Global Impacts Report 2016

Highlighting the improvements being made by certified fisheries around the world

Our vision is of the world's oceans teeming with life, and seafood supplies safeguarded for this and future generations.

Our mission is to use our ecolabel and fishery certification program to contribute to the health of the world's oceans by recognising and rewarding sustainable fishing practices, influencing the choices people make when buying seafood and working with our partners to transform the seafood market to a sustainable basis.

MSC, 2016. Marine Stewardship Council: Global Impacts Report 2016.
MSC, London, UK. 64 pp
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This page: Maldives ocean coast

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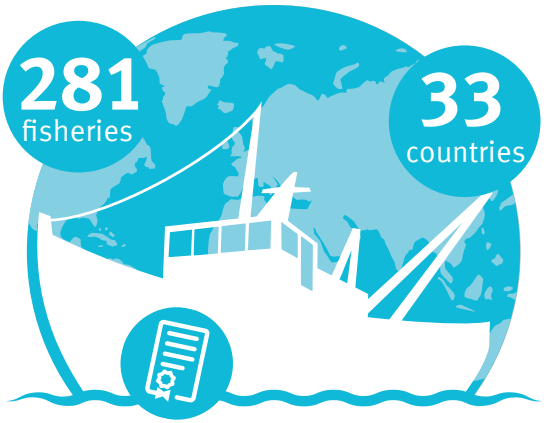
Executive summary

Our oceans are home to an extraordinary diversity of life. They regulate the climate, and provide us with food, income, joy and wonder. Seafood provides a major source of protein for nearly 3 billion people, while many millions of people rely on fishing for their livelihood.

But the health of our oceans and the fish stocks that are so crucial to coastal communities and national economies are under threat with 29% fished beyond sustainable limits. As the global population continues to grow, recovering overexploited and depleted stocks, while ensuring the rest are managed sustainably, is crucial for future food security and prosperity.

The Marine Stewardship Council (MSC) was established in 1997 to address unsustainable fishing and safeguard seafood supplies for the future. Working with scientists and marine experts, we have developed the world's most recognised standard for sustainable wild-caught seafood. Well-managed fisheries that ensure the long-term sustainability of fish stocks and keep ecosystems healthy can be certified to this standard, and their products sold with the blue MSC ecolabel.

This, our fourth Global Impacts Report, looks at the impact of the MSC from the first certification in 1999 to 2015, showcasing recent improvements and highlighting the overall progress that certified fisheries have made to secure thriving fish stocks and healthy oceans.



Global reach

- 281 fisheries in 33 countries have been certified as sustainable against the MSC Standard.
- The total number of Chain of Custody certificate holders almost tripled from 1,099 in 2010 to 2,898 in 2015.

Accessibility

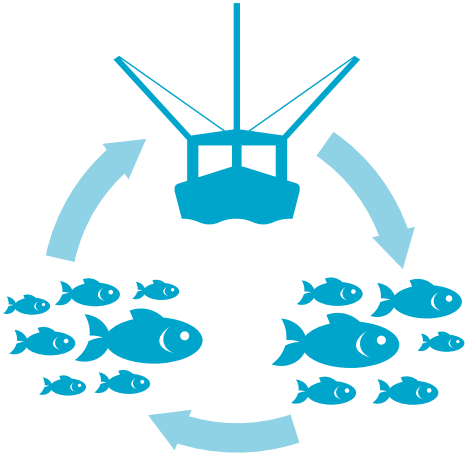
- Our tools are helping small-scale and developing world fisheries take their first step on the road to sustainability.
- Our Benchmarking and Tracking Tool shows that these fisheries are making considerable improvements to their operations in just five years.

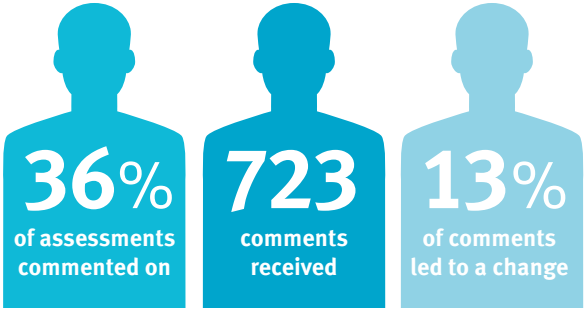
Improvements in fishery performance

- 94% of certified fisheries have made at least one improvement to strengthen or further monitor the sustainability of their practices to maintain their certificate.
- Advances in technology, research and fisheries management are enabling fisheries to fish 'smarter' and more selectively, minimising bycatch.

Traceable supply chains

- DNA testing shows that over 99% of MSC labelled products are correctly labelled.
- Traceback activities have also been scaled up in South East Asia.





Sustainable fish stocks

- The percentage of global wild catch that is MSC certified has almost doubled from 5% in 2010 to 9.4% in 2015.
- Stocks targeted by MSC certified fisheries are well managed. Fisheries have made efforts to maintain or improve their fishing operations to ensure they remain sustainable.

Stakeholder engagement

- Between 2012 and 2015, stakeholders commented on 36% of fishery assessments with a total of 723 comments received.
- 13% of comments contributed to a change in a fishery's assessment score.

Foreword

Our results highlight significant improvements being made by certified fisheries around the world. Their efforts, coupled with the support of scientists, NGOs and retailers, will help to ensure that we have healthy oceans now and for future generations.

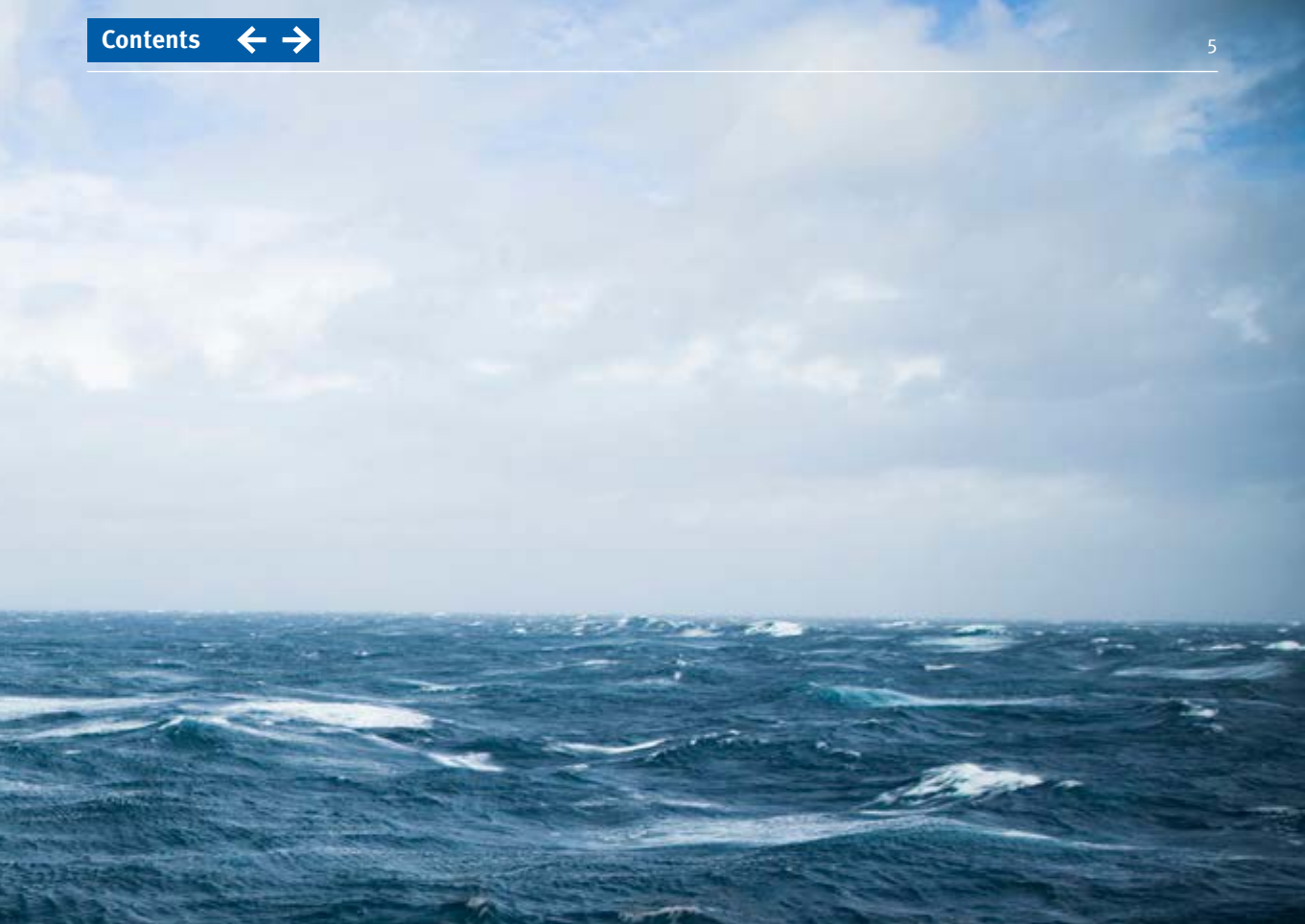
Last year marked 20 years since the publication of the FAO's Code of Conduct for Responsible Fisheries. At a time when many of the world's fish stocks were at the brink of collapse, the code captured international opinion on how best to manage fisheries to ensure they remain healthy and productive long into the future. With the code at the core of our fisheries standard, the MSC program has acted as an important catalyst for change, recognising and rewarding fisheries that adopt these responsible fishing practices.

Today, almost 10% of the world's wild-caught fish is MSC certified. The 281 fisheries harvesting this catch have passed an independent and robust scientific assessment that has determined they are targeting fish stocks sustainably, have effective management in place, and have minimised their impacts on marine ecosystems. Once harvested, almost 3,000 certified processors, distributors and retailers ensure that this sustainably caught fish can be traced from ocean to plate.

This report presents a quantitative evaluation of the progress we are making to ensure healthy, thriving oceans and safeguard seafood supplies for the future. The results, presented across six thematic chapters, highlight significant improvements being made by certified fisheries around the world.

As you may notice, the format of this year's report has been adapted in response to feedback from our stakeholders. However, the core dataset and methodology used to generate the results remain openly available online.

This year's report features case studies to illustrate how the results translate to improvements 'on the water' – from dramatically reducing the number of seabirds accidentally caught in a longline fishery in the southern Indian Ocean, to minimising bycatch of cod, monkfish and whiting in a North Sea haddock trawl.



The case studies also highlight the important role that stakeholders play both during the assessment process, and in supporting fisheries as they make improvements. Thanks to collaboration with a research institute, better data on population dynamics is helping lobster fishers in Normandy and Jersey to manage stocks sustainably (page 22), while potential conflict between an environmental NGO and the Icelandic lumpfish fishery instead led to positive cooperation (page 24).

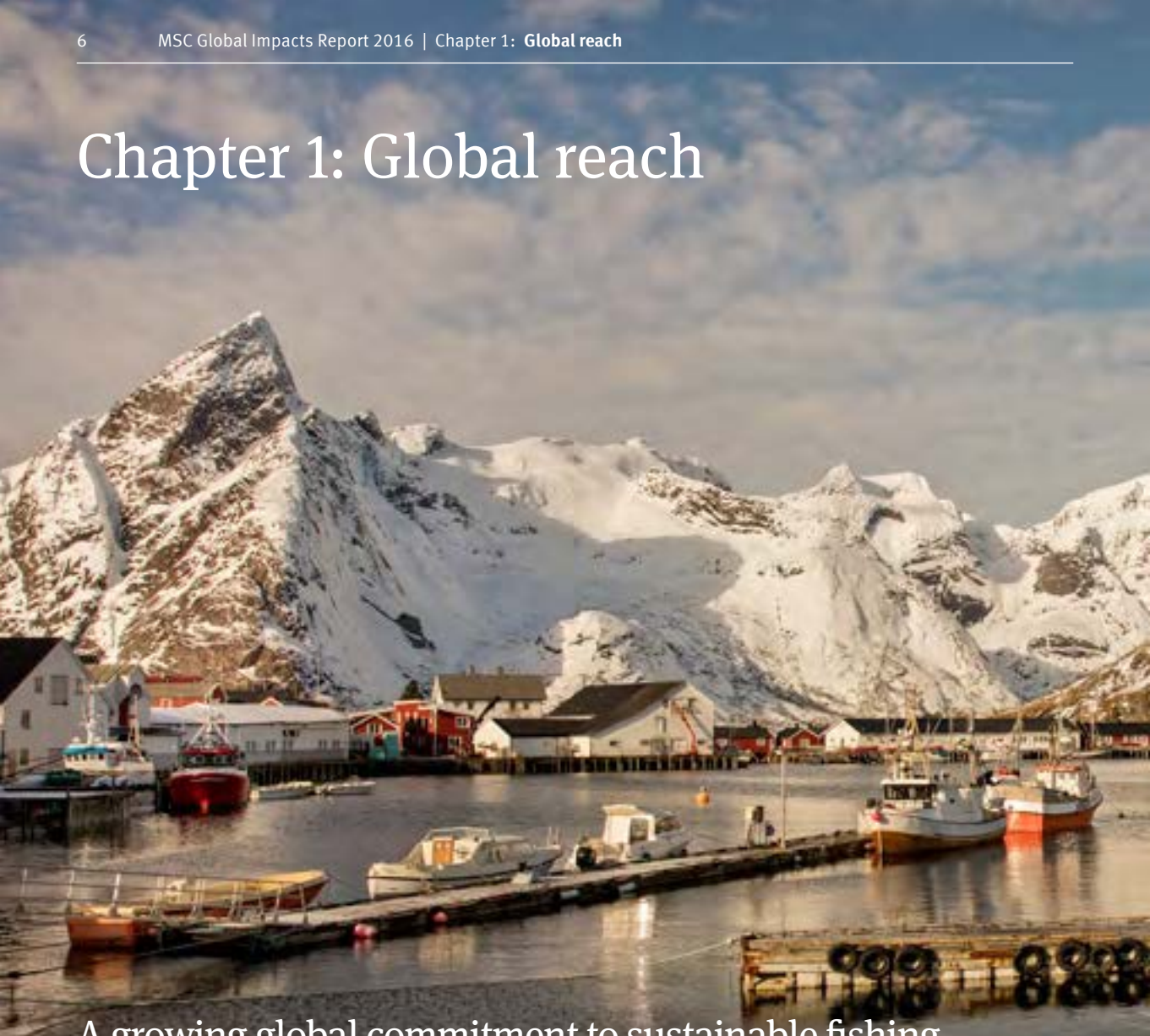
Although the progress being made by MSC certified fisheries is indisputable, some regions of the world remain under-represented in the MSC program. The announcement of Sustainable Development Goal 14 on the sustainable use of the oceans served as a timely reminder of the important role of small-scale and developing world fisheries to food security, livelihoods and economic development, particularly in coastal and island nations.

