



Global Impacts Report 2017

1997-2017: A 20th anniversary review of
the Marine Stewardship Council program
and the progress and improvements made
by MSC 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.

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Foreword

Reflecting on 20 years of the Marine Stewardship Council



Twenty years ago, the MSC was a bold new idea developed by WWF and Unilever to address the global challenge of unsustainable fishing. Their aim was to create a market-based mechanism that would connect seafood producers and consumers through a credible third party, science and evidence based certification and labelling program. This approach would both recognise and reward existing good practice, but critically, through the leadership of engaged partners and stakeholders, incentivise and drive real and lasting change where needed to ensure the health, productivity and resilience of our global marine commons.

From the beginning, we recognised that the credibility and robustness of the program would be dependent upon our ability to capture, track, and document evidence of improvements and impacts. A number of early studies captured fishers' stories and reported anecdotal evidence of both environmental and economic impact (MSC, 2009). Since 2011, we've published more detailed and systematic analyses in our annual Global Impacts Report. These reports have documented a range of improvements from increased biomass of target species, to bycatch reductions, new scientific understanding and a range of positive economic benefits for engaged fisheries and supply chain partners.

It has not been an easy journey, but twenty years on since our foundation, WWF and Unilever's bold idea has become a proven concept. 12% of global marine wild catch is certified to the MSC Fisheries Standard, the market for certified sustainable and labelled seafood is worth over US\$5 billion and the program is widely recognised as the most rigorous and credible indicator of environmental sustainability and traceability in the seafood sector.

As we celebrate our 20th anniversary I would like to acknowledge and give special thanks to all of our partners – most importantly, to MSC certified fisheries, and also to the myriad of engaged and certified seafood businesses throughout the supply chain, to our accredited third party certifiers and to the conservation NGO community whose engagement in the third party process ensures robust and credible outcomes.

Thank you as well to our funders and to our outstanding governance bodies who give their time, energy and expertise to help the MSC navigate the complexities of the sustainable seafood world.

It has been a shared journey with many bumps in the road but also a tremendous amount of learning, refinement and improvements to ensure that the MSC remains fit for purpose and able to deliver our shared vision for our oceans.

As we look forward to the next twenty years I have no doubt that the MSC, through the continued engagement and support of our partners, will be able to make a meaningful contribution to the delivery of the United Nations Sustainable Development Goals, particularly in relation to SDG 14.

Rupert Howes
CEO, Marine Stewardship Council

An introduction to the MSC's monitoring & evaluation activities



Investing in science and research has been a key part of the MSC's journey over the past 20 years. Formally established in 2013, our monitoring and evaluation (M&E) team tracks the impacts of our program and evaluates how effectively we are delivering our mission.

Our theory of change holds that consumer desire and market demand encourage fisheries to achieve MSC certification, and that the efforts of these fisheries to demonstrate sustainability results in positive on the water change.

To test this, we capture and analyse data from MSC certified fisheries to determine whether positive impacts on marine ecosystems are indeed taking place. This creates a transparent, impartial and consistent scientific foundation to evaluate progress.

The 2017 Global Impacts Report contains systematic analysis of the performance of MSC certified fisheries and makes use of both fisheries scoring data (compiled by the MSC from independent fisheries assessments) and external, publicly available datasets. These analyses are complemented by in-depth stories to bring the data alive. By bringing these layers of evidence together, we hope to

provide a picture of the impact of the MSC program. This year, our analysis demonstrates commitments by certified fisheries to increasing protection for marine habitats and funding new scientific research (page 11). We also present evidence of improved stock status in MSC certified fisheries globally (page 24). These findings add to the growing body of evidence that fisheries achieving MSC certification are delivering lasting change (see also Martin et al. 2012; Bellchambers et al. 2015; Lallemand et al. 2016; MSC, 2016).

There are many challenges associated with demonstrating impact in the marine environment, and we are committed to strengthening our M&E program to better address these. We continue to adapt to ever-evolving scientific understanding and input from our stakeholders, and welcome your feedback and collaboration as we embark on the next exciting chapter for the MSC.

David Agnew
Science & Standards Director



Executive summary

Our fifth Global Impacts Report reflects on the progress of the MSC over the past 20 years, examines the sustainability performance of certified fisheries around the world and highlights areas of future interest.

Global reach

12% of global marine wild catch is MSC certified, a figure that has doubled since 2010.

In 2017, MSC became the first global seafood certification to achieve GSSI recognition.

The map on pages 16-17 highlights the positive impacts of MSC certified fisheries around the world, from the funding of new research in the Arctic to the elimination of illegal fishing in the Southern Ocean.

Evolution of the MSC Fisheries Standard

On pages 8-10 we report on the substantial updates and improvements that have been made to the MSC Fisheries Standard over the past 20 years. Two major revisions (2008 and 2014) reflected evolving global best practice in fisheries management, new scientific understanding and input from stakeholders.

Improvements on the water

94% of MSC certified fisheries have been required to make at least one improvement to strengthen or further monitor the sustainability of their practices, resulting in 1,238 examples of change since 2000.

MSC certified fisheries have funded 46 new scientific research projects as part of the actions taken to ensure sustainable impacts on habitats (pages 11-13).

Sustainable fish stocks

On pages 24-27 we analyse stock status in nine different regions of the world. Globally, stocks targeted by MSC certified fisheries show sustainable levels of stock biomass and in many regions stocks show higher biomass after MSC certification occurred.

Traceable supply chains

DNA testing results have shown levels of mislabelling

Quick guide to the Global Impacts Report 2017

In a hurry? Look for the anchor and compass icons to find short summaries of the information presented in this report



Compass = Data analysis and results



Anchor = Deep dive stories highlighting certified fisheries and global partnerships

of <1% for MSC certified products.

The new Chain of Custody (CoC) Standard for Consumer Facing Organisations (CFO) has seen a steady uptake by the foodservice industry, with 135 CoC holders representing nearly 23,000 CFO sites (page 35).

Improving access

The MSC Capacity Building Toolkit and the use of data-limited methodologies such as the Risk Based Framework have enabled small scale and Global South fisheries to join the MSC program (page 30).

The MSC Global Fisheries Sustainability Fund and Scholarship Research Program have enabled innovative sustainability projects around the world (page 31).

The future of sustainable seafood

The MSC is an official indicator of progress towards the United Nations (UN) Aichi Biodiversity Targets, and contributes to UN Sustainable Development Goals (SDGs) two, eight and 14.

The Aquaculture Stewardship Council (ASC) and the MSC have partnered to release a sustainable Seaweed Standard in late 2017 (page 34).

Summary of fisheries engaged with the MSC program

Global reach

In December 2016, 296 fisheries in 35 countries are certified as sustainable to the MSC Fisheries Standard, demonstrating their commitment to healthy ecosystems and the long-term sustainability of fish stocks.

Suspended and withdrawn fisheries

Achieving and maintaining certification requires considerable investment and dedication, and audits can result in fisheries being suspended from the program until performance improvements are made. In 2016, 17 fisheries were suspended.

Fisheries can also choose to withdraw from the program for a variety of reasons, and are not required to provide the MSC with the reason for their withdrawal. In 2016, 16 fisheries chose to withdraw from the program.

The importance of pre-assessments

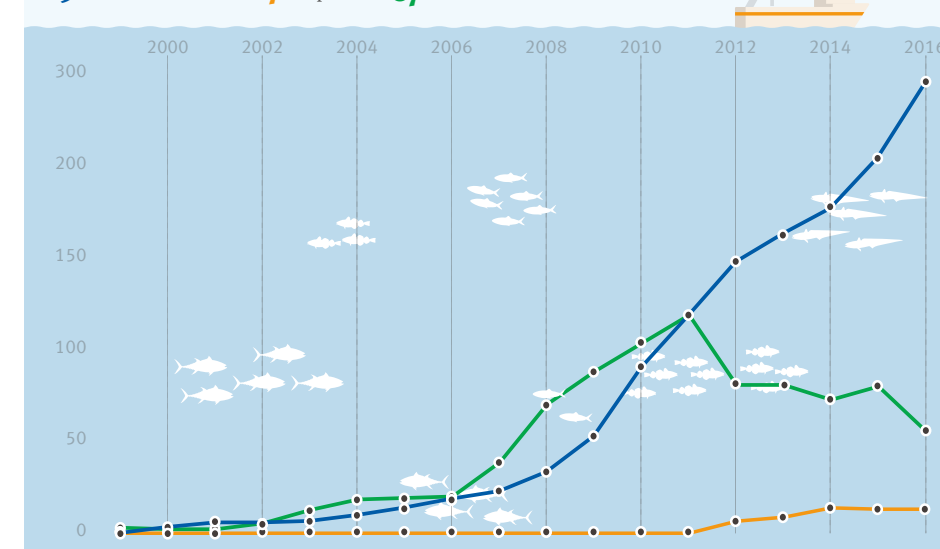
A 2016 analysis of third party certifier pre-assessment data from 1997-2014 found that approximately half of fisheries that undertook a voluntary pre-assessment did not then pursue full MSC assessment in that same year. This suggests that many fisheries are not yet ready to be assessed against the robust sustainability requirements of the MSC Fisheries Standard.

Working towards sustainability

Hundreds of fisheries around the world are engaged in Fishery Improvement Projects (FIPs). Many of these FIPs will use the MSC's benchmarking tools and other resources to guide their journey towards sustainability (page 30).

Number of fisheries in the MSC program as of December 31st 2016

296 Certified fisheries 17 Suspended 67 In assessment



100s

of fisheries are not yet ready for assessment and are engaged in pre-assessment activities and FIPs

Chapter 1: Global impacts

20 years of improvement on the water

The evolution of the MSC Standard

This year marks 20 years since the birth of the MSC as an international and independent non-profit organisation. Formed in the aftermath of the collapse of the Newfoundland Grand Banks cod fishery in 1992, the core output of the organisation was the scientifically based MSC Fisheries Standard, used by third party certifiers to assess if a fishery is well managed and ecologically sustainable.

The first iteration of the MSC Fisheries Standard, then called the MSC Principles and Criteria, was published in 1999. Since then, it has been continually developed and improved to reflect the most up-to-date understanding of internationally accepted fisheries science and best practice management, informed through consultation with stakeholders around the globe.

