



MSC Global Impacts Report 2016

Appendix and methods

About the appendix

This document details the methods, data sources, and supplementary figures and tables for the [Global Impacts Report 2016](#).

Where external data sources are cited, data can be independently verified by accessing those sources. All MSC assessments are carried out by accredited third party certification bodies, and as such the certification bodies take full responsibility for the accuracy and truthfulness of fishery assessment scores given.

If any interpretative issues arise in relation to the MSC Fisheries and Chain of Custody Standard, the text of the English MSC scheme documents will prevail in all instances:

MSC Fishery Certification Requirements:

<https://www.msc.org/documents/scheme-documents/fisheries-certification-scheme-documents>

MSC Chain of Custody Certification Requirements:

<https://www.msc.org/documents/scheme-documents/chain-of-custody-certification-scheme-documents>

All data used to generate the plots and maps in the report are downloadable from:

<https://www.msc.org/documents/environmental-benefits/global-impacts/global-impacts-2016-supplementary>

If using any data, kindly acknowledge the MSC as the source and provide a download date and website link. When citing elements of this report, please cite as:

Marine Stewardship Council (2016) *Supplementary Materials to the MSC Global Impact Report*. MSC, London, UK.

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Glossary of terms and acronyms

List of acronyms and glossary of terms used throughout the report

(Acronym) term	Definition
ASI - Accreditation Services International	Accreditation Services International, provider of accreditation services for the MSC program.
B_{MSY} – biomass at MSY	Spawning stock biomass that can deliver MSY when fished at F _{MSY} .
BMT - Benchmarking and Tracking Tool	
B_{trigger} - B trigger at MSY	Value of spawning stock biomass (SSB) that triggers a specific management action.
Bycatch	Bycatch in this context of the GIR refers to all species assessed in P2, including retained species, discards and ETP species.
CAB - Conformity Assessment Body	Organization that performs conformity assessment services against the MSC Fisheries and CoC standards.
Catch	The total weight of a species caught, includes discards and this total weight is therefore not always equal to landed weight.
CCAMLR - Convention for the Conservation of Antarctic Marine Living Resources	
Certificate holder	An entity which holds a certificate issued by an MSC accredited CAB.
CoC - Chain of Custody	All elements of a supply chain
CSIRO - Commonwealth Scientific and Industrial Research Organisation	
Default tree	All versions of the MSC Fishery certification requirements since FAM v1 was released in 2008.
EEZ - Exclusive Economic Zone	
Enhanced fishery	A fishery that includes in its operations some ‘catch and grow’ aquaculture methods, i.e., juveniles are captured from the wild stock in the same geographic region and allowed to settle and grow in a relatively controlled environment, e.g., rope-grown mussels and hatchery reared salmon.
ETP - Endangered, Threatened and Protected Species	
F - Fishing mortality or pressure	
FAO - United Nations Food and Agriculture Organization	
FIP - Fishery improvement project	



(Acronym) term	Definition
Fishery	In this GIR edition, a single certified fishery is defined as an MSC fishery certificate holder targeting one stock with a certain gear type/method/vessel type. Note that this differs slightly from MSC requirements using this term to refer to a Unit of Assessment (or a group of UoAs), in some cases including more than one species or harvest method.
F_{MSY} - Fishing mortality at MSY	The fishing mortality that, at equilibrium, maintains an average population size of B _{MSY} , and yields MSY.
GIR - Global Impacts Report	
Green weight	The weight of fish landed before any processing is done
Harmonisation	The MSC's harmonisation process is a measure taken to ensure that fisheries operating in the same region, and with the same target species (i.e. the Unit of Assessment), achieve consistent conclusions with respect to evaluation, scoring and conditions for improvement during MSC fisheries assessments even when they are scored by different conformity assessment bodies (CABs). The process consists of meetings of CABs and experts for the relevant fisheries, facilitated by MSC staff, aimed at reaching consensus on the scoring of particular stocks/fishing methods. These meetings generally focus on cases where different CABs have provided different interpretations of how MSC standard requirements should apply (e.g., high seas or straddling stocks).
ICES - International Council for the Exploration of the Sea	
Improvement	In the MSC standard, improvements are the result of a condition required to achieve outcomes in order to achieve a score of 80 or above.
IUCN - International Union for the Conservation of Nature	
Landings	Wild caught harvest that is landed, and may be less than actual catch if part of it was discarded (or transferred to another vessel) while still at sea.
M&E - Monitoring and Evaluation	
MSC - Marine Stewardship Council	
MSC labelled product	Products sold with the MSC ecolabel
Main activity	The main type of activity undertaken by a chain of custody certificate holder, e.g., primary processing, trading, packaging. The scope of a certificate may include multiple other activities in addition to the main activity.
MSY - Maximum Sustainable Yield	The largest average catch or yield that can continuously be taken from a stock when stock biomass is at B _{MSY} , under existing environmental conditions.
N - Number	Number of elements or sample size.
NGO - Non-Governmental Organization	
Objection	Concerns about a CAB's certification determination that can be raised by a stake-holder, reviewed, and, where necessary, ruled upon by an independent adjudicator, according to an established procedure.



(Acronym) term	Definition
P1 - Principle 1	Principle 1 of the MSC Fisheries standard Principles and Criteria, i.e. stock status.
P2 - Principle 2	Principle 2 of the MSC Fisheries standard Principles and Criteria, i.e. environmental status.
P3 - Principle 3	Principle 3 of the MSC Fisheries standard Principles and Criteria, i.e. fishery governance.
PCDR - Public Comment Draft Report	The first assessment report produced by a CAB, after review by the client and peer reviewer, and open for public comment before it is modified into a PCR.
PCR - Public Certification Report	The final version of the assessment report, after stake-holder comments to the PCDR have been taken into account.
PI – Performance indicator	Performance Indicator that needs to be scored for each in order to establish whether MSC standard requirements are being met.
Pre-assessment	A process to explore how a fishery would score against each of the MSC's 28 performance indicators and used as a baseline for making improvements.
Primary processor	The first time seafood is changed from its original form as it was harvested. This includes heading and gutting, filleting, de-scaling, shelling, etc.
Retail to consumer	An activity category for Chain of Custody certificate holders. It includes selling at fresh fish counters at retailers, fish mongers, markets selling directly to consumers, where the product will be prepared elsewhere before being eaten by a consumer.
Restaurant/take away to consumer	An activity category for Chain of Custody certificate holders. It includes any foodservice situation such as fish and chip shops, standard restaurants, quick service restaurants, where the product is prepared on-site and sold directly to consumers as 'ready to eat', or eaten on-site.
SG - Scoring guidepost	For each PI within the standard, the benchmark level of performance required to obtain a given score (e.g. 60, 80) for a given scoring issue.
SI – Scoring issue	The attribute (or attributes) being scored in order to evaluate a PI.
Scoring element	A list of elements evaluated within a Component in order to score performance of an indicator; also used in determining a SG benchmark. In the case of Principles 1 or 2, different elements correspond to individual parts of the ecosystem affected by the fishery that are being evaluated separately, such as different species/stocks/sub-stocks or habitats within a Component.



(Acronym) term	Definition
Secondary processor	An activity category for Chain of Custody certificate holders. It refers to subsequent changes made after primary processing, to the form of the seafood. This includes preparation of the seafood with other ingredients to manufacture products for foodservice or retail such as breading, adding sauces or breaking down the seafood into smaller components (e.g., loins, mince, oil, etc.).
SSB - Spawning stock biomass	The biomass of a population that has reached maturity and thus is able to reproduce. Usually stock assessments produce status evaluations and reference points for this portion of the harvested population.
Stock	A wild population of a marine (or freshwater) species that is harvested by fishers. A stock ideally corresponds to a biological unit that has its distinctive demographic dynamics and thus it is assessed separately from other populations belonging to the same species. In reality, exact information on the genetic structure of the catch is often missing, which sometimes leads to erroneously aggregating more than one population of the same species under the same stock. As more knowledge is accumulated, stock definitions can be revised, and consequently their stock assessments.
Traceability	The ability to track a product through all stages of production, processing and distribution.
Traceback	The tracking of labelled products from the supermarket shelves back to the certified fishers that caught the animal.
UoA - Unit of Assessment	The sum of all the elements that are assessed for awarding a given certificate. For fisheries evaluated against the MSC Fisheries standard, this includes the target stock(s) being certified, combined with any fleets, or groups of vessels, or individual fishing operators or other eligible fishers pursuing that same stock using different methods/gears/practices, as well as the species and ecosystem in the area where the fishery is active.
UoC - Unit of Certification	The target stock(s) and any fleets, groups of vessels, or individual fishing operators, defined by the fishing method/gear/practice for pursuing that stock, covered by an MSC fishery certificate.
WWF - World Wildlife Fund	
Year	Calendar year



Methods for the Global Impacts Report 2016

Chapter 1: Global Reach

Global maps of number of certified fisheries in 2010 and 2015 (maps A, B)

In order to show where MSC fisheries operate around the world and how this has changed in the last 5 years, all MSC-certified fisheries were counted by Exclusive Economic Zone (EEZ) and mapped.

A single certified fishery is defined as one MSC certificate-holder targeting one stock. For example the SSMO Shetland inshore brown & velvet crab, and scallop fishery counts as three fisheries, one for each species targeted, while Isle of Man Queen Scallop Trawl counts as one. Thus this count is not equivalent to the number MSC Units of Certification (UoC, see glossary), which are defined by target species, gear, and area of operation. Statistics for MSC Fishery certificates are presented in chapters 1, 3 and 6, and fisheries are counted in the same way throughout all these analyses.

Fisheries whose certificates were suspended were included in the count of certified fisheries, as they still can reacquire their certificate if they address the causes of their suspension (except for the stock status analysis presented in Chapter 2, see below). Fisheries which had either failed or withdrawn from the programme were removed. Certificate-holders represented in the map for 2015 include all fisheries with a valid certificate at the end of 2015. Certificate-holders in the map for 2010 include all fisheries with a valid certificate at the end of 2010.

Fisheries were assigned to an EEZ based on the main area where they harvest the species for which they are certified. Fisheries operating consistently across national boundaries were assigned to two different EEZs. For example, fisheries operating in the Barents Sea are assigned to both Russia and Norway. In the cases of Canada and the USA, which have EEZs spanning more than one ocean, the EEZ was split by ocean. Certified fisheries are only present on the Atlantic and Pacific coasts of these countries' EEZ (e.g., there are no certified fisheries in Hawaii), and were thus assigned accordingly. High seas fisheries were assigned to the nearest EEZ. For example the Canada Highly Migratory Species Foundation British Columbia Albacore Tuna North Pacific fishery was assigned to Canada's EEZ on the Pacific side.

Mapping methods:

All maps were generated using the 'ggplot2' package within the statistical software R (www.cran.r-project.org). The polygon layers were mapped in a rectangular projection using the World Geodetic System 1984 (WGS84) coordinate reference system from the EPSG library in R. Small scale (1:110,000,000) shape files from <http://www.naturalearthdata.com> were used as base layers. In order to generate low-resolution shapefiles, some geographic features and small islands are not visible on the maps. The world EEZ shape file was downloaded from marineregions.org (version 8, 2014). Data for each area were plotted in discrete bins with a scale appropriate to the spread of values being mapped.