We are committed to building capacity in these fisheries, and have developed tools and training initiatives to support them to achieve certification and benefit from access to new markets.

Finally, I would like to take this opportunity to thank the certified fisheries around the world for their dedication and commitment to sustainable fishing, and the investment they have made to achieve and maintain certification. Their efforts, coupled with the strong support of scientists, NGOs and retailers, will ensure that we have sustainable fisheries now and for future generations.

David Agnew
Science & Standards Director

Chapter 1: Global reach



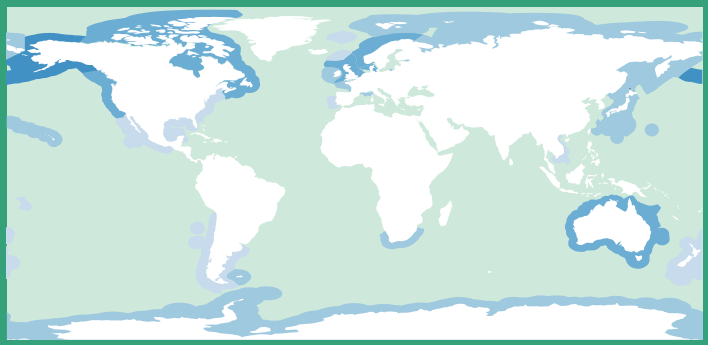
A growing global commitment to sustainable fishing

From the mudflats of the Mekong delta, to the Fjords of Norway, the last few years have seen a swell of support for sustainable fishing. Fisheries around the world are making important commitments to safeguard the health and productivity of vital fish stocks and to minimise the impacts of their operations on marine environments. Since the formation of the Marine Stewardship Council (MSC) in 1997, these commitments have been recognised through the certification of 281 fisheries in 33 countries against our rigorous standard for sustainable fishing. A further 90 fisheries are currently in assessment.

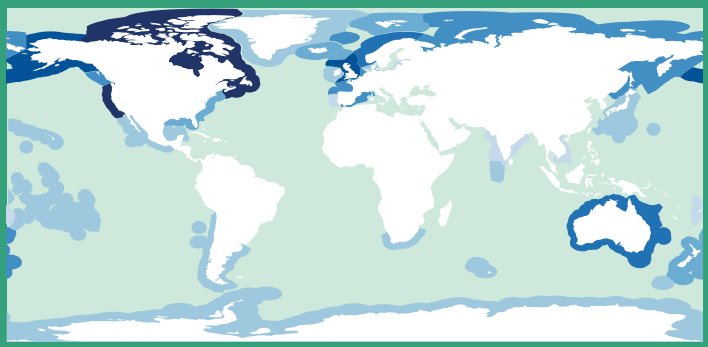
But that's not all. Over 3,000 seafood suppliers, distributors and processors have also committed to ensuring that the 9 million tonnes of fish being landed by these fisheries can be traced from ocean

to plate, and is not mixed or substituted on its journey to consumers around the world.

In this chapter, we give an overview of the global scale of the MSC Certification Program and explain how commitments by fisheries and supply chain actors around the world have led to certification in new regions and markets, and of new species over the past five years.



A. Number of certified fisheries 2010



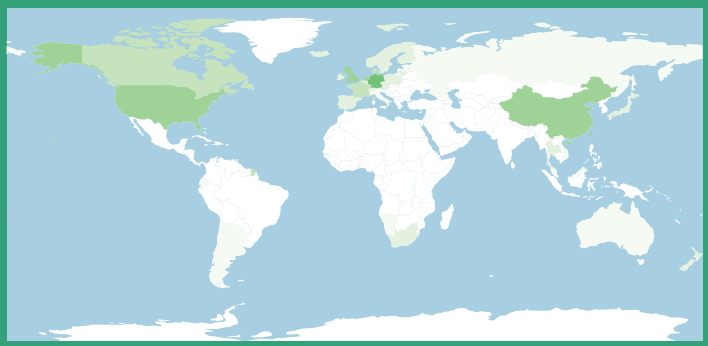
B. Number of certified fisheries 2015

Map A
Number of certified fisheries in each country's Exclusive Economic Zone (EEZ) in 2010

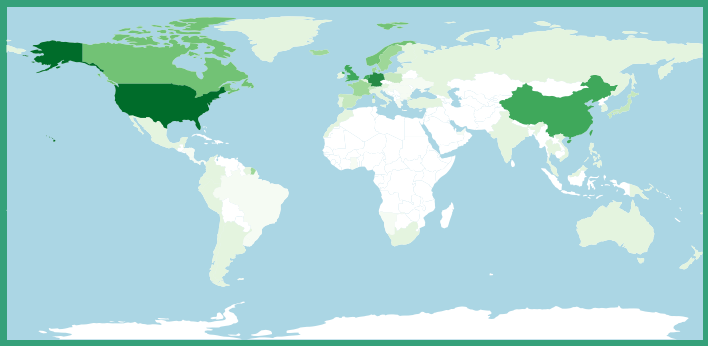
Map B
Number of certified fisheries in each country's EEZ in 2015

(EEZs not shown for countries with no certified fisheries)

- 26+
- 20-25
- 16-20
- 11-15
- 6-10
- 2-5
- 1



C. Number of Chain of custody certifiicate Holders 2010



D. Number of Chain of custody certifiicate Holders 2015

Maps C, D
Number of Chain of Custody certificate holders by country

- 301-350
- 251-300
- 201-250
- 151-200
- 101-150
- 51-100
- 2-50
- 1

A swell of support for sustainable fishing

Over the past five years, the number of certified fisheries has risen in Europe and North America, where engagement with the MSC program is strong, but it is growing in other regions too.

India and China recently achieved their first fishery certifications, following programs of improvement by the Ashtamudi short-necked clam fishery in Kerala and the Zoneco scallop fishery in Zhangzidao.

In the Antarctic, five toothfish and two krill fisheries became certified having worked hard to ensure the long-term sustainability of fish stocks and the environment on which they rely.

In northern European waters, the first six Icelandic, three Greenlandic and six Faroese fisheries achieved certification. Seafood is the bedrock of Greenland's economy with prawn accounting for nearly half of its seafood exports, while a commitment to MSC by the Icelandic Sustainable Fisheries group saw several new species including Icelandic golden redfish and lumpfish enter the program.

Canadian fisheries continue to demonstrate their commitment to sustainability with 14 new fisheries joining the program since 2010. Today, 78% of Canadian catch by value is MSC certified.

The first inland fisheries in North America, including the First Nation fishery operating on the frozen Waterhen Lake and the large commercial fishery of Lake Erie, have also received MSC certification since 2010.

Recent years have seen a rise in the number of certified tuna fisheries, with 11 achieving certification and a further 10 in full assessment. These fisheries harvest skipjack, yellowfin and albacore from 10 of the 23 global tuna stocks, representing 14% of globally landed tuna.

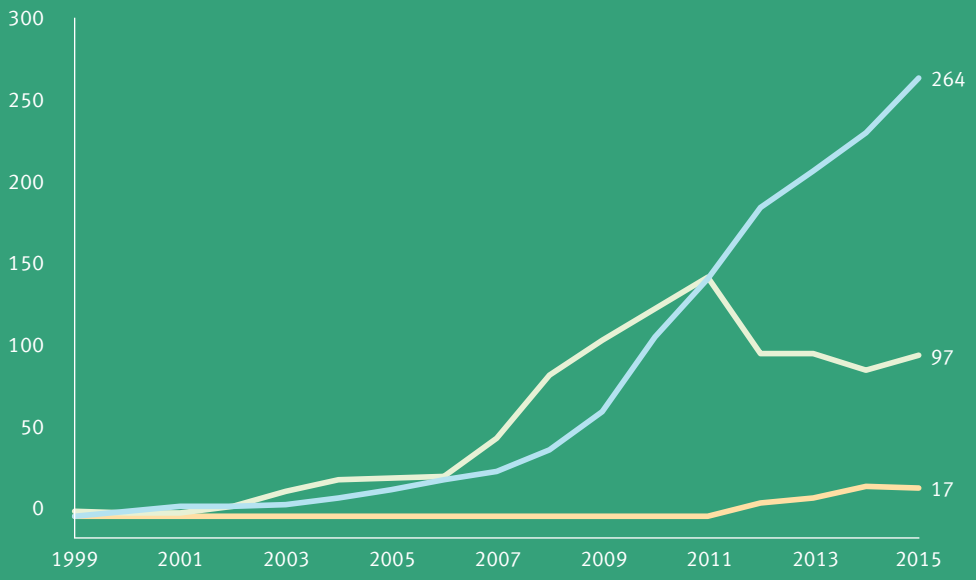
Despite the clear growth of the MSC program, some parts of the world remain under-represented. With the exception of the South African hake trawl and the Juan Fernández rock lobster fishery, there are no certified fisheries around the African continent nor along the Pacific South American coast, and very few in South East Asia. The MSC's regional teams are building partnerships with fisheries, markets and other organisations in these regions to help build momentum for sustainable seafood and ensure fisheries in improvement projects (see Chapter 5) are making progress towards MSC certification.

Another growth area in recent years has been in the certification of fisheries which harvest species for fishmeal and fish oil production. Sometimes referred to as 'reduction fisheries' their products are used in both aquaculture and agricultural farms. Today around 7% of global reduction fishery landings are either MSC certified or in full assessment.

281

fisheries in 33 countries are now MSC certified

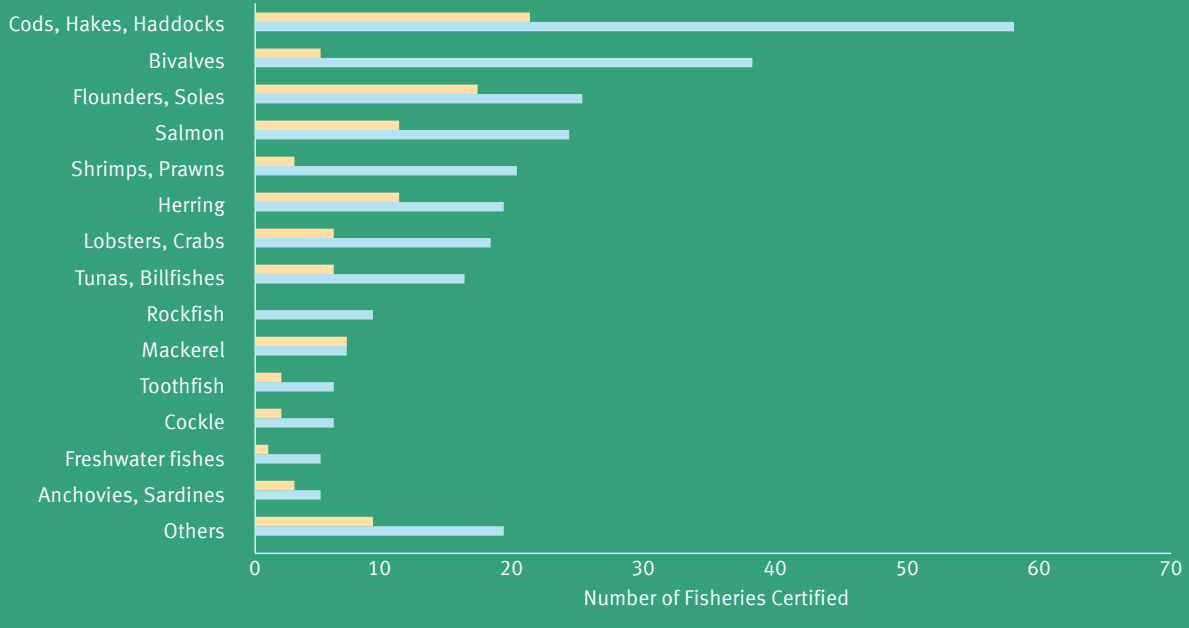
Number of fisheries



Number of certified fisheries between 1999 when the first fishery was MSC certified, and December 2015

certified | suspended | in assessment

Fisheries by species



Number of certified fisheries by species group 2010–2015

2010 | 2015

* All species groups with <5 fisheries certified in 2015 have been combined in the 'Others' category

Ensuring the integrity of global seafood supply chains

The MSC Chain of Custody program has grown considerably in recent years with the number of certificate holders increasing from 1,099 in 2010 to 2,898 in 2015 (Maps C & D, Page 8). The USA, Canada and Europe have the most companies with Chain of Custody certification at all stages of the seafood supply chain. They are also the regions with the highest numbers of MSC-approved products. China ranks amongst the countries with the highest number of Chain of Custody certificates. These are overwhelmingly in the processing sector. A number of countries in South America, Asia and Eastern Europe received Chain of Custody certification for the first time in the last five years.

