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2015

Living Blue Planet Report

Species, habitats and
human well-being

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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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Founded in 1826, the Zoological Society of London (ZSL) is an international scientific, conservation and educational organization. Its mission is to achieve and promote the worldwide conservation of animals and their habitats. ZSL runs ZSL London Zoo and ZSL Whipsnade Zoo; carries out scientific research in the Institute of Zoology; and is actively involved in field conservation worldwide. The ZSL manages the *Living Planet Index*® in a collaborative partnership with WWF.

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Living Planet Report

WWF's *Living Planet Report*, released every two years, is a leading science-based analysis on the health of our planet and the impact of human activity upon it. The *Living Planet Report 2014* detailed alarming declines in biodiversity, showing species populations falling by half between 1970 and 2010. It also showed that humanity, particularly in developed nations, continues to make unsustainable demands on nature.

This special edition takes a deeper look into these findings, and their implications, for the marine realm. Data on marine ecosystems and human impacts upon them is limited, reflecting the lack of attention the ocean has received to date. Nevertheless, the trends shown here present a compelling case for action to restore our ocean to health.

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NEARLY 3 BILLION PEOPLE RELY ON FISH AS A MAJOR SOURCE OF PROTEIN. OVERALL, FISHERIES AND AQUACULTURE ASSURE THE LIVELIHOODS OF 10-12 PER CENT OF THE WORLD'S POPULATION. 60 PER CENT OF THE WORLD'S POPULATION LIVES WITHIN 100KM OF THE COAST. MARINE VERTEBRATE POPULATIONS DECLINED 49 PER CENT BETWEEN 1970 AND 2012. POPULATIONS OF FISH SPECIES UTILIZED BY HUMANS HAVE FALLEN BY HALF, WITH SOME OF THE MOST IMPORTANT SPECIES EXPERIENCING EVEN GREATER DECLINES. AROUND ONE IN FOUR SPECIES OF SHARKS, RAYS AND SKATES IS NOW THREATENED WITH EXTINCTION, DUE PRIMARILY TO OVERFISHING. TROPICAL REEFS HAVE LOST MORE THAN HALF THEIR REEF-BUILDING CORALS OVER THE LAST 30 YEARS. WORLDWIDE, NEARLY 20 PER CENT OF MANGROVE COVER WAS LOST BETWEEN 1980 AND 2005. 29 PER CENT OF MARINE FISHERIES ARE OVERFISHED. IF CURRENT RATES OF TEMPERATURE RISE CONTINUE, THE OCEAN WILL BECOME TOO WARM FOR CORAL REEFS BY 2050. SEABED MINING LICENCES COVER 1.2 MILLION SQUARE KILOMETRES OF OCEAN FLOOR. MORE THAN 5 TRILLION PLASTIC PIECES WEIGHING OVER 250,000 TONNES ARE IN THE SEA. OXYGEN-DEPLETED DEAD ZONES ARE GROWING AS A RESULT OF NUTRIENT RUN-OFF. THE OCEAN GENERATES ECONOMIC BENEFITS WORTH AT LEAST US\$2.5 TRILLION PER YEAR. JUST 3.4 PER CENT OF THE OCEAN IS PROTECTED, AND ONLY PART OF THIS IS EFFECTIVELY MANAGED. INCREASING MARINE PROTECTED AREA COVERAGE TO 30 PER CENT COULD GENERATE UP TO US\$920 BILLION BETWEEN 2015 AND 2050.



Marco Lambertini
Director General,
WWF International

The trends shown in this report present a compelling case for action to restore our ocean to health.

OUR LIVING BLUE PLANET

Our ocean – that seemingly infinitely bountiful, ever awe-inspiring blue that defines our planet from space – is in crisis.

When I wrote the foreword to the 2014 edition of WWF's *Living Planet Report*, I said it was not for the faint-hearted. This edition – a deep dive into the health of marine species and the habitats on which they depend – is equally if not more sobering.