Global map of Chain of Custody certificate-holders in 2010 and in 2015 (maps C,D)

MSC Chain of Custody (CoC) certificates were displayed on a map in order to show the spatial distribution of where MSC certified harvest is processed, traded, packaged and/or sold around the world.



One certificate can be valid for one site where the company operates or multiple sites run by the same company. The country associated with the certificate is the country where the company's main office is based. For example, McDonald's Europe certificate is associated with the UK, where it has its main office, although the certificate validity extends to McDonald's restaurants all over Europe. For this reason, the actual number of locations with active certificate-holders is under-estimated, with a bias towards regions where large companies have based their headquarters.

The maps (figures C and D on page 8) were created using geographic locations for all valid Chain of Custody certificate-holders regardless of their main activity or seafood species involved. Certificate-holders shown in the map for 2015 include all companies with a valid certificate at the end of 2015. Certificate-holders in 2010 include all companies with a valid certificate at the end of 2010.

In contrast to the map displaying absolute numbers of certified fisheries, the Chain of Custody maps display the proportion of certificates in a given country relative to the total number of certificates across all countries. Relative numbers allow a visual comparison of global patterns across multiple maps, even when the sample sizes vary greatly from map to map. Therefore the comparison between the 2010 and 2015 map illustrates changes in spatial distribution rather than changes in absolute numbers of certificate-holders.

For mapping methods see above.

Number of certified fisheries through time

Number of fisheries joining the program through time, measured every year from December 1999, when the first fishery was certified against the MSC fishery standard, to December 2015.

FAO defines a fishery as a unit determined by an authority or other entity that is engaged in raising and/or harvesting fish. Typically, the unit is defined in terms of some or all of the following: people involved, species or type of fish, area of water or seabed, method of fishing, class of boats and purpose of the activities. The MSC requirements also use this term to refer to a Unit of Assessment (or a group of such UoAs) that is under assessment or certified against the MSC fisheries standard. In the context of this report, a single certified fishery is calculated as one MSC certificate holder targeting one stock. The graph shows separate time-series for fisheries that are 'certified' (i.e. currently have a valid fishery certificate), 'suspended (i.e., they were previously certified but then either failed to meet standard requirements and thus the certificate validity is suspended until those requirements are met again,)', and 'in assessment' (i.e., currently undergoing assessment against the MSC standard, attending determination).

Number of certified fisheries by species in 2010 and 2015

Number of fisheries currently in the program (i.e., either certified or suspended) are shown by species taxonomic group at two points in time: December 2010 and December 2015.

Species assigned to each taxonomic group are shown in Table S1. All species groups with less than five fisheries certified in 2015 were combined under the 'others' category.

Global maps of Chain of Custody certificate-holders by main activity in 2015 (maps A, B, C)

Chain of Custody certificates valid in 2015 were separated by the certificate-holder's declared main activity to provide a snapshot of the geographic patterns of where different parts of the seafood supply chain are concentrated currently.



Main activity categories included here are: 'primary processing', 'secondary processing' and 'trading at restaurants and fish counters'. The following categories are recorded but were excluded from the maps: trading, logistics, storage, distribution, on-vessel chain of custody (harvest stage), and kinds of processing which couldn't be unambiguously assigned to either primary or secondary (such as preservation). The categories used were selected for being more clearly tied to a particular stage, such as at the beginning (i.e. primary processing) or at a later stage (i.e. secondary processing), of the seafood's journey from the fishing vessel all the way to the consumer.

In a small number of cases, multiple activities were listed under a Chain of Custody certificate, but a main activity was not indicated. Where possible, the main activity was deduced based on the combination of other activities listed. For example, a company stating Packing or Repacking, Storage and Secondary Processing could be assumed to be a Secondary Processor. When there was no clear way of assigning the company to a main activity, it was excluded from the map.

The restaurants and fish counters category includes all certificate holders listed as 'retail to consumer' and 'restaurant/take away to consumer' (see Glossary), excluding those companies which have both an MSC logo licence and a Chain of Custody certificate. This often happens at the end of the supply chain where the company doing the final packaging also sells the fish under its own brand. These certificates have been removed from figure C in order to avoid duplication of certificates between figures C and D (i.e., the number of eco-labelled products).

Chain of Custody certificates are represented as a relative proportion per country, in order to easily visually compare spatial patterns shown across different maps by activity category. Note that each map (A-C) shows values relative to the number of certificates per activity category (primary, secondary, etc), and not relative to the total number of CoC certificates.

For mapping methods see above.

Global map of labelled product distribution in 2015 (map D)

The products per country displayed in figure D are the relative number of MSC products that have been approved for distribution exhibiting the MSC label in a particular country relative to the total number of products across all countries.

The map only includes products that were assumed as being actively sold by the end of 2015. Although the MSC collects sales data from certificate-holders' yearly turnover declarations, these cannot be used to map product distribution as a single product may be sold in multiple countries. This information, however, is used to determine which products are being actively sold. On the other hand, each company declares in which countries they are likely to sell their products. This information is used to map where products are being actively sold. Thus the map of MSC products per country illustrates how many different MSC products may be available, but not how much was actually sold.

Products with a valid license to exhibit the logo but not reported as sold for the previous 3 years were removed from the dataset. This was done to avoid cumulative overestimation over time, as products drop out of the market and are replaced by others, ensuring the values more accurately reflect products 'on the shelf'.

For mapping methods see above.

Chapter 2: Sustainable fish stocks

Stock status boxplots for Northern Europe in 2000 and in 2014 (graphs A and B)

Box and whisker plots show the health of stocks in northern European waters that are targeted by MSC certified fisheries compared to those that are not targeted by any certified fisheries. The status of stocks is expressed as median spawning stock biomass (SSB) and fishing mortality (F) relative to assessment reference points, i.e. $MSY-B_{trigger}$ and F_{MSY} , respectively. Values are shown for two snapshots in time: the year 2000, before any fish stocks in this analysis were certified, and 2014. Plotted boxes show the range of values within the 25th and 75th percentile, whiskers show the 10th and 90th percentile, and individual dots indicate outlier values.

Stocks that are targeted by fisheries that will eventually become certified by 2014, labelled 'MSC' are compared to stocks in the same region that are fished by fleets that were never certified throughout this period, labelled 'not MSC'. Stocks targeted by fisheries that at some point joined the MSC program but then either withdrew, were suspended, or are currently in assessment, were not included because their current status might be influenced by having been part of the program at some point. Information on stock status was obtained from the official stock assessments published by the International Council for the Exploration of the Sea (ICES) for 2014. The values had been compiled and made openly downloadable from the ICES website data portal (www.ices.dk). At the time the analyses were performed, estimates from 2015 scientific advice had not yet been compiled. Only stocks for which these parameters were available were included in the analysis. This excluded a few stocks, both within and outside the MSC program, that are not assessed through a full analytical assessment, because the lack of these two reference points would not allow for direct comparison. The list of stocks for which data were compiled and analysed is provided in table S2.

ICES do not provide advice for keeping stocks at a specific BMSY value, but rather a range of values at which the stock can be assumed to be fluctuating around BMSY, representing a safe space. The lower precautionary threshold defined as $MSY-B_{trigger}$ is a lower limit for a stock's spawning biomass that, when crossed, indicates that action is required. This is often in the form of a management intervention aimed at rebuilding the stock. For a fishery to meet the requirements of MSC certification the spawning stock biomass (B in the figure) of fish stocks needs to be fluctuating comfortably above $B_{trigger}$ and fishing mortality should generally be at or below F_{MSY} . Stock status is captured by the ratio of $B/B_{trigger}$, where values above 1 are assumed to indicate the stock biomass is fluctuating around BMSY, and values below are considered not sustainable and are expected to trigger management intervention to reduce F and rebuild the stock. Fishing levels are also shown using F/F_{MSY} , where the ideal status is to be at or slightly below 1 to fully exploit the stock while avoiding risk of overfishing.

The commitment to maintain sustainability, however, needs to take into account that dealing with such dynamic resource as aquatic populations requires an accordingly dynamic evaluation approach. Fish population abundance can be subject to huge fluctuations also due to sources other than commercial fishing, such as environmental forcing, and changes in food-web dynamics such as a change in predator abundance or nutrient availability. In order to take into account natural variability, and time lags in observing responses to management measures as well as management constraints due to socio-



economic impacts of fishery restrictions, the MSC standard makes allowances for time lags for fisheries to be able to respond to these changing conditions, be they from social or environmental drivers. This means that some stocks could in some years be above or below their management targets. A key element for ensuring sustainability is safe-guarded, however, is the fact that these allowances are always time-bound, and fisheries are suspended when these fluctuations outside management thresholds become more than just temporary. Stocks can only in rare cases still be targeted if their biomass levels fall below their target levels. In those cases, the management authorities and fisheries need to work together to demonstrate that they have an effective rebuilding plan in place, which is projected to bring the stock back up to healthy levels. This will usually involve a significant reduction in fishing effort and the effectiveness of this plan will in all cases be regularly scrutinized against standard scoring requirements. If those measures are not effective and the time-bound plan is not successfully followed, the fishery's certificate will be suspended until the issue is addressed. This is the case for European seabass and Northeast Atlantic mackerel that were suspended at the time of performing these analyses.

Kobe plot of stock status for Northern Europe in 2000 and in 2014 (graphs A and B)

The kobe plot in supplementary figure S1 shows the same stock assessment values from the box and whisker plots described above, but plotted in the same two dimensional space. This illustrates simultaneously the current stock abundance, i.e. whether it is or not overfished, and the fishing pressure it is subjected to, i.e. whether it is or not undergoing overfishing. Both pieces of information combined allow identifying stocks in poor state ('overfished' and subject to 'overfishing' - upper left quadrant), stocks in good state ('underfished' and subject to 'underfishing' - lower right quadrant), stocks that are depleted or rebuilding (lower left quadrant, depending on whether F is being reduced and recent trends of B are increasing), and stocks that are stable or overfished (depending on whether B is sufficiently high to withstand F that is above F_{MSY}).

The spread of values in the box and whisker plots show that in some cases F of stocks targeted by certified fisheries was above F_{MSY} . This level of fishing effort may still satisfy the MSC fishery standard requirements, provided stock assessments demonstrate it does not pose an immediate risk to the health of a stock. This is the case of North Sea cod (Fig S1) where biomass is so high that it can withstand high fishing mortality levels.

The common sole, on the other hand, fished by a small fishery in the Eastern English Channel, for example, is very close to the management threshold of MSY trigger while it is applying a fishing pressure that is too high. Moreover, the total allowable catch (TAC) set by the European Council is considerably higher than that recommended by ICES scientific advice. So, why did certifiers deem that this fishery still satisfies the MSC Standard requirements? The latest certification requested improvements on harvest control rules. In response to this, the fishery has put in place a management plan, aimed at a gradual reduction of catches. This, paired with technical measures on mesh size and area closures for juveniles, and under close monitoring, is expected to bring the stock to a safe level by 2020 (nwwac.org). The fishery will be allowed to maintain its certification in the coming years if scientific advice confirms that it is on track with the planned rebuilding targets. The North Sea sole, is not fished



as intensely, but F is still considered too high. Similarly, the fishery targeting this stock will be allowed to stay in the program if it addresses requested reduction in pressure.