Although the African continent remains under-represented in the MSC program, companies in Morocco and Ghana received Chain of Custody certificates for the first time, in 2013 and 2014 respectively. Seafood trading, processing and distribution activities often take place in countries away from the fishery of origin. The large number of certificates in China, which has only one certified fishery to date, is an example of this.

The number of Chain of Custody certificate holders has grown by 264% since 2010

Growth of the Chain of Custody program by supply chain stage

Singapore has seen considerable growth in Chain of Custody certificates over recent years, with 19 companies becoming certified since 2010. While much of the growth has included trading companies, two hotel chains also received Chain of Custody certification.

MSC labelled products are sold in a number of countries that have neither Chain of Custody certificates nor certified fisheries, notably in the Middle East and Africa. Growth in the sales of MSC products in the Middle East appears to be driven by the presence of multinational organisations. For example, IKEA distributes MSC frozen and chilled fish in Egypt, Israel, Jordan, Qatar, Saudi Arabia and Kuwait. The German company Stührk Delikatessen distributes MSC canned and chilled fish in Bahrain, Jordan, Kuwait, Oman, Qatar and Saudi Arabia, while PharmaCare distributes fish oil supplements in Libya.

The certification of several Indian Ocean and Pacific tuna fisheries in the past five years has been one of the drivers behind the increasing number of processing companies in South East Asia. All of the certified companies in the Philippines, most of the companies in Thailand and some in Vietnam process tuna.

In response to the fast growth in this region, our program monitoring activities have focused especially on these countries. More information on this can be found in the Traceability chapter.

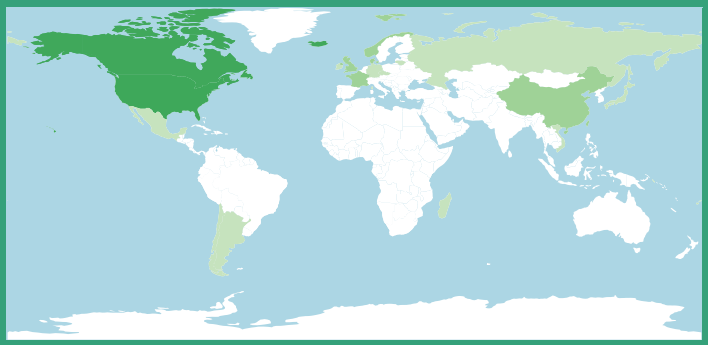
To focus in on different elements of the seafood supply chain, the following maps break down Chain of Custody certificate holders by supply chain stage. Maps A, B and C show the percentage of Chain of Custody certificate holders in countries around the world relative to the global total, while Map D shows the percentage of MSC products sold in each country relative to the global total.

Maps A, B, C
Percentage of chain of custody holders per country, relative to the global total.

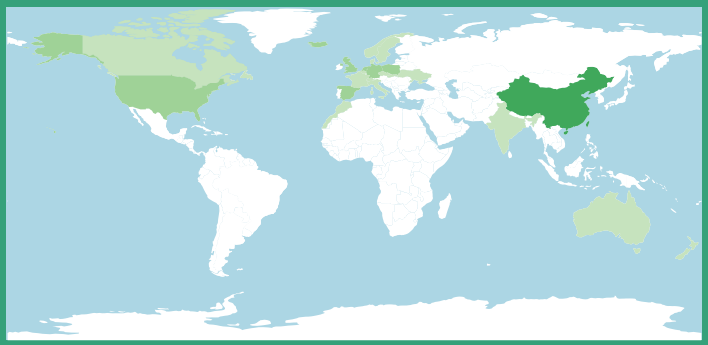
- 15-20
- 10-15
- 5-10
- 0.01-5
- 0

Map D
Percentage of MSC labelled products approved by country, relative to the global total.

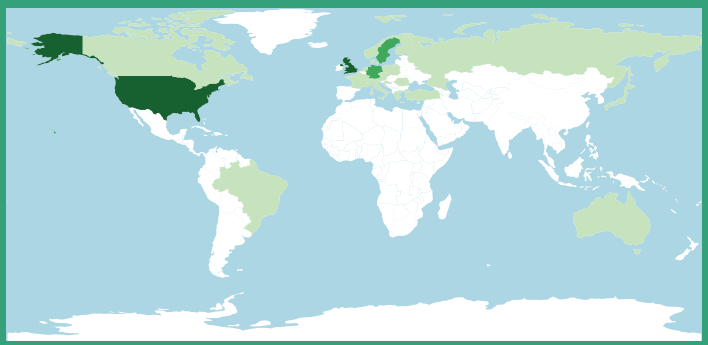
- 10-25
- 5-10
- 2-5
- 0.01-2
- 0



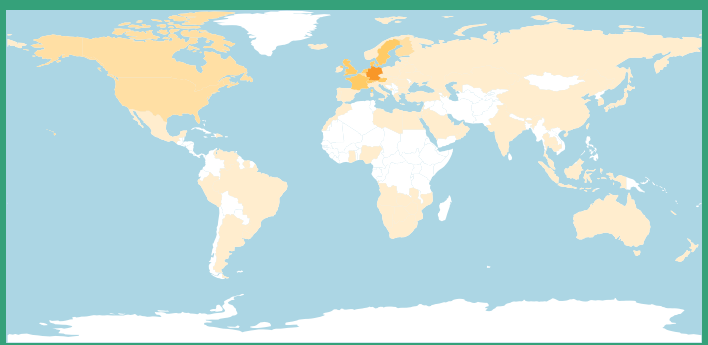
A. Primary processors



B. Secondary processors



C. Restaurants and fish counters



D. Number of eco-labelled products

Chapter 2: Sustainable fish stocks

Ensuring the health and productivity of global fish stocks

Ensuring that the world's fish stocks remain healthy and productive is vital to the health of marine ecosystems, and to the food security and wellbeing of a significant proportion of the world's population.

Around the world, fish provides 3 billion people with almost 20% of their intake of animal protein and supports the livelihoods of many millions (FAO, 2014).

As well as providing a vital source of food and nutritional security for coastal and island nations, the fishing industry contributes US$500 billion per year to the global economy as the most highly traded food commodity in the world (Smith et al., 2010). Over 58 million people make their living through fishing, most of them in developing countries (FAO, 2014).

Yet today's fish stocks are under considerable pressure from the demands of a growing global population. Since the early 1990s global wild-capture production has remained at around 90 million tonnes/year, and the majority (61%) of the world's wild fish stocks are considered fully exploited, with only 10% considered under-exploited (FAO, 2014). The remaining 29% of global stocks are fished beyond sustainable limits and need to be recovered to sustainable levels (FAO, 2014).

In this chapter, we demonstrate progress towards ensuring that all fish stocks around the world are managed sustainably.

How the MSC Standard evaluates the sustainability of fish stocks

Ensuring the sustainability of fish stocks is a core principle of the MSC Fisheries Standard. In order to become certified as sustainable, all fisheries must demonstrate that they are harvesting their catch at a level that allows fish to remain healthy and productive into the future. Not only does this allow marine populations to thrive, it serves as an insurance policy for fishers, helping to ensure that they will enjoy the same economic and nutritional benefits of fish for generations to come.

In line with best practice in fisheries science, and to ensure applicability to a range of target species and fishery types, the MSC Standard determines the health of fish stocks by evaluating two key indicators. First, it requires that stocks are at or fluctuating around the stock size (measured as the biomass of fish that remain in the water) which produces the maximum sustainable yield (MSY). It also requires that there are management measures in place to control fishing effort so that stocks are able to deliver MSY. Some of the most important of these measures are an effective assessment of stock size, and formal rules to control harvesting so that stocks are maintained at the MSY biomass level or are able to recover to this level if for some reason they drop below it. MSY is a widely recognised benchmark and represents the largest catch that fishers can harvest from a particular fish stock indefinitely.

Although this is a relatively simple concept, it is important to note that fish stocks are dynamic. Fluctuating environmental conditions and population dynamics, combined with with variation in fishing effort, inevitably mean that in reality, the size of fish populations, and the potential MSY, will fluctuate over time. In order to take this variability and uncertainty into account. The MSC standard requires that management strategies take this uncertainty into account, are robust to it and where necessary adopt a precautionary approach.

All certified fisheries must demonstrate that they are harvesting their catch at a level that allows fish populations to remain healthy and productive into the future

An increasing proportion of the world's fisheries are meeting the MSC's sustainability requirements

Growth in MSC certified catch around the world

In 2010, the 196 countries that are party to the Convention on Biological Diversity agreed the Aichi Biodiversity Goals, which aim to halt biodiversity loss by 2020 (Secretariat of the Convention on Biological Diversity, 2011). The number of MSC certified fisheries and their respective tonnage is considered a key response indicator towards Target 6, on managing and harvesting fish and invertebrate stocks sustainably. MSC certification means that an independent evaluation has established that their stock status is maintained at the globally recognised level of MSY.

Over the past five years, the proportion of global wild-capture landings that are MSC certified has almost doubled from 5% (4,541,358 tonnes) in 2010 to 9.4% (8,821,221 tonnes) in 2015, according to figures from the UN Food and Agriculture Organization (FAO, 2014). However the pattern is not consistent across the world.

Failed certification and suspensions

The MSC maintains the leading global standard for certification of wild-capture fisheries, and a third-party certification system that ensures that certification is robust, highly credible and transparent. This is a high bar, and while many fisheries have made the improvements necessary to meet the standard, others have not.

Of all the fisheries that have announced assessments, about 10% failed that assessment, 17 have been suspended since certification (see page 11), and 264 remain as certified and 97 are in assessment. Many of the fisheries that announced and then withdrew when they realised that they would not meet the standard, or those that failed certification, have gone on to generate the improvements that are necessary to re-enter assessment. Once certified, fisheries are subject to annual surveillance audits to ensure that they continue to meet the requirements of certification. At the end of 2015, 17 certified fisheries were currently suspended because they no longer did. Most of these suspensions have been due to failure to keep target stock sizes at the required MSY level, or to maintain or improve management systems such as harvest control rules.

Two recent examples illustrate the rigour with which the third-party assessment teams apply the MSC Standard. In 2015, the MSC certificates for all five cod fisheries in the Eastern Baltic Sea were suspended after independent surveillance audits determined the stock assessment was insufficient to provide the necessary advice on stock status or reference points to ensure effective management. In 2014, the Portuguese sardine purse seine fishery was also suspended after its fourth surveillance audit revealed that despite efforts made by the fishery and the Portuguese institutions, stocks were not recovering at the rate expected.

