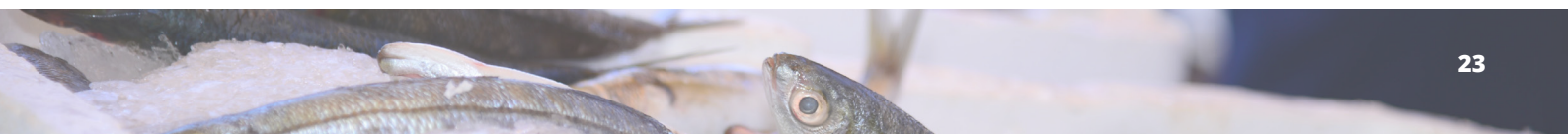


Figure 12: Comparative breakdown of the likely fishing gear used to catch species sold at Carrefour France vs. France's and global wild-catch production.^{xxxix}

Bottom trawling is one of the least selective types of fishing gear used. It is often singled out as possibly the most destructive industrial fishing practice, because it generates 28% of seafood landings globally but is responsible for up to half of all discarded fish and marine life worldwide. The primary sources of impact are the 'doors' of the trawl, which can weigh several tonnes and create furrows if dragged along the bottom, and the footrope configuration⁹, which usually remains in contact with the bottom across the entire lower edge of the net. In addition, bottom trawling is known to remove vast amounts of non-target species, including habitat forming deep-sea corals and sponges.^{xi} Carrefour has already stopped the capture of some particularly fragile deep-sea species, such as the Blue ling (*Molva dypterygia*)^{xii}; but bottom trawling is not only used for these species (for instance, Atlantic cod can be caught by bottom trawlers).

We believe that Carrefour would benefit from proactively disclosing the real proportion of seafood harvested by bottom trawlers, and a plan to reduce it, in line with its commitment to offer species caught with selective fishing gear.

⁹ The footrope consists of a rope, wire or chain which is attached to the bottom front of the net (the lower edge of the net mouth) to provide weight to keep the net on or near the seabed. Footrope configuration varies with trawls and the commercial species targeted, and can affect the level of negative impacts on the seabed and subtidal benthic invertebrates. To potentially reduce contact with the seabed, and therefore direct damage and disturbance, the footrope can be raised.





Exposure to illegal fishing: much lower than the average

Data on illegal, unreported and unregulated fishing (IUU fishing) is hard to come by. We therefore used 'unreported' catches as a proxy for IUU catches.

Please see '[Do you IUU?](#)' for an in-depth analysis of the risks posed by IUU fishing for listed companies, and see our [IUU Fishing Detection Toolkit](#) to assess the risk of IUU fishing at any listed company.

Based on Sea Around Us¹⁰ data on species and origins, we have estimated the proportion of wild-caught fish likely to come from unreported volumes at Carrefour France. This data was available for 63% of the total wild-caught volumes.

We estimate that **9% of these volumes comes from unreported sources, or about 5% of Carrefour fresh and chilled seafood volumes (including farmed fish)**. This is a much lower proportion than the French or the global average – see Figure 13.

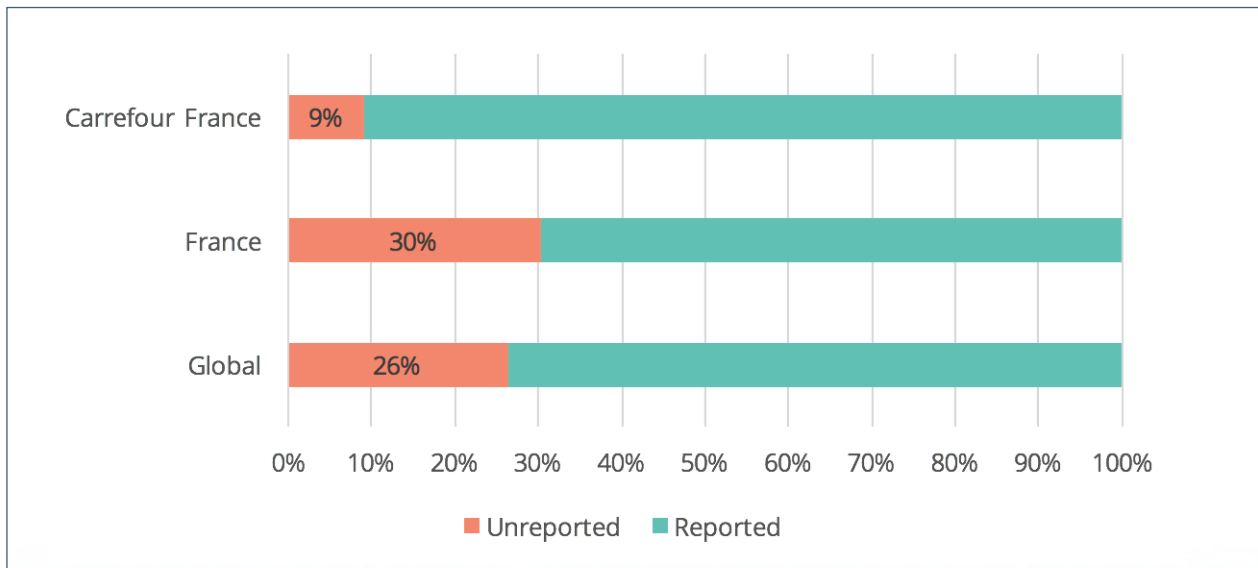


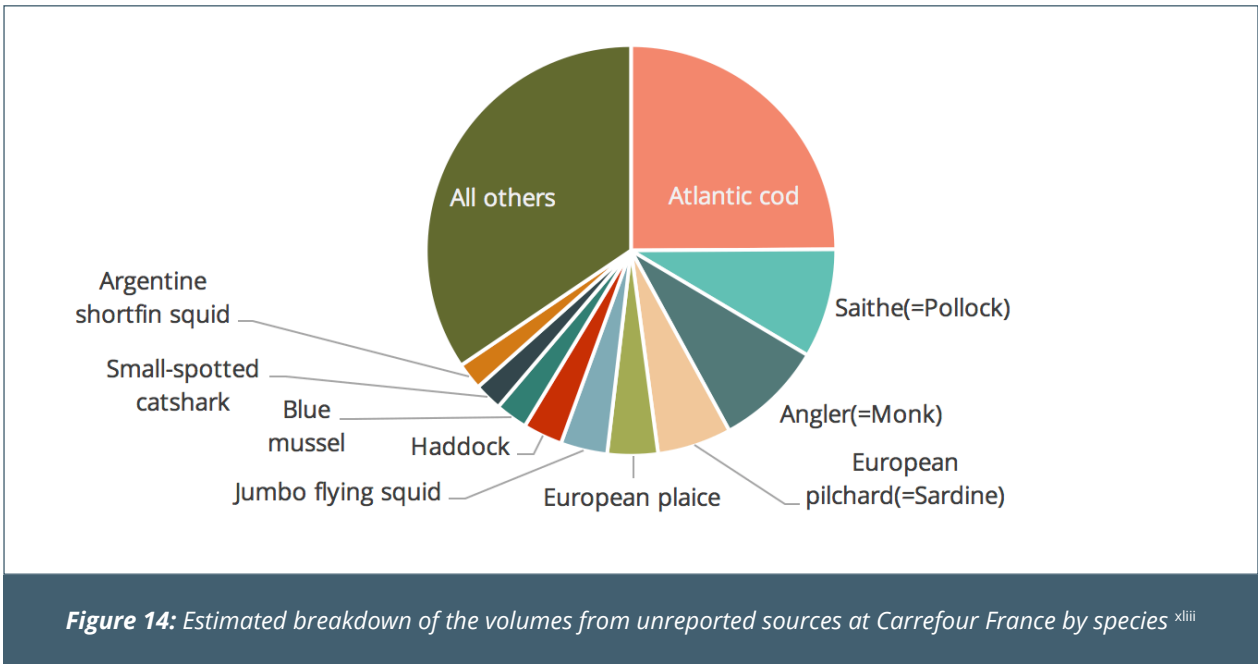
Figure 13: Comparative breakdown of the estimated proportion of unreported catch for species sold at Carrefour France vs. France's and global wild-catch production.^{xiii}

10

The Sea Around Us is an international research initiative and a member of the Global Fisheries Cluster at the University of British Columbia. The Sea Around Us assesses the impact of fisheries on the marine ecosystems of the world and offers mitigating solutions to a range of stakeholders.



We estimate that ten species account for exactly two-thirds of the volumes from unreported sources likely to be found at Carrefour France - see Figure 14.



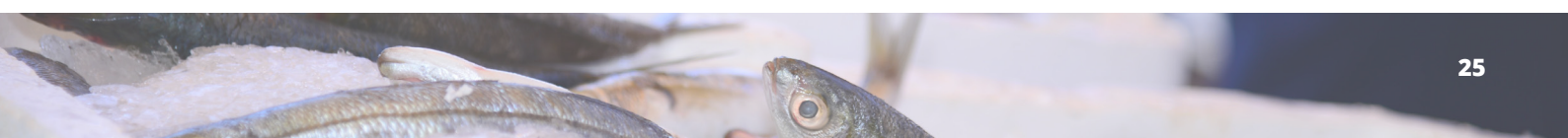
Note: 'unreported' does not mean 'illegal'. The reconstructed catch data estimated by Sea Around Us combines estimates of unreported catches - determined through extensive literature searches, consultation with local experts and calculation of discarded fish - with officially reported data for small and large-scale fisheries for every country. The data emerged from a decade-long catch reconstruction project. Unreported volumes are therefore the difference between the total estimated catches of each country and reported catches (i.e., official catch data reported by each country to the FAO) for both large- and small-scale fisheries.^{xliv}

Globally, unreported catches account for 26% of total reconstructed catches estimated by Sea Around Us and IUU fishing is estimated to account for around 20% of total catches.^{xlv} Some of the catch considered 'unreported' by Sea Around Us is unlikely to be considered IUU and some of the actual IUU catch is unlikely to be included in 'unreported' catch as per Sea Around Us, but overall, it is likely that 'unreported' catches are an acceptable proxy for IUU activity.