In one case, Norwegian spring-spawning herring, stock biomass is below the threshold for rebuilding. As a condition of its certification, this fishery was asked by certifiers to make improvements on management and harvest control rules in order to maintain certification. The declining trend in fishing pressure in recent years shows that there was a management response, and it is expected, based on stock status predictive models, that population biomass will respond.

Overall, compared with the year 2000, before certification (Fig. S1 A), many stocks have shifted from the 'bad' or 'poor' health areas to healthier states (Fig. S1 B). Although at the start 'pre-MSC' stocks (i.e. stocks fished by fisheries that eventually will become certified) and stocks targeted by fisheries outside of the program had a similar state, those currently targeted by MSC certified fisheries have more noticeably increased their spawning biomass and reduced fishing pressure. Currently, no MSC certified fishery in the region targets stocks in the upper left quadrant. And stocks fished by certified fisheries tend to be under lower fishing pressure.

Chapter 3: Improvements in fishery performance

Histograms of requested improvements by species

Individual histograms show which types of improvements were most frequently requested of fisheries that were certified. Different histograms show how, on average, different types of fisheries had to work on different aspects of sustainability (or where they already performed at best practice).

For each plot, the fisheries included are those that are currently certified (as of December 2015) and were assessed using a default tree (see Glossary). All fisheries included in the analysis were assessed against the Fisheries Certification Requirements version 1.3, or earlier versions. This does include fisheries which are suspended, but does not include fisheries which failed or withdrew from assessment.

The proportion of requested improvements, or 'conditions' posed for maintaining certification, is calculated as the number of individual scores for each element and scoring guidepost that were below 80 at the Public Certification Report stage, compared to the total number of scores. This does not exactly correspond to the proportion of fisheries which were asked to make improvements, because a single fishery may use multiple gear types or operate in multiple jurisdictions, and therefore receive more than one score per performance indicator. The average proportion of scores below 80 across all fishery types was also shown for comparison. Note also that if a score was modified later in the certification process as a result of harmonisation (see Glossary), this is not taken into account because the current MSC scoring database structure (i.e., the database where all information from PCRs is tracked) makes it difficult to extract this information. However, this is unlikely to have a significant effect on patterns observed.

Scores were grouped into elements based on the grouping of performance indicators in the Fisheries Certification Requirements. See Table S4 for a list of performance indicators assigned to each element. Separate histograms are shown for fisheries targeting different species groups (see Table S3 for a list of species included under each taxon group, and respective regions). Target species groups were identified



based on the species groups used in the FAO Statistics global marine wild catch portal, and have been further divided into smaller groups based on taxonomic similarity and similarity in the patterns observed in scores. All species groups containing more than 10 certified fisheries were included in the analysis. This was chosen as a minimum representative sample size of group level patterns, rather than particular characteristics of individual fisheries.

Species groups shown in the main text of the Global Impacts Report were: bivalves, salmon, cods hakes & haddocks, lobsters & crabs, shrimps & prawns and tuna & billfishes. Flounders & soles and herring are also groups with more than 10 certified fisheries, however these do not appear in the main report due to space limitations. Species groups not included in analysis, for being made of less than 10 fisheries, were: toothfish, rockfish, freshwater fishes, cockles, anchovies & sardines, mackerel, vendace, smelt, Nephrops, redfish, mackerel icefish, ling, sablefish, lingcod, lumpfish, krill, sharks & rays, and halibut. Some additional species groups are shown in supplementary figure S2.

Histograms of requested improvements by gear

The proportion of conditions per scoring element was also calculated for fisheries using different gear types. As differences in patterns of improvements required by gear type mainly relate to Principle 2 (i.e., environmental impacts) performance indicators, this analysis did not include scoring elements from Principle 1 or Principle 3. Gears included under each gear type category, and respective regions, are shown in table S5.

Gear types were first grouped based on the International Standard Classification of Fishing Gears (ISSCFG), published by FAO in 2010. Gear types were then aggregated into larger groups based on similarity of gear characteristics (as described in the ISSCFG) and similarities in observed patterns in scores. Some gears used in MSC fisheries do not appear in the ISSCFG, in particular enhanced fishery methods such as rope-grown spat. These were added as new categories. Demersal trawls, gillnets, hand gathering, longline, pole & line, and purse seines are the six most commonly used gear types in MSC fisheries. Results in fishery performance for these gear types are shown in Figure S3. Average proportions of scores below 80 across all gear types are shown for comparison.

Improvements made to address bycatch impacts by species group and intervention type

All requested improvements considered satisfied, or 'conditions closed', between 2007 and 2013 relating to bycatch and Endangered, Threatened and Protected (ETP) species were analysed to determine what actions were taken in order to address these impacts.

This involves 46 certificates, 60 fisheries, and 62 conditions. The fisheries analysed operate around Europe in the North Sea and Barents Sea, off of Eastern Canada, Western Australia, South Africa, New Zealand, and around the Pacific Rim of the US, Canada and Russia. Variables collected included: action description, action type, and bycatch species affected. The research or interventions carried out to close conditions were grouped under Monitoring, Impact Assessment, Management procedures, and Gear modification categories.



The number of fisheries making either taking action to mitigate or gathering information on bycatch were counted by the bycatch species group affected. The actions taken were then grouped within each bycatch species category to show how many fisheries implemented each type of initiative, e.g. monitoring, impact assessment, etc., in order to address conditions.

Each condition can apply to more than one species, and can be addressed by more than one type of action. For example, the New Zealand blue whiting pelagic trawl fishery increased observer coverage (Monitoring) and also conducted a Potential Biological Removal Analysis on the sea lion population (Impact Assessment). The Mexico Baja California red rock lobster implemented mandatory reporting for fish and crustaceans, thus this improvement is counted under Fish and under Crustaceans. Thus, the sum of fisheries carrying out interventions per species group in the graph does not necessarily equal the overall number of actions undertaken, as some actions addressed multiple issues, while in other cases several initiatives were taken to resolve a single issue. Instead, the graph is intended to illustrate what were the types of interventions that most frequently helped resolve impacts, by species group. The detailed list of interventions per intervention type is shown in supplementary table S6.

Chapter 4: Traceable seafood supply chains

In order to test whether products sold with the MSC label actually contained the species and stock advertised on the packaging, products on sale were collected and genetically tested. Using a list of all MSC licenced seafood products across all global markets (total of 8218 unique products at the time of testing), and with an aim of collecting a statistically significant sample size from this list, 257 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). The products came from 16 countries, included 13 species of fish and covered a wide range of different product forms (fresh, frozen, chilled, preserved and surimi).

The tests used by the laboratory identified a specific section of DNA, or 'genetic barcode' within each sample. Depending on the species and product type being analysed, the laboratory used either used a methodology that compares Single Nucleotide Polymorphism (SNPs), or conducted DNA sequencing. For each test SASA ensured that the genetic barcode identified could be clearly distinguished from those of closely related species, or those likely to be used as substitutes, to prevent false positives. Established genetic reference libraries were used to validate the barcodes (BOLD database, Fish Trace database, augmented with voucher specimen sequences from Genbank). The tests were repeated up to four times on samples that failed to produce a result. In order to ensure the independence and consistency of testing, all samples, with the unavoidable exception of canned products, were provided to the laboratories without the product details.



Chapter 5: Accessibility

Benchmarking and Tracking tool mean indices

The MSC has developed the Bench Marking and Tracking tool (BMT) as a means to track progress of fisheries against MSC sustainability requirements, particularly for those engaged in Fishery Improvement Project (FIP), i.e., in projects aimed at improving fisheries practices to achieve sustainability. The average trajectory of fisheries progressing through a Fishery Improvement Project (FIP), tracked through the BMT scores, is shown through time. The thick line in the graph shows median BMT score in each year since the start of the FIP, and upper and shaded areas correspond to the 25th and 75th percentiles.

Data were obtained going through individual websites of fisheries listed on the online Fishery Improvement Project (FIP) directory (<http://fisheryimprovementprojects.org/>) and collecting information where BMT information was made publicly accessible. Reporting these scores is entirely voluntary, as is the use of the MSC's BMT tool. Thus, the fisheries included do not represent an exhaustive list of FIPs that have utilised the MSC's BMT tool, and the sample might be biased as fisheries with more successful outcomes might be more eager to share these results.

Several of the fisheries in this data set only measured the BMT score at the start and the end of the 5 years. A few did collect data for the 2nd, 3rd and 4th year. Although it would've been possible to gap fill data for missing years using a linear regression for each fishery, part of the purpose of the analysis was to highlight non-linearities in how fisheries make progress. For example, it may be easy to make big improvements at the start, by addressing the simpler changes required, but towards the end, the more challenging improvements might be a lot slower to make. If there were any such patterns in the data, this would have been smoothed over by using fitted values. The confidence intervals around the estimates show that there is quite some variability across different fisheries, although this is likely also a result of the small sample size. The fisheries used in the graph are listed in table S7.

Useful links: WWF Seafood Sustainability - <http://seafoodsustainability.org/fisheries/>
Banks, R. 2015, Review of the Fishery Improvement Plan for Indonesian Tuna fisheries and revision to the MSC scoring (<http://ipnlf.org/perch/resources/poseidon-indonesian-fip-review-final.pdf>)
CeDePesca - <http://cedepesca.net/promes/>



Chapter 6: Transparency

Types of stake-holders submitting comments and proportion of comments leading to a change in determination

Stakeholders are invited to comment on MSC fishery assessments at several stages during the fishery assessment process. Stakeholder comments in this analysis include only those that were submitted for fishery assessments between 2012 and 2015 at the Public Comment Draft Report (PCDR) stage. Any comments made on site audits or other documents were excluded. Submissions are received in written form, and are then published along with the final Public Certification Report. Stakeholders were further grouped into NGO, fishing industry, academia or government, based on the mission of the organisation.

Each comment is a part of a submission written by a single stakeholder or group of stakeholders about a specific topic. Often stakeholders address more than one topic in a single letter (for example, habitats impacts and stock assessments). The CAB is required to respond to concerns about different topic areas separately, and so these are counted as separate comments. The Assessment Team for the fishery must review all submissions, and change the score, background information, or conditions of the fishery as appropriate. The written response of the CAB states whether or not any changes were made as a result of the comment. These responses were used to determine whether scores were changed or conditions were added as a result of stakeholder input. Where scores did change, the Performance Indicator affected was recorded, as well as the scoring element (e.g., Bycatch, Harvest Strategy etc).