'Over **80%** of wild-caught fish landed in the Pacific Northeast is now MSC certified'

In focus: Exploring the status of MSC certified fish stocks in Europe

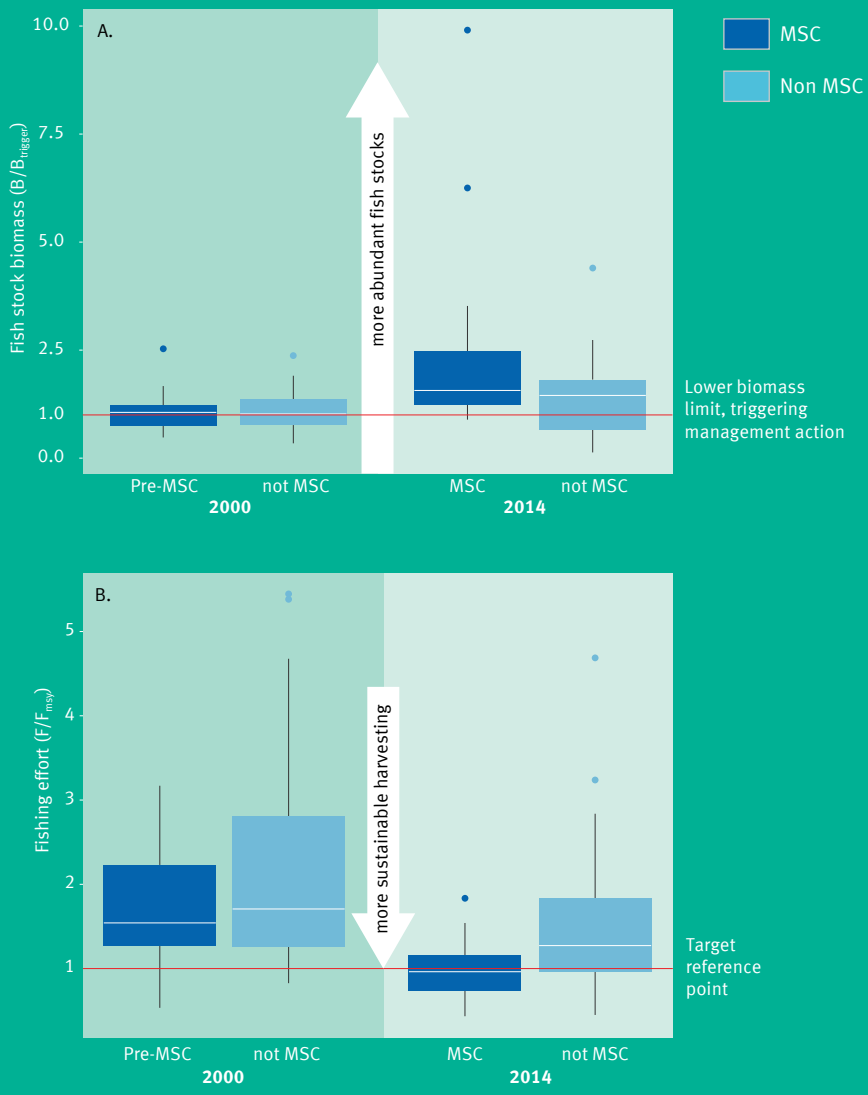
The intergovernmental organisation International Council for Exploration of the Sea (ICES) provides management advice mainly in European waters, as well as around the Arctic, Iceland and the Faroe Islands. Large numbers of fisheries are certified in this region, fishing a variety of stocks.

To explore the sustainability of MSC certified and uncertified fish stocks within the ICES region, we compared fish biomass in Northern European stocks, and the fishing effort (an indication of the effectiveness of management in realising sustainable catch levels) relative to management reference points. ICES does not estimate the biomass level consistent with maximum sustainable yield (B_{MSY}), but it does estimate a reference point, $B_{trigger}$, which is the lower limit of likely estimates of B_{MSY}. The MSC Standard therefore requires that stocks are above $B_{trigger}$. An appropriate management rule to ensure that stocks are fluctuating around the biomass level associated with MSY is to keep fishing mortality (F) at or below F_{MSY} – that is, the rate of fish catch at which B_{MSY} should be maintained.

The plots on Page 21 show that in 2000, when no fishery had yet been certified against the MSC Standard, fishing effort was too high and stock biomass levels were close to or below the $B_{trigger}$ limit across 48 stocks in the ICES region. Over the past 14 years, better fisheries management has improved the status of ICES stocks overall. However, the stocks which are targeted by certified fisheries have generally increased in biomass more than the stocks that are not being targeted by any certified fishery, and the status of those stocks is above Btrigger (fluctuating around B_{MSY}).

In addition, it is clear that fishing mortality being applied to stocks targeted by MSC certified fisheries has gone down since 2000, and is at the appropriate target level in 2014. A few fisheries are currently working on improvements in order to reduce their fishing effort even further. In contrast, non-certified stocks show a much greater variability in terms of biomass and fishing effort, with the median fishing effort remaining too high to ensure productive fish stocks.

Although MSC certification is unlikely to have been the sole driver behind this change, the current status of MSC certified stocks is a testament to the combined efforts of fisheries and regional management authorities that have chosen to demonstrate their commitment to sustainable exploitation.



Box and whisker plots showing the performance of ICES stocks, expressed as mean fishing mortality (F) and spawning stock biomass (SSB) relative to their respective reference points (mean SSB/MSYB$_{trigger}$ - shown as red line in Graph A and mean F/F$_{MSY}$ - shown as red line in Graph B). In Graph A, the biomass of fish populations should be sitting above the red line to indicate a healthy state. In graph B, fishing effort should in most cases be at or below the red line to indicate that a stock is being fished sustainably. This analysis was done for stocks targeted by MSC certified fisheries (Graph A: n= 17, Graph B: n= 20) and non-certified fisheries (Graph A: n=26, Graph B: n=28) between the years of 2000 (before the fish stocks became MSC certified) and 2014. The solid white lines in boxes represent the median, the upper and lower boundaries of the box indicate the interquartile range. Full details in online appendix (www.msc.org/2016-impacts-appendix).

Case Study:

Big data, bigger lobsters

Better data on population dynamics is helping lobster fishers in Normandy and Jersey to manage stocks sustainably

To the lobster fishers of Normandy and Jersey, management measures are nothing new. The shared waters of Granville Bay were the scene of the first ever international fishing treaty back in 1839. More recently, in 2000, the Bay of Granville Treaty provided detailed measures to ensure the sustainability of the fishery. These included regulations on minimum landing size and limits on the number of licensed fishing vessels and pots per vessel.

Thanks to these improvements, the fishery – which comprises around 130 small vessels catching lobsters with pots – was able to achieve MSC certification in 2011. However, the assessment came with a number of conditions to ensure that lobster continue to be harvested at sustainable levels.

To ensure the stock maintains high productivity with a low risk of overfishing, the certification required the fishery to put in place an action plan that will result in more larger lobsters overall, with more individuals having the chance to reproduce over a longer period. In addition, the fishery had to agree well-defined and effective harvest control rules, with clear measures to take if stock levels were to decline.

For these measures to be effective, the fishery needed stronger data on the lobster population, including abundance, size, age and distribution. As well as reviewing past studies, the fishery has developed a process for collecting and pooling data. This has included surveying lobsters in commercial fishing grounds and conservation areas, sampling lobsters sold at auction or landing sites, independent

‘We’ve always tried to fish the right way, but MSC certification has helped us to coordinate and formalise our harvest strategy. It’s also strengthened our relationship with researchers and provided us with the information we need to manage our lobster stocks.’

Eric Leguelinel, Co-president of the Crustacean Commission, Regional Fishing Committee of Basse-Normandie

on-board inspectors and voluntary self-reporting from individual fishing boats.

The fishery worked closely with scientists from the French marine research institute IFREMER to analyse the data. The process gave fishers and researchers new insights into the lobster population and its behaviour – for example, they discovered that lobsters tended to migrate offshore once they reached maturity.

They developed a standardised 'index of abundance' to monitor the health of the lobster stocks. If the index drops below 1 (the 2007 baseline), pre-agreed measures will be taken to reduce fishing effort – such as reducing the number of pots and fishing licences.

Further controls will be triggered if harvest levels fall below 6kg per 100 pots – a level based on the lowest recorded catch in 1996, from which the fishery nevertheless recovered. These include biological measures to rebuild stocks, such as increasing the minimum landing size, a ban on landing females with eggs, and introducing new closed seasons and areas.

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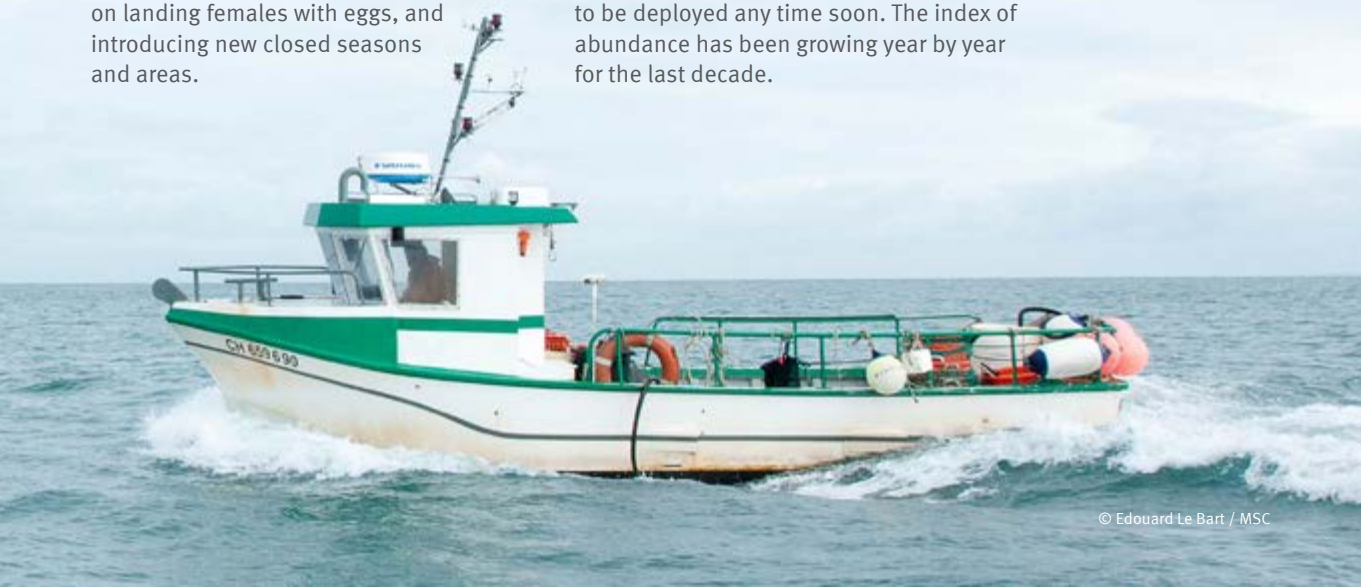
Independent audits showed the fishery was making good progress, and after three years assessors concluded that all conditions had been met, well ahead of schedule. Encouragingly, there's little danger that harvest control rules will need to be deployed any time soon. The index of abundance has been growing year by year for the last decade.



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Chapter 3: Improvements in fishery performance

How continued improvements being made by MSC certified fisheries help to safeguard the health of marine ecosystems

The MSC Standard requires that fisheries score an average of 80 across six fish stock performance indicators (Principle 1), 15 ecological performance indicators (Principle 2) and seven general management indicators (Principle 3). The fishery is assigned a score against each performance indicator where 60 is the minimum acceptable performance, 80 is global best practice and 100 is near-perfect performance. If a fishery scores between 60 and 79 for any performance indicator it must improve its performance in that area to the 80 level in order to retain its certificate.

Most often, these improvements call for a fishery to collect further information or evidence to demonstrate that it is not causing any negative impacts on the wider marine environment in the long term. For example, the MSC certified Icelandic lumpfish fishery established a seabird monitoring programme as a requirement of its certification to ensure the gillnets that it uses do not impact important seabird populations in the region.

It is the certified fisheries themselves that dedicate considerable time, energy and resources to developing action plans to meet these improvement requirements and ensure their operations remain sustainable. The development of action plans can often initiate long-term collaborations with scientific institutions, NGOs, retailers and governments, which work with the fishery to help it achieve the necessary improvements.

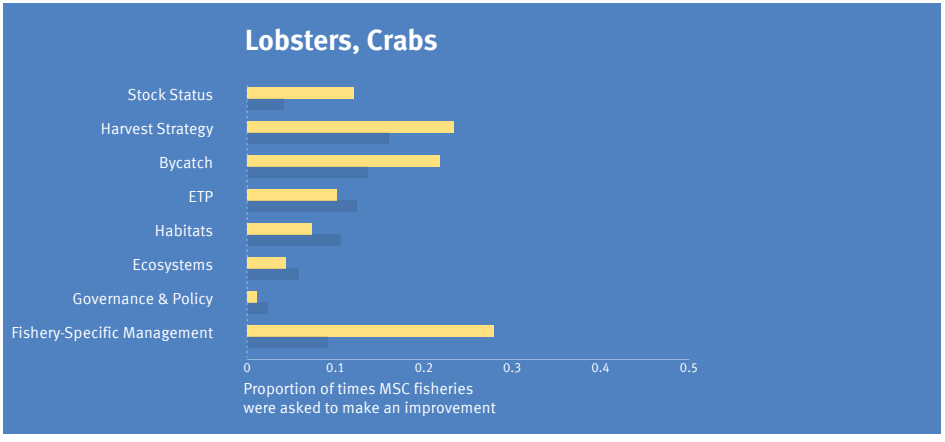
In this chapter, we analyse the results of all fishery assessments using the default assessment tree between 2008 and 2015 to identify where most improvements by certified fisheries were being made.

Results by species group

Since the start of the MSC program in 1997, 281 fisheries have been certified against the MSC Fisheries Standard of which 260 (94%) were asked to make at least one improvement to strengthen or further monitor the sustainability of their practices.

By the end of 2015, 52% of the requested improvements had already been met, and the remainder were in progress, demonstrating the commitment being made by certified fisheries globally to ensure the future health of marine environments.

Different target species are harvested, managed and governed in a wide variety of ways, and there are clear differences in the number and type of improvements depending on target species and fishing methods.