When it comes to changes to the Standard, the MSC's policy is to reflect proven best practice, incorporating new findings once they are generally agreed by the

international community and implemented in multiple jurisdictions. Read more about this journey on pages 8-10.

Evidence for impact

The MSC program as a whole incentivises and catalyses practical solutions and on the water change.

Use of the MSC ecolabel creates market incentives that reward sustainable fishing practices, enabling many fisheries to better compete in the global marketplace. This 'pull' for certification, and the improved performance from fisheries that it requires in many cases, leads to improved stewardship of the world's oceans and underpins our theory of change.

In this chapter, we have captured some of the 1,200+ improvements made by MSC certified fisheries since 2000 (see highlights on map page 16), and mapped MSC engagement within large marine ecosystems around the globe (page 14).

To complement this broader picture, we also present in-depth analysis focusing on the practical actions taken by fisheries worldwide to reduce their impact on habitats (page 11). Benthic impact is measured as part of the wider ecosystem assessment captured by Principle 2 of the MSC Fisheries Standard, which ensures that the environmental impact of fishing activities is sustainable.

Systematic reporting and sharing our data

It is inherently difficult to carry out monitoring and evaluation activities in dynamic marine systems and to isolate the impacts of the MSC from other drivers. We endeavour to be as transparent as possible in our analysis, and have shared our data, methodology and additional program monitoring indicators within the supplementary materials available online at www.msc.org/global-impacts/measuring-global-impacts/research-and-key-documents

Together with the analyses featured in this report, these datasets are used for the systematic evaluation of the MSC program.

Be part of the change

To ensure the MSC Standards keep pace with global best practice, we engage with stakeholders around the world to guide the direction of our work. Anyone can join these public consultations via improvements.msc.org

2016 analysis: Bycatch, discards, and a systematic species review

The 2016 Global Impacts Report featured in-depth analysis of the efforts made by certified fisheries to reduce bycatch and discards, enabling 'smarter' and more selective fishing (MSC, 2016). We also conducted a systematic analysis of the improvements made by MSC certified fisheries, categorised by species. You can see this analysis in the supplemental materials: www.msc.org/global-impacts/measuring-global-impacts/research-and-key-documents

The evolution of the MSC Fisheries Standard

Since the release of the MSC Principles and Criteria for Sustainable Fishing in 1999 the MSC Fisheries Standard has been updated regularly. The changes have been informed by changes in global best practice in fisheries management, new scientific understanding, and input from stakeholders. Version 2.0 of the Standard, released in 2014, strengthened the requirements for sustainable environmental impacts of fishing, helping to ensure sustainability now and in the future.



Nations Convention on the Law of the Sea, 1982; FAO Code of Conduct, 1995; Mangel et al. 1996).

Although the development of the original Principles represented an important milestone, they were not specific enough to allow effective auditing of fishery performance. Up until 2008, the MSC therefore allowed certifiers to develop their own indicators for scoring each fishery under assessment.

This flexible assessment approach ultimately led to dissimilar interpretations of the Standard. Between 2006 and 2008 more specific indicators were developed by the MSC itself, through a multi-stakeholder consultation process, leading to the publication of the Fisheries Assessment Methodology and Guidance version 1.0 in 2008.

The release of version 1.0 (and subsequent revisions, the last being version 1.3 in 2013), saw both fisheries and certification bodies receive a comprehensive set of performance indicators against which the sustainability of fisheries globally could be evaluated.

It can be challenging to develop sustainability requirements that are grounded in best available science and management practice, applicable across all types of fisheries, and auditable. This challenge is further exacerbated by the rapid evolution of scientific understanding and accepted best practice management (Agnew et al. 2013).

Running parallel to our own evolution since 1997 has been a shift in international acceptance of ecosystem-based fisheries management. No longer is this seen as a simple add-on to single species stock management approaches, but rather as an approach that affects all fisheries management decisions (Link, 2002; Pikitch et al. 2004; Rice, 2011).

Learning and improvements: 1997-2008

The first iteration of the MSC Standard, the Principles and Criteria for Sustainable Fishing, was developed through international consultation with stakeholders between 1997 and 1999. It was grounded in the best scientific evidence, fisheries management principles, and policy agreements available at the time (e.g. United

The 2008 update also incorporated new developments in fisheries science and management, including for instance the Food and Agriculture Organisation (FAO) Guidelines for the Ecolabelling of Fish and Fishery Products (2005) and the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999a).

The first MSC certified fishery

In 2000, Western Australia rock lobster became the first fishery to become MSC certified. The fishery has since completed two reassessments, implementing revisions to the Standard over the last 17 years.

Updating stock status requirements

Before 2008, the MSC required a fishery's target population be maintained at high productivity whilst avoiding overfishing.

However, it lacked specific stock reference points that a fishery could use as a target to maintain or improve towards, as well as clear expectations on the harvest strategy or control rules that were to be set by management authorities.

The updated Fisheries Standard improved this, firmly embedding within Principle 1 that all certified stocks needed to have a biomass target reference point equivalent to maximum sustainable yield (B_{MSY}) and have a status fluctuating around this target. In chapter 2, we see that this is reflected in the healthy stock status of MSC certified fisheries around the globe (page 24).

Data-limited fisheries and the Risk-Based Framework (RBF)

The Fisheries Standard is designed to be accessible to all types of fisheries. However, its strong requirement for quantitative data can be a barrier to some, including small-scale and artisanal fisheries and those without access to stock assessments (Costello et al. 2012). To address this challenge, the MSC developed a set of precautionary risk-based indicators for the assessment of data-deficient fisheries – the Risk Based Framework (RBF).

The RBF was originally developed by Australia's Commonwealth Scientific and Industrial Research Organisation in its Ecological Risk Assessment for Effects of Fishing. In 2008, the method was piloted in seven fisheries around the world before being integrated into the MSC Fisheries Standard in July 2009.

This is one example of how the MSC has addressed the challenge of maintaining global applicability without sacrificing the scientific credibility of the Standard. To date, 67 fisheries have been certified using the RBF to evaluate fishery impacts on either target or bycatch stocks. 24% of these fisheries were in the Global South, including in Suriname (page 32).

An ecosystem approach to fisheries management: 2008-2014

Between 2008 and 2014 the MSC released annual updates to the Fisheries Standard. Many of the updates included improvements in the way that the Standard required ecosystem-based fisheries management to be assessed.

For example, in 2011 the Standard was updated to reflect best practice for targeting low trophic level species such as krill, which have a key role to play in some marine ecosystems. Prior to 2011, the Standard had included the requirement that target stock management take into account the role of the species in the ecosystem, but was not specific about how to do this. Over the course of three years, the MSC undertook extensive consultation and commissioned specific research to understand the most appropriate management approach for key low trophic species (Smith et al. 2011). The work was combined with the results of other international research (Pikitch et al. 2012). In 2011 MSC released details of how to identify whether a species was of key importance to an ecosystem, and what management of these species would be required to meet the MSC Standard.

In another example, responding to widespread concern about the ability of most management systems to monitor and control shark exploitation if shark finning was permitted, version 1.3 of the Standard, released in 2013, included strict restrictions on shark finning. The new requirements reflected international policies put in place by

Regional Fishery Management Organisations and guidance outlined in the International Plan of Action for the Conservation and Management of Sharks (1999), and their release followed extensive consultation with stakeholders.

Working with stakeholders

All MSC Standards and certification requirements are regularly reviewed through our policy development process, and incorporate valuable input from our stakeholders through targeted workshops, webinars, focus groups, and online consultation.

For example, the newest Fisheries Standard (version 2.0), developed between 2012-14, involved a year-long consultation with over 80 stakeholders including fishing industry experts, scientists, non-profit organisations and a wide network of industry partners across the globe.

Further improvements: version 2.0

The most recent update to the Standard reflects the latest fisheries science. In particular, it increases the requirements for Principle 2 of the Standard: Sustainable environmental impact.

Highlights include:

- New requirements to review measures to minimise unwanted catch and implement them where appropriate, incorporating the principles outlined in the International Guidelines on Bycatch Management and Reduction of Discards (2011).
- Stronger protection for habitats and vulnerable marine ecosystems (VMEs), incorporating the principles outlined in the International Guidelines for the Management of Deep-sea Fisheries in the High Seas (2009).
- Ensuring that the cumulative impacts of overlapping MSC certified fisheries do not harm bycatch species or VMEs.

In 2016, the Western Asturias octopus trap fishery of artisanal cofradías became the first to be certified to version 2.0 of the MSC Fisheries Standard.

International recognition

In 2017, the MSC was recognised by the Global Sustainable Seafood Initiative (GSSI) as a credible international seafood certification program.

Our certification program meets all the essential components of the GSSI benchmark, and a further 63 supplementary components relating to issues such as deep-sea fishing, VMEs, and data collection to demonstrate impact.

On the horizon

The constant evolution of the MSC Standard ensures that all MSC certified fisheries demonstrate continued improvements that align with evolving best practice science and management.

However, recognising that undertaking very frequent revisions of the Standard introduces uncertainty and increases complexity of the assessment process, the MSC Board of Trustees has agreed that the Fisheries Standard will next be reviewed in 2019, five years after the release of version 2.0 in 2014.

Ocean to plate traceability

The MSC Chain of Custody (CoC) Standard is a vital link between sustainable production and consumption, ensuring that MSC certified products are identifiable and segregated at every step along the supply chain.

Since the first MSC CoC certificate was issued in February 2000, the MSC has regularly evaluated and adopted new assessment tools. For example, DNA testing was introduced in 2009 to add another level of scrutiny to certified supply chains and products. Seafood fraud has received considerable attention from the academic community, and overall DNA testing results have shown near negligible (<1%) levels of mislabelling for MSC certified products (MSC, 2016) compared to a global average of 30% (Pardo et al., 2016). Read more about the MSC CoC Standard on page 35.

How certified fisheries help preserve marine habitats



Over the last 15 years, 18 MSC certified fisheries have changed the way they fish to avoid vulnerable habitats, and 35 have undertaken new research to fill ecological knowledge gaps. In this way, certification has contributed to global habitat conservation.