Supplementary tables and figures

Table S1 – taxonomic groups of certified species shown in Chapter 1 and used to produce histograms in Chapter 3

Species Group	Family/Class	Scientific Name	Common Name
Anchovies, Sardines	Engraulidae	<i>Engraulis anchoita</i>	Anchovy (Argentine)
Anchovies, Sardines	Engraulidae	<i>Engraulis encrasicolus</i>	Anchovy (European)
Anchovies, Sardines	Clupeidae	<i>Sardinops sagax</i>	Pilchard (South American)
Anchovies, Sardines	Clupeidae	<i>Sardina pilchardus</i>	Sardine
Anchovies, Sardines	Argentinidae	<i>Argentina silus</i>	Smelt (silver)
Anchovies, Sardines	Clupeidae	<i>Sprattus sprattus</i>	Sprat (European)
Bivalves	Veneridae	<i>Ruditapes decussatus</i>	Carpet shell (grooved)
Bivalves	Veneridae	<i>Ruditapes philippinarum</i>	Carpet shell (Japanese)
Bivalves	Mactridae	<i>Mactromeris polynyma</i>	Clam (Arctic surfclam)
Bivalves	Pharidae	<i>Ensis directus</i>	Clam (Atl.razor)
Bivalves	Veneridae	<i>Meretrix lyrata</i>	Clam (lyrate hard)
Bivalves	Veneridae	<i>Paphia malabarica</i>	Clam (short neck)
Bivalves	Veneridae	<i>Venerupis corrugata</i>	Corrugated venus
Bivalves	Mytilidae	<i>Mytilus spp</i>	European mussels
Bivalves	Mytilidae	<i>Mytilus galloprovincialis</i>	Mediterranean mussel
Bivalves	Mytilidae	<i>Mytilus edulis</i>	Mussel (blue)
Bivalves	Mytilidae	<i>Mytilus chilensis</i>	Mussel (Chilean)
Bivalves	Ostreidae	<i>Ostrea edulis</i>	Oyster (European flat)
Bivalves	Ostreidae	<i>Crassostrea gigas</i>	Oyster (Pacific cupped)
Bivalves	Pharidae	<i>Ensis arcuatus</i>	Razor shell (Arched)
Bivalves	Pectinidae	<i>Placopecten magellanicus</i>	Scallop (Atlantic)
Bivalves	Pectinidae	<i>Pecten maximus</i>	Scallop (Great Atlantic)
Bivalves	Pectinidae	<i>Zygochlamis patagonica</i>	Scallop (Patagonian)
Bivalves	Pectinidae	<i>Aequipecten opercularis</i>	Scallop (queen)
Bivalves	Pectinidae	<i>Patinopecten yessoensis</i>	Scallop (yesso)
Cockle	Cardiidae	<i>Cerastoderma edule</i>	Cockle
Cockle	Donacidae	<i>Donax deltoides</i>	Cockle
Cods, Hakes, Haddocks	Gadidae	<i>Gadus morhua</i>	Cod (Atlantic)
Cods, Hakes, Haddocks	Gadidae	<i>Gadus macrocephalus</i>	Cod (Pacific)
Cods, Hakes, Haddocks	Gadidae	<i>Melanogrammus aeglefinus</i>	Haddock
Cods, Hakes, Haddocks	Merlucciidae	<i>Merluccius capensis, M. paradoxus</i>	Hake (cape)



Species Group	Family/Class	Scientific Name	Common Name
Cods, Hakes, Haddocks	Merlucciidae	<i>Merluccius merluccius</i>	Hake (European)
Cods, Hakes, Haddocks	Merlucciidae	<i>Merluccius productus</i>	Hake (North Pacific)
Cods, Hakes, Haddocks	Merlucciidae	<i>Merluccius australis</i>	Hake (southern)
Cods, Hakes, Haddocks	Merlucciidae	<i>Macruronus novaezelandiae</i>	Hoki
Cods, Hakes, Haddocks	Merlucciidae	<i>Macruronus magellanicus</i>	Hoki (Argentine)
Cods, Hakes, Haddocks	Lotidae	<i>Molva molva</i>	Ling
Cods, Hakes, Haddocks	Gadidae	<i>Theragra chalcogramma</i>	Pollock (walleye)
Cods, Hakes, Haddocks	Gadidae	<i>Pollachius virens</i>	Saithe
Cods, Hakes, Haddocks	Gadidae	<i>Micromesistius australis</i>	Whiting (southern blue)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Hippoglossoides dubius</i>	Flounder
Flounders, Soles	Pleuronectidae, Soleidae	<i>Atheresthes stomias</i>	Flounder (arrow-tooth)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Atheresthes evermanni</i>	Flounder (Kamchatka)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Limanda ferruginea</i>	Flounder (yellowtail)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Pleuronectes quadrituberculatus</i>	Plaice (Alaska)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Pleuronectes platessa</i>	Plaice (European)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Solea solea</i>	Sole
Flounders, Soles	Pleuronectidae, Soleidae	<i>Microstomus pacificus</i>	Sole (dover)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Pleuronectes vetulus</i>	Sole (English)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Hippoglossoides elassodon</i>	Sole (flathead)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Lepidopsetta polyxystra</i>	Sole (Northern rock)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Eopsetta jordani</i>	Sole (petrale)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Glyptocephalus zachirus</i>	Sole (rex)
Flounders, Soles	Pleuronectidae, Soleidae	<i>Lepidopsetta bilineata</i>	Sole (Southern rock)



Species Group	Family/Class	Scientific Name	Common Name
Flounders, Soles	Pleuronectidae, Soleidae	<i>Limanda aspera</i>	Sole (yellowfin)
Freshwater fishes	Percichthyidae	<i>Macquaria ambigua</i>	Golden perch
Freshwater fishes	Escocidae	<i>Esox lucius</i>	Northern pike
Freshwater fishes	Perciformes	<i>Perca flavescens</i>	Perch (American yellow)
Freshwater fishes	Perciformes	<i>Sander lucioperca</i>	Pikeperch
Freshwater fishes	Perciformes	<i>Sander vitreus</i>	Walleye
Halibut	Pleuronectidae	<i>Hippoglossus stenolepis</i>	Halibut
Halibut	Pleuronectidae	<i>Hippoglossus hippoglossus</i>	Halibut (Atlantic)
Herring	Clupeidae	<i>Clupea harengus</i>	Herring
Krill	Euphausiidae	<i>Euphausia superba</i>	Krill (Antarctic)
Lobsters, Crabs	Brachyura	<i>Callinectes sapidus</i>	Crab (blue)
Lobsters, Crabs	Brachyura	<i>Cancer pagurus</i>	Crab (brown)
Lobsters, Crabs	Brachyura	<i>Cancer magister</i>	Crab (Dungeness)
Lobsters, Crabs	Brachyura	<i>Geryon quinqueedens</i>	Crab (red)
Lobsters, Crabs	Brachyura	<i>Chionoecetes opilio</i>	Crab (snow)
Lobsters, Crabs	Brachyura	<i>Necora puber</i>	Crab (velvet swimcrab)
Lobsters, Crabs	Nephropidae	<i>Homarus americanus</i>	Lobster (American)
Lobsters, Crabs	Palinuridae	<i>Panulirus argus</i>	Lobster (Caribbean spiny)
Lobsters, Crabs	Nephropidae	<i>Homarus gammarus</i>	Lobster (European)
Lobsters, Crabs	Palinuridae	<i>Jasus frontalis</i>	Lobster (Juan Fernandez rock)
Lobsters, Crabs	Palinuridae	<i>Panulirus interruptus</i>	Lobster (red rock)
Lobsters, Crabs	Palinuridae	<i>Panulirus cygnus</i>	Lobster (rock)
Lobsters, Crabs	Palinuridae	<i>Jasus tristani</i>	Lobster (Tristan da Cunha rock)
Miscellaneous coastal fishes	Perciformes	<i>Dicentrarchus labrax</i>	Bass (sea)
Miscellaneous coastal fishes	Perciformes	<i>Dicentrarchus labrax</i>	European seabass
Miscellaneous coastal fishes	Perciformes	<i>Argyrosomus hololepidotus</i>	Southern meagre(=Mulloway)
Miscellaneous coastal fishes	Perciformes	<i>Aldrichetta forsteri</i>	Yellow-eye mullet
Miscellaneous demersal fishes	Ophidiidae	<i>Genypterus blacodes</i>	Ling
Miscellaneous demersal fishes	Hexagrammidae	<i>Ophiodon elongatus</i>	Lingcod



Species Group	Family/Class	Scientific Name	Common Name
Miscellaneous demersal fishes	Cyclopteridae	<i>Cyclopterus lumpus</i>	Lumpfish(=Lumpsucker)
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastes marinus, S. norvegicus</i>	Redfish (golden)
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastes goodei</i>	Rockfish (chilipepper)
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastes diploproa</i>	Rockfish (splitnose)
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastes entomelas</i>	Rockfish (widow)
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastes flavidus</i>	Rockfish (yellowtail)
Miscellaneous demersal fishes	Anoplopomatidae	<i>Anoplopoma fimbria</i>	Sablefish
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastolobus altivelis</i>	Thornyhead (Longspine)
Miscellaneous demersal fishes	Scorpaenidae	<i>Sebastolobus alascanus</i>	Thornyhead (shortspine)
Miscellaneous pelagic fishes	Scombridae	<i>Scomber scombrus</i>	Mackerel
Miscellaneous pelagic fishes	Channichthyidae	<i>Champsocephalus gunnari</i>	Mackerel icefish
Nephrops	Nephropidae	<i>Nephrops norvegicus</i>	Nephrops
Salmon	Salmonidae	<i>Oncorhynchus tshawytscha</i>	Salmon (chinook)
Salmon	Salmonidae	<i>Oncorhynchus keta</i>	Salmon (chum)
Salmon	Salmonidae	<i>Oncorhynchus kisutch</i>	Salmon (coho-silver)
Salmon	Salmonidae	<i>Oncorhynchus gorbuscha</i>	Salmon (pink)
Salmon	Salmonidae	<i>Oncorhynchus nerka</i>	Salmon (sockeye-red)
Sharks, Rays	Squalidae	<i>Squalus acanthias</i>	Dogfish (spiny)
Sharks, Rays	Squalidae	<i>Squalus suckleyi</i>	Dogfish (spotted spiny)
Sharks, Rays	Rajidae	<i>Raja rhina</i>	Skate (Longnose)
Shrimps, Prawns	Penaeidae	<i>Penaeus semisulcatus</i>	Grooved Tiger Prawn
Shrimps, Prawns	Penaeidae	<i>Penaeus semisulcatus</i>	Grooved Tiger Prawn
Shrimps, Prawns	Penaeidae	<i>Penaeus indicus</i>	Indian white prawn
Shrimps, Prawns	Penaeidae	<i>Fenneropenaeus merguensis</i>	Prawn (banana)
Shrimps, Prawns	Penaeidae	<i>Metapenaeus endeavouri</i>	Prawn (blue endeavour)
Shrimps, Prawns	Penaeidae	<i>Penaeus esculentus</i>	Prawn (brown tiger)
Shrimps, Prawns	Penaeidae	<i>Fenneropenaeus indicus</i>	Prawn (Indian white)
Shrimps, Prawns	Pandalidae	<i>Pandalus borealis</i>	Prawn (northern)