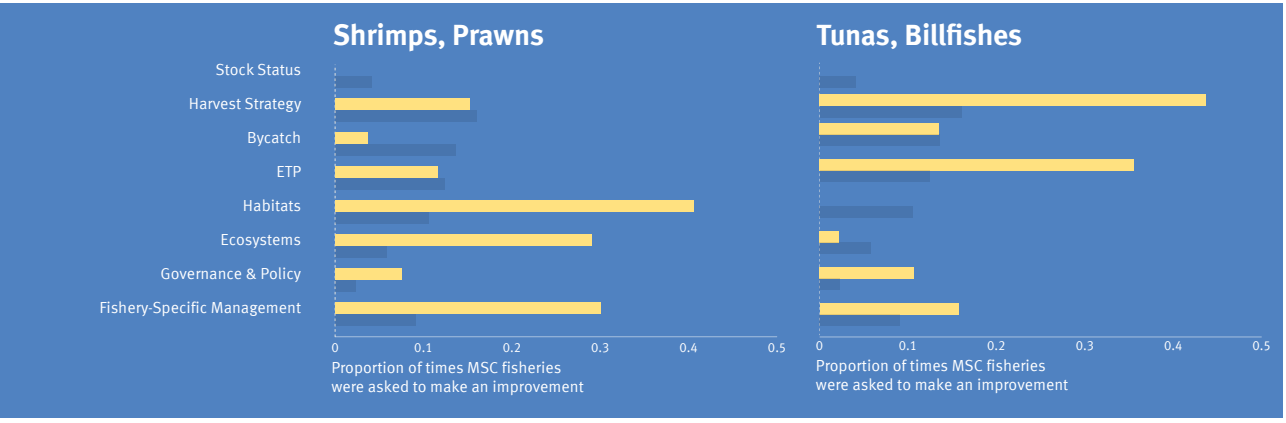


Plots show the number of times that fisheries needed to make an improvement, expressed as a proportion of all scores assigned to those fisheries against different areas of the MSC Default Assessment Tree. Dark bars show the proportion across all types of fishery in the MSC program, while the yellow bar shows the proportion across fisheries with similar target species. Details of the performance indicators grouped under each theme are available in the online appendix (www.msc.org/2016-impacts-appendix).

Species and regions: *21 certified lobster and crab fisheries were analysed, harvesting American and European lobster, spiny or rock lobster, snow crabs, blue crabs and brown crabs. These fisheries operate in the US, Canada, Mexico, Chile, UK, Australia, France and South Africa.*

Despite varying in the scale and depth at which they operate, all MSC certified crab and lobster fisheries in the program use traps. These are commonly baited with small oily fish, such as mackerel and herring. These fisheries were required to make improvements more frequently than average relating to bycatch, because the MSC requires that bait for such fisheries is harvested sustainably, and assessed in the same way as bycatch. The improvements being made by these fisheries ensure that the bait species they use come from non-depleted, well-managed stocks, and that the inadvertent capture of non-target species in the traps is minimised.

Invertebrates like crabs and lobsters have distinct life-history traits, and the traditional stock assessment methods used for fin-fish fisheries cannot be applied to these species. The complex population dynamics of crabs and lobsters makes them more challenging to manage, so many of these fisheries have been asked to make improvements to ensure their harvest strategies are being applied in a precautionary manner.



***Species and regions**: 22 certified shrimp and prawn fisheries were analysed. They include temperate and tropical fisheries operating in Europe, Greenland, the Faroe Islands, Canada, the US, Australia and Suriname.*

Shrimps and prawns live close to the seabed and are most commonly fished using bottom trawls. This fishing method can impact benthic habitats and associated species such as deepwater coral and sponges. Bottom-trawl fisheries are often required to improve monitoring of their activities and put measures in place to reduce their impacts on marine habitats and ecosystems in order to remain sustainable.

***Species and regions:** 15 certified tuna and billfish fisheries were analysed, targeting five tuna and two swordfish stocks. The fisheries target skipjack, albacore and yellowfin tuna, in the North and South Pacific and Indian Ocean, and swordfish in the North Atlantic and South West Pacific.*

The governance and management of highly migratory species such as tuna and swordfish pose a particular challenge as their distribution straddles multiple national and international jurisdictions. The effective management of these species requires the cooperation of large numbers of coastal states and distant water fishing nations, operating in multinational organisations called regional fishery management organisations.

This makes the development of well-defined, internationally accepted harvest control rules – formal instructions to reduce fishing effort when stocks (or catches) decline below a threshold level – particularly problematic, often prompting a requirement for improvements in harvest strategy and fishery specific management (Bellchambers *et al.*, 2016). Certified tuna and billfish fisheries were commonly asked to make improvements to these harvest control rules, and other aspects of management.

Case Study

Catching the right fish

Scotland's North Sea haddock fishery has introduced successful measures to reduce bycatch and discards of other species.

Haddock is Scotland's most popular fish, and one of the most important species to the Scottish fishing industry. With stable, well-managed stocks, Scotland's North Sea haddock fishery achieved MSC certification in 2010. However, there were concerns over the potential impact of bycatch of other species by the fishery's 200 vessels, which are mostly single or twin-rigged trawlers.

The assessors commented that the fishery's efforts to reduce cod catches were likely to benefit other species as well. Nevertheless, they felt that further measures could be taken to ensure bycatch didn't have a negative impact on species which appear to be in decline in the North Sea. As a condition of certification, the fishery was required to continue initiatives to reduce bycatch and discards, including the design and adoption of new types of selective gear. Vessels were also required to record all retained species.

Initiatives the fishery has adopted to reduce bycatch include:

- **Real-time closures** – if high concentrations of cod or juvenile fish are encountered (more than 40 cod in an hour's fishing), an area covering 225 miles^2 is closed to fishing for 21 days. Three such areas are now closed seasonally.

- **Selective gear** – the fishery is trialling a number of gear types to reduce bycatch. Vessels in the fleet that also fish for nephrops, which use a smaller smaller mesh (80-99mm) have been required since 2012 to use, as a minimum, a 200mm square mesh panel. The mandatory use of the panel has been shown to reduce cod bycatch by 60%, as well as reducing capture of juveniles and other species. Vessels have voluntarily trialled varying mesh sizes and a fish exclusion device called the Flip Flap netting Grid which greatly reduce retention of small haddock, cod and whiting.

- **Electronic recording** – skippers record information on the fish they catch in an electronic logbook. This is sent directly to Marine Scotland, the government directorate responsible for marine management, providing valuable data to improve decision-making.

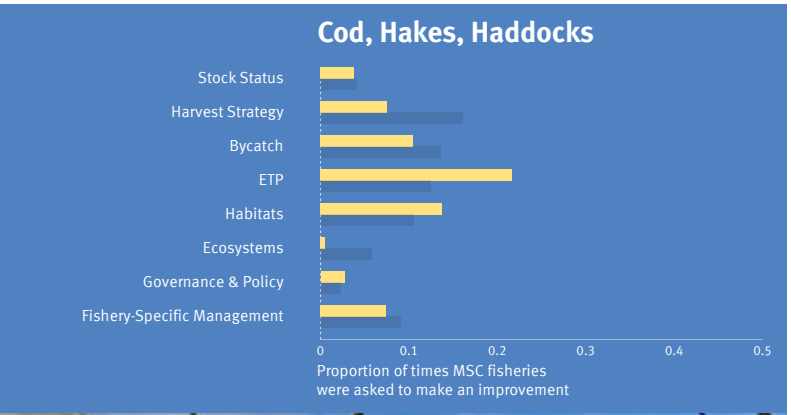
- **Catch quotas** – many vessels in the fishery participate in a voluntary scheme called a catch-quota management system. Traditional quota systems are based on landings – but this can have the perverse effect of encouraging fishers to discard bycatch species once they have reached their quota. Under the catch-quota management system, all cod species must be recorded, and count towards the overall quota. Records are verified by CCTV. As an incentive, participating vessels are exempt from controls on fishing effort, giving them the opportunity to land a larger proportion of their remaining catch.

At the fishery's second surveillance report, the assessors concluded that efforts to reduce bycatch and discards and improve recording were being implemented effectively, and the condition was closed.

© MSC

‘Over the past few years, we have implemented a number of strategies to minimise the environmental impacts of our fishery. MSC certification provided independent recognition of these efforts and helped us to identify ways in which we can improve our bycatch monitoring and mitigation efforts further still.’

Mike Park, Chief Executive
Scottish White Fish Producers Association Limited



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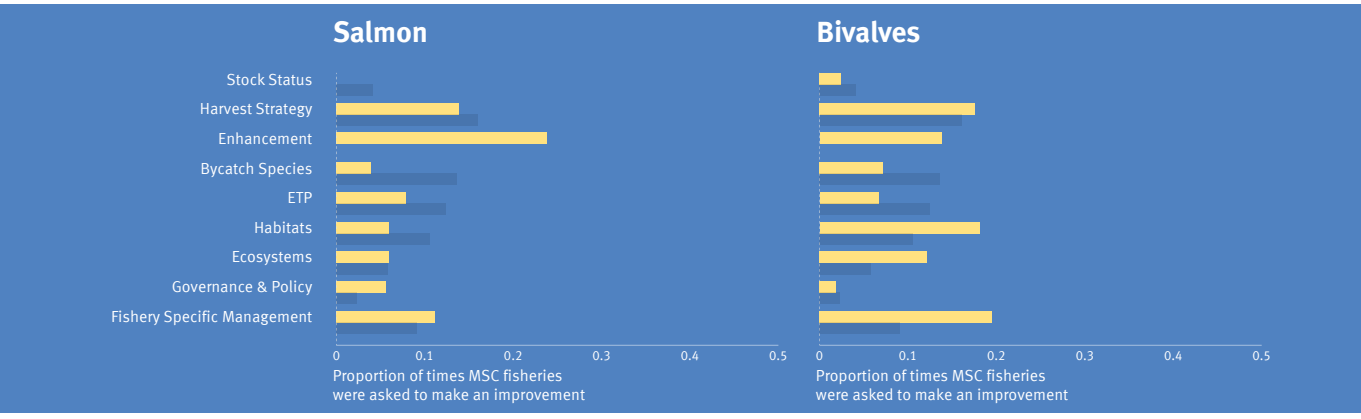
Species and regions: *62 certified fisheries targeting Pacific and Atlantic cod, haddock, hoki, hake, whiting, ling, pollock and/or saithe were included in the analysis. These fisheries are located in the Baltic Sea, North East Atlantic, Barents Sea, Northern Pacific, Southern Atlantic, New Zealand and Southern Australia.*

Most MSC certified cod, hake and haddock fisheries operate at industrial scales, with high commercial value. Their resources allow them to commission extensive research and monitoring to support stock assessments and develop accurate fishery management plans. As such, these fisheries are rarely required to make improvements to their management plans, or harvest strategies to maintain their certification.

However, cod, hake and haddock fisheries are asked to make a comparatively high number of improvements relating to impacts on ETP species (22% of the time) and habitats (14% of the time) compared to other types of MSC certified fisheries. This is likely due to the types of fishing gear they employ, which include gillnets, Danish seines and demersal trawls. The improvements that these fisheries make ensure that all measures have been taken to ensure the impact of these gears on habitats and non-target species is sustainable (see pages 28 & 29).



Species and regions: *13 certified salmon fisheries in the US and Russia, targeting pink, coho, chum, sockeye and chinook salmon were included in the analysis.*

MSC certified salmon fisheries are highly selective with few environmental impacts. They use passive or non-damaging fishing gears such as purse seines, traps and trolling lines which rarely interact with other species or benthic habitats when used at the mouths of spawning streams.

However, 12 of the 13 MSC certified salmon fisheries are 'enhanced fisheries' meaning that some of the salmon they harvest were originally reared in hatcheries before being released into the wild. Most hatchery reared fish return to their hatchery for spawning, and are caught there. Nevertheless, enhancement activities have the potential to negatively impact the productivity and diversity of wild salmon stocks if hatchery-reared fish stray into wild spawning streams.

As a result, most of the work being done by MSC salmon fisheries relates to developing better techniques to understand the potential negative impacts on wild stocks from straying hatchery-reared fish. In Alaska, for example, which has an important MSC certified salmon fishery, the Alaska Department of Fish and Game is conducting research in this area.

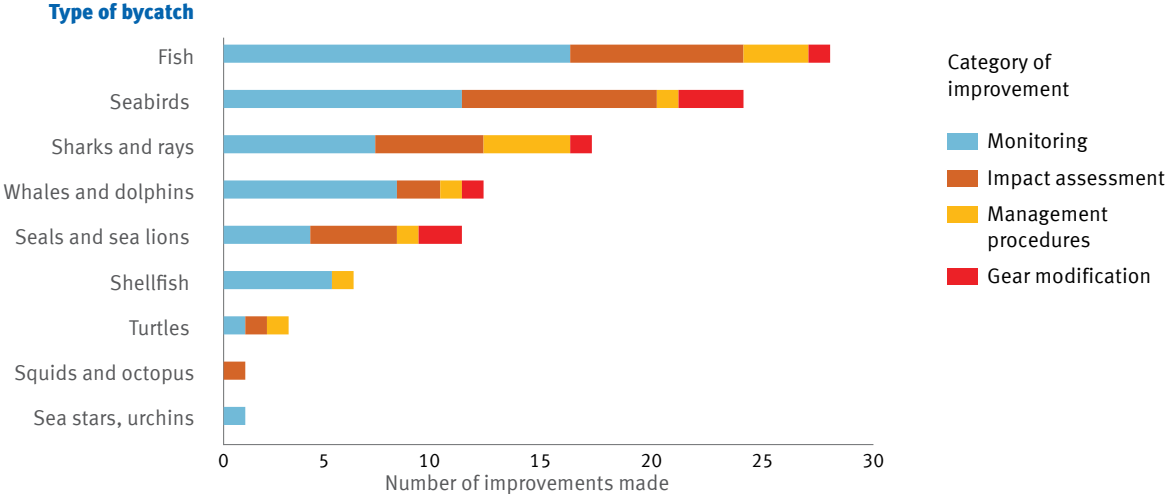
Species and regions: *32 certified bivalve fisheries were included in the analysis. They include mussel, clam, scallop and oyster fisheries, operating in Europe, in the North Atlantic off Canada and the Faroe Islands, off the Atlantic coast of Argentina, the Pacific coast of Chile, in the Western Pacific around Japan and China, and in India.*

Eight certified mussel fisheries and two certified scallop fisheries are classed as 'enhanced' bivalve fisheries and were required to make improvements to ensure they have no negative impact on the genetic diversity of wild scallop or mussel populations.