Aquatic habitats are the physical environments where fishing takes place. Habitats are important to consider in fisheries management because they may provide essential areas for marine animals to breed or find food. Some habitats, such as the structures formed by warm-water or cold-water corals (often termed 'biogenic' habitats), are of high conservation concern because they are highly diverse, unique, or vulnerable to fishing impacts. Others are of lesser concern, but the impact of fishing within them still needs to be managed sustainably.

To achieve MSC certification, fisheries are required to ensure their impacts on marine habitats are sustainable; to have a strategy in place to manage these impacts; and to have sufficient understanding of the relevant habitats to underpin management. These requirements form a key part of how the MSC Fisheries Standard helps to operationalise the ecosystem approach to management.

New analysis

To assess the contribution of MSC certified fisheries to global habitats conservation, we reviewed improvements in habitats'

management made by fisheries following MSC certification between 2000 and 2015 based on changes to their assessment scores.

All fisheries certified as of December 2015 (185 fisheries) were analysed, and 117 unique actions were identified, contributing to improvements in habitat status, management and information in 39 fisheries. The majority of these were bottom-contact fisheries (trawls, dredges, longlines), although habitat impacts were also addressed in some enhanced bivalve fisheries.

The improvements were grouped into four overarching types: Research, Impact assessment, Technical, and Governance.

Research improvements included both ongoing data collection systems and finite research projects. Most frequently, fisheries produced maps of the location and intensity of fishing or of the distribution of vulnerable habitats, as in the Greenland coldwater prawn fishery (page 18). In total, 46 new research projects were completed to fulfil the requirements of 30 MSC assessments.

New monitoring systems (e.g. mandatory self-reporting) helped 12 fisheries to record important species where they were encountered in new locations. For example, vessels under the Danish Fishermen’s Producer Organisation certificate now have a shared map-based tool on board to record encounters with corals and sponges in real time.

Impact assessments determine the likelihood that a fishery will cause serious harm to a given habitat and therefore indicate whether a change in management is necessary. Information gathered during certification often feeds into such assessments.

For example, the Canada Atlantic halibut fishery commissioned a map of its fishing footprint. By comparing the map to existing maps of vulnerable habitats identified by the Canadian Government it was able to demonstrate a negligible likelihood of impact (2%).

Alterations in vessel procedures, area fished, or gear specifications were considered as technical changes. Eighteen fisheries made technical changes to comply with the MSC habitats requirements, and spatial closures were the most commonly implemented measure (13 fisheries). In seven cases these closures were voluntarily adopted by industry, and the remaining six were statutory closures implemented by fisheries management agencies.

Two fisheries implemented Governance changes. In one case, an advisory council was established to provide advice on habitats’ concerns. In the other, the country became party to the Convention on Biological Diversity, which conferred an additional level of legal protection on recognised important natural areas.

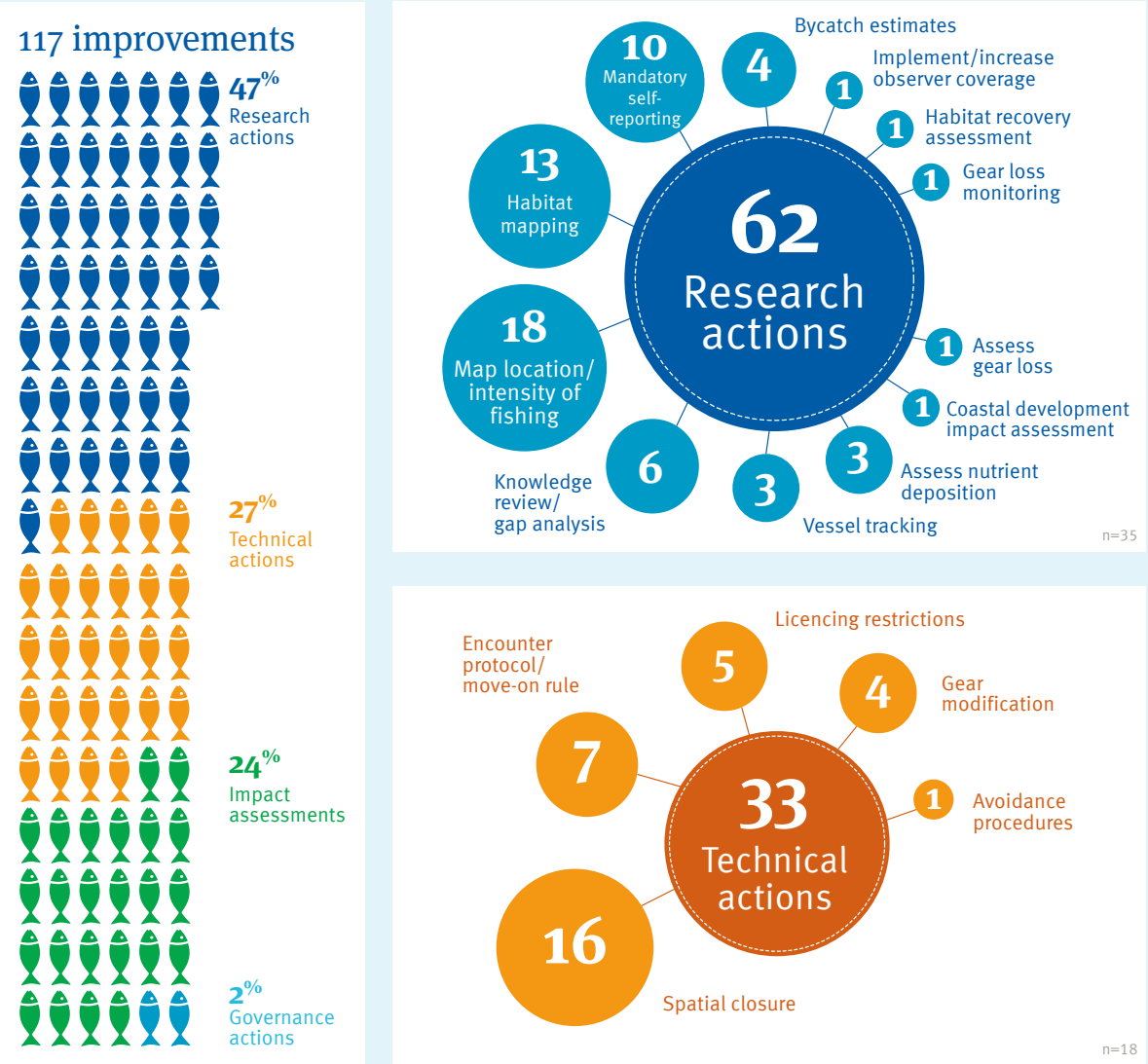
What does this mean?

While habitats are increasingly being considered in national and international fisheries management approaches, the level of information necessary to implement management is often lacking (Heupel & Auster 2013; Kaiser et al. 2015), or is considered too costly to obtain (Pitcher et al. 2016).

Many uncertainties still remain in the science around habitat impacts, and the 89 new research and impact assessment actions taken to comply with MSC requirements are evidence that this knowledge gap is being filled by certified fisheries. The 36 technical and governance actions show that MSC certified fisheries are also improving the management of habitat impacts.

Exploring the conservation of marine habitats in certified fisheries

Out of 185 MSC certified fisheries, 39 made at least one improvement to habitats’ management.



This analysis includes improvements completed by 39 MSC certified fisheries between 2000 and 2015. Number of fisheries (n) in this case refers to number of MSC certificates. Each certificate represents a fishing company targeting one or more fish stocks and using one or more gear types. Note that many fisheries undertook multiple actions of different types.

MSC certified fisheries within large marine ecosystems



MSC certified fisheries help to safeguard the health of marine ecosystems by investing in improvements that ensure the sustainability of their practices. To explore where these improvements are having impact at a global scale, we have begun to map certified catch to large marine ecosystems (LMEs) across the world. The highest density of certified fisheries is currently in higher latitude LMEs.



How certification promotes positive, on the water change

When a fishery is assessed against the MSC Fisheries Standard, it receives a score for each of 28 sustainability indicators.

- Scores of below 60 = Fail
- Scores of 60-79 = Acceptable performance
- Scores of 80-99 = Global best practice
- Scores of 100 = Near-perfect

If a fishery scores 60-79 for any indicator, it must improve its performance within a specified time frame in order to retain certification. Certified fisheries must score an average of at least 80 for indicators within each of the three Principles of the MSC Standard.

Impacts on marine ecosystems

Since the first fishery was certified in 2000, 94% of MSC certified fisheries have been required to make at least one improvement, resulting in 1,200+ concrete examples of change. Many of these improvements relate to the wider environmental impacts of a fishery.

This year, our analysis focuses on the improvements made by fisheries to safeguard marine habitats (page 11).

Large marine ecosystems

To explore whether the improvements demonstrated by MSC certified fisheries are having impact at a global scale, we have begun to map certified catch to LMEs across the world.