The marine Living Planet Index (LPI) presented here is roughly in line with the global LPI, which shows a 52 per cent decline in vertebrate populations since 1970. That alone should set off alarm bells. But it's what's hidden in the overall marine LPI that foretells an impending social and economic crisis.

When we look at the fish species most directly tied to human well-being – the fish that constitute up to 60 per cent of protein intake in coastal countries, supporting millions of small-scale fishers as well as a global multibillion-dollar industry – we see populations in a nosedive. The habitats they depend on, such as coral reefs, mangroves and seagrasses, are equally threatened.

The picture is now clearer than ever: humanity is collectively mismanaging the ocean to the brink of collapse. Considering the ocean's vital role in our economies and its essential contribution to food security – particularly for poor, coastal communities – that's simply unacceptable. Could the economic implications of the collapse of the ocean's ecosystems trigger the next global recession or undermine the progress we have made on eradicating poverty?

Solutions exist: smart fishing practices that eliminate bycatch, waste and overfishing; getting rid of harmful subsidies and unregulated fishing; protecting key habitats and a large enough portion of the ocean to enable the regeneration of its living resources while conserving iconic species and inspirational places; cutting CO₂ emissions that threaten a potentially catastrophic acidification of the ocean. And the ocean has another great advantage: it is a dynamic, interconnected global ecosystem that can bounce back relatively quickly if the pressures are dealt with effectively.

WWF reports on the state of the planet's health every two years. But we decided we needed to amplify the warning siren for the ocean this year, because the situation is urgent and the moment to act is at hand. The global community has prioritized a healthy ocean in the post-2015 sustainable development agenda. These commitments must be backed by tangible investment in restoring and sustainably managing marine resources.

The pace of change in the ocean tells us there's no time to waste. These changes are happening in our lifetime. We can and we must correct course now.

CHAPTER ONE: THE STATE OF OUR BLUE PLANET

On Mali Island in Fiji, Alumita Camari expertly handles a freshly caught live (and aggressive) mud-crab from the mangroves. Mita, as she's commonly known, is considered the best mud-crab harvester in her village. A single mother, she relies on fishing to provide for herself and her daughter.

Life in Fiji has always been shaped by the ocean. The Pacific island nation is home to the Great Sea Reef, known locally as Cakaulevu. Over 200km in length, it's the world's third longest barrier reef system after Australia's Great Barrier Reef and the Mesoamerican Reef off the Caribbean coast of Central America.

The reef and associated ecosystems like mangroves are fundamental to the country's economy and people's way of life. They provide food, attract hundreds of thousands of tourists each year, and protect coastal areas from storms.

But coral reefs and other marine ecosystems are declining all over the world. Populations of marine species are falling, while habitats are being destroyed and degraded. The incredible marine biodiversity of our blue planet, and the diverse coastal cultures that have evolved upon it, face an uncertain future.



The marine Living Planet Index

The *Living Planet Report 2014* highlighted the alarming state of the natural world upon which our societies and economies depend. The Living Planet Index (LPI), which measures trends in 10,380 populations of 3,038 vertebrate species, declined 52 per cent between 1970 and 2010. In other words, population sizes of mammals, birds, reptiles, amphibians and fish fell by half on average in just 40 years. Humanity continues to make unsustainable demands on nature, threatening our long-term well-being and prosperity. As ecosystems decline, meeting the basic needs of a growing human population will become an even greater challenge.

The LPI for marine populations, compiled for this report, shows a decline of 49 per cent between 1970 and 2012 (Figure 1). This is based on trends in 5,829 populations of 1,234 mammal, bird, reptile and fish species. With many more species and locations included, the marine LPI in this report is almost twice as large as it was in the *Living Planet Report 2014*, giving an even clearer picture of ocean health — and the decline is even greater than previously described. The period from 1970 through to the mid-1980s experienced the steepest decline, after which there was some stability — but more recently, population numbers have been falling again. The global index masks considerable variation in different regions: numbers have been increasing (from previously depleted levels) in northern latitudes, but falling in tropical and subtropical regions.