Wild-capture fisheries were often required to make improvements to demonstrate that their dredge or bottom trawl gears do not negatively impact the habitats where fishing takes place.

Both enhanced and wild-capture bivalve fisheries were required to make improvements more frequently than average relating to ecosystem impacts. This included monitoring their activities to improve understanding of the ecological interactions between mussels and other species and to ensure that the larval and adult bivalves being harvested for enhancement activities were being captured at a rate that maintains ecosystem function.

In focus: exploring the improvements certified fisheries have made to minimise bycatch



What does each category of improvement relate to?

- **Monitoring –** these improvements require an ongoing data collection system to be established to record the fishery's interactions with non-target species and quickly detect any changes – e.g. increased observer coverage, implementing video surveillance, and strengthening self-reporting (log books).

- **Impact assessment –** these improvements require analyses to be conducted on existing data to determine the impact of the fishery on the bycatch species it catches, for instance to identify which species are most vulnerable to fishing, or where fishing impacts may be most serious – e.g. stock assessments and seabird population research.

- **Management procedure** – these improvements require the establishment of management measures to ensure that bycatch interactions are sustainable, and if possible reduced or avoided – e.g. closing the fishery at a particular time of year to avoid seabird breeding seasons, establishing advisory bodies and implementing bycatch quotas.

- **Gear modification –** these improvements require a change to a fishery's operations to reduce interactions with bycatch species, often in response to monitoring data – e.g. the introduction of tori lines to scare seabirds away from long lines fishing vessels, changing the mesh size of a net to allow juvenile fish or non-target species to escape, and introducing exclusion devices.

What is bycatch and why is it important?

Due to the rich diversity of species in our oceans, most fisheries encounter species other than the ones they are targeting during fishing trips. The incidental capture and mortality of non-target marine fish and animals during fishing is known as bycatch (FAO, 2011). This can be a major threat to marine biodiversity when mortalities are high or when ETP species are being incidentally caught (Lewison *et al.*, 2004).

The MSC Standard distinguishes between the bycatch of species that are listed in national or international regulations as ETP and those that are not. MSC certified fisheries need to comply with all ETP regulations. For both ETP and non-ETP species, fisheries must ensure that their impacts are not hindering recovery and are minimised to the extent possible.

Advances in technology, research and fisheries management have led to the development of devices and strategies that reduce the frequency with which fisheries capture these non-target species, enabling fisheries to fish 'smarter' and more selectively.

This section explores the improvements that certified fisheries were required to make between 2007 and 2013 to monitor or reduce their interactions with non-target species. The actions of 60 MSC certified fisheries were evaluated in total and all improvements have been completed.

Actions taken by MSC fisheries to minimise and mitigate bycatch

MSC certified fisheries have undertaken a range of improvements to ensure that impacts on bycatch species are effectively managed and that enough information is collected to support those management strategies.

Where improvements are required, they most commonly relate to a lack of information about how much bycatch is being landed, or a lack of population data on non-target or ETP species where a fishery is operating. Bycatch monitoring systems ensure that fisheries quickly detect any changes to their interactions with non-target or ETP species.

Where monitoring activities detect potential negative impacts on a population level, fisheries are asked to address them promptly by, for example, modifying their gear or implementing a new management procedure. Some measures help to avoid the capture of a bycatch species in the first place, such as avoiding spawning areas, scaring away species that might accidentally be impacted, or introducing a device that excludes unwanted species while the gear is being used. Other measures may help improve survival rates so species that are caught are more likely to be released alive: these include training crews on safe handling and release practices and introducing gear that causes less harm to captured species.

Types of species encountered

The types of bycatch species encountered vary depending on where a fishery operates, and the types of gear it uses. Between 2007 and 2013, improvements most commonly related to non-target fish species, seabirds, sharks and rays.

Case Study

Beating bird bycatch

Smarter fishing practices have dramatically reduced the number of seabirds accidentally caught in a longline fishery in the southern Indian Ocean.

Seabird bycatch can be a serious problem in longline fisheries. A survey by BirdLife in 2011 estimated that up to 300,000 birds were killed every year after becoming ensnared on longline hooks (Anderson *et al.*, 2011).

In the early days of toothfish fishing in the Southern Ocean, many thousands of endangered albatrosses and petrels were killed annually, threatening important populations. Since then, all fisheries have made significant progress in reducing mortality rates by changing fishing practices in line with the requirements of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). Albatross deaths in licensed longline fisheries have effectively been eliminated by setting and hauling lines only at night.

Petrels, however, forage after dark, so further mitigation measures are needed. This is particularly important in the Kerguelen Islands, a remote French-controlled archipelago in the southern Indian Ocean which contains globally significant breeding populations of petrels. When the Kerguelen toothfish fishery sought MSC certification, concerns were raised about seabird mortality – particularly in the case of the grey petrel, which is listed as 'Near Threatened' on the IUCN Red List.

Before 2005, at least 750 grey petrels were being killed each year in legal and illegal fisheries around Kerguelen – enough to cause a decline in the population. Mortality rates dropped enormously when CCAMLR requirements were adopted. Nevertheless, Kerguelen was identified as a high-risk area and seabird bycatch remained higher than in the best-performing fisheries.

When the fishery was certified in 2013, it was required to reduce seabird mortality year by year until all vessels

© Martin Hale/Arkive

were performing at the best possible level. The target was to reduce fatalities to an annual maximum of 20 birds of all species per vessel by the end of the fourth year of certification. In addition, the fishery had to put in place a monitoring system specifically for grey petrels.

The fishery implemented a number of measures to reduce interactions with seabirds. These included:

- Increasing the weight of fishing lines so that they sink faster
- Improving the design of Tori lines (multi-coloured streamer lines hung vertically above the longline as it is set) to deter birds from diving to eat the baited hooks attached to longlines
- Using a protective barrier of hanging streamers to keep birds away from the hauling point while the lines are hauled in
- Using white lines that are less visible to birds
- Closing the fishery during the grey petrel breeding season, from 1 February to 15 March.

In addition, as an incentive to individual vessels to improve their performance, those with lower rates of seabird mortality are granted a slightly higher share of the overall toothfish quota – although auditors have said they would like to see more of a cooperative system for sharing best practice across the fleet.

The latest surveillance report concluded that the fishery was well ahead of its target for reducing seabird mortality. In 2014-15, just three grey petrel mortalities were reported. While any seabird bycatch is regrettable, the rate of mortality is unlikely to have any negative impact on petrel populations and is a vast improvement on the situation prior to MSC certification.

Case Study

Traps and terrapins

Louisiana's blue crab fishery retrieves abandoned pots to reduce the impacts of ghost fishing.

The Louisiana blue crab fishery became MSC certified in 2012. Managed by the Louisiana Department of Wildlife and Fisheries, some 3,000 fishermen catch blue crab in Louisiana state waters in the Gulf of Mexico. Every year, large numbers of crab traps are lost or abandoned. They may be swept away or sunk in hurricanes and storms, cut loose by passing boats, caught in shrimp gear, vandalised or not properly disposed of when no longer in use.

Modern traps, usually made from vinyl-coated wire mesh, can take years to degrade. As long as they remain in the water, they continue to capture crabs and other marine life as well as posing a hazard to boating. In the Gulf of Mexico, species at risk from this 'ghost fishing' include the diamondback terrapin – listed as 'Near Threatened' on the IUCN Red List.

Since 2004, the Louisiana Department of Wildlife and Fisheries has led a derelict crab trap removal programme, assisted by the Louisiana Sea Grant college programme, voluntary organisations, recreational fishers and individual volunteers. Portions of the fishery are closed for up to 16 days in February or March so that traps can be retrieved. The programme is funded through fees on commercial and recreational fishing licences.

In February 2015, 422 traps were retrieved from the Sabine Lake area, bringing the total since the programme began to 24,645. Trap removal efforts focus on the intertidal zone, where terrapins are most likely to be caught.

While the trap removal programme is set to continue, Louisiana fishery managers and other stakeholders are also looking at other ways to reduce the risk of terrapin bycatch. These include adding terrapin excluder devices to crab traps, using biodegradable panels, and prohibiting crab fishing in certain important habitats.

Chapter 4: Traceable seafood supply chains

How the MSC program ensures traceable, sustainable seafood

Seafood fraud – the selling of seafood products with a misleading label, description or promise – can threaten the bottom line of honest fishers and seafood traders, undermine the progress being made by sustainable fisheries, and allow illegal and unregulated fishing practices to go undetected.

This is why traceability – the ability to track any food through all stages of production, processing and distribution – is vital to delivering the MSC's vision of healthy oceans and its promise to consumers that MSC labelled seafood comes from a sustainable source.

In 1999, the MSC developed its Chain of Custody Standard to ensure that every distributor, processor, and retailer trading in MSC certified sustainable seafood has effective traceability systems in place.

Across the globe, a series of monitoring activities are regularly carried out to verify that these traceability requirements are effective, including biennial DNA tests on a representative sample of MSC labelled products.

In 2015, we expanded our supply chain monitoring activities, through the trial of an online digital traceability tool in Europe and China, and the launch of a dedicated series of product tracebacks and supply chain investigations in South East Asia.

Our latest DNA testing results

The use of DNA testing has revolutionised seafood traceability over the past decade (Mariani *et al.*, 2015). Since 2009, the MSC has commissioned DNA tests on hundreds of products from all over the world to verify the authenticity of seafood carrying the blue MSC label.

The MSC's latest DNA test results revealed that 99.6% of MSC labelled products are correctly labelled. The study sampled 257 unique products and 13 species of fish, sourced from retailers across 16 countries. These results are consistent with those of previous years. On average, the MSC's DNA testing has found a mislabelling rate of less than 1% for MSC labelled seafood since 2009.

The MSC labelled product samples were randomly selected, collected and processed by an independent laboratory (the Wildlife DNA Forensics unit at Science and Advice for Scottish Agriculture, SASA). They covered a wide range of product forms (fresh, frozen, chilled, preserved and surimi). The tests identified a specific section of DNA or 'genetic barcode' within each sample and cross-referenced these with a reference library containing the genetic barcodes of all known fish species.

99.6%

of MSC labelled products are correctly labelled

The one sample that failed to yield a result after four attempts was a halibut product from the USA. The product was a pouch of seafood chilli so the processing and preserving processes may have denatured the sample's DNA, an occasional limitation of the DNA testing process.

Only one product among the 256 successfully tested was found to be mislabelled. The mislabelled product was a frozen fish fillet from a European retailer labelled as MSC certified Southern rock sole (*Lepidopsetta polyxystra*). The DNA test results instead identified the product as the Northern rock sole species (*Lepidopsetta bilineata*) which had also been caught in an MSC certified fishery.

This single incident was immediately investigated by tracing back the documentation through the supply chain, notifying the related certification bodies, and informing the brand owners of the result. The result of the investigation did not show any evidence of the deliberate substitution of an MSC certified species with a non-certified species, but rather the accidental mix-up of two closely related species, both of which had been caught in MSC certified fisheries.

The results of the MSC's DNA testing programme are very positive. Nevertheless, the MSC takes traceability extremely seriously and continues to monitor the certified seafood supply chain very closely. We continue to use targeted tracebacks, unannounced audits and volume reconciliations to ensure the integrity of the certified seafood supply chain for those species that cannot yet be traced using DNA testing.

Looking to the future, the scope of the MSC's testing programme will be broadened to other seafood products and explore the use of new technologies to verify the authenticity of sustainable seafood.

The MSC Chain of Custody Standard

The MSC Chain of Custody Standard is a voluntary supply chain traceability scheme, covering over 3,000 seafood suppliers, distributors and processors across the world. It assures consumers that the MSC labelled seafood they buy has been sourced legally from a certified sustainable source, has not been mixed with uncertified seafood, and can be traced along each link of the supply chain from ocean to plate.

To ensure that these traceability measures are effective, the MSC regularly conducts a series of monitoring activities. In addition to DNA testing (described earlier), they include:

1. Tracebacks on MSC labelled products check that the correct paperwork is in place along each step of the supply chain from the point at which a product is sold back to a sustainable source.

