



# ENDANGERED SEAFOOD ON THE MENU

*Over 90 threatened fish and invertebrates are caught in industrial fisheries*

Leslie A Roberson<sup>1</sup>, Reg A Watson<sup>2</sup>, Carissa J Klein<sup>1</sup>

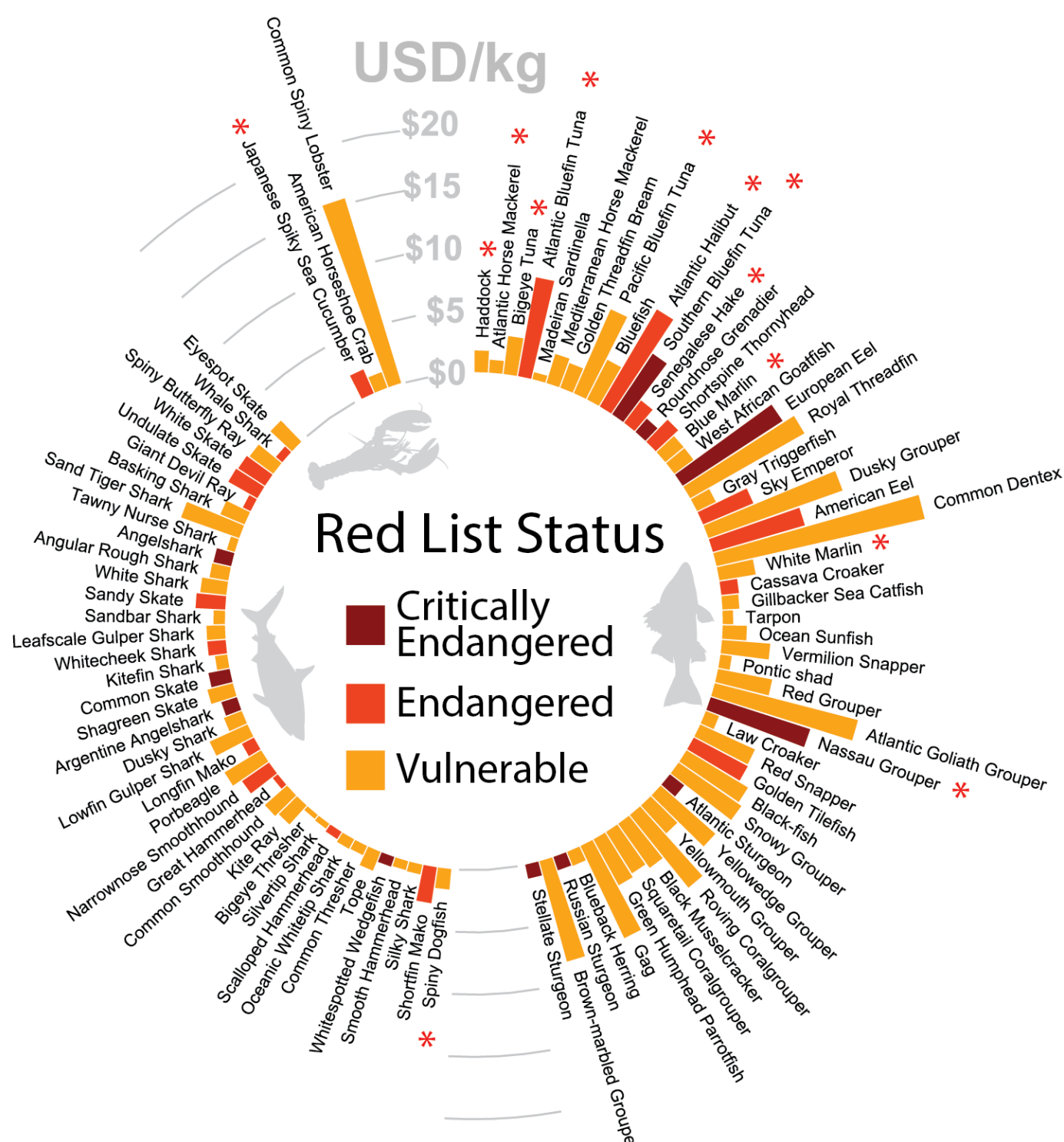
<sup>1</sup> School of Earth and Environmental Sciences, University of Queensland, Brisbane, QLD, Australia

<sup>2</sup> Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, TAS, Australia

## It is legal to catch, sell, and buy species that are threatened with extinction

Fishing, either targeted or incidental, is the primary driver directly causing declines in marine biodiversity. Industrial-scale harvest of species at risk of extinction is controversial and usually highly regulated on land and for charismatic marine animals (e.g., whales, sea turtles). In contrast, threatened marine fish and invertebrate species can be legally caught at industrial scales and sold internationally.