Species Group	Family/Class	Scientific Name	Common Name
Shrimps, Prawns	Penaeidae	<i>Metapenaeus ensis</i>	Prawn (red endeavour)
Shrimps, Prawns	Penaeidae	<i>Penaeus (Melicertus) latisulcatus</i>	Prawn (western king)
Shrimps, Prawns	Pandalidae	<i>Pandalus jordani</i>	Shrimp (Oregon pink)
Shrimps, Prawns	Penaeidae	<i>Xiphopenaeus kroyeri</i>	Shrimp (seabob)
Shrimps, Prawns	Pandalidae	<i>Pandalus montagui</i>	Shrimp (striped)
Shrimps, Prawns	Penaeidae	<i>Penaeus latisulcatus</i>	Western king prawn
Miscellaneous demersal fishes	Nototheniidae	<i>Dissostichus mawsoni</i>	Toothfish (Antarctic)
Miscellaneous demersal fishes	Nototheniidae	<i>Dissostichus eleginoides</i>	Toothfish (Patagonian)
Tunas, Billfishes	Xiphiidae	<i>Xiphias gladius</i>	Swordfish
Tunas, Billfishes	Scombridae	<i>Thunnus alalunga</i>	Tuna (albacore)
Tunas, Billfishes	Scombridae	<i>Thunnus obesus</i>	Tuna (bigeye)
Tunas, Billfishes	Scombridae	<i>Katsuwonus pelamis</i>	Tuna (skipjack)
Tunas, Billfishes	Scombridae	<i>Thunnus albacares</i>	Tuna (yellowfin)
Other diadromous fishes	Salmonidae	<i>Coregonus albula</i>	Vendace

Table S2 - list of stocks and corresponding values represented in the box and whisker plots in Chapter 2

ScientificName	Year	B_Bref	F_Fmsy	Year & certification status in 2014
<i>Clupea harengus</i>	2000	1.10	1.83	2000 MSC
<i>Clupea harengus</i>	2000	1.04	1.49	2000 MSC
<i>Clupea harengus</i>	2000	1.58	0.76	2000 MSC
<i>Clupea harengus</i>	2000	1.08	1.54	2000 MSC
<i>Clupea harengus</i>	2000	0.73	2.64	2000 MSC
<i>Engraulis encrasicolus</i>	2000	NA	NA	2000 MSC
<i>Gadus morhua</i>	2000	0.48	NA	2000 MSC
<i>Gadus morhua</i>	2000	0.75	NA	2000 MSC
<i>Gadus morhua</i>	2000	0.53	2.09	2000 MSC
<i>Melanogrammus aeglefinus</i>	2000	1.41	NA	2000 MSC
<i>Melanogrammus aeglefinus</i>	2000	1.25	1.12	2000 MSC
<i>Melanogrammus aeglefinus</i>	2000	0.68	NA	2000 MSC
<i>Melanogrammus aeglefinus</i>	2000	0.88	2.43	2000 MSC
<i>Molva molva</i>	2000	0.92	2.23	2000 MSC
<i>Pandalus borealis</i>	2000	2.53	0.53	2000 MSC
<i>Pleuronectes platessa</i>	2000	1.13	2.47	2000 MSC
<i>Pollachius virens</i>	2000	1.46	1.28	2000 MSC
<i>Pollachius virens</i>	2000	1.67	NA	2000 MSC



ScientificName	Year	B_Bref	F_Fmsy	Year & certification status in 2014
<i>Pollachius virens</i>	2000	1.05	0.98	2000 MSC
<i>Sebastes marinus</i>	2000	0.75	1.63	2000 MSC
<i>Solea solea</i>	2000	1.13	3.17	2000 MSC
<i>Solea solea</i>	2000	1.06	1.50	2000 MSC
<i>Clupea harengus</i>	2000	0.75	1.98	2000 not MSC
<i>Clupea harengus</i>	2000	1.38	0.83	2000 not MSC
<i>Clupea harengus</i>	2000	0.77	1.48	2000 not MSC
<i>Clupea harengus</i>	2000	1.36	1.51	2000 not MSC
<i>Gadus morhua</i>	2000	0.95	4.68	2000 not MSC
<i>Gadus morhua</i>	2000	1.14	1.14	2000 not MSC
<i>Gadus morhua</i>	2000	0.42	3.23	2000 not MSC
<i>Gadus morhua</i>	2000	0.34	5.38	2000 not MSC
<i>Gadus morhua</i>	2000	0.76	2.33	2000 not MSC
<i>Lepidorhombus boscii</i>	2000	0.85	2.82	2000 not MSC
<i>Lepidorhombus whiffiagonis</i>	2000	1.46	1.78	2000 not MSC
<i>Mallotus villosus</i>	2000	NA	NA	2000 not MSC
<i>Mallotus villosus</i>	2000	NA	NA	2000 not MSC
<i>Melanogrammus aeglefinus</i>	2000	1.49	1.12	2000 not MSC
<i>Melanogrammus aeglefinus</i>	2000	1.30	5.45	2000 not MSC
<i>Melanogrammus aeglefinus</i>	2000	0.83	NA	2000 not MSC
<i>Melanogrammus aeglefinus</i>	2000	1.66	1.64	2000 not MSC
<i>Merlangius merlangus</i>	2000	NA	NA	2000 not MSC
<i>Merlangius merlangus</i>	2000	0.43	NA	2000 not MSC
<i>Merlangius merlangus</i>	2000	1.06	2.20	2000 not MSC
<i>Merluccius merluccius</i>	2000	0.68	3.37	2000 not MSC
<i>Merluccius merluccius</i>	2000	NA	3.65	2000 not MSC
<i>Micromesistius poutassou</i>	2000	1.91	1.57	2000 not MSC
<i>Pleuronectes platessa</i>	2000	0.59	1.43	2000 not MSC
<i>Pollachius virens</i>	2000	1.13	NA	2000 not MSC
<i>Reinhardtius hippoglossoides</i>	2000	1.09	NA	2000 not MSC
<i>Solea solea</i>	2000	0.90	1.06	2000 not MSC
<i>Solea solea</i>	2000	0.90	1.49	2000 not MSC
<i>Solea solea</i>	2000	1.02	2.79	2000 not MSC
<i>Solea solea</i>	2000	1.04	1.13	2000 not MSC
<i>Solea solea</i>	2000	0.91	2.41	2000 not MSC
<i>Sprattus sprattus</i>	2000	2.37	1.20	2000 not MSC
<i>Sprattus sprattus</i>	2000	1.60	1.19	2000 not MSC
<i>Clupea harengus</i>	2014	1.08	0.82	2014 MSC



ScientificName	Year	B_Bref	F_Fmsy	Year & certification status in 2014
<i>Clupea harengus</i>	2014	1.37	1.16	2014 MSC
<i>Clupea harengus</i>	2014	2.22	0.75	2014 MSC
<i>Clupea harengus</i>	2014	0.89	0.73	2014 MSC
<i>Clupea harengus</i>	2014	2.35	0.71	2014 MSC
<i>Engraulis encrasicolus</i>	2014	NA	NA	2014 MSC
<i>Gadus morhua</i>	2014	1.93	NA	2014 MSC
<i>Gadus morhua</i>	2014	3.52	1.19	2014 MSC
<i>Melanogrammus aeglefinus</i>	2014	1.61	NA	2014 MSC
<i>Melanogrammus aeglefinus</i>	2014	9.91	0.43	2014 MSC
<i>Melanogrammus aeglefinus</i>	2014	1.77	0.65	2014 MSC
<i>Molva molva</i>	2014	6.25	1.02	2014 MSC
<i>Pandalus borealis</i>	2014	2.81	0.54	2014 MSC
<i>Pleuronectes platessa</i>	2014	3.49	0.95	2014 MSC
<i>Pollachius virens</i>	2014	1.27	1.05	2014 MSC
<i>Pollachius virens</i>	2014	1.51	NA	2014 MSC
<i>Pollachius virens</i>	2014	1.09	0.96	2014 MSC
<i>Sebastes marinus</i>	2014	1.52	1.05	2014 MSC
<i>Solea solea</i>	2014	1.10	1.28	2014 MSC
<i>Solea solea</i>	2014	1.13	1.83	2014 MSC
<i>Clupea harengus</i>	2014	1.68	0.72	2014 not MSC
<i>Clupea harengus</i>	2014	2.20	1.03	2014 not MSC
<i>Clupea harengus</i>	2014	1.98	0.95	2014 not MSC
<i>Clupea harengus</i>	2014	1.72	1.07	2014 not MSC
<i>Gadus morhua</i>	2014	0.48	3.24	2014 not MSC
<i>Gadus morhua</i>	2014	0.53	1.29	2014 not MSC
<i>Gadus morhua</i>	2014	0.76	1.19	2014 not MSC
<i>Gadus morhua</i>	2014	0.13	4.69	2014 not MSC
<i>Gadus morhua</i>	2014	0.71	1.79	2014 not MSC
<i>Lepidorhombus boscii</i>	2014	1.46	2.31	2014 not MSC
<i>Lepidorhombus whiffiagonis</i>	2014	1.44	2.13	2014 not MSC
<i>Mallotus villosus</i>	2014	NA	NA	2014 not MSC
<i>Melanogrammus aeglefinus</i>	2014	0.47	1.14	2014 not MSC
<i>Melanogrammus aeglefinus</i>	2014	0.42	2.12	2014 not MSC
<i>Melanogrammus aeglefinus</i>	2014	2.32	1.49	2014 not MSC
<i>Merlangius merlangus</i>	2014	NA	NA	2014 not MSC
<i>Merlangius merlangus</i>	2014	0.38	NA	2014 not MSC
<i>Merlangius merlangus</i>	2014	1.47	1.00	2014 not MSC
<i>Merluccius merluccius</i>	2014	4.40	1.26	2014 not MSC

ScientificName	Year	B_Bref	F_Fmsy	Year & certification status in 2014
<i>Merluccius merluccius</i>	2014	NA	2.84	2014 not MSC
<i>Micromesistius poutassou</i>	2014	1.76	1.43	2014 not MSC
<i>Pleuronectes platessa</i>	2014	2.73	0.45	2014 not MSC
<i>Pollachius virens</i>	2014	2.03	NA	2014 not MSC
<i>Reinhardtius hippoglossoides</i>	2014	1.47	NA	2014 not MSC
<i>Solea solea</i>	2014	1.29	1.41	2014 not MSC
<i>Solea solea</i>	2014	0.94	0.79	2014 not MSC
<i>Solea solea</i>	2014	0.30	0.66	2014 not MSC
<i>Solea solea</i>	2014	1.61	0.70	2014 not MSC
<i>Solea solea</i>	2014	0.81	1.85	2014 not MSC
<i>Sprattus sprattus</i>	2014	1.37	1.56	2014 not MSC
<i>Sprattus sprattus</i>	2014	2.54	0.92	2014 not MSC

Table S3 – list of stocks used to produce the kobe plot in Supplementary figure S1