The commitment of the Carrefour group to fight against illegal fishing should be applauded. In 2016, it co-edited with the Environmental Justice Foundation and WWF a guide aimed at fishers to fight against illegal fishing.^{xlvi}

Below-average levels of discards for wild-caught seafood sold by Carrefour

Of the 97 million tonnes of seafood caught and landed globally every year, 8.3 million (9%) are estimated to be discarded at sea^{xlvii} – about sixteen times more than French wild seafood capture, or more than the total seafood consumed annually in the US or in Japan.





Using Sea Around Us and the same methodology for discards as for unreported volumes, we calculated that **for every 100 tonnes of wild-caught seafood sold by Carrefour in France, another five tonnes of seafood were discarded at sea** (c. half the global average). This is a much lower proportion than the French average - see Figure 15.

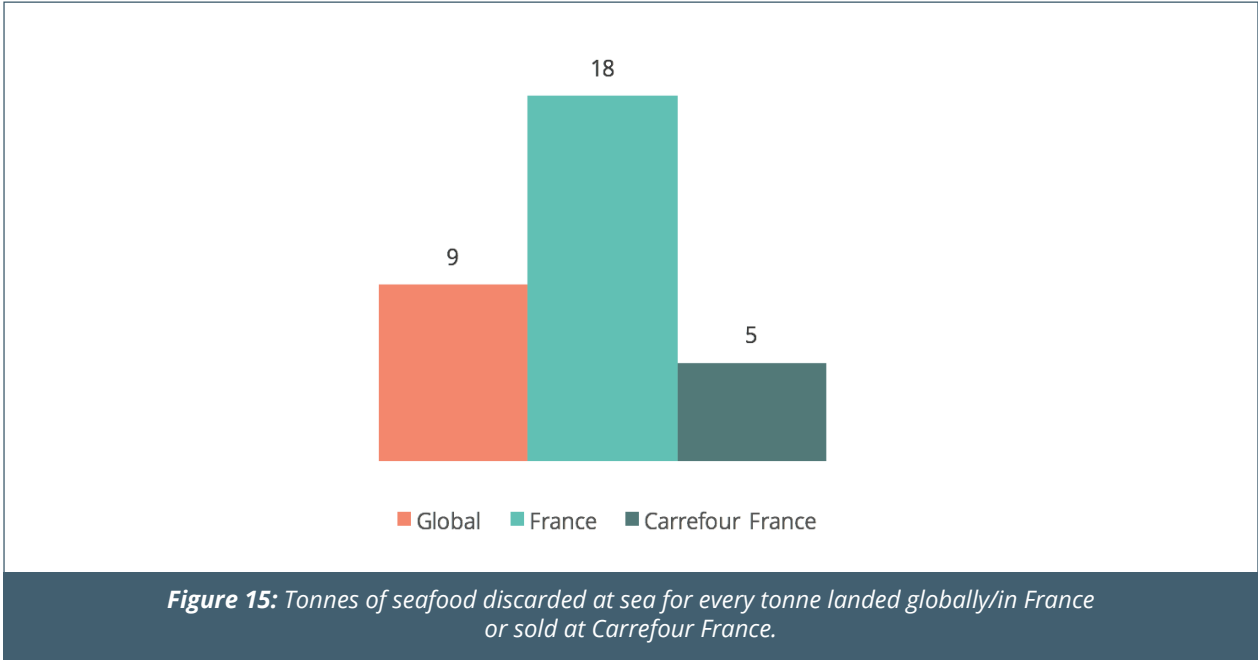


Figure 15: Tonnes of seafood discarded at sea for every tonne landed globally/in France or sold at Carrefour France.

The species with the most associated discards (in total volumes) sold by Carrefour are:

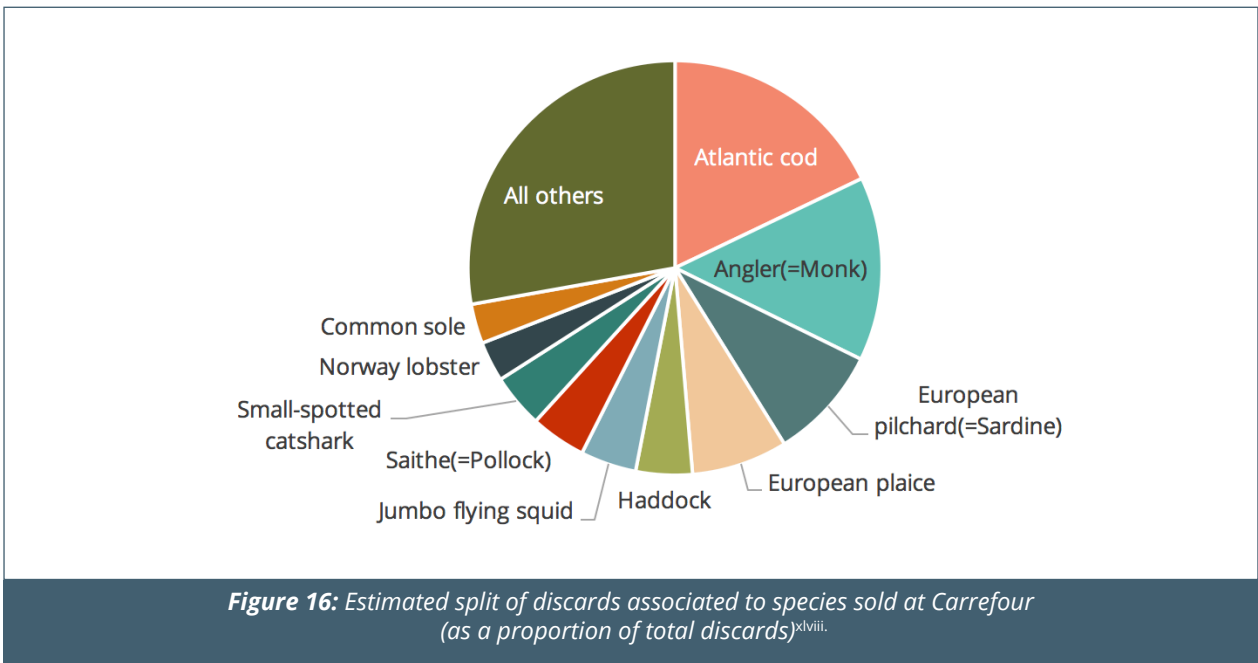
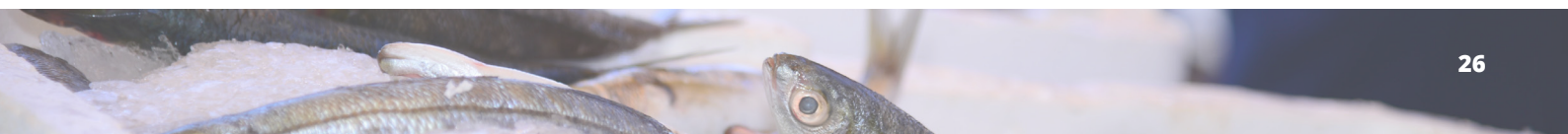


Figure 16: Estimated split of discards associated to species sold at Carrefour (as a proportion of total discards)^{xlviii}.





Species with a high proportion of associated discards and significant (>10 tonnes) volumes at Carrefour include Whiting (*Merlangius merlangus*), Spinous spider crab (*Maja squinado*), and the Common razor shell (*Ensis ensis*).^{xlix}

Threatened species are unlikely to be for sale at Carrefour in France

Out of the 44.6 million kgs of seafood we identified as wild-caught, we determined the exact species for 39.6 million kgs (89%). Within these, a total of 27 million kgs could be matched with an IUCN status (*Data Deficient, Least concern, Near Threatened, Vulnerable, Endangered or Critically Endangered*) – not all species have an IUCN status and some ‘species’ are groupings of several potential species.

Analysing the share of each status, we note the following:

- the proportion of wild-caught species whose status is *Least Concern* (i.e. the healthiest) is similar at Carrefour France to that seen globally, but below the French average (i.e. French fishing vessels capture comparatively more Least Concern species vs. what Carrefour France sells).
- this is only true if we use more recent assessments by the IUCN with a European scope only rather than older, global assessments. For instance, Atlantic cod was rated *Vulnerable* globally in 1996, but *Least Concern* in Europe in 2013, without updates on the global status. In Figure 17 below, we reflect the most recent scientific assessments.
- the estimated proportion of Carrefour France’s seafood volumes that is *Vulnerable, Endangered or Critically Endangered* (the definition of threatened species as per the IUCN)ⁱ is not zero.

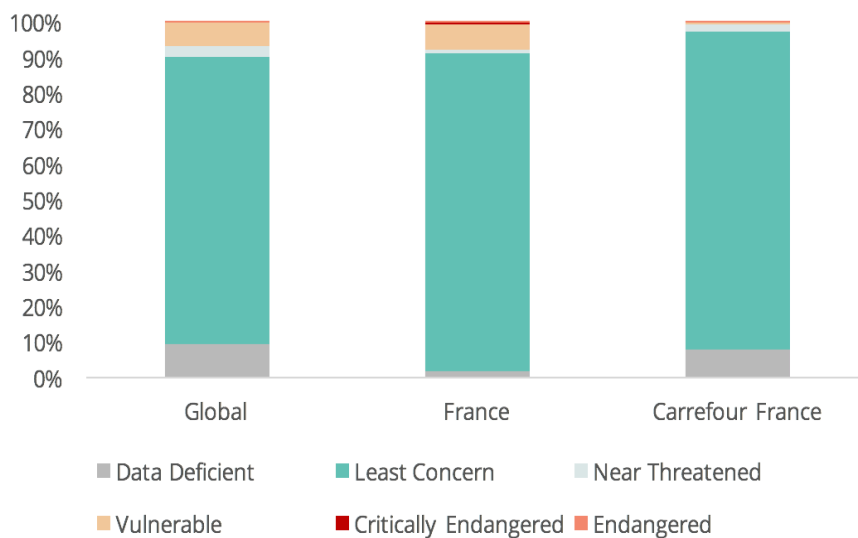
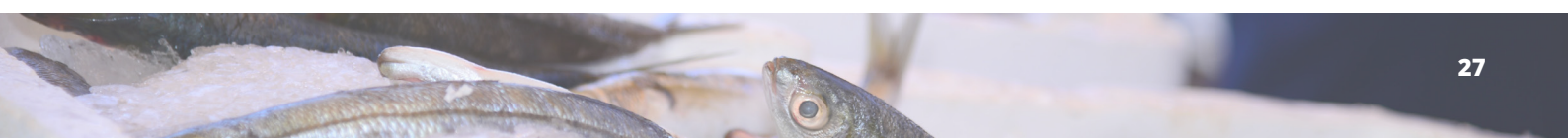


Figure 17: Comparative breakdown of the IUCN status of Carrefour France wild-caught seafood volumes, France’s wild-catch production and global wild-catch productionⁱⁱ





Threatened species in Carrefour stores?