This chapter dives deeper into this data. Because the marine environment has not been comprehensively monitored, there are gaps in the data for some regions. The Zoological Society of London (ZSL) has created indices for a number of ecosystems and species types where we have sufficient robust data available from published reports, journal articles and fisheries researchers.

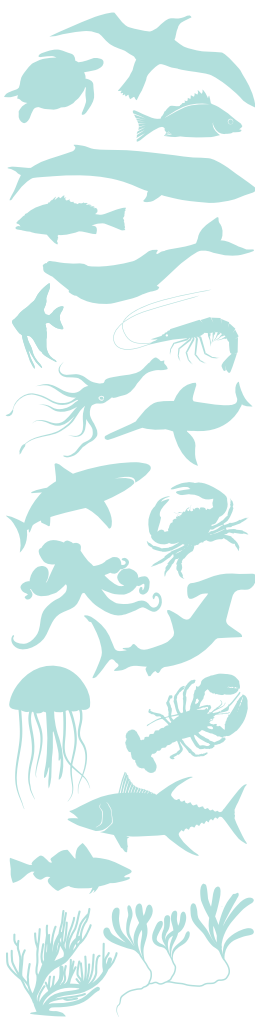
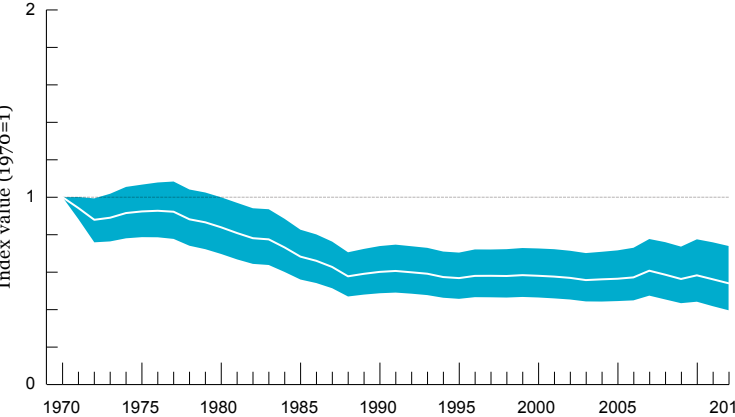


Figure 1: The global marine LPI shows a decline of 49 per cent between 1970 and 2012. This is based on trends in 5,829 populations of 1,234 species (WWF-ZSL, 2015).

Key

- Marine Living Planet Index
- Confidence limits



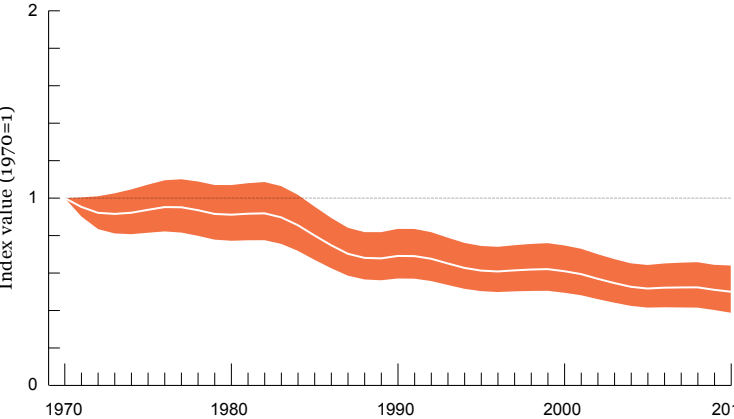
Fish

Of the marine fish in the LPI (930 species), 1,463 populations (492 species) are recorded as utilized, whether for local subsistence or commercial use. The index for all utilized fish species indicates a 50 per cent reduction in population numbers globally between 1970 and 2010 (Figure 2). Of the utilized fish populations, data sources for 459 contain information on threats. Exploitation is identified as the main threat in the vast majority of cases; other threats listed include habitat degradation/loss and climate change impacts.

Figure 2: The utilized fish index declined 50 per cent between 1970 and 2010 (WWF-ZSL, 2015).