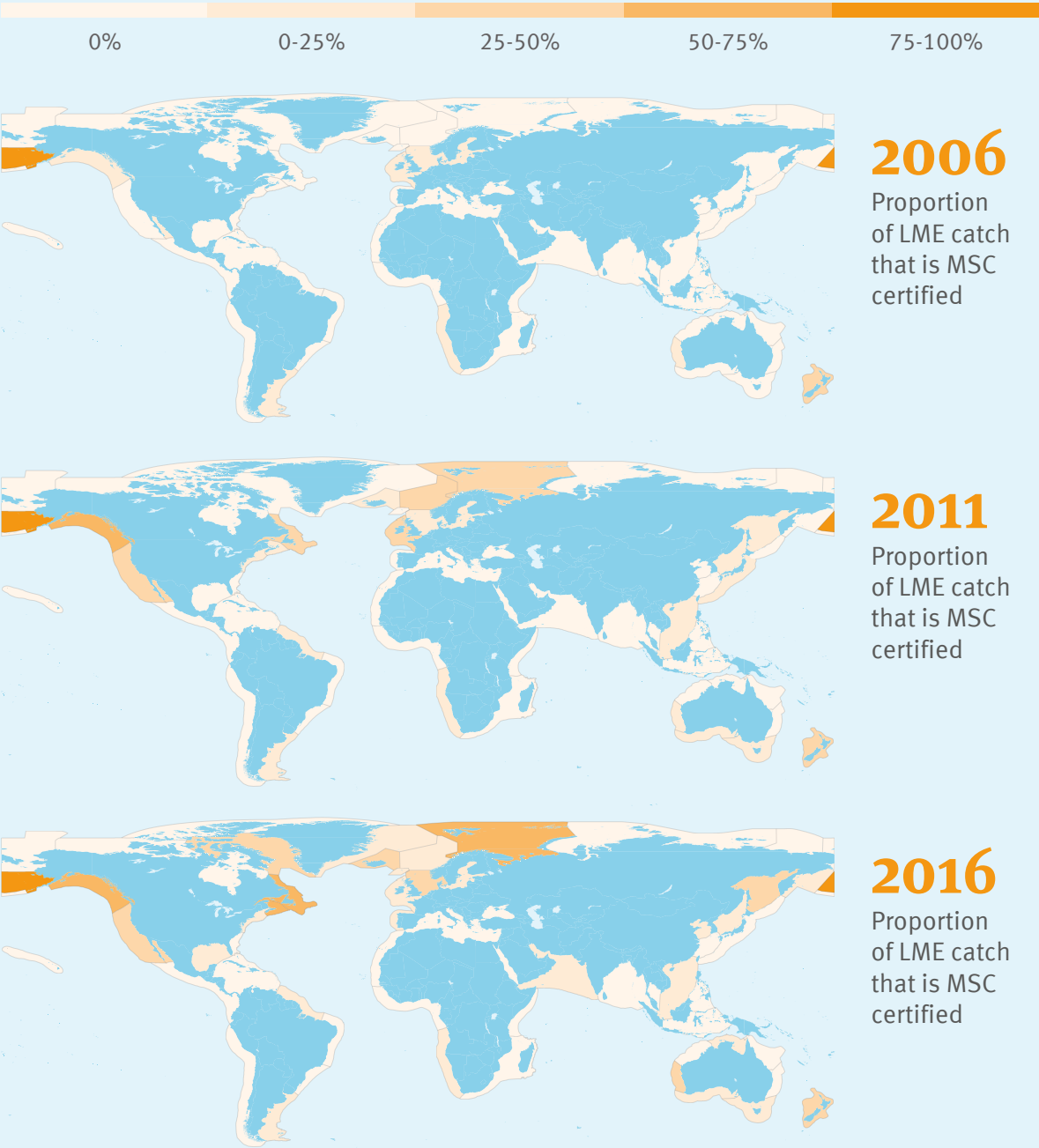
Certified fisheries are unevenly distributed across the world’s marine ecosystems with the highest density of certified fisheries in higher latitude LMEs.

However, some of the LMEs with the highest productivity and biodiversity – particularly in the tropics and the Global South – have low representation from MSC certified fisheries. These regions are also vulnerable to the impacts of climate change.

Over the next three years, we will prioritise engagement with fisheries from some of these highly important LMEs.

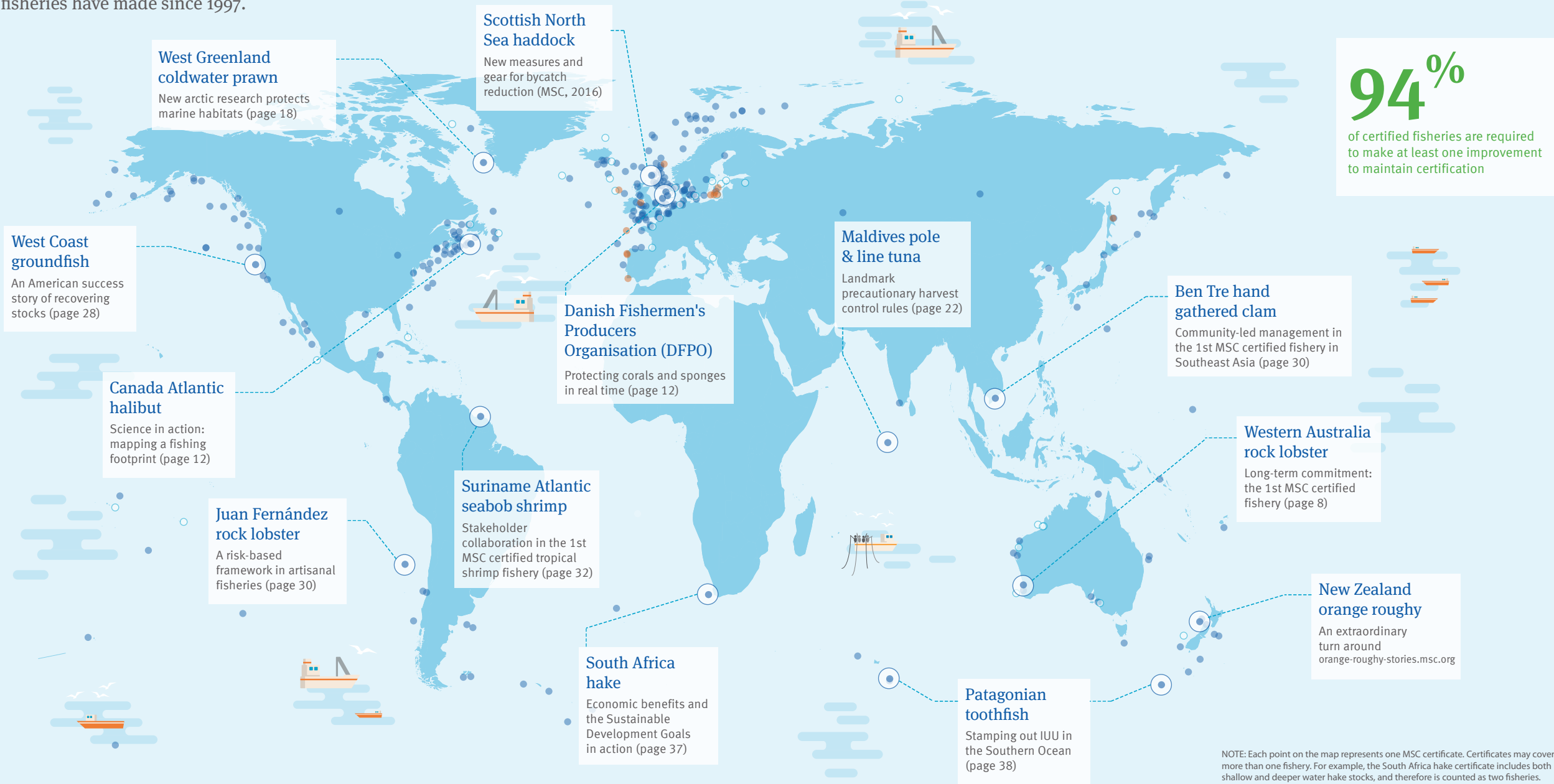
Mapping sustainable fisheries

Proportion of large marine ecosystem (LME) catch that is MSC certified, 2006-2016



20 years of impact in MSC certified fisheries

The MSC certification program recognises, rewards, and incentivises sustainable fishing around the globe. This map highlights just a few of the improvements that certified fisheries have made since 1997.



Deep Dive

Mysteries of the seafloor

How research collaboration between Sustainable Fisheries Greenland (SFG) and the Zoological Society of London (ZSL) uncovered new information about Greenland's benthic habitats.



The MSC assessment process requires every fishery to provide evidence about the health of fish stocks, habitats and other marine species where it operates. Where there are gaps in this information, assessment can catalyse fruitful fishery-research collaborations and the funding of new marine science.



© ZSL/Institute of Zoology

The West Greenland continental shelf extends from the equivalent latitude of the Shetland Isles to more than 1,000 km within the Arctic Circle. Its deep, dark seafloor harbours a diverse array of marine creatures from sea cucumbers and starfish to corals and sponges. But the full extent of its life has only recently been revealed.

When the Greenland cold water prawn fishery first entered MSC assessment in the late 2000s, the assessment team noted that the Greenland Institute of Natural Resources had extensive historical data on stock assessments, yet very little was known about the benthic habitats where the fishery was operating. In fact many of these habitats had never been mapped at all.

To understand more about benthic habitats in the fishing ground, SFG saw an opportunity to approach researchers at ZSL for independent research support.

“Working with Sustainable Fisheries Greenland has enabled us to conduct pioneering research into benthic habitats on West Greenland’s continental shelf, an area that would otherwise have been very difficult for us to access. SFG has shown great commitment to supporting research into understanding the habitats in this unique region and in using this information to maximise the sustainability of its operations.”

Dr Chris Yesson, Institute of Zoology, Zoological Society of London

The ZSL team began mapping the seabed by lowering tethered cameras off the side of the survey vessel used to conduct the fishery’s annual stock assessments. The cameras took high resolution images of the seabed, often hundreds of metres deep, with each image containing up to six hundred benthic organisms. The research, which so far has led to the publication of three new scientific papers, revealed new information about the benthic animals living in each type of habitat, with more found in rocky habitats and fewer in soft sediment (Yesson et al. 2017).

In response to the findings, SFG began trialling innovative bycatch mitigation measures to minimise damage to delicate sea pens in the vicinity of the fishery, and has worked to designate a marine protected area that will safeguard important coral and sponge species.

Although the fishery received MSC certification in 2013, its partnership with ZSL is still going strong. Camera surveys have continued each year and SFG has also gone on to fund a PhD project that will identify possible vulnerable marine ecosystems (Yesson et al. 2016). The research supported by SFG will inform responsible fisheries management long into the future.

“As conservation scientists, it is important for us to remain impartial and retain control of the direction of our research. Although there is a danger that this can create conflict when working with industry, in this instance it is a genuine pleasure to collaborate with a fishery that clearly cares about its ecological impact and respects and responds to scientific input.”

Dr Kirsty Kemp, Institute of Zoology, Zoological Society of London

“Although the skippers were initially sceptical about the work of the scientists, extensive collaboration between the two parties has seen that attitude change. Now, our skippers compete with one another to provide the scientists with information about any new or interesting findings. Along with the certification itself, this has been a very valuable side-benefit of the MSC assessment process.”