To establish the list of potential threatened species likely to be found in Carrefour France stores, we have excluded species whose sale is forbidden in France - for instance, the Undulate ray (*Raja undulata*),ⁱⁱⁱ even though it is in theory possible that Carrefour unknowingly purchased some if the products were mislabelled earlier in the supply chain.

We have also excluded species whose global IUCN status is *Vulnerable* or *Endangered* but where a more recent local assessment (typically in Europe) has resulted in a more favourable assessment. This is for instance the case of the Atlantic cod (*Gadus morhua*)ⁱⁱⁱⁱ or the Haddock (*Melanogrammus aeglefinus*).^{iv}

We have also excluded species that Carrefour committed not to sell, such as the Blue ling (*Molva dypterygia*),^v even though our model suggests that Carrefour could have bought this demersal *Vulnerable* species.

Overall, **we could not confirm with certainty that threatened species were sold by Carrefour**, with one exception.

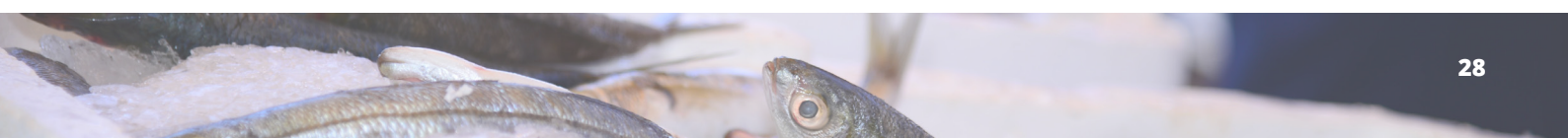
Carrefour purchased 22 tonnes of products clearly labelled as bluefin tuna ('Thon rouge' in French) during the period analysed, for a total of EUR 374k.^{vi} Whilst the group committed not to sell bluefin tuna in 2008 due to the bad state of the stocks, it was then resumed, under some conditions, such as the size of the fishing vessels (small vessels only) and the fishing gear used (only pole and line).^{vii} This is understandable given that the stocks of some populations (especially Atlantic bluefin tuna) had started to recover.

The data we analysed covered the January 2020 – September 2021 period. At that time, all three species of bluefin tuna (Atlantic, Pacific and Southern) were deemed to be threatened (i.e. either *Vulnerable* – Pacific bluefin tuna, *Endangered* – Atlantic bluefin tuna, or *Critically Endangered* – Southern bluefin tuna).^{viii}

Atlantic bluefin tuna is caught in the Atlantic ocean but also farmed in the Mediterranean. Given that indications on the origin of these products is either 'North-East Atlantic' (a FAO fishing zone), 'Mediterranean', or missing, it is likely that at least part of it (the one labelled as 'North-East Atlantic' was wild-caught.

The IUCN Status of the Atlantic bluefin tuna moved from *Endangered* to *Least Concern* in September 2021. This means that Carrefour France most likely purchased and sold at least one threatened species caught in the wild, although the IUCN status of that species changed soon after, as the health of the stock had recovered.

Assuming an unchanged mix of species, it is now unlikely that threatened species of seafood are for sale in France.

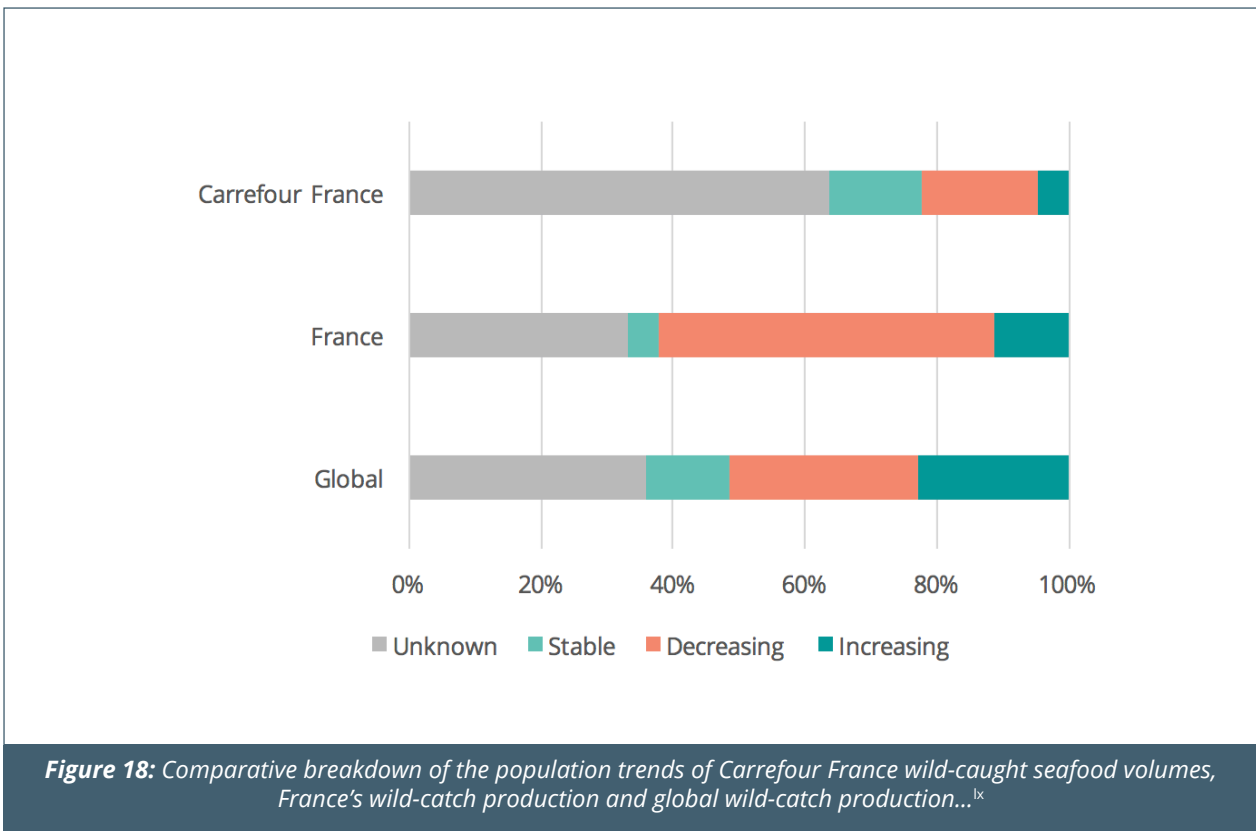




Population trends of Carrefour wild-caught species: below global average but better than the French average

The IUCN provides an assessment of the trends in the populations of the species it covers. Globally, of all the species of seafood wild-caught that have been assessed by the IUCN, 35% have increasing or stable populations, 29% decreasing populations, and trends are unknown for other species. Focusing on the species caught by French entities only, the trends are worse: a majority of the species are experiencing a decline in their populations.^{lvix}

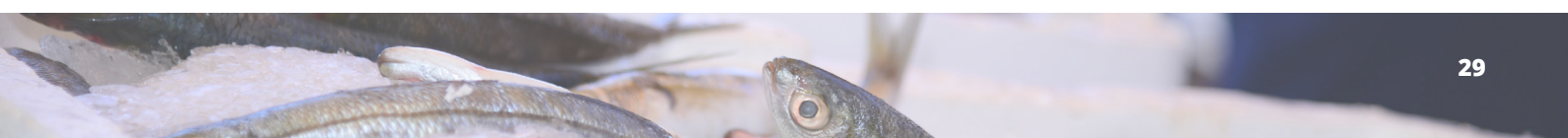
For wild-caught species sold at Carrefour in France, the proportion of species whose population is stable or increasing is similar to that of species seeing declining populations, but the overall picture is worse than the global average – see Figure 18.^{lvv}



Based on our estimates, some of the key species sold by Carrefour where the population is increasing include the European plaice (*Pleuronectes platessa*), the Atlantic herring (*Clupea harengus*) and the Common dab (*Limanda limanda*).

Key species sold by Carrefour France where the population is decreasing include the Yellowfin sole (*Limanda aspera*), the Atlantic mackerel (*Scomber scombrus*), the Swordfish (*Xiphias gladius*) and the Skipjack tuna (*Katsuwonus pelamis*).

This means that a significant share of future seafood revenue is at risk for Carrefour, given that the populations of fish that contribute to generating this revenue for Carrefour are decreasing.





Aquaculture is often mentioned as a potential solution to the declines of wild-caught species. But how sustainable is farmed seafood sold at Carrefour?

Carrefour's farmed seafood: sustainability in line with the average

To determine whether the farmed seafood offered by Carrefour in France was responsible and sustainable, we used scores attributed by SeafoodWatch.^{lxii}

Assessment and scores were available for species and country combinations accounting for 19.7 million kgs, out of the 44.1 million kgs (in net weight of finished product) of farmed seafood that we estimate Carrefour sold during the period analysed (retaining only identified species) – see [Methodology](#) section.

