

BUILDING UP A PICTURE

The analysis presented by Global Fishing Watch is just one of many attempts to estimate the global impact of fishing. Although the data set used to generate this map includes only a small proportion of the world's estimated 2.8 million motorized fishing vessels, it contains 50 to 75% of active vessels larger than 24m and >75% of vessels larger than 36m, the size at which most vessels are mandated by the International Maritime Organization to transmit AIS signals⁷⁴. Nevertheless, it does not map small-scale or illegal fishers and many industrial commercial vessels are smaller than this, so it's clear that this is only part of the story.

The data can also be assessed and interpreted in different ways, as is evidenced by a follow-up response to the *Science* paper discussed here by Amoroso et al. 2018 who use a smaller grid size to show that the area of ocean physically swept by fishing gear is substantially smaller^{74,164}. As we've explored in other sections of this report, this is where the power of big and open data can help drive conservation science forward. The Global Fishing Watch website brings together the information shown here with data from a range of other sources, including satellite surveys of fishing vessels operating at night and data from within coastal EEZs and fisheries authorities within specific countries, such as the Indonesian Government's Ministry of Maritime Affairs and Fisheries⁷⁵. The website is also interactive, showing changes over time. Other sources document the extent of illegal, small-scale and unreported catches. This includes the Sea Around Us datasets we explore in the next section⁷⁶ and other online databases⁷⁷. Layering together datasets like this is helping to build up a more comprehensive picture of what we're catching and where, giving us the true scale of our footprint on the oceans.

Our understanding of the ecological footprint of fishing is likely to evolve, as will the uses we find for these data. By making this high-resolution data publicly available, Global Fishing Watch and others have helped to ensure that this evolution happens transparently and at a rate previously unheard of in marine conservation science.

Artisanal fishermen return to the port after fishing for hake off the coast of Valparaiso, Chile.



Global sea catch increased from the 1950s on, peaking at 130 million tonnes in 1996. While since then it has decreased at an average rate of 1.2 million tonnes per year, we still extract over 110 million tonnes from the oceans each year.

WHAT AND HOW MUCH HAVE WE CAUGHT?

Almost 6 billion tonnes of fish and invertebrates (e.g. crustaceans and molluscs) have been extracted from the world's oceans since 1950. Annual catch increased dramatically from 28 million tonnes in 1950 to more than 110 million tonnes in 2014. However, since peaking in 1996 at about 130 million tonnes, catch has been decreasing at an average rate of 1.2 million tonnes per year⁷⁶.

Maria L.D. Palomares and Daniel Pauly, Sea Around Us, University of British Columbia

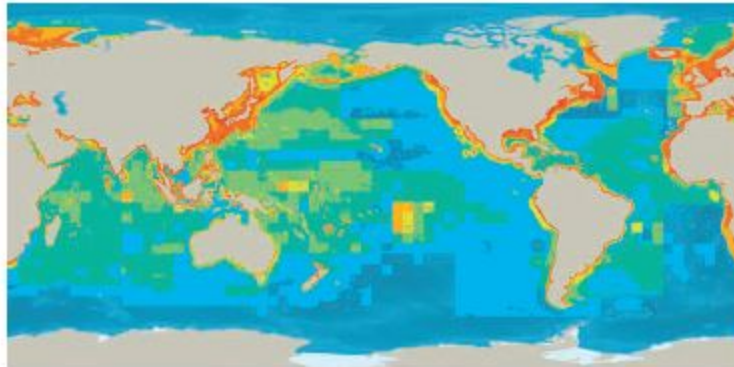
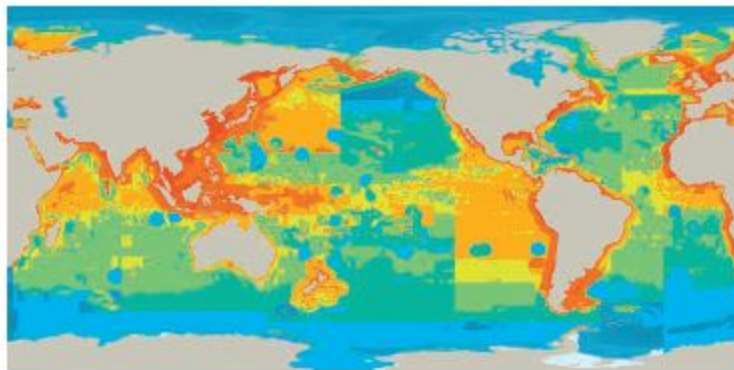


Figure 12: Average annual catches of the world's maritime fishing countries in the 1950s compared to the 2000s. Blue indicates zero or very minute catches, and yellow indicates light or no fishing. Zones of moderately heavy (in orange) to heavy fishing intensity (in red) now wrap around every continent, affecting all coastal areas and many parts of the high seas. Maps generated by the Sea Around Us information system⁷⁶.



OUT OF 1,500 SPECIES RECORDED AS BEING CAUGHT, JUST 10 MAKE UP A THIRD OF TODAY'S GLOBAL CATCH

These figures are the results of research conducted by Sea Around Us, a research initiative at the University of British Columbia that assesses the impact of the world's fisheries on marine ecosystems. Sea Around Us 'reconstructed' post-1950 data from the 273 Exclusive Economic Zones (EEZs) of 217 maritime countries and territories around the world to arrive at a more accurate estimate of actual catch figures than has been officially reported. Each country's EEZ extends 200 nautical miles from its coastline. The researchers combine national-level FAO data from within the EEZs with additional data sources including local catch statistics, social science reports, colonial archives, and expert knowledge⁷⁸.

Estimates of unreported catches include the dead fish and invertebrates that are returned to the sea before landing, referred to as discards. Although these have only a low commercial value, they definitely have high ecological impact⁷⁹. Measures of uncertainty in catch statistics are also calculated and incorporated in the final figures. These additions increase the overall estimate of fisheries catches substantially with discards making up 10-20% of reconstructed catches to the year 2000 and less than 10% from then on⁷⁹.

Since 2000, 73% of the global catch has come from fishing vessels within their EEZs, while distant-water fleets caught the remainder (either legally or illegally) in the EEZs of developing countries, or on the high seas⁸⁰. About 77% of the cumulative catch since 2000 was taken by industrial fleets, mostly by the top 10 fishing countries – China followed by Peru, Thailand, the Russian Federation, the USA, Indonesia, Japan, Chile, India and Vietnam. The amount of fish caught by these fleets ranges from 114,000 to 774,000 tonnes per year. In contrast, about 20% is taken by artisanal fleets, about 3% by subsistence fishers, and less than 1% by recreational fishers⁷⁸.

A new analysis of Sea Around Us data for the *Living Planet Report* compares cumulative catches in the 1950s to the 2000's (figure 12). Zones of moderately heavy (in orange) to heavy fishing intensity (in red) now wrap around every continent, affecting all coastal areas and many parts of the high seas. This implies that fishing activities have exposed shallow coastal marine ecosystems to potential long-term damage, notably by trawling⁸¹. These maps also show the growth of fishing intensity in the south and east, particularly South East Asia, over the last 60 years.