Key

- Utilized fish index
- Confidence limits

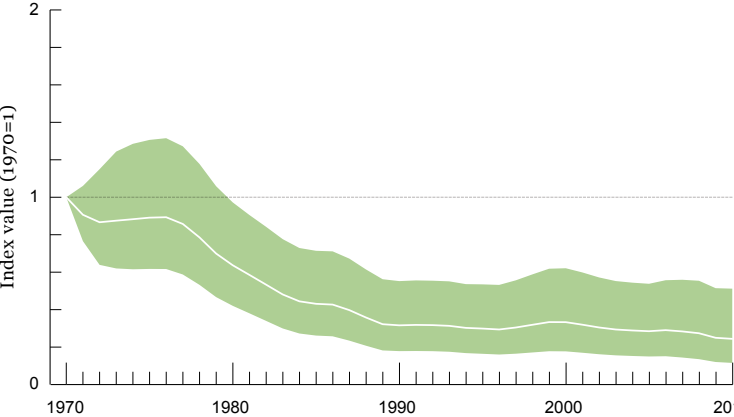


For fish species of importance for regional economies, livelihoods and food, the decline may be even more dramatic. This can be seen in the case of Scrombidae, the family of mackerels, tunas and bonitos. An index for Scrombidae, based on data from 58 populations of 17 species, shows a decline of 74 per cent between 1970 and 2010 (Figure 3). While the most rapid decline is between 1976 and 1990, there is currently no sign of overall recovery at a global level.

Figure 3: The index for Scrombidae (tuna, mackerel, bonito) declined 74 per cent between 1970 and 2010 (WWF-ZSL, 2015).

Key

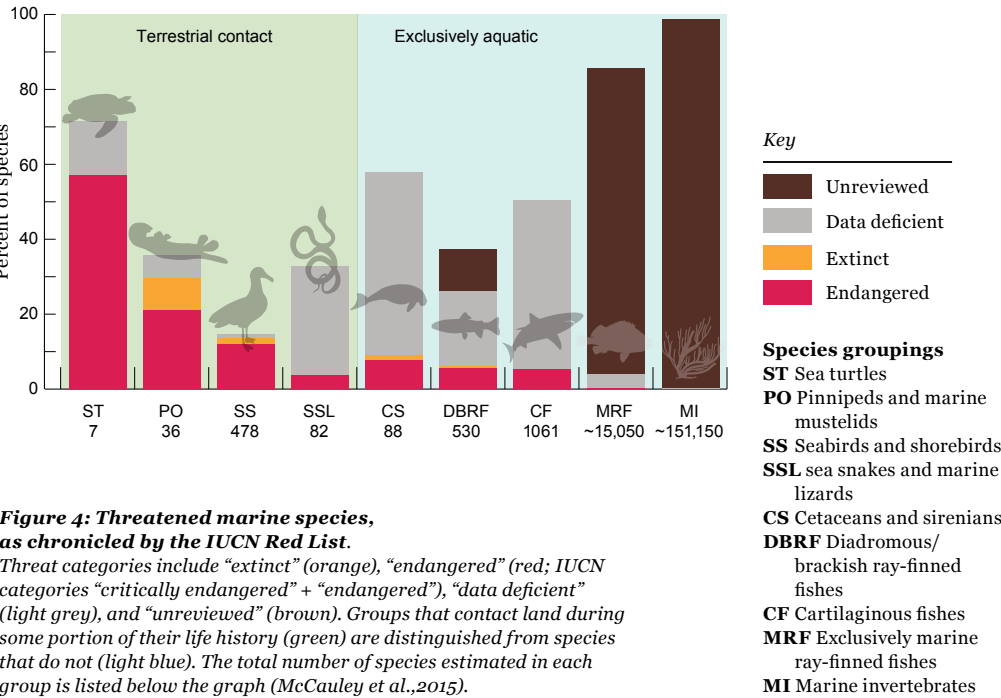
- Scrombidae index
- Confidence limits



Other species

The decline observed in fish populations holds true for other marine species. As marine ecosystems are closely interconnected, these declines can affect marine food webs and alter ocean ecosystem functioning (McCauley et al., 2015). While the IUCN Red List shows a growing number of threatened marine species, only a small fraction of known marine species have been evaluated – and in many case there is insufficient data to conduct an adequate assessment (Figure 4). Further research and monitoring is urgently needed into fish species and marine invertebrates, in particular, to determine threat levels.