SeafoodWatch computes an overall score for each species, location and farming method (the higher the better), which is the combination of ten sub-scores.

The simple average of all assessments performed by SeafoodWatch for farmed seafood globally is a score of 4.7. The volume-weighted average score of the species purchased by Carrefour France is 4.1, or 5.5 if we assume that in each case Carrefour would choose the most sustainable option – see Figure 19.^{lxiii}

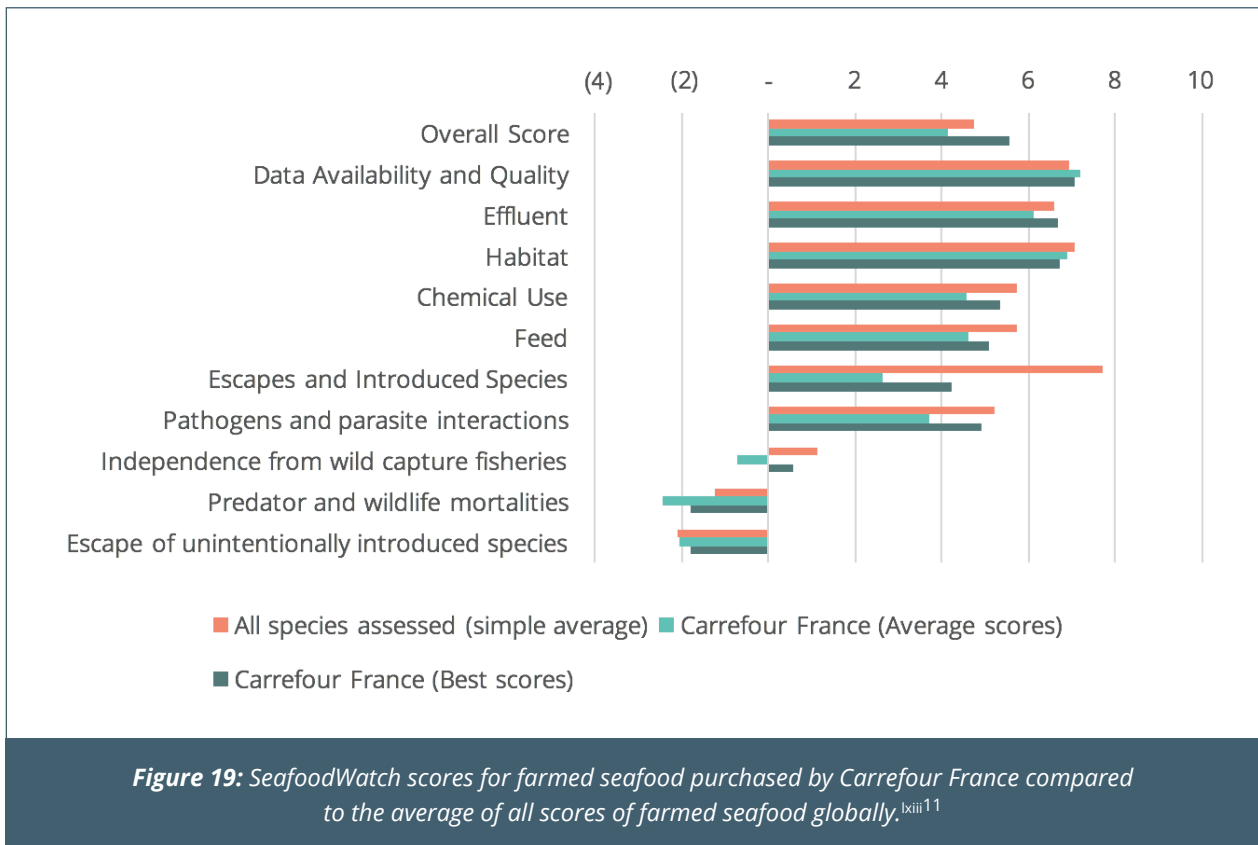


Figure 19: SeafoodWatch scores for farmed seafood purchased by Carrefour France compared to the average of all scores of farmed seafood globally.^{lxiii1}

11 Scores range between 0 (Worst) and 10 (Best), except for the last three (Independence from wild capture fisheries, Predator and wildlife mortalities, and Escapes) where they can be negative (higher scores indicate better performance in each case). See <https://prod.seafoodwatch.org/globalassets/sfw/pdf/standards/aquaculture/seafood-watch-aquaculture-standard-version-a4.pdf> for more details.





Escapes (i.e., the risk of and/or number of farmed fish that escape and their impacts on wild species), **independence from wild fisheries** (i.e., the degree of reliance on wild eggs, juveniles, broodstock, or other species used by the aquaculture industry), as well as **chemical use** (i.e., the environmental impact of antibiotics and other chemicals released by the farm) are the three indicators on which Carrefour diverges the most (negatively) from the global average - see Figure 19, even assuming that Carrefour would choose the most sustainable option for each species and origin combination in each case.^{lxiv} This is despite the group's commitment to limit the industrial fishing of small pelagics used as feed and prohibit the use of antibiotics as soon as possible.^{lxv}

Among the worst rated combinations of species and country of origin found at Carrefour France, the Atlantic salmon (whether raised in Norway or in the UK), and the Giant tiger prawn (especially from Ecuador) are the ones with the highest volumes at Carrefour France. Planet Tracker extensively discussed the environmental issues related to these species in *Salmon Feels the Heat*, *Loch-Ed Profits*, and *Shell Shock*, and how investors could help address them in *Bonds for Ponds*.

This should be caveated by a key methodological limitation: in the absence of details on the exact area within a country where a species is farmed, we took the simple average of all farming methods and areas for a given species and country, even though scores might vary widely.

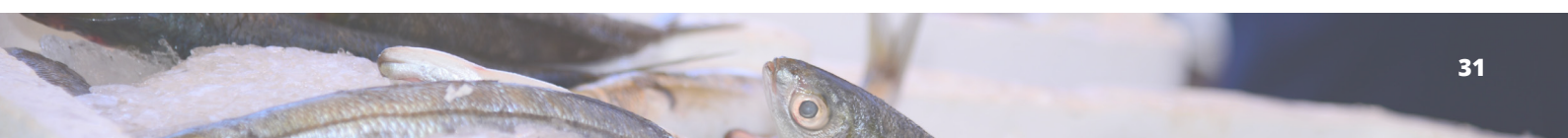
For instance, the aquaculture of Atlantic salmon in Norway using marine net pens is rated 3.7 by SeafoodWatch on average, with scores ranging from 2.8 (Karmøy to Sotra area) to 4.7 (East Finnmark area) depending on the area farmed.^{lxvi}

For farmed species, we could not find any significant variation in margins depending on the sustainability of the species farmed. However, because the multiple risks posed by unsustainable aquaculture are likely to result in additional regulatory scrutiny and financial costs (see *Salmon Feels the Heat*, *Loch-Ed Profits*, and *Shell Shock*), we argue that unsustainable aquaculture is likely to become less attractive financially eventually as additional costs are likely to be passed on through the value chain.

Could certification be an answer?

Almost half of Carrefour seafood is MSC or ASC certified (in value terms)

Carrefour uses certification as a key measure of sustainability for its seafood. The group set itself the target of having 50% of all the fish that it sells under its Carrefour brand (and under national brands at the traditional fish counter) coming from sustainable fishing practices by the end of 2020.^{lxvii} The definition of 'sustainable fish' is broad though, as it includes fish certified by MSC, ASC, organic fish, or fish branded Carrefour Quality Lines or sold under other responsible programmes. As at end 2021, only 35% of Carrefour-brand products generating sales of EUR 773 million (up 17% y/y) were categorised as sustainable based on Carrefour's own definition, meaning the company missed its target. The new target is for 50% of Carrefour branded fish and national brand products to come from sustainable sources (same definition as before) by 2025.^{lxviii}





Based on data supplied by Carrefour, we calculate that 49% of the seafood purchased by Carrefour France (in purchase value terms) was certified either by MSC (wild-caught seafood) or ASC (farmed seafood) between January 2020 and September 2021, looking at all fresh and chilled seafood products, not Carrefour-branded ones – see Figure 20.

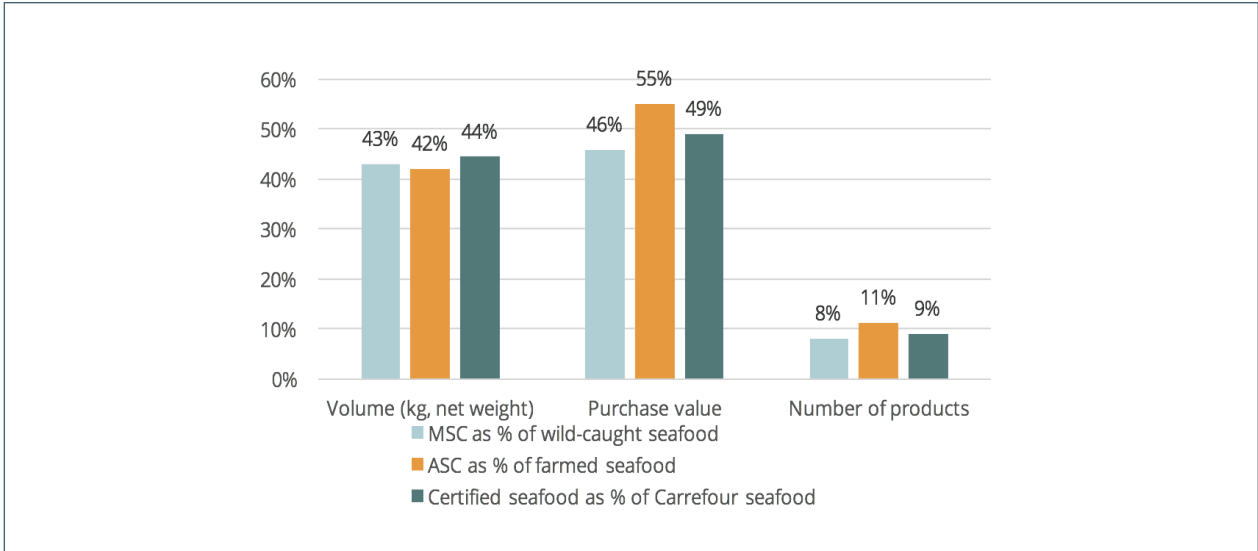


Figure 20: Proportion of certified fresh and chilled seafood at Carrefour France by harvesting method.^{lxix}

This relative abundance of certified products might not be obvious for consumers in Carrefour’s supermarkets though, given that less than 10% of the products on display are certified (in number of products, not volume terms).