While certain populations of threatened fish and invertebrates are monitored with fisheries stock assessments, they are treated differently to other wild animals, and are usually permitted to be caught in industrial fisheries regardless of the species' global conservation status.



**Average price and Red List status for 91 threatened catch species from 2006 to 2014:** Ex-vessel prices (what's paid at the dock) are global averages for 2010. Species are ordered clockwise by descending catch volume for each taxonomic group (teleosts, chondrichthyans, and invertebrates). The 13 species with red asterisks are found in international import records.

## Methods

We combined five global databases to investigate which endangered seafood species are still caught and sold in large industrial fisheries on a global scale:

- The Sea Around Us database of reconstructed global catch in wild marine fisheries
- A second global catch database, for validation
- A global seafood trade database that links exporting, processing/re-exporting, and importing countries
- The RAM Stock Legacy global database of commercially exploited fish and invertebrates
- The IUCN Red List global assessment of species' risk of extinction and key threats

Our results make the most conservation estimate of threatened species catch and trade. We exclude small-scale fisheries and illegal or unreported catch. We consider only species-level data, excluding group records such as 'sharks and rays.'

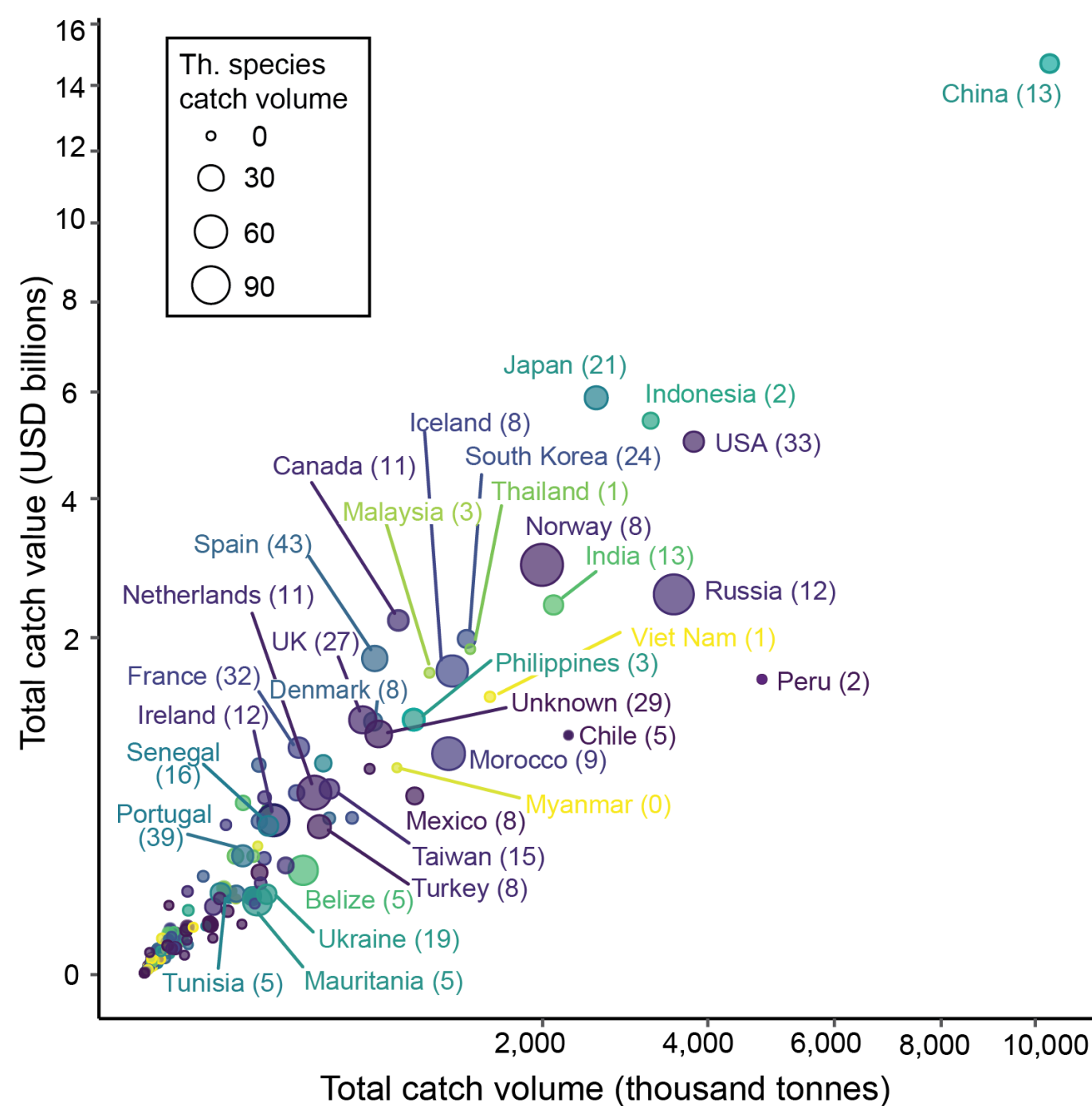
[l.roberson@uq.edu.au](mailto:l.roberson@uq.edu.au)