Stock name	ICES code	Scientific name	Status
Anchovy ICES VIII	ane-bisc	Engraulis encrasicolus	not MSC
Atlantic cod Baltic Areas 22 and 24	cod-2224	Gadus morhua	not MSC
Atlantic cod Baltic Areas 25-32	cod-2532	Gadus morhua	not MSC
Atlantic Cod Celtic Sea	cod-7e-k	Gadus morhua	Certified
Atlantic cod Faroe Plateau	cod-farp	Gadus morhua	not MSC
Atlantic cod Iceland Division Va	cod-iceg	Gadus morhua	not MSC
Atlantic cod North Sea	cod-347d	Gadus morhua	Certified
Atlantic cod Northeast Arctic	cod-arct	Gadus morhua	not MSC
Atlantic cod West of Scotland	cod-scow	Gadus morhua	not MSC
Atlantic herring-Norweign spring spawning, Northeast Atlantic	her-noss	Clupea harengus	not MSC
Blue Whiting Northeast Atlantic	whb-comb	Micromesistius poutassou	not MSC
Capelin Barents Sea	cap-nor	Mallotus villosus	not MSC
Capelin Iceland	cap-icel	Mallotus villosus	not MSC
common European sole Bay of Biscay	sol-bisc	Solea solea	not MSC
common European sole Celtic Sea	sol-celt	Solea solea	not MSC
common European sole ICES Kattegat and Skagerrak	sol-kask	Solea solea	Certified
common European sole ICES VIId	sol-eche	Solea solea	not MSC
common European sole Irish Sea	sol-iris	Solea solea	not MSC
common European sole North Sea	sol-nsea	Solea solea	Certified



Stock name	ICES code	Scientific name	Status
common European sole Western English Channel	sol-echw	Solea solea	not MSC
European Plaice ICES VIId	ple-eche	Pleuronectes platessa	not MSC
European Plaice North Sea	ple-nsea	Pleuronectes platessa	not MSC
Fourspotted megrim ICES VIIIc-IXa	mgb-8c9a	Lepidorhombus boscii	Certified
Golden Redfish - Northeast Atlantic, Subareas V, VI, XII and XIV	smr-5614	Sebastes marinus	not MSC
Greenland halibut Northeast Arctic	ghl-arct	Reinhardtius hippoglossoides	not MSC
Haddock - North Sea, Skaggeiak and West of Scotland	had-346a	Melanogrammus aeglefinus	Certified
Haddock Faroe Plateau	had-faro	Melanogrammus aeglefinus	not MSC
Haddock Iceland ICES Va	had-iceg	Melanogrammus aeglefinus	not MSC
Haddock ICES IIIa and North Sea		Melanogrammus aeglefinus	Certified
Haddock ICES VIIb-k	had-7b-k	Melanogrammus aeglefinus	Certified
Haddock Northeast Arctic	had-arct	Melanogrammus aeglefinus	not MSC
Haddock Rockall Bank	had-rock	Melanogrammus aeglefinus	not MSC
Haddock West of Scotland		Melanogrammus aeglefinus	not MSC
Hake Northeast Atlantic North	hke-nrtn	Merluccius merluccius	not MSC
Hake Northeast Atlantic South	hke-soth	Merluccius merluccius	not MSC
Herring Iceland (Summer spawners)	her-vasu	Clupea harengus	not MSC
Herring ICES 22-24-IIIa	her-3a22	Clupea harengus	Certified
Herring ICES 25-32	her-2532-gor	Clupea harengus	not MSC
Herring ICES 28	her-riga	Clupea harengus	Certified
Herring ICES 30	her-30	Clupea harengus	not MSC
Herring ICES VIIa-g-h-j	her-irls	Clupea harengus	not MSC
Herring North Sea Autumn spawning Iva,b,c & VII	her-47d3	Clupea harengus	not MSC
Herring Northern Irish Sea	her-nirs	Clupea harengus	Certified
Ling-27, ICES Area Va	lin-icel	Molva molva	not MSC



Stock name	ICES code	Scientific name	Status
Megrim ICES VIIIc-IXa	mgw-8c9a	Lepidorhombus whiffiagonis	Certified
Northern prawn-27, IVa and IIIa	pan-sknd	Pandalus borealis	Certified
Pollock Faroe Plateau	sai-faro	Pollachius virens	Certified
Pollock ICES IIIa, VI and North Sea	sai-3a46	Pollachius virens	not MSC
Pollock Northeast Arctic	sai-arct	Pollachius virens	Certified
Pollock or saithe Iceland Grounds	sai-icel	Pollachius virens	not MSC
Sprat ICES Baltic Areas 22-32	spr-2232	Sprattus sprattus	not MSC
Sprat North Sea	spr-nsea	Sprattus sprattus	Certified
Whiting ICES IIIa, VIId and North Sea	whg-47d	Merlangius merlangus	Certified
Whiting ICES VIa	whg-scow	Merlangius merlangus	Certified
Whiting ICES VIIe-k	whg-7e-k	Merlangius merlangus	Certified
Anchovy ICES VIII	ane-bisc	Engraulis encrasicolus	not MSC
Atlantic cod Baltic Areas 22 and 24	cod-2224	Gadus morhua	not MSC
Atlantic cod Baltic Areas 25-32	cod-2532	Gadus morhua	not MSC
Atlantic Cod Celtic Sea	cod-7e-k	Gadus morhua	Certified
Atlantic cod Faroe Plateau	cod-farp	Gadus morhua	not MSC
Atlantic cod Iceland Division Va	cod-iceg	Gadus morhua	not MSC
Atlantic cod North Sea	cod-347d	Gadus morhua	Certified
Atlantic cod Northeast Arctic	cod-arct	Gadus morhua	not MSC
Atlantic cod West of Scotland	cod-scow	Gadus morhua	not MSC
Atlantic herring-Norweign spring spawning, Northeast Atlantic	her-noss	Clupea harengus	not MSC
Blue Whiting Northeast Atlantic	whb-comb	Micromesistius poutassou	not MSC
Capelin Barents Sea	cap-nor	Mallotus villosus	not MSC
Capelin Iceland	cap-icel	Mallotus villosus	not MSC
common European sole Bay of Biscay	sol-bisc	Solea solea	not MSC
common European sole Celtic Sea	sol-celt	Solea solea	not MSC
common European sole ICES Kattegat and Skagerrak	sol-kask	Solea solea	Certified
common European sole ICES VIId	sol-eche	Solea solea	not MSC
common European sole Irish Sea	sol-iris	Solea solea	not MSC
common European sole North Sea	sol-nsea	Solea solea	Certified
common European sole Western English Channel	sol-echw	Solea solea	not MSC
European Plaice ICES VIId	ple-eche	Pleuronectes platessa	not MSC
European Plaice North Sea	ple-nsea	Pleuronectes platessa	not MSC
Fourspotted megrim ICES VIIIc-IXa	mgb-8c9a	Lepidorhombus boscii	Certified



Stock name	ICES code	Scientific name	Status
Golden Redfish - Northeast Atlantic , Subareas V, VI, XII and XIV	smr-5614	Sebastes marinus	not MSC
Greenland halibut Northeast Arctic	ghl-arct	Reinhardtius hippoglossoides	not MSC
Haddock - North Sea, Skaggerak and West of Scotland	had-346a	Melanogrammus aeglefinus	Certified
Haddock Faroe Plateau	had-faro	Melanogrammus aeglefinus	not MSC
Haddock Iceland ICES Va	had-iceg	Melanogrammus aeglefinus	not MSC
Haddock ICES IIIa and North Sea		Melanogrammus aeglefinus	Certified
Haddock ICES VIIb-k	had-7b-k	Melanogrammus aeglefinus	Certified
Haddock Northeast Arctic	had-arct	Melanogrammus aeglefinus	not MSC
Haddock Rockall Bank	had-rock	Melanogrammus aeglefinus	not MSC
Haddock West of Scotland		Melanogrammus aeglefinus	not MSC
Hake Northeast Atlantic North	hke-nrtn	Merluccius merluccius	not MSC
Hake Northeast Atlantic South	hke-soth	Merluccius merluccius	not MSC
Herring Iceland (Summer spawners)	her-vasu	Clupea harengus	not MSC
Herring ICES 22-24-IIIa	her-3a22	Clupea harengus	Certified
Herring ICES 25-32	her-2532-gor	Clupea harengus	not MSC
Herring ICES 28	her-riga	Clupea harengus	Certified
Herring ICES 30	her-30	Clupea harengus	not MSC
Herring ICES VIIa-g-h-j	her-irls	Clupea harengus	not MSC
Herring North Sea Autumn spawning Iva,b,c & VII	her-47d3	Clupea harengus	not MSC
Herring Northern Irish Sea	her-nirs	Clupea harengus	Certified
Ling-27, ICES Area Va	lin-icel	Molva molva	not MSC
Megrim ICES VIIIc-IXa	mgw-8c9a	Lepidorhombus whiffiagonis	Certified
Northern prawn-27, IVa and IIIa	pan-sknd	Pandalus borealis	Certified
Pollock Faroe Plateau	sai-faro	Pollachius virens	Certified
Pollock ICES IIIa, VI and North Sea	sai-3a46	Pollachius virens	not MSC

Stock name	ICES code	Scientific name	Status
Pollock Northeast Arctic	sai-arct	Pollachius virens	Certified
Pollock or saithe Iceland Grounds	sai-icel	Pollachius virens	not MSC
Sprat ICES Baltic Areas 22-32	spr-2232	Sprattus sprattus	not MSC
Sprat North Sea	spr-nsea	Sprattus sprattus	Certified
Whiting ICES IIIa, VIId and North Sea	whg-47d	Merlangius merlangus	Certified
Whiting ICES VIa	whg-scow	Merlangius merlangus	Certified
Whiting ICES VIIe-k	whg-7e-k	Merlangius merlangus	Certified

Table S4 – List of elements and corresponding fishery standard PIs used on the y-axis of the histograms shown in Chapter 3 and in figure S2. For details on PIs see Annex 2 and links provided at the start of this document.

Principle	PI	Element
Principle 1	1.1.1	Stock Status
Principle 1	1.1.2	Harvest Strategy
Principle 1	1.1.3	Stock Status
Principle 1	1.1.4	Bivalve Stock Enhancement
Principle 1	1.2.1	Harvest Strategy
Principle 1	1.2.2	Harvest Strategy
Principle 1	1.2.3	Harvest Strategy
Principle 1	1.2.4	Harvest Strategy
Principle 3	1.2.5	Bivalve Stock Enhancement
Principle 3	1.2.6	Bivalve Stock Enhancement
Principle 1	1.3.1	Salmon Stock Enhancement
Principle 1	1.3.2	Salmon Stock Enhancement
Principle 1	1.3.3	Salmon Stock Enhancement
Principle 2	2.1.1	Bycatch
Principle 2	2.1.2	Bycatch
Principle 2	2.1.3	Bycatch
Principle 2	2.2.1	Bycatch
Principle 2	2.2.2	Bycatch
Principle 2	2.2.3	Bycatch
Principle 2	2.3.1	ETP
Principle 2	2.3.2	ETP
Principle 2	2.3.2Alt	ETP
Principle 2	2.3.3	ETP
Principle 2	2.4.1	Habitats
Principle 2	2.4.2	Habitats

Principle 2	2.4.3	Habitats
Principle 2	2.5.1	Ecosystems
Principle 2	2.5.2	Ecosystems
Principle 2	2.5.3	Ecosystems
Principle 2	2.6.1	Translocation
Principle 2	2.6.2	Translocation
Principle 2	2.6.3	Translocation
Principle 3	3.1.1	Governance & Policy
Principle 3	3.1.2	Governance & Policy
Principle 3	3.1.3	Governance & Policy
Principle 3	3.1.4	Governance & Policy
Principle 3	3.2.1	Fishery-Specific Management
Principle 3	3.2.2	Fishery-Specific Management
Principle 3	3.2.3	Fishery-Specific Management
Principle 3	3.2.4	Fishery-Specific Management
Principle 3	3.2.5	Fishery-Specific Management

Table S5 - gear types under each group (Chapter 3).