Overall, our analysis shows that Carrefour has room for further progress on a series of seafood-related environmental considerations. This, of course, is based on the assumption that our model is correct. The reality could be different though. There is only one way to know: improved seafood supply chain disclosure.





RECOMMENDATIONS: How Carrefour and its Investors Could Profitably Improve Ocean Health

The Ten Stages of Seafood Sustainability Knowledge

For a retailer like Carrefour to be able to profitably improve ocean health, the key is to determine at what stage the retailer is on the seafood sustainability journey. Below, in Table 3, we have listed the key stages that any food retailer needs to progress through to be able to profitably improve ocean health through more sustainable seafood sourcing, based on the level of knowledge about its own operations that this retailer has at each stage. This knowledge is a pre-requisite for action.

By using our interactive [Seafood Sustainability Protocol](#), users are able to determine at which stage they are on the seafood sustainability journey, and how to progress further.

Actions to increase knowledge depend on which stage a food retailer has reached and include in brief: collecting data either internally or from suppliers, assessing the sustainability of the seafood offering based on this data, and lastly analysing the interlinkage between the sustainability of the seafood offered and its profitability to be able to design and implement a strategy that maximises both.

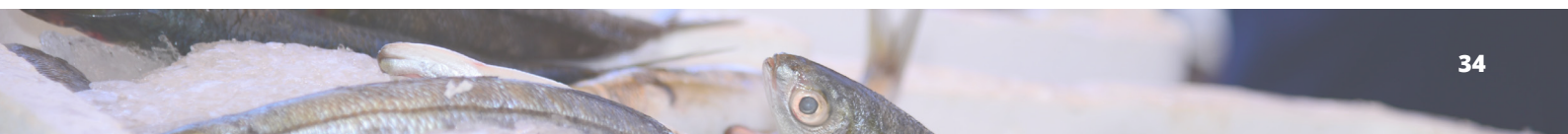
For instance, if a retailer is at Stage 3 (this is the case of Carrefour in France), they have reliable data on their consolidated seafood offering by product name and supplier, some non-sustainability related data (e.g. volume, revenue, margin), know whether these products are certified are not, as well as the country or FAO zone of harvest of the majority of their seafood products, but they do not have a centralised way to monitor and aggregate other information allowing to assess the sustainability of these products (e.g. detailed harvesting method, current and future stock health).



Table 3: How food retailers can progress through the ten stages of seafood sustainability knowledge.

At this stage the company knows (✓) / doesn't know (✗)...	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8	Stage 9	Stage 10
... its consolidated seafood offering by product name and supplier and some non-sustainability related data (e.g. volume, revenue, margin)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
... whether their seafood products are certified or not	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
... the country or FAO zone of harvest of a majority of seafood products	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓
... the production method (farmed or wild-caught) of a majority of seafood products	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓
... the detailed harvesting method of a majority of seafood products	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓
... the exact species (scientific names) purchased/sold of a majority of seafood products	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓
... the exact harvest location (GPS coordinates or exact farm) of a majority of seafood products	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓
... detailed sustainability indicators including the above plus: - current and future stock health and population trends for wild fish - key assessment of aquaculture-related impacts (escapes, mortality, effluent, chemical use, etc.) for farmed fish	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓
... the links between sustainability and profitability	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
... what to do to improve both	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
How to move to the next stages:	Data collection / Supplier engagement			Supplier engagement / Data collection / Estimates (e.g. using Planet Tracker methodology)				Strategic planning based on financial & sustainability nexus		

For instance, if a retailer is at Stage 3 (this is the case of Carrefour in France), they have reliable data on their consolidated seafood offering by product name and supplier, some non-sustainability related data (e.g. volume, revenue, margin), know whether these products are certified are not, as well as the country or FAO zone of harvest of the majority of their seafood products, but they do not have a centralised way to monitor and aggregate other information allowing to assess the sustainability of these products (e.g. detailed harvesting method, current and future stock health).





PRACTICAL ACTIONS: Recommendations for Carrefour

Once a retailer knows, and has progressed through, the stages of seafood sustainability knowledge comes the time to act. Actions should be tailored to each food retailer's sustainability profile and involve a combination of **change in sourcing decisions** and **disclosure**. Our [Seafood Sustainability Protocol](#) allows to do just that.

Towards More Sustainable Seafood Sourcing Decisions At Carrefour

Based on our analysis, the following practical recommendations should be implemented by Carrefour to improve the sustainability of its seafood sourcing and/or its financial health:

Optimise its internal systems and engage with suppliers to ensure that the methods, location and date of harvest are consistently tracked, along with the exact name of the species.

Educate consumers and engage with suppliers with a view to:

- Reducing the sale of **overfished species**, the sale of species where **stock health is deteriorating**, and the sale of species that contribute the most to Carrefour's total **discards** of seafood or that form the highest sources of **unreported catch**.
- Reducing the proportion of seafood harvested by **bottom trawlers** (we estimate it at 30%) to strengthen Carrefour's commitment to offer species caught with selective fishing gear. This would also have positive implications in terms of carbon emissions given the high carbon footprint of bottom trawling.^{lx}

Switch to suppliers of farmed seafood with **lower levels of escaped fish, chemical use and a higher independence from wild fisheries**.

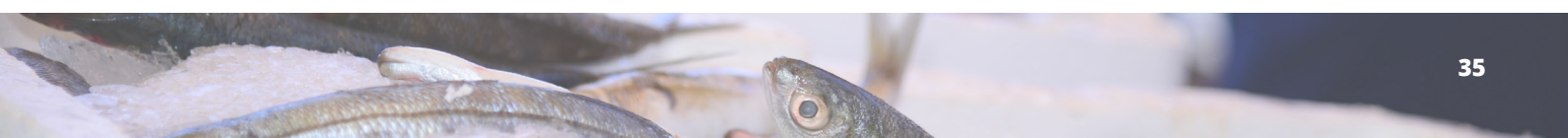
Not solely rely on **certification** as a barometer of sustainability for seafood, but instead use a transparent methodology to assess seafood sustainability, such as the [one in this report](#).

Issue a time-bound target aiming at ensuring that a significant proportion of their seafood is **fully traceable**.

Finding out which species to source to make up for any lost volumes/revenue is not easy. As per our analysis, no wild-caught species currently on sale by Carrefour ticks all the boxes in terms of sustainability, i.e. excellent current and future stock health, very low discards rates and share of unreported catch, caught mostly by selective fishing gear, increasing populations, and *Least Concern* status. It could be that this is the case for some specific stocks within a given species though, but we don't have this data.

Disclosing Seafood Supply Chain Data On The Ocean Disclosure Project

Once Carrefour France reaches stage 7 of the seafood sustainability journey outlined above, the group should **disclose details of its seafood supply chain**. To be able to do so, it is of course crucial for Carrefour to track these details first.





Carrefour should track four indicators on a centralised basis

For each seafood product (fresh and chilled only), the procurement department of Carrefour already tracks 20 indicators, so adding a few more should be manageable. We recommend the following four:



1. What? **Exact species** (scientific name). Displaying this in-store has already been mandatory for unprocessed seafood products since December 2014 in France,^{lxxi} so Carrefour must already partly know this information.



2. Where? **Exact location of harvest** (using a tier system, e.g. GPS co-ordinates of capture location/farm ideally, or if not available, fishery/area farmed, or if not available, country/FAO zone. Note: Carrefour has already succeeded in achieving its target of geo-monitoring 100% of its Brazilian beef suppliers.^{lxxii}



3. How? **Detailed harvesting method**, including fishing gear used or farming method. Displaying the detailed fishing gear used in-store has already been mandatory in France for unprocessed seafood products since 2014.^{lxxiii}



4. When? **Date of harvesting**. This is to check against seasonal closures of fisheries and would also allow for greater efficiency in case of food recalls (e.g. outbreak at a fish farm). Carrefour already commits to not sell wild-caught seabass during its reproduction period.^{lxxiv}

The combination of these four indicators would allow Carrefour to assess the sustainability of its seafood in detail (hence reaching stage 8), using a similar method to the one we followed.

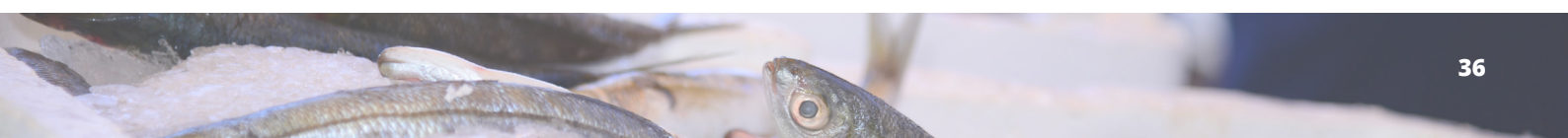
Note: Combining all these indicators at the group level, not just for the French market, is another key requirement to ensure greater visibility on Carrefour's sustainability.

Currently Carrefour cannot assess the sustainability of its seafood in detail but changing this is doable

Within the list of all indicators available for Carrefour to evaluate internally the sustainability of its offering (and shared with Planet Tracker), only the indicator 'certification label' provided an immediate, albeit incomplete answer - see section on Certification on page 33 above and example below.

To some extent, it is understandable that Carrefour limits the number of variables it tracks for each of the categories of products it retails given the sheer number of categories of products on offer. However, we argue that for the most environmentally sensitive categories (e.g. meat, seafood, clothes,...), adding a few key datapoints for each product is not going to create data storage issues and would provide essential advantages.