[Leslie Roberson](#)

[@leslieamlwch](#)

[cbcs.uq.edu.au](#)

Centre for Biodiversity and Conservation Science

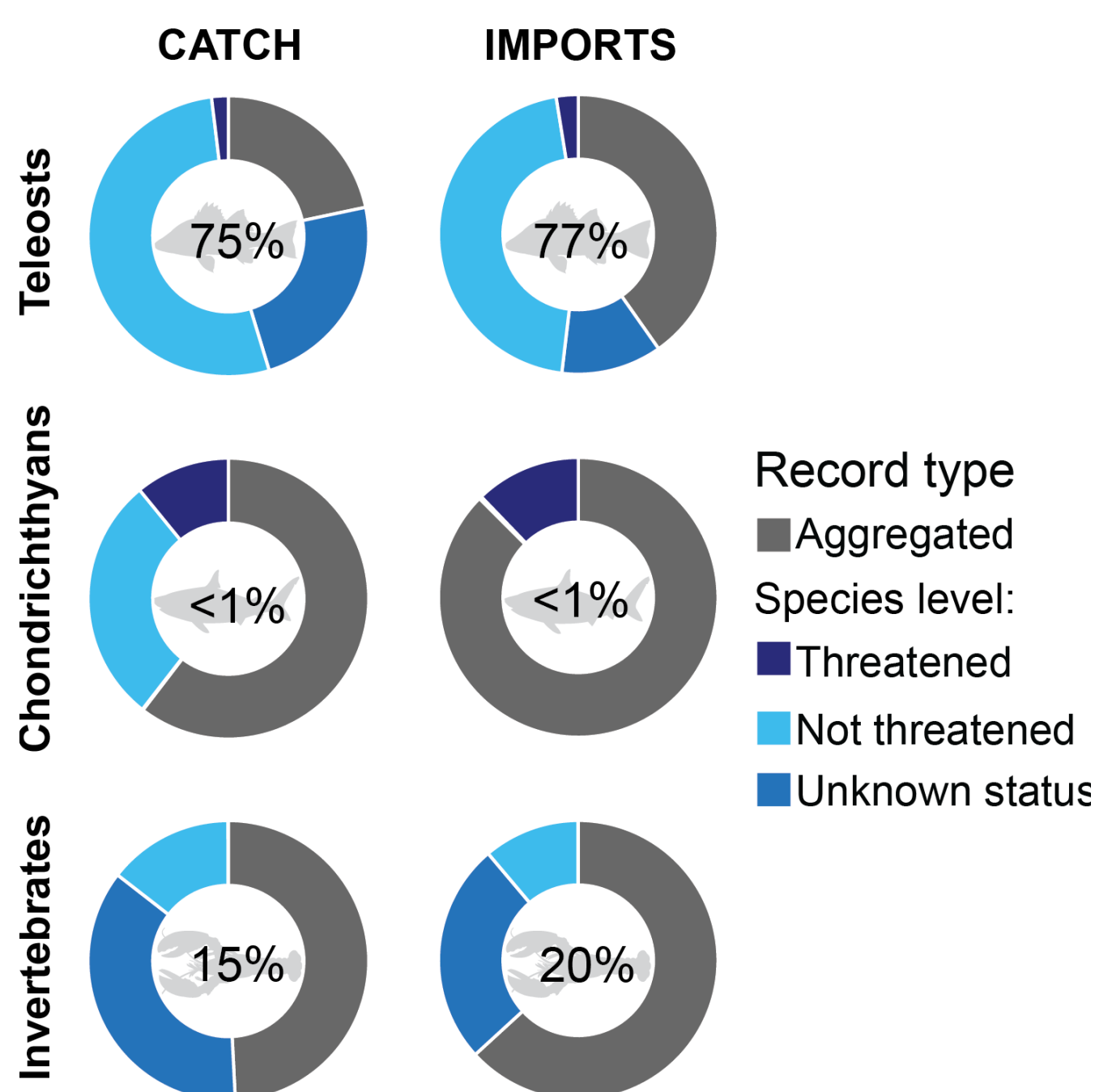


**Threatened species catch and import volumes and values compared to country totals:** Catch volume and estimated value for 163 fishing countries are shown on a log transformed scale (Left) and import volume and estimated value for 204 importing countries are shown on a continuous scale (Right). Bubble size corresponds to volume of threatened species catch or imports (thousand tonnes). Number of threatened species each country catches or imports is in parentheses. Colour shows the percent of each