Gear Category	Gear	FAO Gear Code
Beach seines	Beach seines	SB
Dredges	Boat dredges	DRB
Demersal trawls	Bottom trawls - not specified	TB
Demersal trawls	Bottom trawls - otter	OTB
Demersal trawls	Bottom trawls - pair	PTB
Demersal trawls	Bottom trawls - shrimp trawl	TBS
Enhanced	Catch and Grow	-
Gillnets	Combined gillnets-trammel nets	GTN
Bottom seines	Danish seines	SDN
Longlines	Demersal longline	LLS
Demersal trawls	Demersal trawl	TB
Gillnets	Driftnets	GND
Gillnets	Fixed gillnets (on stakes)	GNF
Gillnets	Gillnets - not specified	GN
Gillnets	Gillnets and entangling nets - not specified	GEN
Hand gathered	Hand dredges	DRH
Hand gathered	Hand gathered	-
Hand gathered	Hand-gathering (rake and sieve)	-
Pole and line	Handlines and pole lines - hand operated	LHP

Gear Category	Gear	FAO Gear Code
Pole and line	Handlines and pole lines - mechanized	LHM
Harpoons	Harpoons	HAR
Dredges	Harvesting machines - mechanised dredges	HMD
Enhanced	Hatch and Catch	-
Pole and line	Hooks and lines (not specified)	LX
Pelagic trawls	Midwater trawls - not specified	TM
Pelagic trawls	Midwater trawls - otter	OTM
Pelagic trawls	Midwater trawls - shrimp	TMS
Longlines	Pelagic longline	LLD
Bottom seines	Scottish seines	SSC
Purse seines	Seine nets (purse)	PS
Gillnets	Trammel nets	GTR
Traps	Traps - Barriers, fences, weirs	FWR
Traps	Traps - not specified	FIX
Traps	Traps - pots	FPO
Pole and line	Trolling lines	LTL

Table S6 - Details on interventions made by MSC certified fisheries to make requested improvements on bycatch impacts (Chapter 3).

Action Type	Detailed Action
Gear modification	Implementation of tori lines
Gear modification	Sea Lion Exclusion Device (SLED) implementation
Impact assessment	Develop bycatch estimates
Impact assessment	Mitigation strategy evaluation
Impact assessment	Quantitative analysis showed fishery impact zero/negligible
Impact assessment	Research project on bycatch
Impact assessment	Knowledge review/gap analysis
Impact assessment	Risk assessment indicates species is low risk
Impact assessment	Stock assessment or Potential Biological Removal analysis (PBR)
Management procedures	Avoidance measures
Management procedures	Bycatch quota implementation
Management procedures	Establish advisory body to consider bycatch reports and provide management advice
Management procedures	Implement full retention policy
Management procedures	Procedures to increase bycatch species survival
Monitoring	Gear loss monitoring
Monitoring	Improve observer coverage

Action Type	Detailed Action
Monitoring	Increase bycatch self-reporting requirements
Monitoring	Photographs taken to ID species
Monitoring	Species ID guide
Monitoring	Tagging/DNA testing
Monitoring	Training for crew on handling/sampling/ID
Monitoring	Video surveillance
Gear modification	Adjust net mesh sizes

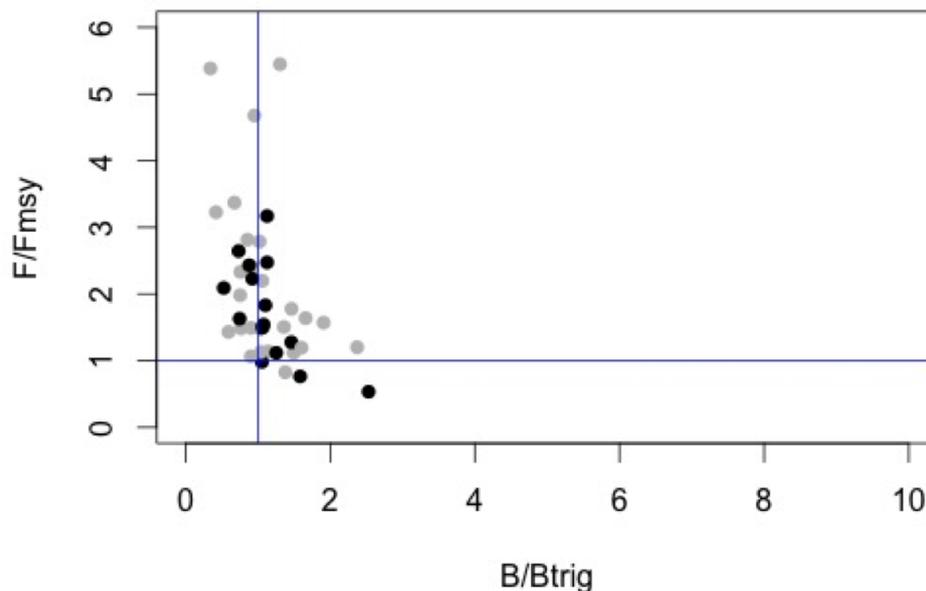
Table S7 - List of fisheries engaged in a FIP that were used to explore average change in BMT scores.

Species (Common)	Species (Scientific)	Gear	Location
Spiny lobster	<i>Panulirus argus</i>	Traps and casitas	Bahamas EEZ, Atlantic Ocean
Spiny lobster	<i>Panulirus argus</i>	Traps	Nicaragua, Caribbean Sea
Mahi mahi	<i>Coryphaena hippurus</i>	Longline	Ecuador EEZ and international waters of the Eastern Pacific Ocean
Mahi mahi	<i>Coryphaena hippurus</i>	Longline	Peru EEZ and international waters of the Eastern Pacific Ocean
Blue Swimming Crab	<i>Portunus pelagicus</i>	Gillnet and traps	Vietnam EEZ, Kien Giang province
Yellowfin Tuna	<i>Thunnus albacares</i>	Longline, handline	Vietnam EEZ, South China Sea, Western Central Pacific Ocean
Yellowfin & skipjack tuna	<i>Thunnus albacares</i>	Pole and line	Indonesia, Western Central Pacific
Yellowfin tuna	<i>Thunnus albacares</i>	Handline	Indonesia EEZ, Indian Ocean
Yellowfin & skipjack tuna	<i>Thunnus albacares</i>	Pole and line	Indonesia EEZ, Indian Ocean
Yellowfin, skipjack & bigeye tuna	<i>Thunnus albacares</i>	Longline	Indonesia EEZ, Indian Ocean
Yellowfin, Skipjack & bigeye tuna	<i>Thunnus albacares</i>	Purse seine	Indonesia EEZ, Indian Ocean
Yellowfin, skipjack & bigeye tuna	<i>Thunnus albacares</i>	Purse seine	Indonesia, Western Central Pacific
Yellowfin & skipjack tuna	<i>Thunnus albacares</i>	Longline	Indonesia, Western Central Pacific
Skipjack tuna	<i>Katsuwonus pelamis</i>	Troll	Indonesia, Western Central Pacific

Species (Common)	Species (Scientific)	Gear	Location
Yellowfin tuna	<i>Thunnus albacares</i>	Handline	Philippines
Sardine	<i>Sardina pilchardus</i>	Coastal seine & trawlers	Morocco EEZ, Atlantic Ocean
Rock lobster	<i>Panulirus ornatus</i>	hand-collection, gillnets, diving with spears, bars, and stakes, trammel nets and traps	Kenya EEZ, Indian Ocean
Red & green lobster	<i>Panulirus argus</i> , <i>Panulirus laeviscauda</i>	Traps	Northeast coast of Brazil
Pacific anchoveta, Pacific thread herring & Pacific bumper	<i>Cetengraulis mysticetus</i> , <i>Opisthonema libertate</i> , <i>Chloroscombrus orqueta</i>	Purse seine	Gulf of Panama, Panama
Mahi mahi	<i>Coryphaena hippurus</i>	Longline	Guatemala, Eastern Pacific Ocean
Yellowfin tuna	<i>Thunnus albacares</i>	Longline	Panama, Eastern Pacific Ocean
South Pacific hake	<i>Merluccius gayi gayi</i>	Bottom trawl	Chile, Southeast Pacific

A

ICES stocks 2000 (pre-MSC in black)



B

ICES stocks 2014 (MSC in black)

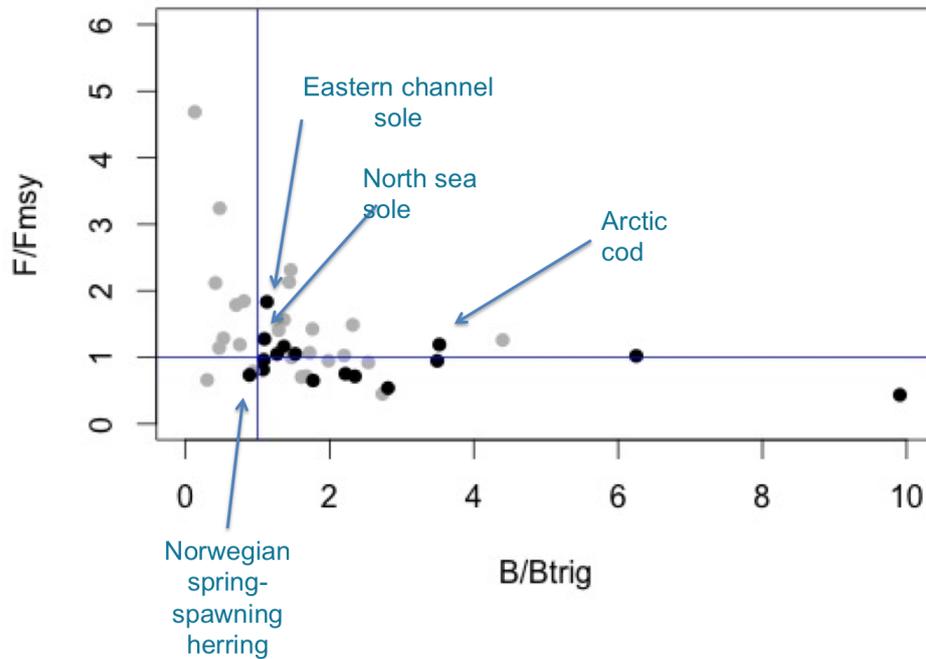
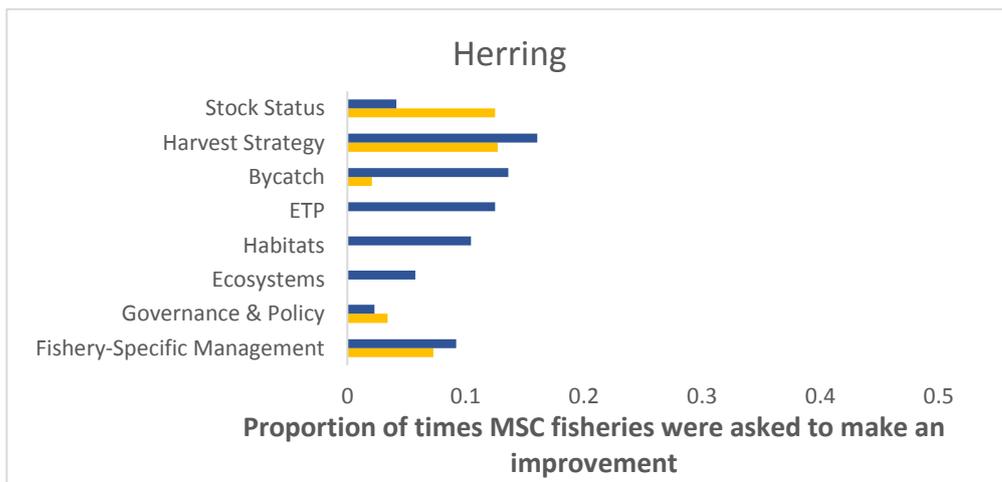


Figure S1 – ‘kobe’ plot of the ratio of fishing pressure, F , over the reference point F_{MSY} , on the y-axis, against the ratio of spawning population biomass, B , over the ICES reference point $MSY-B_{trigger}$ on the x-axis. Two snapshots in time are shown: A) year 2000, and B) year 2014.