We expect that many suppliers would not immediately be able to provide Carrefour with this information, but we argue that in time, working with their own suppliers, they eventually could and should.





To start with, Carrefour could start centralising some information it already has - see below.

The Benefits of Greater Disclosure for Carrefour: Low-Hanging Fruit

Some of the missing information is not present in Carrefour's central databases even though it is available for some products.

See, for instance, these two pictures of canned tuna sold by Carrefour in France,^{lxv} where the packaging clearly indicates the fishing gear ('pêché à la canne', or 'pole and line' in English) and also the species of tuna caught ('thon listao', or 'skipjack tuna' in English) – see Figure 21.



Figure 21: A can of skipjack tuna sold by Carrefour in France.^{lxvii}

Adding extra information on the exact species caught/farmed, the gear used or the fishery where the product is sourced would require additional time – namely transcribing information present on the product itself or in the specifications sheet supplied by the supplier into a database. It would also reveal an absence of such information for a considerable number of products and would require a more nuanced approach to certification. For instance, skipjack tuna caught with a pole and line is one of the most sustainable combinations of gear/species for tuna. Yet the canned product sold by Carrefour showed above is not certified, meaning that using the information Carrefour currently has, this product would look less sustainable than it is.



How to disclose and what: the Ocean Disclosure Project

Whilst Carrefour could dedicate a section of its website to this disclosure, we believe it would be more convenient and also likely create greater positive media coverage if this disclosure were made via the **Ocean Disclosure Project** (ODP). ODP is a reporting framework for seafood companies including mostly retailers, suppliers and fish feed manufacturers, to voluntarily disclose their wild-caught seafood sourcing alongside information on the environmental performance of each source.^{lxxvii}

Other food retailers already disclose (partially) details of their seafood supply chain on the Ocean Disclosure Project, including: Aldi in Australia; Walmart in Canada; Aldi in Ireland; Aldi, ASDA, Co-op, Morrisons, Lidl, Sainsbury's, Tesco and Waitrose in the UK, as well as Food Lion, The Giant Company, Giant Eagle, Giant Food, Hannaford, Meijer, Publix, Sam's Club and Walmart in the US.^{lxxviii}

For instance, Co-op in the UK recently had its seafood supply audited to assess the risk it poses to ocean wildlife (via the bycatch of other species),^{lxxix} and published the information on the ODP.^{lxxx}

Key indicators typically disclosed that we believe Carrefour should also publish are the **exact species, fisheries and fishing gear used**. See, for instance, the profile of Tesco in the UK [here](#).^{lxxxi} Volumes are not generally disclosed, even though doing so would allow a truer assessment of a company's seafood.

The Net Financial Benefits Of Greater Supply Chain Disclosure

Centralising sustainability data on Carrefour's seafood supply chain, analysing it and **disclosing it publicly would provide benefits that exceed the costs incurred**.

Indeed, we have estimated the financial benefits arising from bringing in more disclosure – by computing the time and efforts needed to add this extra information and then the financial benefits linked to better centralised management.

Overall, over five years, **the net benefits of greater seafood supply chain disclosure** are worth about **3% of the estimated gross profit** made on seafood in France for Carrefour France under our conservative assumptions listed below – see Figure 22. Benefits exceed costs from year one, and the vast majority of the benefits would materialise in year one.

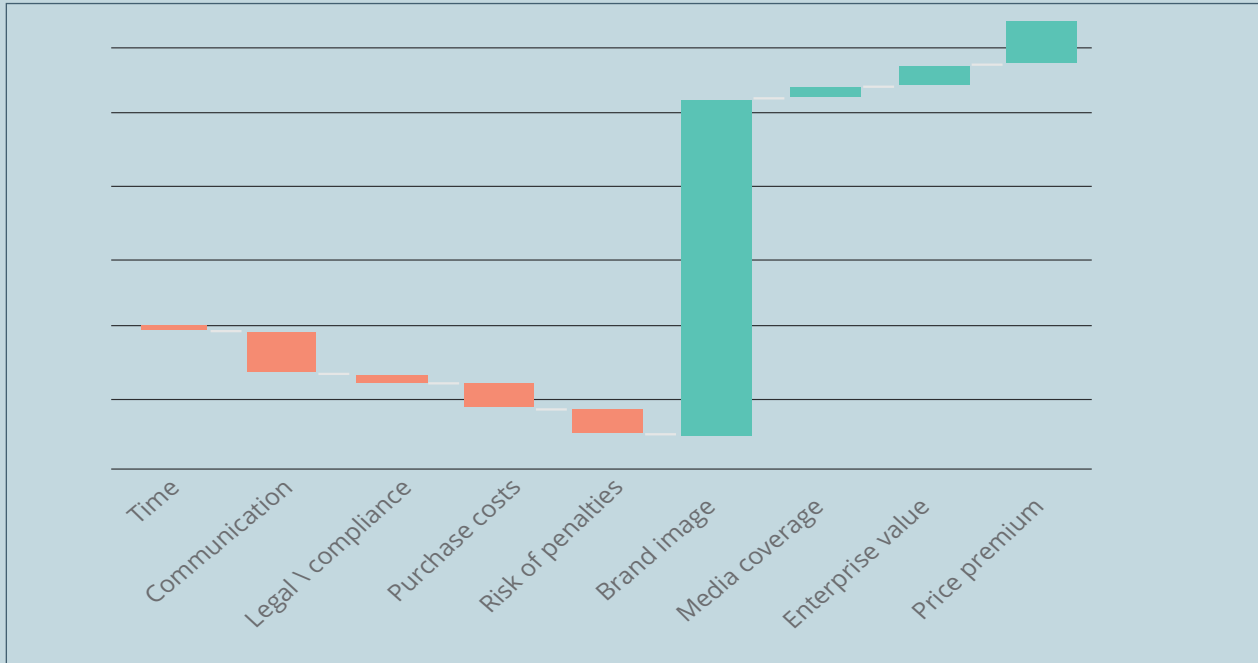
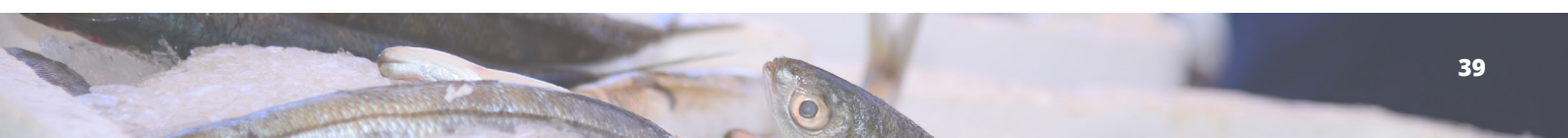


Figure 22: Estimating the net financial benefits of greater seafood supply chain disclosure for Carrefour France (in EUR millions, costs in orange, benefits in green). Numerical values on the scale have been removed since Carrefour does not publish profitability data.

We have not assumed any market share gains, although these are possible, especially if Carrefour is not followed by competitors.

The main assumptions used are as follows:

- An estimated 6 hours spent engaging with each supplier.
- A 3% rise in the PR and communication expenses of Carrefour France (for which seafood accounts for an estimated 2% of sales, i.e. this would be a large increase), leading to a 1.5% increase in media coverage.
- A 12.5% increase in legal and compliance costs.
- An average 0.3% increase in the price of seafood products purchased at 27.5% of the suppliers (no increase for the others), more than offset by an average 0.55% rise in retail prices.
- A 0.1% increase in the brand valuation of Carrefour France, conservatively valued at 13% of revenue (the Tesco and Walmart brands are valued at 15% and 10% of revenue respectively).^{lxxxii}
- A 0.15% increase in the enterprise valuation of Carrefour France as some investors are ready to assign higher multiples for greater sustainability.





We believe Carrefour should **think of greater supply chain disclosure the same way as marketing expenses**: too little is highly damaging for the brand. Tracking the four indicators we recommend (exact species, exact location, detailed harvesting method, date of harvest) and disclosing at least the first three would be an optimal way to generate both greater sustainability and net financial benefits.

Carrefour Should Implement Seafood Traceability Targets

A powerful way to monitor and disclose details on Carrefour's seafood while encouraging greater sustainability earlier in the supply chain would be for Carrefour to give preferential treatment to suppliers of **fully traceable fish**.

Carrefour could publicly signal it is taking seafood traceability seriously by pledging to implement **the Global Dialogue on Seafood Traceability (GDST)** standards, like many other food retailers (e.g. Sainsbury's or Whole Food Markets).^{lxxxiii} These standards provide interoperability between different traceability technologies and providers, and therefore help close traceability gaps in seafood supply chains, often found at the processing level. Please see [Traceable Returns](#) for more details.

By issuing a **time-bound target aimed at sourcing a significant share of their seafood volumes from fully traceable fish**, Carrefour would not only provide itself with the means to increase the trust of its consumers in the seafood it offers but also lead a non-negligible portion of global seafood supply chains to implement traceability to be able to supply the retailer.

Carrefour has already made significant progress on the traceability of textiles, cocoa or palm oil. The group already applies blockchain technology to some of its Carrefour Quality Lines for salmon.^{lxxxiv}

Investing in robust traceability solutions is likely to generate attractive returns for seafood processors.^{lxxxv} Carrefour could therefore provide financial incentives for processors that have not yet done so to invest in traceability, where the funds provided by the retailer could be invested by the processor into a traceability solution interoperable across the supply chain (by using the GDST standards). The financial benefits of this investment (on average, we estimated that the EBIT margin of a seafood processor could double by investing in traceability)^{lxxxvi} could then be shared with Carrefour.