Peder Munk Pedersen, Sustainable Fisheries Greenland



© Chris Yesson/Institute of Zoology

Chapter 2: Sustainable fish stocks

Ensuring the health and productivity of global fish stocks

Sustainable fish stocks

Chapter 1 focused on the actions MSC certified fisheries take to ensure their broader environmental impacts are sustainable. This chapter addresses the sustainability of the target fish stocks themselves.

Global importance

Fisheries are vital to the food security and sustainable development of billions of people worldwide. Hundreds of millions of people are directly or indirectly dependent on seafood for their livelihoods, and, in 2014, fishery exports from developing countries were valued at US\$80 billion, higher than all other food commodities (including meat, rice and sugar) combined (FAO, 2016).

A challenging state of play

While the FAO has recorded an improvement in many mid- and high-latitude fish stocks in the last 15 years due to improved fisheries management, the overall status of global fish stocks remains poor, with 31.4% of fish stocks considered overfished (FAO, 2016).

Importantly, these data only include stocks for which

formal assessments exist: the picture is worse if estimates of unassessed stocks are included and studies indicate that 80% of the world's stocks are unassessed while fewer than 1% of species have stock assessments (Rosenberg, 2017; Costello et al. 2012).

Aiming for maximum sustainable yield

To establish if a fishery is sustainable, managers generally need to know the size of the stock (biomass or B) as well as the intensity with which it is being harvested (fishing mortality or F).

The MSC Fisheries Standard uses biomass at maximum sustainable yield (B_{MSY}) as a target reference point for sustainably managed stocks. Due to the dynamic nature of marine ecosystems, certified fisheries are expected to maintain stock status fluctuating around or rebuilding towards this point, and fishing mortality at or below that required for sustainable yield (F_{MSY}).

Maintaining stocks at B_{MSY} allows for long-term economic benefits. Recent research indicates that if currently mismanaged stocks were brought back to healthy biomass, this would result in a considerable increase in both yield and profit (Costello et al. 2017).

However, as so few of the world's fish stocks are assessed, it can be difficult to correctly gauge B_{MSY} . The MSC therefore supports the use of data-limited methods, including the MSC RBF, for assessing the status of these stocks. The MSC is also working on decision-support and assessment tools for assessing stock health against Standard requirements in data-limited situations (page 30).

Testing the credibility of MSC's sustainability claim

On pages 24-27 we use independent stock assessment data to analyse the evolution of stock status in nine different regions of the world since 2000.

Globally, stocks targeted by MSC certified fisheries show sustainable levels of stock biomass, conforming to the requirements of the MSC Fisheries Standard. This is not always the case for non-certified stocks in the same regions.

In many regions, MSC certified stocks show higher biomass after certification occurred.

Resilience in a changing world

While in-depth considerations of how climate change will affect fisheries are beyond the scope of this report, the ecological sustainability required for MSC certification can help mitigate negative impacts by improving the resilience of fisheries and marine ecosystems in a rapidly changing world.

Across the world, fish populations are moving in response to climate change (Cheung et al. 2009). As species distributions shift, it will become increasingly important for neighbouring countries and member countries in Regional Fisheries Management Organisations (RFMOs) to share data and agree on management objectives for shared stocks.

The cooperative management of migratory species is an explicit requirement in the MSC Fisheries Standard. On page 22, we explore a landmark decision made by the Indian Ocean Tuna Commission RFMO to adopt harvest control rules for skipjack tuna – a precautionary measure that will help increase the resilience of this vulnerable region to potential climate-related stock fluctuations.

Deep Dive

Safeguarding skipjack

Landmark decision safeguards the future of Indian Ocean skipjack tuna stocks



In May 2016, the Indian Ocean Tuna Commission (IOTC) took the ground-breaking decision to adopt vital harvest control rules for skipjack tuna – against a backdrop of currently abundant stocks. This precautionary management strategy will help to assure the long-term sustainability of skipjack tuna stocks in the Indian Ocean.



Harvest control rules are an important tool in modern science-led fisheries management. They are a set of clear, pre-defined guidelines that determine how much fishing can take place in a given fishery, based on the size of a given stock. In particular, they act as an insurance policy for fisheries by defining the trigger point – a threshold stock size – at which fishing efforts must decline or cease to prevent the stock becoming overfished.

All MSC certified fisheries must have robust harvest strategies, but establishing them can be a particular challenge to fisheries targeting highly migratory species like tuna. Tuna move thousands of miles each year to feed and spawn, crossing multiple national and international jurisdictions. Their management therefore requires the cooperation of large numbers of coastal states and distant water fishing nations, operating in multinational ocean-wide Regional Fisheries Management Organisations (RFMOs).

The Maldives pole and line skipjack tuna fishery was first certified in 2012. One of the key conditions of its certification was that the IOTC should improve its harvest strategies by adopting harvest control rules for the fishery within the five-year certification period, a condition that would require the cooperation of all IOTC members.

To ensure the fishery retained its certificate, the Maldivian Government spearheaded efforts to establish harvest control rules, supported by non-profit organisations the International Pole and Line Foundation (IPNLF), WWF and the International Seafood Sustainability Foundation, retailers and suppliers including Sainsbury's, Marks & Spencer and World Wise Foods, and members of the EU seafood industry. Following nearly four years of collaborative

work with scientists and IOTC member states, a proposal was submitted for the second time in 2016.

Following months of detailed discussion, the final proposal received wide support across IOTC member states, demonstrating a collective commitment to sustainability among the coastal and distant water fishing nations. In fact, the proposal received the most support of any IOTC conservation measure to date, and was co-sponsored by an unprecedented 14 out of 31 member states. The proposal was adopted as a binding resolution during the IOTC's 2016 annual session.

Although skipjack tuna in the Indian Ocean is currently abundant, these agreed, well-

defined harvest control rules, which were catalysed by the MSC assessment process, are designed to ensure stocks remain in a healthy state long into the future. Given the challenges of establishing harvest strategies for highly migratory species, their introduction at a time when stocks are healthy not only represents a milestone for the sustainable management of tuna, but for marine conservation more broadly.

Skipjack is the most widely consumed species of tuna, typically sold in cans. Globally, around three million tonnes of skipjack are caught every year (FAO, 2016). Last year over 750,000 tonnes were caught by MSC certified fisheries, representing about a quarter of the total supply.

“The adoption of this harvest control measure is a ground-breaking moment in the responsible management of tuna fisheries globally. It is the first ever precautionary harvest control rule adopted by a tuna Regional Fisheries Management Organisation while stocks are not overfished and reaffirms the sustainability credentials of the MSC certified Maldives pole and line fishery.”

Martin Purves, Managing Director of IPNLF

“A robust harvest strategy is a critical management step to ensure the long-term sustainability of the Indian Ocean skipjack tuna fishery. The introduction of this Harvest Control Rule was informed by a process of management strategy evaluation that spanned nearly 4 years and demonstrates the IOTC's commitment to implementing fisheries management policies which are grounded in robust evidence-based science.”

Dr. M. Shiham Adam, Director General, Marine Research Centre, Ministry of Fisheries and Agriculture, Maldives

Exploring the status of MSC certified stocks around the world



An analysis of stock data from nine regions of the world shows that MSC certified fisheries target stocks with healthy biomass. In nearly all regions, stocks targeted by certified fisheries have higher biomass in the years following certification.

The size of a fish population (or the stock biomass) relative to a scientifically determined reference point is an important indicator of the sustainability of a fishery.

The MSC Standard considers a fishery to be sustainable if it targets stocks with biomass fluctuating around B_{MSY} or higher, and harvests these stocks at a rate that can continue indefinitely.

If stock biomass is below its target range, a fishery may still be considered sustainably managed if fishing effort is adequately reduced so that the target population can start rebuilding.

Analysing stock biomass in certified and non-certified fisheries

The following analysis explores whether MSC certified fisheries meet these criteria. Pages 26-27 show the results of over 100 independent stock assessments published by fisheries management bodies around the world. To be as objective as possible, we only analysed those stocks compiled in a public database, the RAM Legacy Stock Assessment Database (www.ramlegacy.org; Ricard et al. 2012), and included all those with data from 2013 or later (see supplementary materials for further details).

For each region, the stock size (B) of fisheries was compared to the reference point used most commonly by local managers (BRef). This was maximum sustainable yield (MSY) in most cases.

However, in Europe the reference point was $MSY_{BTRIGGER}$, used as a limit below which managers intervene to reduce

fishing so the stock can rebuild. For Australia it was the maximum economic yield (MEY) which ensures greater economic efficiency of a fishery.

Stocks at the $MSY_{BTRIGGER}$ level are likely to be at the lowest boundary of fluctuations around B_{MSY} , whereas those at B_{MEY} are likely to be substantially above B_{MSY} .

Healthy stocks are expected to have values around B/BRef equal or greater than 1 (represented by the horizontal dotted line on the graphs on pages 26-27).

Results

Globally, MSC certified fisheries target stocks with healthy biomass and are being fished at sustainable rates (see supplementary materials for data on fishing intensity).

The graphs on pages 26-27 show biomass above the horizontal dotted line for stocks fished by MSC certified fisheries, indicating a healthy stock status.

This is not always true for other, non-certified, stocks in the same regions, such as the West Coast of Canada, or the European countries outside the European Union. This is a conservative comparison because it only includes non-certified fisheries that are formally assessed with reference points. Those that do not have full analytical assessments are more likely to be mismanaged and show unhealthy stock status (Costello et al. 2012; Rosenberg et al. 2017).

By comparing recent snapshots of stock health with values from 2000, when none of the stocks examined were MSC certified, we can see that stocks have higher biomass in years following certification in nearly all regions.

This suggests that either a desire to obtain MSC certification incentivised better stock stewardship, or that the MSC label was sought as recognition of efforts made to recover stocks to healthy levels of biomass.

One example of such efforts is the recovery of the West Coast groundfish stocks in the USA. Improvements in management enabled this fishery to meet the MSC sustainability requirements and achieve certification (page 28).

The biomass of a handful of certified stocks does fall below the dotted line. Where this means that the stock is below the lower limit of acceptable values around B_{MSY} the MSC Standard requires the fishery to provide evidence that the stock is rebuilding.