country's catch or import volume that is aggregated (i.e. yellow indicates catch and import volumes mostly recorded in aggregated groups and purple indicates catch and import volumes mostly recorded to the species level). Volumes and values are weighted moving averages for 2015

## Catch and imports records are vague for many species

Seafood traceability decreases as the animal moves through international supply chains.

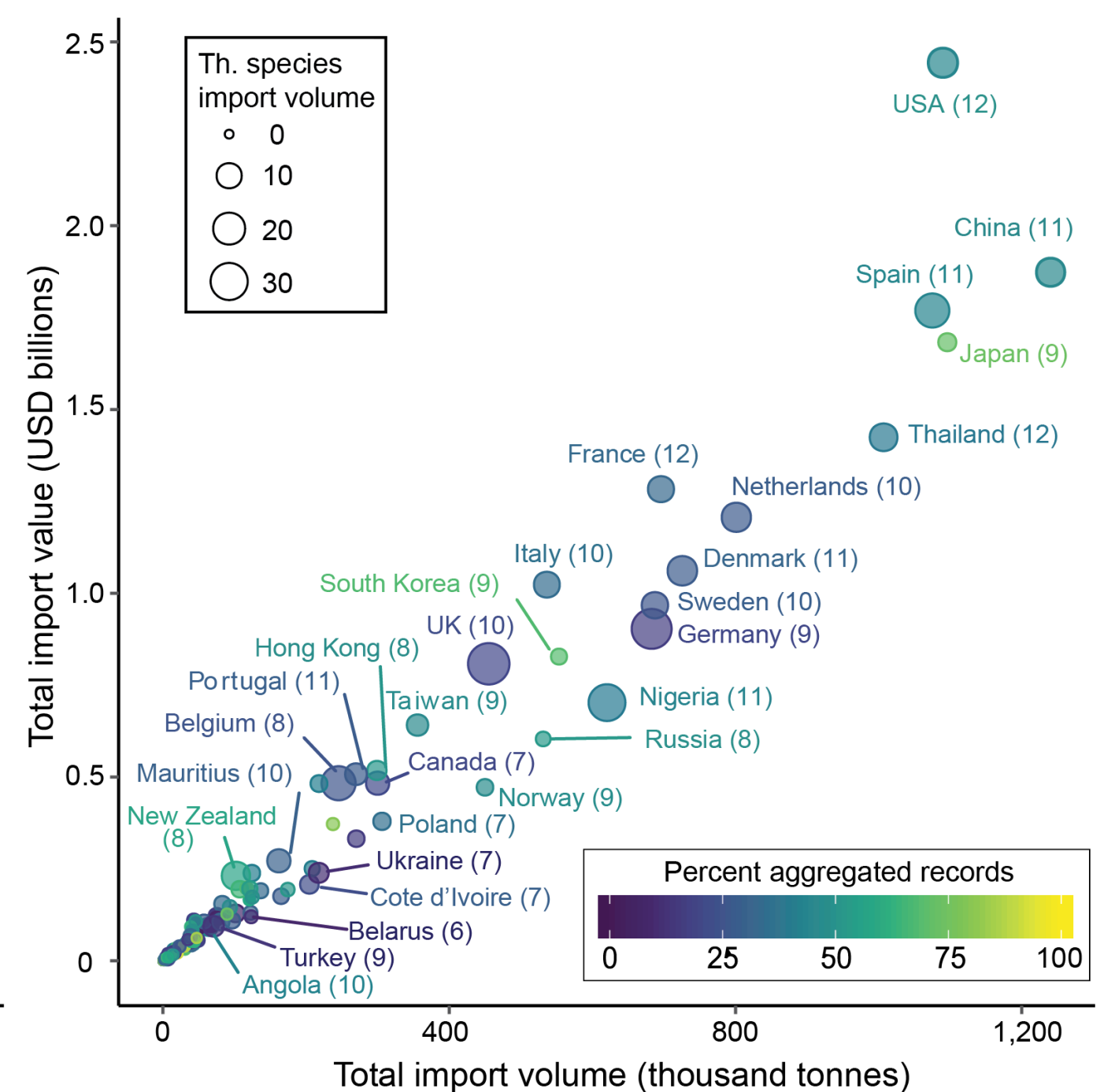
Documentation is much better for teleosts (bony fish) than for chondrichthyans (sharks and rays). Invertebrates (e.g. shellfish) are poorly documented, and many have unknown conservation statuses.