The Role of Investors and Lenders

Investors in Carrefour as well as lenders to the group have a key role to play, by engaging with the group to ask for:

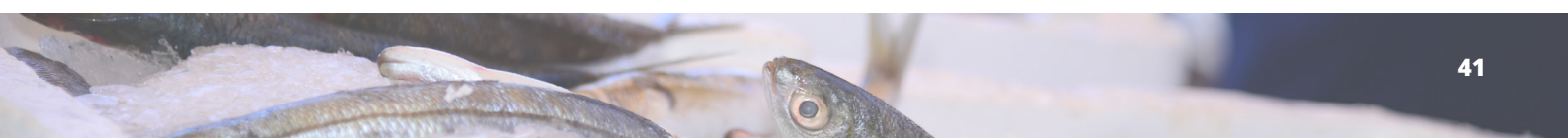
- **Greater seafood supply chain disclosure**, which ultimately will financially benefit the group and its financial backers.
- **A change in seafood sourcing towards more sustainable choices.**
- **Time-bound targets on seafood traceability.**

An effective way to do so is to condition capital to the attainment of sustainability objectives. Carrefour issued a sustainability-linked bond in March 2022 that did just that.^{lxxxvii} The group could do it again, for instance with a financial instrument linked to a time-bound target aiming at sourcing a significant share of their seafood volumes from fully traceable fish.

Lenders (and providers of trade finance in particular) could support any initiative aimed at providing financial incentives to suppliers that implement traceability solutions.

Overall, by engaging with Carrefour on greater disclosure, transparency, sustainability and traceability of their seafood, a financial institution could win multiple times:

- as a **shareholder** of Carrefour, since greater disclosure and a more sustainable and profitable seafood sourcing would both translate into higher profits for Carrefour.
- as an **issuer**, by issuing a sustainability-linked loan conditioned to sustainability targets (for instance seafood traceability targets).
- as a **lender**, by supporting any initiative aimed at providing financial incentives to suppliers that e.g. implement traceability solutions or disclose more of their seafood supply chains.
- as a **sustainable finance institution**, by showcasing that providing capital to increase the sustainability of ocean ecosystems is both the right thing and a good thing to do.





METHODOLOGY: How We Investigated

Analysing 4 million confidential data points from Carrefour France

Planet Tracker is very grateful to Carrefour for sharing their seafood data for the French market. The data shared came in the form of an Excel file containing more than four million data points. For each unique type (SKU¹²) of seafood product sold, this data contained mainly the following information - in French:

Name of the product

- 12,261 different seafood products (both freshwater and marine products, also including a marginal share of other aquatic foods such as seaweed). The scope retained was only fresh and chilled products (i.e. canned sardines for instance would be excluded).

Month and Year

- The data we received covered January 2020 to September 2021.

Warehouse

- 21 warehouses across metropolitan France.

Supplier name and associated code

- There were 265 different suppliers for the period.

Internal categorisation of the product

- Carrefour uses a three-tier categorisation system (family, sub-family and category), with respectively 7, 27, and 462 unique entries in each tier.

Origin of the product

- A code referring either to a FAO Zone (e.g., North-East Atlantic) or a country.

Data on conditioning and packaging

- This could be for instance, the quantity of items in each product sold and their weight (e.g., two fillets for a total of 240g).

Internal branding categorisation

- For instance, is the product private label or part of Carrefour Quality Lines (Filière Qualité Carrefour)?

Certification label

- Is the product certified by MSC or ASC? Is it organic?

Number of parcels received

- Over the period (Jan '20 – Sep '21) Carrefour received close to 36 million parcels.

Net weight

- The total net weight of the products sold was 97,615 tonnes over the period.

Purchase value

- The total price paid by Carrefour to its suppliers for all the seafood products it sold. Over the period it was EUR 764.8 million (USD 827 million).
- The average price paid per net kg of product was EUR 7.83 (USD 8.47).

Retail value

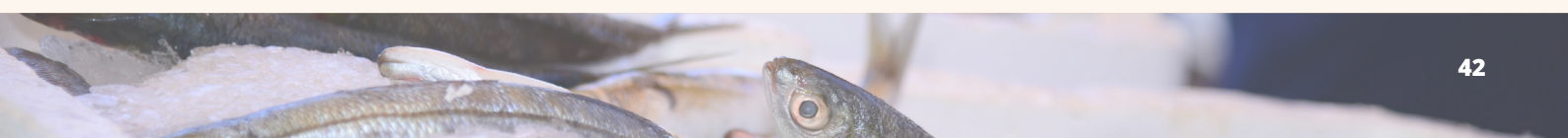
- The price paid by Carrefour consumers (excl. VAT). This dataset was only available for supermarkets (not hypermarkets) and not for each supplier.

Retail margin

- The difference between the retail value and the purchase value.

12

Stock-Keeping Unit, a distinct type of item for sale or tracked in inventory and all attributes associated with the item type that distinguish it from other item types. These attributes can include manufacturer, description, material, size, colour, packaging, and warranty terms. Distinct SKUs are typically identified by a code that retailers assign to products to keep track of stock internally, once it arrives from a warehouse or distributor.





Key data missing to accurately assess the sustainability of Carrefour's seafood

The above dataset constitutes a considerable amount of information to manage – and it is just for the French market, and just for fresh and chilled seafood products. Yet it is equally important to note what information is missing from this data to make a thorough sustainability-related assessment, namely:

Harvesting method (aquaculture or wild-catch)

- This is because the key sustainability issues for each are widely different (e.g. overfishing or impact on ecosystems for wild-catch, nutrient pollution or feed used for aquaculture).

Fishing gear (trawls, purse seines, pole and line, etc.) or farming method used

- This is because some gear (e.g. bottom trawls) have a much worse impact on ecosystems than others (e.g. pole and line). The same goes for farming methods.

Fishery where wild-catch fish is sourced from

- For wild-catch products, sustainability assessments (including certification) is typically done at the fishery level, so knowing that a product comes from e.g. the Gulf of Alaska pollock fishery is important, rather than just the FAO Zone.

Exact species

- This is extremely important: some species of a same genus or family can be overfished and/or threatened while others are not.

Because this missing data is essential to assess the sustainability of the seafood sold, we estimated it using the method described below. Any company wishing to perform a similar analysis can do so using our interactive [Seafood Sustainability Protocol](#).

Our full methodology including the Python scripts used is available upon request.

Uncovering the Identity of the Seafood Species Sold by Carrefour

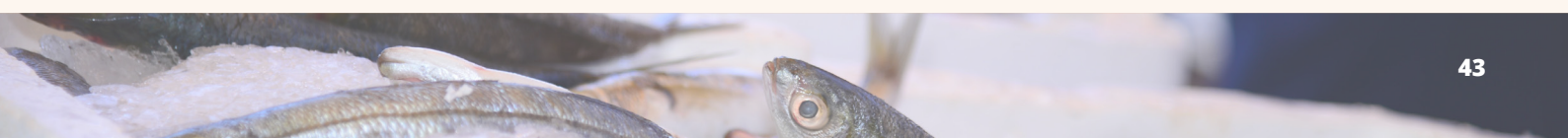
To identify the exact species contained in each of Carrefour's seafood products and the associated volumes in kg, we followed a four-step process:

- 1 For each of the 12,261 seafood products we assigned a keyword representative of the likely species, genus or family of species based on the name of the product (e.g. 'Salmon'). Overall, we assigned 176 unique keywords to the 12,261 products analysed.

For instance, the product 'DOS CABILLAUD MSC 5KG' was identified as 'Cod' ('Cabillaud' means 'Cod' in French).

- 2 Then, based on the name of the product, the keyword assigned and other data, such as the certification (or absence thereof), the classification used by Carrefour, the product's origin or our own research, we split all 12,261 products between wild-catch and farmed seafood and between freshwater and marine species. This was to assess the sustainability of each product later on (sustainability issues vary considerably based on the production method and the habitat).

For instance, the product 'DOS CABILLAUD MSC 5KG' coming from North-East Atlantic and certified by MSC was identified as 'Wild-Catch' and 'Marine'.





- 3 Using a list of all seafood species globally compiled by the FAO (including their English and French names), we then listed for each of the keyword assigned (e.g. 'Tuna') all of the species that could potentially be associated for that keyword: in the case of 'Tuna', this could be for instance any of 50 species – skipjack tuna, albacore tuna, etc. For any given keyword, we identified between one and 500 potential species, with an average of 21 potential species per keyword.

For instance, for the keyword 'Cod' associated to the product 'DOS CABILLAUD MSC 5KG', we identified nine possible species (excluding any geographical, commercial and legal considerations at this stage, i.e. only listing the species that could be referred as 'cod' in French).

- 4 For each of the potential species identified, we used the breakdown of global seafood production per capture method (farmed and wild-caught) and geographical origin using FAO's FishStatJ^{lxxxviii} to distribute the volumes of each seafood product according to a probability-based weighting.

*For instance, coupling the production data of the nine cod species identified with the origin (Atlantic North East), we computed that with a 99.99608% probability, 'DOS CABILLAUD MSC 5KG' was Atlantic Cod (*Gadus morhua*), based on the proportion that Atlantic cod represents within all wild-caught cod species in Atlantic North East.^{lxxxix}*

The output of this process was a table listing, for each species, the data provided by Carrefour, in particular the volumes and purchase value.

*For instance, we estimated that Carrefour sold 8,845 tonnes of products containing Atlantic Cod (*Gadus morhua*) during the period, equivalent to 10.5% of the total seafood sold on a net weight basis.^{xcvii}*

Assessing the Sustainability of the Seafood Species Sold by Carrefour

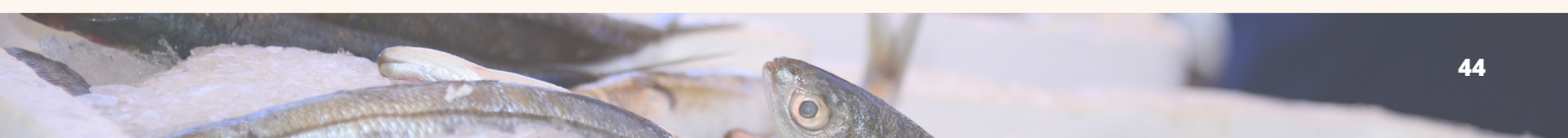
Having identified the species sold by Carrefour, we then assessed their sustainability. For that, we used different methodologies depending on whether the species is caught in the wild or farmed.