This is the case for certain stocks within the European region graphs on pages 26-27, such as the Norwegian spring-spawning herring. For further information on this stock as well as detailed analysis of the health of MSC certified European stocks see also Chapter 2 and the appendix of the Global Impacts Report 2016 (www.msc.org/2016-impacts-appendix).

In Australia, as noted above, management bodies have adopted MEY as their target, and B_{MEY} is higher than B_{MSY} . So, although for one Australian stock B/BRef is lower than the dotted line (Blue endeavour prawn is 0.8 - i.e. biomass is 80% of B_{MEY}) the stock is still well above precautionary limits and catches are less than half MSY. For these reasons, these fisheries are still considered sustainable and included in the MSC program.

Regions not shown in the graphs

Some regions, such as the Pacific and Atlantic Oceans, the Antarctic, Russia, and the West Coast of the US, are home to MSC certified fisheries but are not represented graphically. This is either because there were not enough stocks to produce boxplots, or because assessments in the RAM database were too outdated.

However, third party certification reports (and the official assessments referenced therein), confirm that MSC certified stocks in these regions, such as walleye pollock in the Northern Sea of Okhotsk, Russia, and MSC certified toothfish fisheries in the Antarctic, have healthy biomass and are being fished at sustainable harvest rates.

Further improvements

Stock biomass alone doesn't tell the full story of the MSC's requirements for sustainable fishing.

Where stock status is already on target, fisheries often make other improvements to achieve and maintain MSC certification, such as introducing new monitoring programs or gear changes to ensure the protection of vulnerable species and habitats (see analysis page 11 and analysis of South Africa cape hake (Butterworth, 2016)).

Data, methodology and supplemental materials:

www.msc.org/global-impacts/measuring-global-impacts/research-and-key-documents

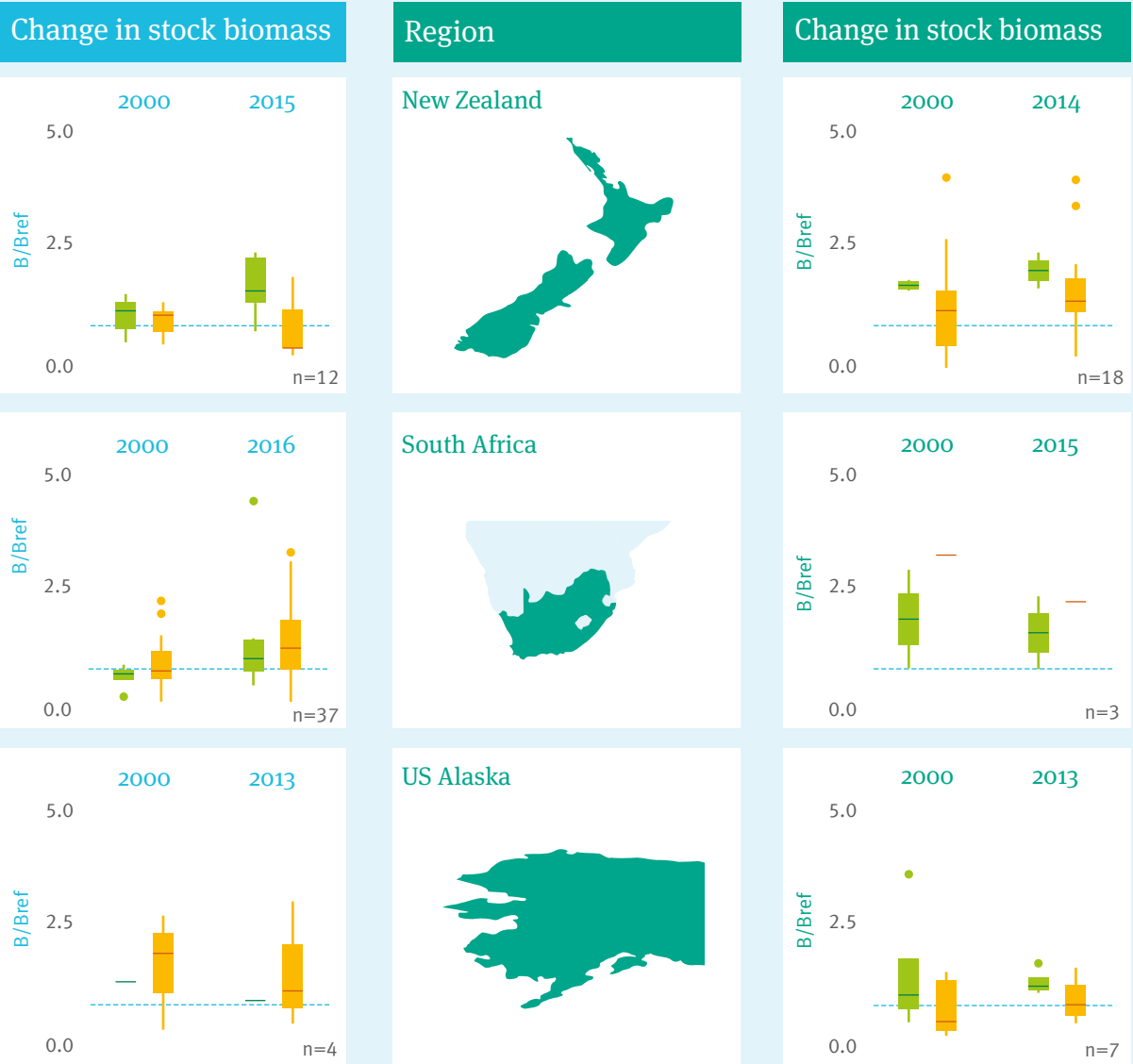
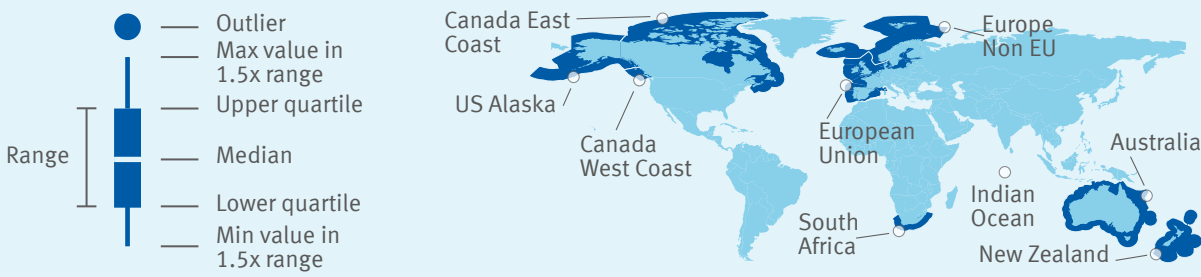
Status of MSC certified stocks around the world

These box and whisker plots compare the health of marine populations (stocks) targeted by MSC certified and uncertified fisheries around the world. For each region, recent biomass of the stock is compared to data from 2000, prior to MSC certification.

 MSC Stocks  Non MSC Stocks



B/BRef = Stock biomass compared to a reference stock biomass that ensures exploitation is managed sustainably; Healthy stocks should lie at or above the dotted line.



Points not shown because of chart boundaries: * North East Arctic haddock (MSC certified) B/Bref is 9.6 in 2015; ** Northeast Atlantic North hake (not MSC certified) B/Bref is 7.3 in 2016

Deep Dive

Transforming the future of US groundfish stocks

How the introduction of a catch-share system revolutionised the future of the US West Coast groundfish trawl.



Since being declared an ‘economic disaster’ in 2007, the turnaround of the West Coast groundfish trawl is a true American success story. In 2014, MSC certification recognised the improvements made by the fishery and helped to usher in further sustainability measures.



© Susan Chambers

The West Coast of the USA is home to the most diverse and geographically extensive fishery ever to enter the MSC assessment process. The US West Coast groundfish trawl comprises 17 different fisheries using a variety of otter trawl configurations, operating off the coasts of Washington, Oregon, and California.

Historically, a total allowable catch target was set for the entire fishery. The situation encouraged too many vessels to chase – and inevitably over-harvest dwindling resources until the target was reached. This in turn led to high discard rates and low compliance with federal rules for sustainable fishing.

Between the 1980s and 2000s, landings dropped by 70%. Fishing communities simultaneously suffered as revenues fell from US\$47.3 million in 1997 to US\$22.2 million in 2007. The fishery was declared an ‘economic disaster’ shortly after.

A bold move for sustainability

In 2011, under the advice of the National Oceanic and Atmospheric Administration (NOAA), the Pacific Fishery Management Council took the then-controversial decision to introduce an individual fishery quota system. The fishery-wide catch quota was divided up between individual fishers, allowing them to harvest their catch when conditions were optimal, or to lease their quota to others if they were unable to fish, improving the stability of their income.

To ensure the new quota system was followed, 100% observer coverage was also introduced across all vessels. The independent observers, trained by NOAA to record the number, location and species caught, ensured that all catch (retained and discarded) was monitored both aboard vessels and upon landing, deterring discards and encouraging individual accountability.

An American success story

The catch-share system has been a tremendous success, described by NOAA as the biggest transformation in fish management for more than a generation (NOAA, 2013). Since its introduction, fishers have made fewer trips each week, landed more of the fish that they catch, and earned higher revenue for each fishing trip.

Importantly, bycatch and discards have dropped substantially with catch of rebuilding stocks 50% lower than before the catch-share system was introduced. For example, the discard rate of darkblotched rockfish dropped from 51% to just 2% and for bocaccio rockfish it fell from 80% to less than 1% (NOAA, 2015).

“The biggest transformation in fish management for more than a generation.”

NOAA, 2013

Continued improvements on the water

In 2014, MSC certification provided valuable recognition of this transformation and ushered in further improvements. Since becoming certified, the fishery client has continued to work closely with NOAA and has fostered strong collaborations with international non-profit organisations including the Environmental Defense Fund and The Nature Conservancy.

To meet conditions on stock status, it has completed a management strategy evaluation of its flatfish harvest control rules and will be updating the stock assessments for groundfish species including arrowtooth flounder and lingcod to ensure that catch rates are appropriate and take a precautionary approach.