2. Volumes of MSC certified seafood are recorded along the supply chain and are monitored to detect product substitutions or mislabelling.

3. Unannounced audits ensure that MSC certificate holders are complying with traceability requirements.

Monitoring the integrity of supply chains in South East Asia

Over recent years, the MSC's Chain of Custody programme has experienced significant growth in South East Asia as the number of certified fisheries in the region has increased. In 2010, there were just six Chain of Custody certificate holders in the region; by 2015 that number had grown to 55. Supply chain activities in the region are dominated by the processing of MSC certified tuna in Vietnam and Thailand, along with new entrants in Malaysia and the Philippines, where labour costs are low.

The region faces industry concerns about substitution, mislabelling and the reliance on paper-based record systems. This, coupled with the growth of tuna processing in the region, puts the integrity of supply chains at higher risk than in some other parts of the world.

In 2015 the MSC strengthened its presence and undertook a series of investigations in the region to accommodate this growth, and to mitigate risk to the integrity of supply chains in South East Asia. A series of tracebacks were completed on tuna products (the bulk of which are processed in Thailand), an unannounced audit was conducted in Vietnam, and eight Vietnamese audit reports (60% of certificate holders) were reviewed and non-conformities analysed. In addition, we provided further training to supply chain companies and auditors in Thailand and Vietnam and commissioned additional technical oversight from Accreditation Services International (ASI), the oversight body for the independent certifiers, to focus efforts and understanding on supply chain risks and trends.

Supply chain activities in South East Asia are dominated by the processing of MSC certified tuna in Vietnam and Thailand

Case Study

Tuna Tracebacks: What it says on the tin

‘Tracebacks’ follow MSC labelled tuna products from the supermarket shelves back to the certified fishery where the fish was caught.

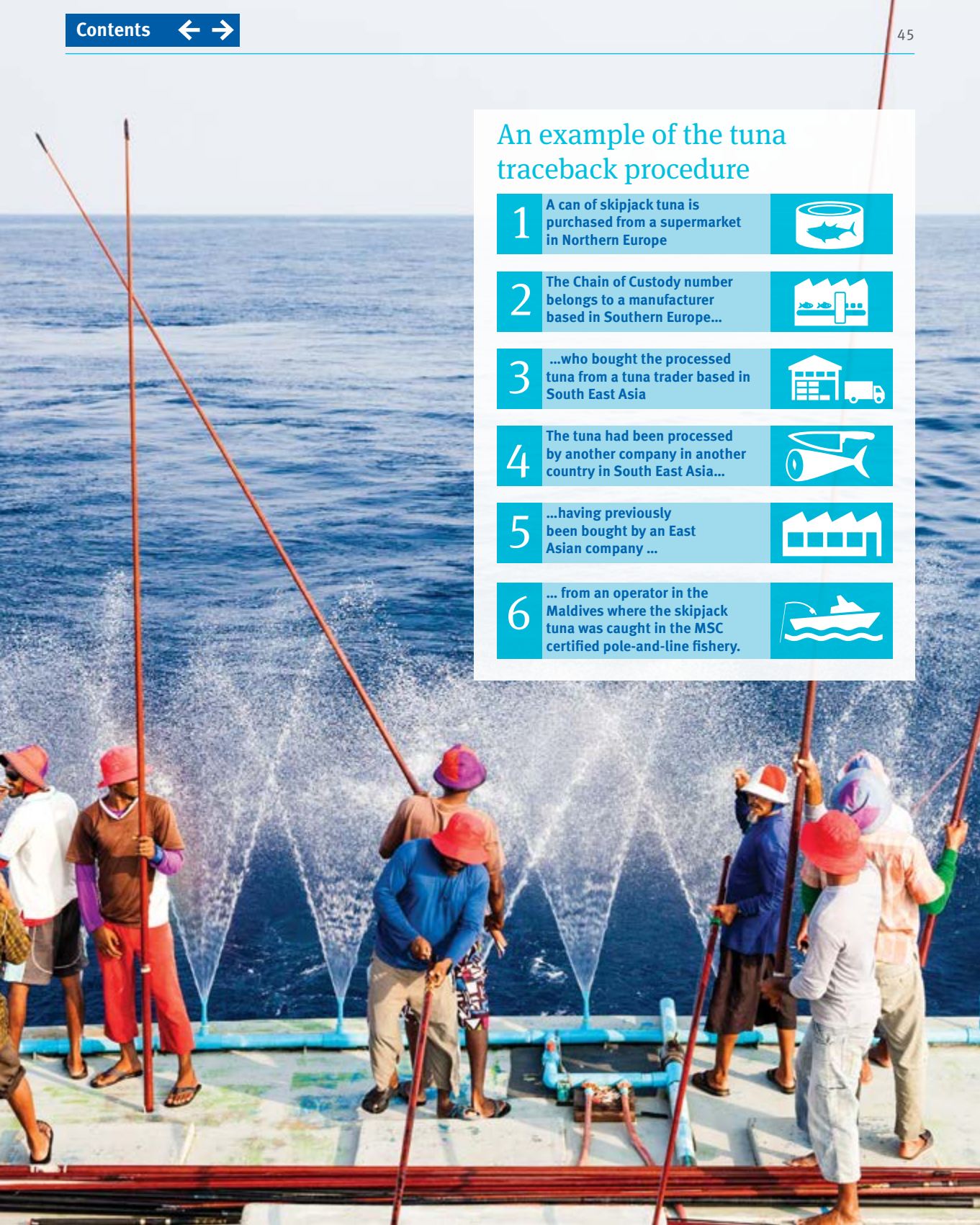
The volume of MSC certified tuna on the market has grown rapidly over the last few years. 11 fisheries are already certified, supplying around 720,000 tonnes of tuna and over 640 consumer-facing products, with another 10 in full assessment.

As well as being among the world’s most popular and economically important fish species, tuna are a challenge to manage. As wide-ranging migratory species, their management requires the cooperation of many coastal and distant water fishing states. Media reports have also focused on mislabelling issues, with one recent study reporting that a staggering 59% of ‘tuna’ bought in the US is not tuna (Warner *et al.*, 2013). This makes a credible traceability system for sustainably caught tuna all the more important.

However, most MSC tuna comes in a can, and the cooking and sterilising processes, along with the brine, oil or vinegar used to preserve the tuna, make it notoriously difficult to extract good quality DNA. While we work with Australia’s Commonwealth Scientific and Industrial Research Organisation (CSIRO) to develop more effective DNA methods, we also verify the integrity of tuna products by using our ‘traceback’ procedure to check every link in the supply chain.

A traceback starts by taking a selected product and finding the number of the Chain of Custody certificate holder. One of our team contacts that company, asking them to provide the records – such as dispatch notes and invoices – that link the product sold with the fish from their suppliers. We then contact that supplier and cross-check against their records to identify the batch in question. Although companies will often supply documentation tracing the product right back to the certified fishery, we make sure we repeat the process for every step of the Chain of Custody.

If a problem is discovered, then we contact the certifier and ask them to check this at the next audit – or in serious cases, to carry out an expedited audit. To date, all tracebacks have been completed successfully.



An example of the tuna traceback procedure

1. A can of skipjack tuna is purchased from a supermarket in Northern Europe
2. The Chain of Custody number belongs to a manufacturer based in Southern Europe...
3. ...who bought the processed tuna from a tuna trader based in South East Asia
4. The tuna had been processed by another company in another country in South East Asia...
5. ...having previously been bought by an East Asian company ...
6. ... from an operator in the Maldives where the skipjack tuna was caught in the MSC certified pole-and-line fishery.

Chapter 5: Accessibility

Supporting improvements in small-scale and developing world fisheries

Of the 120 million people employed in the fisheries sector, 90 percent work in small-scale fisheries, and almost all of those workers (97 percent) live in developing countries (The World Bank, 2012).

Although these fisheries are vital to food security, livelihoods and economic development, not all are managed sustainably, while those that are may lack the resources, data and governance systems they need to achieve MSC certification and benefit from the growing market for sustainable seafood.

Recognising that small-scale and developing world fisheries are currently under-represented in the MSC program, we have developed a series of tools, funding and training initiatives. These aim to make certification more accessible, and to help these fisheries take their first step on the road to environmental improvement, whatever their starting point.

In this chapter, we explore the improvements fisheries are making before entering the MSC assessment process, and describe some of the social and economic benefits they may gain after receiving certification.

One of the key targets under Sustainable Development Goal 14 is to '*Provide access for small-scale artisanal fishers to marine resources and markets*' (United Nations, 2015). The MSC program can help to incentivise improvements in small-scale fisheries and can enable them to gain access to lucrative markets in developed countries (Blackmore *et al*., 2015).

To date, just 20 developing world fisheries are certified and 15 in assessment. Nevertheless, around the world, an increasing number of small-scale fisheries are becoming interested in making improvements towards sustainability (Sampson *et al.*, 2015). This has contributed to the considerable growth of fishery improvement projects (FIPs). FIPs bring together multiple fishery stakeholders – fishers, managers, researchers, funders and NGOs – to improve a fishery's practices and management.

Although the MSC does not run FIPs, we work with other organisations including industry, NGOs and retailers to ensure that the FIPs they manage are delivering real sustainability improvements. This benefits fishers and marine ecosystems, and offers the potential to engage in MSC certification to verify the success of the FIP. We recommend that FIPs use the following tools to support their improvements:

- The **Pre-assessment template** shows how a fishery would score against each of the MSC's 28 performance indicators. This identifies areas where a fishery falls short of the MSC Standard, whether through shortcomings in management or fishing practices or lack of evidence to demonstrate sustainability, and provides a baseline for measuring improvements.

- The **Action plan tool** is designed to help a fishery map out actions to close gaps against each performance indicator in the MSC Standard.

- The **Benchmarking and Tracking tool** (BMT) provides a simple and transparent method for reporting and tracking the status of fisheries against the standard as they improve towards certification. It provides an index showing how the fishery would be likely to score against the MSC criteria based on the actions it takes (where 0 is a fail, and 1 an unconditional pass).

We have developed a series of tools and initiatives to help small scale and developing world fisheries take their first step on the road to environmental improvement.

How the MSC's accessibility tools track improvements

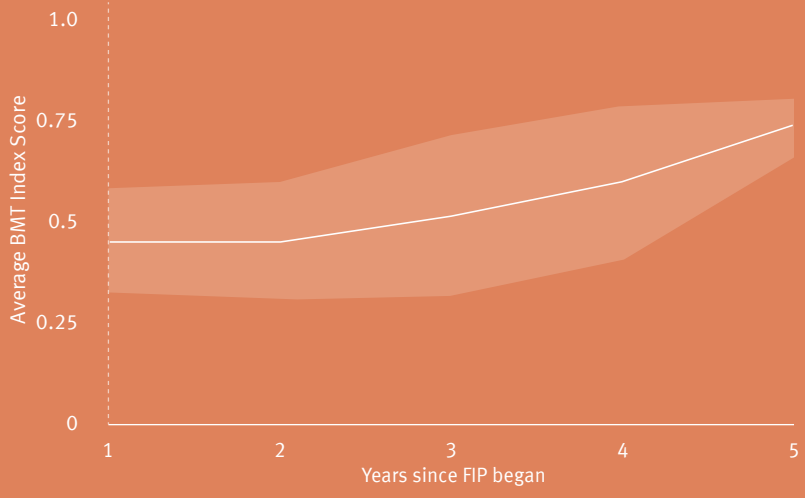
The BMT is used to benchmark the environmental performance of a fishery against the MSC Fisheries Standard. The BMT index provides a simple, consistent method for reporting information about the status of a FIP, helping interested stakeholders, buyers and funders understand the progress being made. A BMT score of zero indicates that the fishery would not meet the minimum requirements of the MSC's performance indicators, while a score of 1 indicates an unconditional pass.

To date, 23 fisheries engaged in FIPs have publicly reported their BMT indices to demonstrate their progress. These fisheries represent 13 developing countries and six species including lobster, tuna and mahi mahi. The chart below illustrates the average change in BMT score over time as these fisheries move towards certification (see below graph).

On average, fisheries started out with a BMT index less than 0.5, indicating that they were below the MSC's minimum certification requirements (equivalent to a mean score of less than 60 across all performance indicators) at the start of the FIP. By year five, fisheries had achieved a mean BMT index of 0.74 indicating that overall they were above the minimum certification requirements (equivalent to a scoring category of 60-79) and moving towards an average score of 80 across all performance indicators.

The graph opposite shows the mean BMT index of 23 developing country fisheries engaged in FIPs over a five-year period. White line represents mean BMT index, shaded area represents confidence limit (standard deviation). Sample size at each time point: year 1 n=23 fisheries; year 2 n=14; year 3 n=12; year 4 n=6; year 5 n=11.

Benchmarking and Tracking tool mean indices



Case Study

Getting on track

The MSC standard is driving improvements in fisheries in the developing world, even before they join the MSC program.

A growing number of FIPs are using MSC tools to drive real improvements on the water as they work toward sustainability and certification.