For wild-caught species, we followed a three-step process, looking sequentially at:

- the IUCN status of the species caught (e.g. Least Concern, Near Threatened, Vulnerable, etc). To do so, we matched data from the IUCN Red List with the list of scientific names of the species previously identified. This is to identify whether Carrefour offers threatened species for sale.

*For instance, *Gadus morhua* (Atlantic Cod) was listed as 'Least Concern' in Europe by the IUCN in its latest assessment (2013).*

- the sustainability scores of the fishery(ies) from which the species was likely to be caught, based on data from FishSource,^{xc} which contains in particular data on fishing gear used (a key determinant of sustainability) as well as many other useful indicators summarised in the form of scores on e.g. management quality, or current and future stock health.





When faced with possible options for fisheries for a given species, we computed the average and best possible scores: the average score reflects what is the most likely outcome in the absence of any action from Carrefour, whilst the best score indicates the best possible outcome that Carrefour could achieve by carefully selecting only the most sustainable option for each species. Carrefour has implemented a considerable number of initiatives to favour sustainable options, but most of the sustainability guidance its sourcing teams give to their suppliers is not public, so the reality is likely to be between the average and the best scores.

*For instance, *Gadus morhua* (Atlantic Cod) caught in North-East Atlantic has an average score (all fisheries combined) of 4.54/10 for Current Stock Health according to FishSource (the stock is not in a good state overall). In this case, the average score we would use is 4.54/10. However, looking only at the best fisheries within the area, the best possible Current Stock Health score for *Gadus morhua* in the North-East Atlantic is 10/10, so the best score is 10/10 (if Carrefour only sourced its cod from that stock).*

- the corollary environmental impact of the wild capture of each species, namely the associated discards and likelihood that the catch came from unreported sources, based on Sea Around Us data.

For instance, according to Sea Around Us data, the probability that Atlantic Cod caught in the North-East Atlantic comes from unreported sources is 11.5%, and for every 100 kg of cod caught and retained on fishing vessels, another 3 kgs are estimated to be discarded.^{xcvii}

For farmed species, we used data from the Monterey Bay Aquarium (SeafoodWatch) that assess the sustainability of farmed seafood species per country:

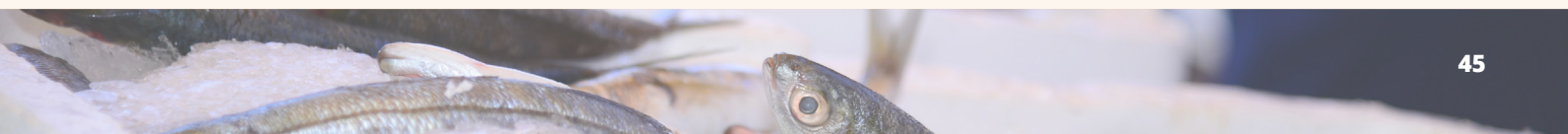
- For each combination of country, species and farming method, we listed the different sustainability scores attributed by SeafoodWatch.

*For instance, Whiteleg shrimp (*Penaeus vannamei*) farmed in semi-intensive ponds in Ecuador is rated 4.02/10 by the Monterey Bay Aquarium - see Table 4. We estimate that whiteleg shrimp from Ecuador accounts for 3.4% of Carrefour France volumes.^{xcviii} Please see [Shell Shock](#)^{xcix} for more details on the financial consequences of the environmental impact of shrimp farming.*

Table 4: Environmental scores of the farming of whiteleg shrimp in Ecuador in semi-intensive ponds as per SeafoodWatch (2021):^{xcii}

Overall score	4.02/10
Data availability	5.23
Effluent	5.00
Habitat	3.47
Chemical Use	3.00
Feed	5.45
Escapes	4.00
Disease, pathogen and parasite	4.00
Independence from wild fish stocks	0.00
Wildlife mortalities	(2.00)
Introduction of secondary species	0.00

Note: scores range from 0 (worst) to 10 (best), except for the last three, where 0 is the best and negative scores indicate negative assessments. Colour-coding is as per SeafoodWatch.





- We then averaged the scores by farming method to compute a set of scores per country and species combination (since Carrefour does not provide the farming method), and also retained the best possible option/score. The average score reflects what is the most likely outcome in the absence of any action from Carrefour, whilst the best score indicates the best possible outcome that Carrefour could achieve by carefully selecting only the most sustainable option for each species. Carrefour has implemented a considerable number of initiatives to favour sustainable options, but most of the sustainability guidance its sourcing teams give to their suppliers is not public, so the reality is likely to be between the average and the best scores.

At the end of this process, we were able to draw conclusions on the sustainability of the seafood sold by Carrefour in France.

Linking the Sustainability of Carrefour's Seafood Species to their Profitability

In [Pollockonomics](#), Planet Tracker evidenced how profitable it was for fishing companies to engage in the catch of an abundant, sustainably caught fish species – Alaska pollock.^{xciii} But does the same relationship hold true for retailers? Is it more profitable to sell sustainable species to end consumers, or on the contrary are margins higher for rare, endangered or overfished species? We investigated using Carrefour data according to the following methodology:

For each of the keywords identified earlier (corresponding to either a species or family of species), we computed the retail margin generated by Carrefour, based on the margin data available for each of the seafood product corresponding to that keyword. In volume terms, margin data was available for 98% of seafood offering (99% in purchase value terms). Note that margin indications were extracted from another of Carrefour's databases and therefore not provided with the same level of granularity as other indicators.

For instance, we computed that Carrefour generates an estimated retail margin on cod 7% pts lower than its average retail margin on seafood (computed as retail value minus purchase value as a proportion of retail value, ex VAT).

We then assumed that each of the potential species that correspond to each keyword have the same margin – admittedly a key limitation of our analysis. This allowed us to estimate margin per species and match these margin estimates with sustainability data per species.

For instance, we estimated that the retail margin on Whiteleg shrimp farmed in Ecuador (rated 4.02/10 by SeafoodWatch), was 1% pt above the average retail margin on seafood.





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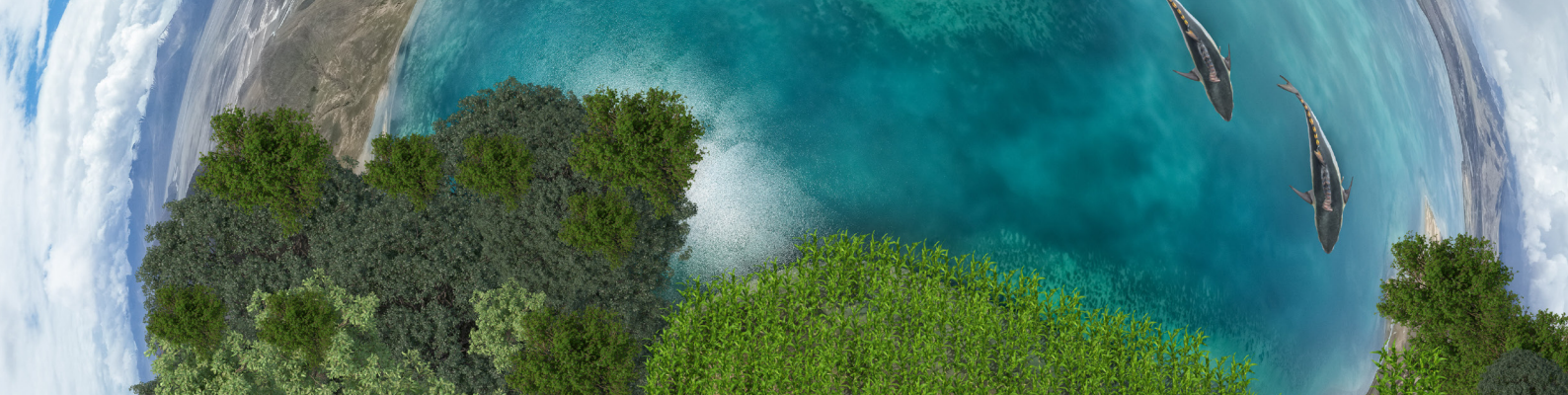
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- vi [Welcome to the TNFD Nature-Related Risk & Opportunity Management and Disclosure Framework » TNFD](#)
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ABOUT PLANET TRACKER

Planet Tracker is an award-winning non-profit financial think tank aligning capital markets with planetary boundaries. Created with the vision of a financial system that is fully aligned with a net-zero, resilient, nature positive and just economy well before 2050, Planet Tracker generates break-through analytics that reveal the role of capital markets in the degradation of our ecosystem and show the opportunities of transitioning to a zero-carbon, nature positive economy.

SEAFOOD TRACKER

Seafood Tracker investigates the impact that financial institutions can have on sustainable corporate practices through their funding of publicly listed wild-catch and aquaculture companies. Our aim is to align capital markets with the sustainable management of ocean and coastal marine resources.

This report focuses on assessing the role that food retailers play in contributing to/reducing the negative impacts that seafood production has on ocean ecosystems.

Seafood Tracker is a part of the wider Planet Tracker Group of Initiatives.

ABOUT BNP PARIBAS ASSET MANAGEMENT

BNP Paribas Asset Management is the asset management arm of BNP Paribas, one of the world's foremost financial institutions, and offers high value-added solutions to individual savers, companies, and institutional investors. It has a broad range of skills in four investment divisions: Equities, Fixed Income, Private Debt & Real Assets, and Multi-Asset, Quantitative and Solutions (MAQS). Sustainability is at the heart of BNP Paribas Asset Management's strategy and investment decision-making process, making an active contribution to energy transition, environmental protection and the promotion of equality and inclusive growth. Its aim is to achieve long-term sustainable investment returns for its clients. BNP Paribas Asset Management has assets under management of EUR 522 billion* (as at 31 March 2022), with more than 500 investment professionals and almost 800 client servicing specialists, serving individual, corporate and institutional clients.

* EUR 645 billion of assets under management and advisory as of 31 March 2022



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