We have selected three species groups as indicators of the current level of stress on biodiversity and marine ecosystem health: sea cucumbers (one of the few invertebrate species groups to have been monitored in some detail); sharks and rays, which include many threatened species but also many data gaps; and marine turtles, where species’ critically endangered status has helped spur conservation action.



Sea cucumbers

Sea cucumbers are distributed globally, and harvested and traded in more than 70 countries (Purcell et al., 2012). They play a vital role in the ecosystem, regulating water quality, turning over sediment, recycling nutrients, and as prey for commercial species such as crustaceans. They are also prized as a luxury food item, particularly in Asia. Globally, sea cucumber fisheries have expanded massively in the last 25 years (Figure 5). Many populations have been overfished, causing knock-on effects in the ecosystem. Some areas without sea cucumbers have become uninhabitable for other organisms; sea cucumbers turn over sand by feeding on organic matter mixed within it, and the nutrients they excrete can be taken up again by algae and corals (Mulcrone, 2005).

In the Galapagos, sea cucumber populations declined 98 per cent between 1993, when the first legal fishery opened, and 2004 (Shepherd et al., 2004). Similarly, populations fell 94 per cent between 1998 and 2001 in the Egyptian Red Sea due to over-exploitation (Lawrence et al., 2005). Despite the introduction of a fishing ban in 2003, populations decreased by another 45 per cent between 2002 and 2007 (Ahmed and Lawrence, 2007). Some commercial species are returning to their earlier overfished areas, but there is no evidence of stock recovery.

Figure 5: Global sea cucumber harvest, based on FAO data (Purcell et al., 2013).



Improved governance of sea cucumber fisheries is vital. Management measures need to take account of sea cucumber stocks, the ecosystems they are part of, and the socio-economic drivers of exploitation (Purcell et al., 2013).

Sharks and rays

Sharks and rays are fished across the open ocean and the coastlines of the world, as the main target or as secondary catch or bycatch (Dulvy et al., 2014). Globally, catches of sharks, rays and related species such as skates rose more than threefold from the 1950s to a high in 2003 and have been falling since (Dulvy et al., 2014). This decrease is not so much a result of improved management, but of the decline in populations (Davidson et al., 2015). As most catches of sharks and rays are unregulated, total catch could be three to four times greater than reported (Clarke et al., 2006; Worm et al., 2013).

Around one in four species of sharks, rays and skates is now threatened with extinction, due primarily to overfishing (Dulvy et al., 2014). Sharks and their relatives include some of the latest maturing and slowest reproducing of all vertebrates (Cortés, 2000): these species are especially vulnerable to overexploitation.

Many shark species are apex predators; others are filter feeders or carnivores of a lower trophic level. While the effects of falling shark numbers are still being studied, there is widespread concern about the damage to ecosystem health. Research has shown that the loss of apex predators nearly always results in further marine ecosystem degradation (Estes et al., 2011).

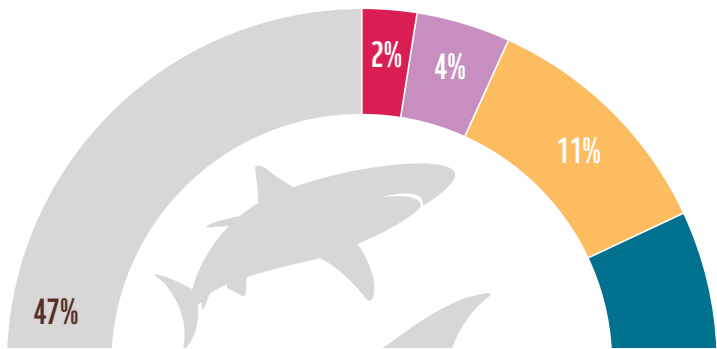


Figure 6: Shark and ray species at risk of extinction: an additional 7 per cent of the data deficient species are estimated to be threatened (Dulvy et al. 2014).