The artisanal **Kenyan rock lobster fishery** underwent a pre-assessment against the MSC's performance indicators in 2010. This helped identify areas where it fell short of the MSC Fisheries Standard, whether through shortcomings in management and fishing practices or lack of evidence to demonstrate sustainability. The results helped inform the design of a FIP funded by the African Union's New Partnership for Africa's Development. A wide range of stakeholders, including the Kenyan State Department of Fisheries, WWF and universities, were involved in developing an action plan to help the fishery meet the MSC Standard.

Priority areas for action included developing a fishery management plan, researching the biology of lobster species in Kenyan waters, and assessing stock levels, lobster catches and mortality outside the fishery. This has resulted in better data on lobster populations, enabling the fishery to set a science-based harvest strategy. Controls have also been introduced, including minimum size restrictions, regulations on the type of gear used, and community-run protected areas.

The FIP used the MSC's Benchmarking and Tracking tool to track and report on its progress. The Kenya lobster fishery's score has risen from 0.13 in 2010 to 0.78 in 2015. The tool will also help the fishery to focus on the remaining areas of concern as it prepares to enter full assessment.

‘MSC certification is a long-term goal, but already the MSC framework is helping our FIP to deliver real improvements in the fishery. It’s helped us identify issues and information gaps, create a clear action plan, track performance and report on our progress.’

Elizabeth Mueni, Principal Fisheries Officer, State Department of Fisheries, Kenya

On a much larger scale, the **Indonesia pole and line tuna FIP** is also using the BMT to track improvements as it aims to move toward MSC certification. The FIP, supported by the International Pole and Line Foundation (IPNLF) and WWF covers four skipjack and yellowfin tuna fisheries in the Indian Ocean and the Western and Central Pacific Ocean.

A pre-assessment, conducted in 2012, informed the development of the FIP Action Plan in 2013. This was facilitated by IPNLF, in collaboration with other NGOs and supported by the industry association Asosiasi Periknan Pole & Line Dan Handline Indonesia (AP2HI). Key achievements since then include the adoption of harvest reference points, improved data collection on target and bycatch species, and the development and launch of a web-based vessel registration and catch reporting system.

As a result of these actions the average BMT index for the four fisheries has improved from 0.51 in 2012 to 0.78 in 2015. A recent review of the FIP identified priority areas for improvement: these included strengthening national management and governance for tuna and bait resources.

Exploring the social and economic impacts of sustainable fishing

Although this report focuses on environmental impacts, the MSC program relies on the dedication of individuals and organisations working in the fishing sector for whom the social and economic impacts are just as important.

While these are not guaranteed outcomes, there is evidence that fishers have gained a number of socioeconomic benefits as a result of MSC certification, from higher revenues, to beneficial partnerships and greater influence with governing institutions.

Many fisheries invest time, money and effort in achieving certification with the aim of reaping price premiums. While this is in no way guaranteed, since price is largely driven by market dynamics and consumer preferences, a number of certified fisheries have received economic benefits as a result of MSC certification.

For example, the MSC certification of haddock is estimated to have created a 10% price premium in UK supermarkets (Sogn-Grundvåg *et al.*, 2013), while Alaska pollock is estimated to have received a 14.2% price premium in the UK (Roheim *et al.*, 2011). A recent study by Lallemand *et al.* (2016) estimated the potential economic impacts of MSC certification to the South African hake fishery. The study showed that MSC certification had been critical in enabling the fishery to access new markets and maintain its market position and that losing its MSC certificate would represent a 38% loss in its net present value (Lallemand *et al.*, 2016).

It remains difficult to determine how the economic benefits of certification are distributed through the supply chain (Blomquist *et al.*, 2015; Stemle *et al.*, 2015). However, a few studies suggest that fishers themselves may receive economic benefits as a result of certification (Stemle *et al.*, 2015). For example, following the 2015 certification of the West Greenland lumpfish fishery, an agreement between Royal Greenland (roe trader) and the Association of Fishermen and Hunters in Greenland (KNAPK) rewarded the fishery for achieving certification with a double bonus on the trading price (Mads Dollerup-Scheibel, 2015).

Certification can also open up access to new markets, including internationally. The previously small-scale and domestic Ben Tre clam fishery in Southern Vietnam began exporting its products to Europe and North America after receiving MSC certification in 2009. An increase in exports to higher-value markets led to an increase in total value at landing (MRAG, 2010).

Chapter 6: Transparency

How MSC assessments are strengthened by feedback from stakeholders from around the world

The oceans upon which the world's fisheries depend provide a vital source of protein for coastal communities and support the livelihoods of hundreds of millions of people (FAO, 2014). They are home to a huge diversity of species as well as rare and vulnerable marine ecosystems. Our first line of defence against global climate change, they are a playground for recreation and a lynchpin of the tourism industry.

It's no surprise then that a broad range of individuals and organisations are interested in, and affected by, the environmental, social and economic impacts of fishing.

Stakeholder engagement lies at the heart of the MSC's rigorous and science-based assessment process. The MSC encourages the participation of NGOs, retailers, scientific institutions, government bodies and other stakeholders in fishery assessments to ensure that they are comprehensive and well-informed, and take wider concerns into account.

Stakeholders are offered a number of opportunities to participate during a fishery assessment. They are invited to attend workshops and/or interviews coordinated by the assessment team and to comment on a fishery's draft certification report. They can also submit a formal objection through which specific concerns about the certification can be reviewed and, where necessary, resolved by an independent adjudicator.

In this chapter we evaluate the contribution and impact that stakeholders had on the fishery assessments that took place between 2012 and 2015.

Independent and objective assessments

The MSC assessment process is transparent and inclusive. It encompasses a number of measures designed to ensure that fishery assessments are comprehensive and impartial, and consider all available information.

1. **Third-party certification process** – To maintain impartiality, fishery assessments are undertaken by independent, third-party certification bodies. These organisations hire a team of highly qualified independent experts to assess the performance of a fishery against the MSC Standard. Certification bodies are held accountable for their recommendations and are accredited and monitored by a separate organisation, Accreditation Services International (ASI), to ensure they are performing competently and consistently.

2. **Opportunities for stakeholders to register their interest** – When a fishery announces its intention to enter MSC assessment, interested stakeholders can register to receive alerts detailing opportunities to participate. These opportunities may include involvement in stakeholder meetings and interviews coordinated by the assessment team.

3. **Stakeholder comments on draft assessment reports –** Once an assessment has taken place, a public comment draft report – a draft of the assessment report – is made publicly available online, and stakeholders are actively invited to comment within a 30-day window. Stakeholder comments help to ensure that all relevant information is reviewed during a fishery assessment, and all potential impacts considered. Certification bodies are obliged to consider and respond to all comments that are submitted.

4. **Objections process –** A formal objections period follows the first public draft report phase and the release of a revised draft 'final report'. This provides a structured framework through which specific concerns about the certification can be reviewed and where necessary resolved by an independent adjudicator.

723

stakeholder comments were received between 2012 and 2015. The scores of 24 fishery assessments were changed as a result

The contribution and impact of stakeholder comments between 2012 and 2015

Stakeholders commented on 36% of all fishery assessments between 2012 and 2015. The majority of comments were submitted by NGOs

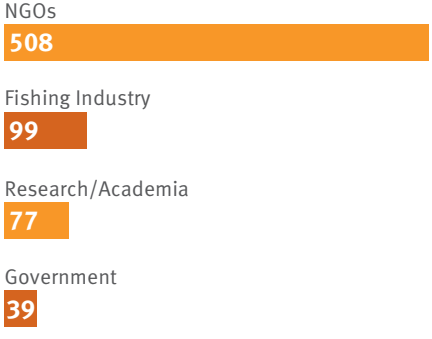
Between 2012 and 2015, stakeholders commented on 36% of fishery assessments with a total of 723 comments received in total. The overwhelming majority (70%) of comments were put forward by NGOs with lower numbers submitted by the fishing industry, researchers and government bodies. In many cases, multiple comments were received from different stakeholders for the same fishery assessment.

In total, 12.5% of comments contributed to a change in score, with 5% prompting a condition to be raised in the final certification report. Conditions are generated when an assessor deems that there is scope for a fishery to collect further information, or improve its operations to meet best practice. In total,17 fisheries were asked to make one or more improvements as a result of stakeholder comments.

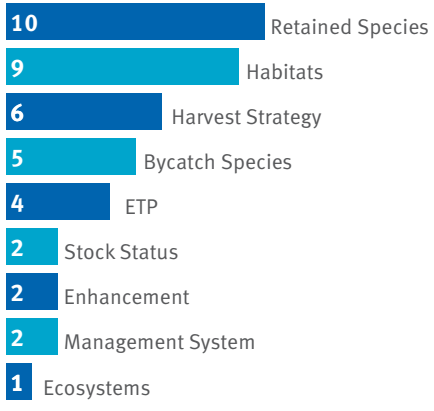
The majority of the improvements generated by stakeholder comments related to ecological performance indicators, evaluated in Principle 2 of the Fisheries Standard. Most commonly, they required further information to be collected to demonstrate that the fishery has minimised its impact on the wider marine environment.

The participation of stakeholders in the MSC assessment process has also seeded some very positive collaborations between stakeholders and the fisheries themselves.

723 Between 2012 and 2015, 723 comments were submitted from a wide range of stakeholders



41 The comments led to 41 conditions across a broad range of topics



Case Study

Gillnets and guillemots

In Iceland, the MSC assessment process has turned potential conflict into positive collaboration to reduce seabird bycatch.

When the Iceland lumpfish fishery entered MSC assessment in 2013, BirdLife International was quick to respond. The environmental NGO had just published a global review of the impacts on seabirds of gillnet fisheries – which are less well studied than longline and trawl fisheries. This research had shown that Iceland was one of the areas with the highest estimated seabird bycatch in gillnets globally (Žydelis *et al.*, 2013).

BirdLife wanted to make sure that the assessment took the impacts of gillnets on bird populations into account. They also saw an opportunity to engage with a gillnet fishery to find ways to reduce bycatch – as they had previously done successfully with other types of fisheries, such as the MSC certified South Africa hake trawl.

Responding to the draft assessment report, BirdLife, through its Icelandic partner Fuglavernd, highlighted discrepancies between external information on seabird bycatch in gillnet fisheries and the level reported by the fishery. While the assessment focused on eider duck – a commercially important species – BirdLife felt that bycatch of other species was being overlooked. They also felt that data were potentially out of date.

As a result of BirdLife's submission, assessors lowered the scores of three performance indicators and introduced a condition, requiring the fishery to improve the data it collected on seabird and mammal bycatch, so that the risks that the fishery posed to non-target species could be monitored and if necessary mitigated.

The process provided an opening for BirdLife to work with the fishery, and to secure funding to establish a seabird monitoring programme in the Icelandic fleet. They approached Landssamband smabataeigenda, the association that represents Iceland lumpfish fishers, who were keen to collaborate and asked their members to allow seabird observers on their vessels.

In 2015, observers joined 12 fishing trips, recording fishing activity and any bycatch of seabirds or other marine life. The fishing fleet has made observers welcome, and is very positive about the initiative. A further 30 trips, covering a wider area and a longer time period to allow for seasonal changes in bird populations, will be carried out in 2016.

Once bycatch levels are established, BirdLife hopes to work with the lumpfish fleet to develop avoidance measures. Ideas that BirdLife are trialling elsewhere include high-visibility panels that alert birds to the presence of gillnets, and LED lights clipped along the headline of the gillnet to deter birds. Trials of both devices show promise. Bycatch has been reduced with no detrimental effect on fish catch.

‘For BirdLife, the stakeholder engagement process has been vital. In both Iceland and South Africa, we’ve found fisheries very amenable to improving their information and management processes when impacts have been identified. The connections initiated through the MSC assessment have often opened up conversations about other topics, and enabled us to establish long term collaborations.’

Rory Crawford, Senior Policy Officer, BirdLife International Marine Programme

Conclusion

The MSC program is making a significant difference to the health of the world's fish stocks and marine ecosystems

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From improving harvesting strategies and monitoring systems, to taking action to reduce bycatch and the impact on other species, MSC certified fisheries have made numerous improvements to their operations over recent years. They have shown their commitment to sustainability by dedicating significant time, energy and resources to meeting the MSC Standard.

These 281 certified fisheries make up almost one-tenth of global seafood catch. With a further 97 fisheries in assessment and a number of others in effective improvement projects, the MSC program is making a significant difference to the health of the world's fish stocks and marine ecosystems.

Changes on the water are reinforced by a fast-growing number of certified businesses in the seafood supply chain, who are bringing more sustainable seafood products to more consumers in more countries. They also rely on the involvement of numerous other stakeholders including scientific institutions, NGOs, retailers and governments, who play a major role in supporting improvements to fisheries and ensuring the MSC Standard remains robust, credible and effective.

The progress that certified fisheries have made, and continue to make, is hugely encouraging. Now we need to influence those fisheries that make up the remaining 90% of global wild seafood catch that is not yet part of the MSC program. With many of these fisheries in urgent need of improvement or recovery, the challenge is huge – but so is the potential for transformation.

Another key challenge is to overcome the barriers to certification for fisheries in the developing world and small-scale fisheries, and to build their capacity for effective and sustainable fisheries management. This will help improve food security and resilience for communities, while also supporting their economic development by enabling them to access new markets for sustainable seafood.

We look forward to sharing further progress in our next report.

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