© MSC/Dr Lindsay Marshall

“The certification of this fishery demonstrates the environmental and economic benefits that can be achieved by working together to solve major fisheries challenges. The catch-share system has delivered benefits to both fish stocks and the fishing community. Rates of bycatch and discards have plummeted, while overfished species are rebuilding more rapidly than initially anticipated. At the same time, fishing businesses are able to fish more efficiently.”

Shems Judd, Pacific Regional Director,
U.S. Oceans Program, Environmental Defense Fund

Chapter 3: The future of sustainable seafood

Challenges and opportunities

A holistic approach

Delivering sustainable fisheries is challenging, and requires the MSC to continually be aware of new developments.

Labour abuses, for example, are of widespread concern within the global fishing community. The MSC is therefore strengthening its current policy to address concerns about forced labour in fisheries and supply chains.

IUU fishing also remains an area of concern. Up to 26 million tonnes of fish may be taken illicitly each year, and IUU fishing can threaten local biodiversity and food security as well as cause economic damage (FAO, 2016). You can read more about IUU and the MSC's contributions to sustainability on the high seas on page 38.

Improving access

Small-scale and Global South fisheries are vital to food security, livelihoods and economic development so it is critical that they are managed sustainably. The MSC has had some success working with small-scale fisheries. The Vietnamese Ben Tre clam fishery, for example, was the first small-scale fishery in Southeast Asia to achieve MSC certification in 2009, and was recertified in 2016.

However, many artisanal fisheries, particularly in the Global South, lack the resources, data, technical knowhow and/or governance systems necessary to meet MSC requirements and benefit from the growing market for sustainable seafood (Duggan and Kochen, 2016; Rosenberg et al. 2017).

Providing solutions

As discussed in chapter 1, the use of the RBF can enable data-limited fisheries to join the MSC program. Examples of the successful implementation of the RBF include the Suriname seabob fishery (page 32) and the artisanal rock lobster fishery of the Juan Fernández islands.

Keeping up with new developments, the MSC is currently collaborating with The Nature Conservancy and the Natural Resources Defence Council to provide even more flexible and robust decision-support tools for assessing stock health against Standard requirements in data-limited situations.

The MSC Capacity Building Program delivers comprehensive guidance and training designed specifically for fisheries working towards MSC certification.

Accompanying fishery improvement tools have also been developed and include Pre-assessment Templates, Fishery Improvement Action Plans, and the Benchmarking and Tracking Tool. Together, these assets provide a framework for improvement and are particularly useful for small-scale fisheries in the Global South.

Other solutions include new criteria to evaluate the sustainability of mixed fisheries (common in areas of higher biodiversity and smaller-scale fisheries) and the introduction of an In Transition to MSC Program which will support fishery improvement projects as they make progress towards achieving MSC certification.

Beyond the Fisheries Standard

Aquatic plant harvesting and farming, overwhelmingly of seaweeds, has been growing rapidly and is now practised in about 50 countries (FAO, 2016). In 2017, the MSC will release a new Seaweed Standard in partnership with the ASC (page 34).

The MSC is also future-proofing its Chain of Custody program by exploring new technologies for ensuring global traceability (page 35).

Investing in the future: The Global Fisheries Sustainability Fund

Awarded for the first time in 2016, this fund supports innovative projects that help small-scale and Global South fisheries to achieve sustainability and certification.

2016 winners include MDPI, an Indonesian NGO working to improve traceability in tuna supply chains, and Blue Ventures, who are developing innovative methods of fisheries data collection in Madagascar.

The MSC Scholarship Research Program Now in its seventh year, the MSC scholarship program supports students conducting research into sustainable fishing and seafood supply chains around the world.

In 2016, the winning projects were:

- Investigating Mexican cooperatives combating illegal fishing
- Probing the socio-economic realities of seaweed farming in Indonesia
- Detangling Atlantic and Indian Ocean tuna populations using next generation DNA sequencing



Deep Dive

The power of partnerships

How stakeholder collaboration empowered the first tropical shrimp fishery to receive MSC certification.



In 2011, Suriname’s artisanal seabob fishery became the first tropical shrimp fishery in the world to achieve MSC certification. Tools such as the MSC RBF allowed it to overcome some of the challenges usually associated with fisheries in the Global South. The sustainability improvements made in this fishery were recognised with recertification in 2017.



© Nathalie Steins / MSC

The small nation of Suriname lies along the north coast of South America. With most of the country swathed in dense rainforest, the majority of Surinamese live along the narrow coastal plain where fishing is essential to community livelihoods.

In the mid-1990s, as an alternative to the traditional catch of *Penaeus* prawn which was then in decline, local fishers began catching Atlantic seabob (*Xiphopenaeus kroyeri*). This small, white tropical shrimp is abundant in the country’s shallow coastal waters and across the wider Caribbean. Suriname is now the third largest producer of Atlantic seabob in the world.

Recognising the growing demand for sustainably sourced seafood in European markets, the Heiploeg Group, one of the largest shrimp processors in Europe and owner of the seabob fishery, commissioned an MSC assessment of the seabob fishery in 2009 as part of its Corporate Social Responsibility program.

The initial pre-assessment revealed that the fishery, like many others in the Global South, lacked the complete, long-term scientific data required to meet the requirements of the default assessment process. In particular, it lacked a formal stock assessment, had gaps in its data collection practices, and did not yet have a strategy in place for managing any interactions with Endangered, Threatened and Protected species in the area.

It therefore became one of the first fisheries in the world to be assessed in part using the MSC RBF. The framework provides a structured outline against which the risk that a data-deficient fishery is having impacts on species, habitats and the surrounding ecosystems can be determined. It was developed to ensure all fisheries have equal access to the MSC program and its associated benefits.

Using the MSC requirements as a framework

to drive improvements to the fishery’s sustainability, Heiploeg quickly recognised that collaborating with fellow fishers, scientists and the Suriname Government would be critical to success.

The client first established a seabob working group including representatives from its only competitor in Suriname (Namoon/SAIL), the Suriname Government and NGOs including WWF to discuss the fishery’s management.

To confirm that stocks were not overfished, the Suriname Government in turn commissioned a full stock assessment. Fishers assisted scientists in collecting 300,000 samples from catches over the course of two years which, together with government data, allowed sustainable catch limits and a Harvest Control Rule to be developed to prevent over-harvesting stocks.

The fishery had already introduced turtle exclusion devices to its nets, but to further reduce bycatch of non-target species, it introduced two escape panels (sections of net with a larger mesh size) across the fleet. During field trials, the panels reduced bycatch by between 12 and 40%, benefiting populations of non-target species, and increasing operational efficiency by speeding up on-deck sorting.

The improvements paid off and in 2011, Suriname’s artisanal seabob fishery became the first tropical shrimp fishery in the world to achieve MSC certification, as well as being the first fishery in Suriname to be managed under a formal national management plan.

Since becoming certified, the fishery has worked hard to meet some challenging conditions. 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.

To address limitations in its initial stock assessment, the fishery gathered seabob catch data from offshore prawn fisheries and inshore artisanal fisheries to enter into the model. The updated stock assessment demonstrated that seabob catch outside the fishery was not having a negative impact on the stock and the condition was closed.

The fishery further reduced its bycatch by refining the escape panels it had introduced, and collected detailed catch data confirming that no vulnerable species were regularly being caught as bycatch. It also funded a PhD at the University of Ghent exploring the impacts of the fishery on benthic habitats.

Over the same period, the Suriname Government reinforced its own commitments to sustainable fishing by investing US\$20m in enforcement vessels to strengthen its monitoring and surveillance programs.

The fishery was successfully recertified in 2017 after meeting all of its original conditions. Two new conditions will prompt the fishery to refine and evaluate its management systems to ensure it continues to operate sustainably.

Facilitated by the MSC process, this successful collaboration between a fishery, its partners and the Suriname government has provided a management model for other fisheries in the region to follow.

“Thanks to the enthusiastic collaboration of fishers, government and industry, the Suriname seabob fishery successfully overcame many challenges on its path to certification. We hope that the improvements it made and the benefits we are now seeing will inspire fisheries in countries similar to Suriname to work towards MSC certification.”

Dirk-Jan Parlevliet, CEO of Heiploeg

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Beyond fish: The ASC-MSC Seaweed Standard

In late 2017, the MSC and the ASC will jointly release a new certification Standard that aims to contribute to the health of the world's aquatic ecosystems by rewarding and incentivising sustainable and responsible seaweed harvesting and farming practices.

Seaweed today

According to the FAO (2016), about 27 million tonnes of seaweeds and other algae are farmed or harvested annually with an estimated total annual value of US\$ 5.6 billion. Seaweeds are used widely in food, cosmetics and fertilisers, and are processed to extract thickening agents or used as an additive in animal feed. Seaweed production straddles the wild-enhanced-aquaculture boundary, and includes harvesting of natural seaweed beds, farming of planted and suspended seaweeds and land-based aquaculture where seaweed is grown.

Aquatic health and livelihoods

Globally, seaweeds play a key role in aquatic ecosystems and coastal protection, and are a valuable resource for local communities. They also provide a foundation for many marine food webs and form important habitats for associated marine flora and fauna. Over exploitation of seaweed may have detrimental effects on biodiversity and water quality and can increase coastal erosion (FAO, 1990).

A new Standard

As global seaweed production increases, so does demand for certification of the seaweed industry. The ASC-MSC Seaweed Standard reflects international guidelines, sector best practices across different regions, and the latest scientific advice. It was developed through extensive online public consultations and targeted stakeholder workshops beginning in February 2016.



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Fighting seafood fraud: science and technology for traceable seafood supply chains

Seafood fraud – the deliberate selling of seafood products with a misleading label, description or promise – threatens environmental and economic sustainability and can allow IUU fishing to go undetected.

A traceable supply chain 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. For example, the traceability assured by the MSC CoC Standard has recently helped to restore consumer confidence in the sustainability of Patagonian and Antarctic toothfish products (page 38).

Positive growth

Newer versions of the Chain of Custody Standard – such as the Standard for Consumer Facing Organisations (CFO) that was implemented in 2015 – have allowed the foodservice industry to become MSC certified, and there are now 135 CoC holders representing nearly 23,000 CFO sites, including fishmongers, hotels, and restaurant chains. There has also been a notable increase in the number of CoC certificates in Asia-Pacific, suggesting an upsurge in interest in areas outside traditional European markets.