**Taxonomic resolution of catch and import records:** Proportions of catch and imports volumes recorded at species level shown in blue and aggregated records in grey for each taxonomic group. Other commodities (e.g. "marine animals") are not shown. Number indicates the proportion of total catch or import volume in each taxonomic group over a ten-year period. Threatened: Critically Endangered, Endangered, or Vulnerable, Not Threatened: Least Concern or Near Threatened, Unknown status: Data Deficient or not assessed, Aggregated: not a species-level record.

## Acknowledgements

LAR and CJK are supported by the University of Queensland's Centre for Biodiversity and Conservation Science. Thanks James E. Watson for comments on the manuscript, Maria Deng Palomares and Beth Polidoro for assisting with data access, and Stephane Guillou, Awais Hameed Khan, and Fraser McDonald for assistance designing the visualizations for this project



## Wealthier nations are key players in catch and trade of threatened seafood species

Over the decade, we found records of the 91 threatened species in catch data from 138 countries. Spain, Portugal, and the USA caught the highest number of species (43, 39, and 33 species). Six of the ten countries with the highest volume and value of threatened species catch are European (e.g. Norway, Russia). We found 204 countries with import records for 13 of the globally threatened species. European countries (e.g. Germany, UK, Spain) and the USA comprise most of the top importers of threatened species by volume and value, with Nigeria, Thailand, and China also ranking among the top ten.

Countries with few species-specific records compared to aggregated records likely catch or import more threatened species than appear in the data (e.g. Myanmar, Malaysia, Philippines, Japan, and South Korea).

## Conclusions

There are **three main things** consumers need to know to make an informed seafood purchase:

1. The species (e.g. gummy shark, not just "flake")
2. Where it was caught (e.g. Queensland, not just "Australia")
3. How it was caught (e.g. trawl, not just "wild-caught")

Despite the challenges of improving seafood traceability, it is increasingly feasible to identify an animal and trace it to the consumer using emerging technologies such as electronic monitoring, DNA testing, code tags, blockchain, and artificial intelligence. High-level policy actions are required, but consumers also have leverage to demand changes. We just need to value the protection of ugly animals like sea cucumbers like we do for dolphins.