Key

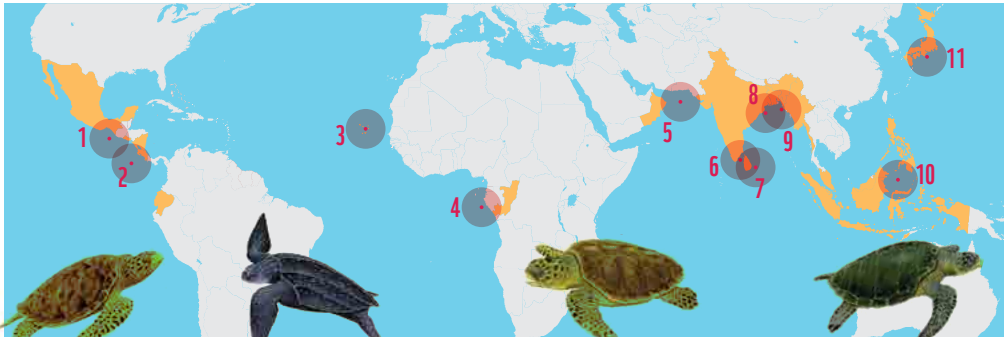
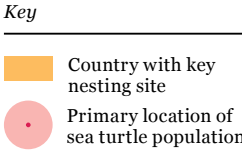
Marine turtles

Marine turtles are spread throughout virtually all tropical and sub-tropical waters. They often migrate thousands of kilometres from feeding grounds to nesting sites, and occupy differing habitats as hatchlings, juveniles and adults. They also face varying pressures from human consumption, bycatch in fisheries, climate change, marine debris, loss of nesting beaches and myriad other hazards.

This makes assessing the status of marine turtles challenging. Currently, the IUCN Red List classifies four turtle species as endangered or critically endangered – hawksbill, Kemp’s ridley, green and loggerhead – while olive ridley and leatherback are vulnerable, and flatbacks are data deficient. However, this global viewpoint masks significant regional disparities. The IUCN Marine Turtle Specialist Group (MTSG) has recently developed a new approach, which focuses on regional management units (RMUs) (Wallace et al., 2010).

In 2013, the status of leatherback turtles was reassessed using this system. Of the seven subpopulations or RMUs, four were assessed as critically endangered, including those in the Eastern Pacific that have declined by 97 per cent in the past three generations, and two as data deficient; however, the North West Atlantic population is now rated least concern after decades of conservation efforts. These regional statistics provide a far more realistic view of the status of leatherbacks than a single global listing. Other species are now being reassessed on a regional basis, which will give a more accurate picture of trends and conservation priorities.

Figure 7: The 11 most endangered subpopulations identified by the MTSG, overlaying threats and known trends for each RMU.



Hawksbill turtles (<i>Eretmochelys imbricata</i>) 1 4 7 10 East Atlantic Ocean, North East Indian Ocean, West Pacific Ocean, East Pacific Ocean Key nesting sites: Congo, India, Indonesia, Príncipe, São Tomé, Sri Lanka, Bangladesh, Malaysia, Philippines	Leatherback turtles (<i>Dermochelys coriacea</i>) 2 East Pacific Ocean Key nesting sites: Mexico, Nicaragua, Costa Rica	Loggerhead turtles (<i>Caretta caretta</i>) 3 6 11 North Pacific Ocean, North East Atlantic Ocean, North East Indian Ocean Key nesting sites: Cape Verde, Bangladesh, Myanmar, Japan	Olive ridley turtles (<i>Lepidochelys olivacea</i>) 5 8 9 West Indian Ocean, North East Atlantic Ocean, North East Indian Ocean Key nesting sites: India, Sri Lanka, Oman
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Turtle illustrations adapted from Conservation International/Cesar Landezaiba

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