Our latest DNA testing results

Most seafood in MSC certified supply chains will travel through multiple countries and continents between harvest and consumption. Maintaining the highest level of traceability and assurance for new and complex fisheries, products and supply chains requires MSC to continually develop its systems for data collection and management, product labelling and tracking, and science-based verification. For example, a 2016 study commissioned



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by the MSC tested the DNA of fish sold in UK fish and chip shops. The study revealed fish mislabelling at a rate of just 1.64% in shops with an MSC certificate, compared to over 8% in non-certified shops. The DNA tests were conducted by SASA laboratory on samples of battered fish from 122 shops in the UK and Ireland, half of which were MSC certified.

Looking to the future

In addition to ongoing DNA testing and other tools, the MSC is exploring the use of new technologies and scientific advances to improve the effectiveness of MSC supply chain audits.

Recent technological developments include remote surveillance tools, electronic audit checklists and digital traceability tools that facilitate instant document tracebacks. The latest advances in molecular and geochemical science, such as rapid DNA test panels and trace element fingerprinting, may also help to verify the species and geographic origin of MSC certified products in future.

Global partnerships for biodiversity and sustainable development

The MSC and the United Nations Convention on Biological Diversity

In 2010, the international community set 20 targets under the UN’s Convention on Biological Diversity. These ‘Aichi Targets’ map global progress towards the Convention’s 2020 goals to conserve biodiversity around the world.

Teaming up with the UN Environment Programme as an official biodiversity indicator partner, the MSC supplies data to help assess progress towards Aichi Targets six and four.

Total MSC certified catch is compared to global wild catch, as reported by the FAO, to track ecological sustainability in global fisheries.



Aichi Target six: reduce direct pressures on biodiversity and promote sustainable use

By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches.

MSC certified catch is a primary indicator for this target.



Aichi Target four: mainstream biodiversity across government and society

By 2020 governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption.

MSC certified catch is a secondary indicator for this target.

“The global indicator produced through the MSC’s monitoring and evaluation is a valuable tool for understanding progress towards sustainable fisheries, and thus global commitments relating to biodiversity and sustainable development. The certification program helps to demonstrate commitment to and inform the decisions of fishers, seafood companies, governments and consumers for healthy oceans.”

UN Environment World Conservation Monitoring Centre, hosts to the secretariat of the Biodiversity Indicators Partnership

The MSC and the Sustainable Development Goals

In 2015, countries adopted a set of 17 goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda.

The MSC and other credible standard setters have a key role to play in helping companies and governments to achieve the SDGs, for example by providing best practice guidance for ‘what good looks like’ in a specific industry (WWF/ISEAL, 2017).



Our oceans

By incentivising best practice in the fishing industry, the MSC contributes to a number of SDG 14 targets including ending overfishing, implementing ecosystem management, and eliminating IUU fishing. Read more about the MSC and IUU fishing in the Southern Ocean on page 38.

The MSC has joined with countries, non-profit organisations, and scientists

from around the world to plan the implementation of SDG 14, participating in events including the 2017 UN Ocean Conference.



Food security and economic productivity

MSC certified fisheries also contribute to sustainable development targets on food security and sustainable economic growth.



Maintaining or rebuilding fish stocks to sustainable levels is essential to ensure the long-term availability of food (Kelleher et al. 2009). Many fisheries have also experienced economic benefits, including access to preferred markets and price premiums, as a result of MSC certification.

Among these is the South African hake trawl, where a recent analysis concluded that losing MSC certification would result in a 37.6% loss of value over five years, and put 5,000-12,000 jobs at risk (Lallemand et al, 2016).



UNEP



WCMC

UNEP-WCMC

The United Nations Environment Programme’s World Conservation Monitoring Centre

Find out more: www.bipindicators.net/indicators/msc-certified-catch

Deep Dive

A sustainable future for Southern Ocean fisheries

How MSC certification has helped restore consumer confidence in Patagonian and Antarctic toothfish

 Patagonian toothfish live in the cold waters of the southern Atlantic, Indian, and Pacific Oceans, a vast area spanning the territorial seas of multiple countries, as well as high seas regions. Antarctic toothfish reside even further south, closer to the Antarctic continent.



© COLTO/SAPMER

Both are commercially and ecologically important species, and around South America the fisheries for Patagonian toothfish are also vital for local communities.

Despite the complexities of managing such wide-ranging fish stocks, and historical issues with IUU fishing, the toothfish industry has been charting a sustainable course over the past 20 years, overcoming its once-damaged reputation among consumers.

In the late 1990s and early 2000s, the illicit fishing of toothfish was threatening the sustainability of stocks, undermining the livelihoods of fishing operators, and having a detrimental impact on other marine wildlife, including some albatross species. This negative spiral led not only to the loss of 32,000 tonnes of fish in a single year at its peak, but also prompted widespread mistrust among consumers. Because they couldn't confidently tell if the toothfish they were buying had been caught legitimately, consumers bought fewer toothfish, and prices plummeted.

Over the past 20 years, thanks to a combined effort involving industry members, international non-profit organisations, and national governments, who joined forces with the Commission for the Conservation of Antarctic Marine Living Resources, IUU has been virtually eliminated in the Southern Ocean, bird bycatch has been dramatically reduced (see MSC Global Impacts Report, 2016), and the impacted toothfish stocks have significantly recovered.

In 2015, Austral Fisheries – a member of the Coalition of Legal Toothfish Operators and an MSC certified fishery – even joined in the pursuit of one of the last-known pirate vessels, the notorious FV Thunder.

In all, the sustainable management of seven toothfish fisheries has now been recognised with MSC certification. In addition to incentivising countermeasures to IUU fishing, this process has triggered further improvements. For example:

- In 2004 the South Georgia Patagonian toothfish longline became the first such fishery to achieve MSC certification. South Georgia and the South Sandwich Islands have since introduced a number of mechanisms to combat IUU fishing, implemented improvements to bycatch management and created a large marine protected area. The South Georgia toothfish fishery was recertified in 2009 and again in 2014, each time with no conditions.
- Australia's Heard Island and McDonald Islands Patagonian toothfish fishery was certified as sustainable in 2012. An AU\$1.2 million joint research project and data-sharing agreement between French and Australian scientists improved the understanding of toothfish stock status across the Kerguelen Plateau (an area of sea comprising both country's fishing

zones) enabling this fishery and the MSC certified Kerguelen Island toothfish fishery to close conditions on stock status.

- The Kerguelen Island fishery, home to globally significant breeding populations of grey petrels, has also implemented a number of measures to reduce interactions with seabirds. Before 2005 at least 750 petrels were killed each year, but in 2014-15 that number had dropped to just three. Read the full story – Beating Bird Bycatch – in the 2016 Global Impacts Report (MSC, 2016, pages 34-35).

Aside from improvements on the water, the MSC Chain of Custody Standard has also played an important role in ensuring toothfish supply chains are free of illegally caught fish. By implementing automated, secure at-sea labelling, maintaining the necessary records and supply chain monitoring systems, and understanding the volume of legally caught products, the Standard effectively segregates MSC toothfish from those caught illegally. This is bolstered by ongoing DNA testing to confirm that toothfish products are correctly labelled.

“The MSC certification process marks a step-change in the way that fisheries are managed and in how they are perceived by consumers. South Georgia is proud to lead by example. By working with the fishing industry and other stakeholders there is a shared sense of responsibility for demonstrating the highest levels of sustainability.”

James Jansen, Government of South Georgia & the South Sandwich Islands

“The MSC process has driven real improvements in the management of toothfish in the Southern Ocean. Certification has not only helped us to reach new consumers with our product, it has facilitated terrific conversations with policymakers, commercial partners and stakeholder groups, ensuring a positive future for our fisheries.”

David Carter, Austral Fisheries

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Conclusion

The landscape of the sustainable seafood movement in 2017 is at once challenging and immensely exciting.

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As reflected in SDG 14, there is an increased focus on the contribution of fisheries towards food security, nutrition, and sustainable economic growth.

The MSC program remains a catalyst for change in this context. By working both with fisheries to reward and incentivise change on the water, and with retailers and consumers to ensure a market for environmentally sustainable seafood, we are uniquely positioned to link ocean health with people's lives and plates.

This report has outlined the history of the MSC Fisheries Standard, focusing on its continual evolution in line with stakeholder input and global best practice. It has showcased evidence of improvements to the sustainability of MSC certified fisheries over the past 20 years, both in terms of stock levels around the world

and in the work done to protect vulnerable ecosystems and marine habitats.

Looking to the future, we are committed to strengthening our work with small-scale and artisanal fisheries in the Global South and in LMEs of key biodiversity importance, focusing our efforts where impact is most needed.

Overwhelmingly, the message of this report is one of transformation and positive change. A little over 20 years ago, the MSC was just a brilliant idea. Over the years we have proven that certification can be an effective tool for seafood sustainability, and we look forward to working with our many partners to ensure that the benefits of sustainable fishing are brought to more communities in future.

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Editor-in-chief: David Agnew

Lead authors: Catherine Longo, Lucy Anderson, Lucy Erickson
 Technical contributors: Taylor Gorham (lead), Robert Lefebure (lead), Jaco Barendse, Jean-Charles Gordon, Marcus Nelson, Peter Hair
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MSC Global Headquarters
and Regional Office – Europe,
Middle East and Africa

Marine House
1 Snow Hill,
London EC1A 2DH
info@msc.org
Tel: + 44 (0) 20 7246 8900
Fax + 44 (0) 20 7246 8901

Registered Charity number: 1066806
Registered Company number: 3322023

MSC Regional Office – Americas
1255 23rd Street NW
Suite 275
Washington, DC 20037
USA

americasinfo@msc.org
Tel: +1 202 793 3284

Non profit status: 501 (C) (3)
Employer Identification number:
91-2018427

MSC Regional Office – Asia Pacific
6/202 Nicholson Parade,
Cronulla
NSW 2230
Australia
apinfo@msc.org
Tel: +61 (0)2 9527 6883

Non profit status: Registered with ACNC
Registered Company number:
ABN: 69 517 984 605,
ACN: 102 397 839

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