A



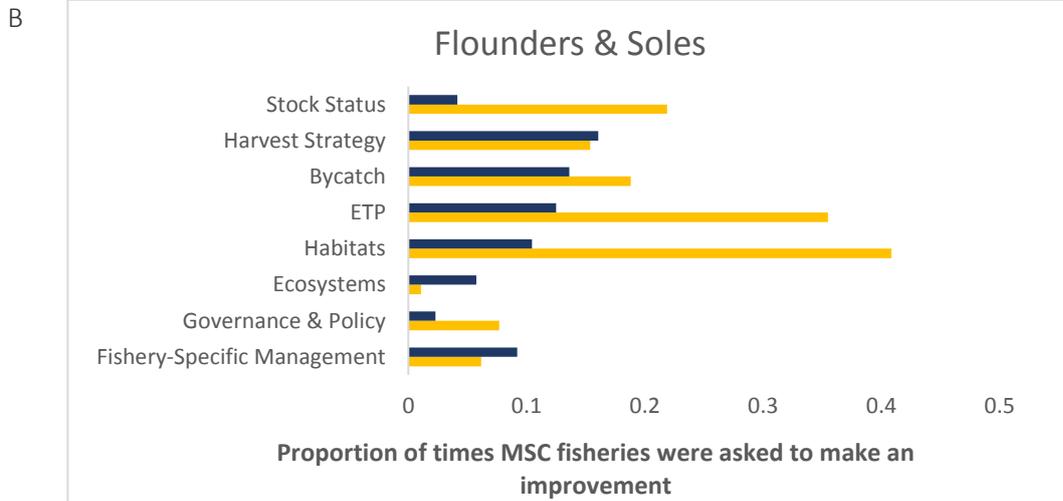


Figure S2 - Proportion of times fisheries were asked to make an improvement, separated by target species, for species groups not shown in the main text (i.e., A) herring, and B) flounders & soles). Improvements required within each species group are shown in yellow, and the average proportion of improvements required across all species groups are shown in dark blue.

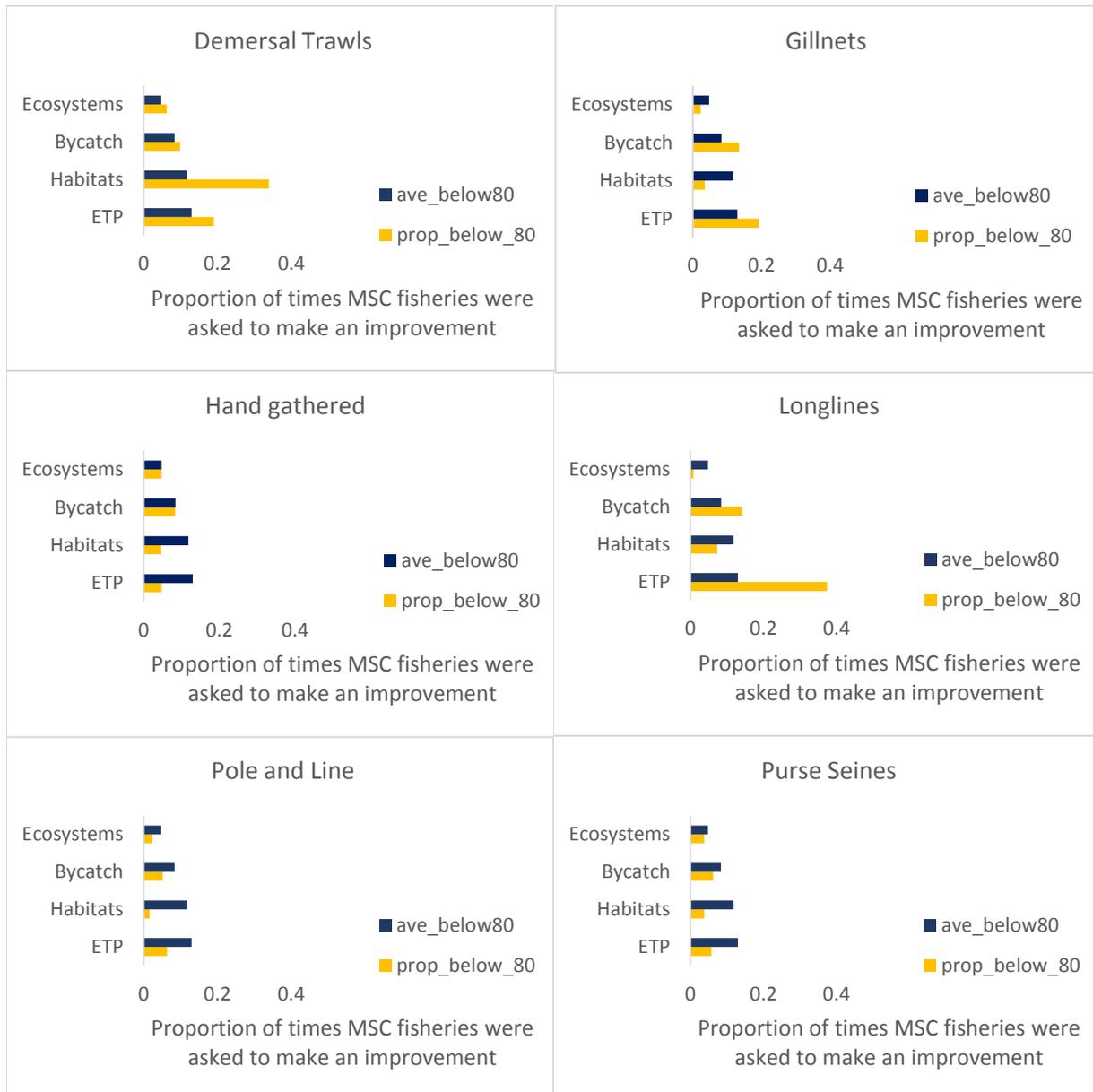
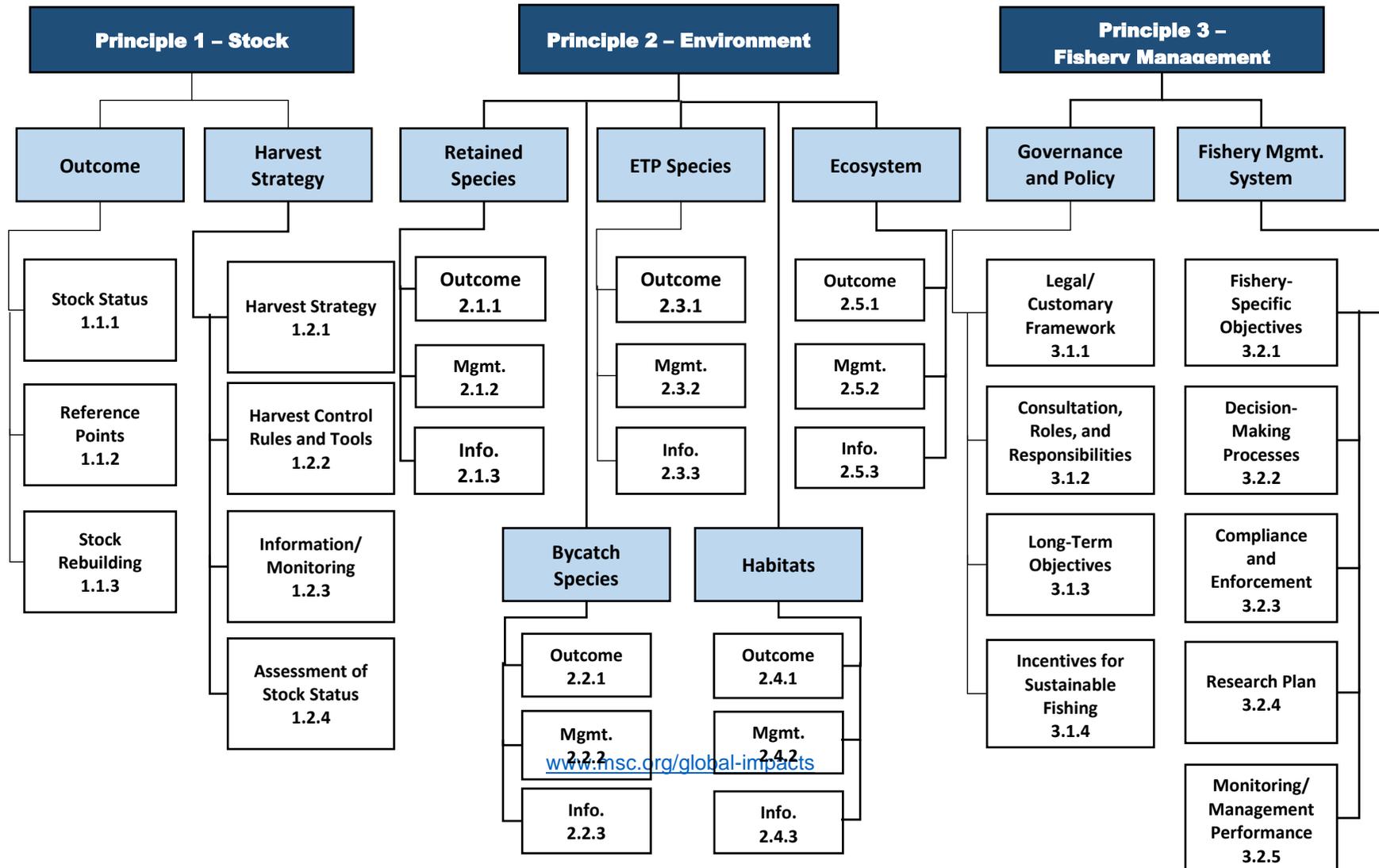


Figure S3 - Proportion of times fisheries were asked to make an improvement, separated by gear type, for six most frequently certified gear types. Improvements required for each gear type are shown in yellow, and the average proportion of improvements required across all gear types are shown in dark blue.



Appendix II

Figure S4 - MSC Fishery Standard: Principles and Criteria for Sustainable Fishing (version 1.3)



www.msc.org/global-impacts



Appendix III

Errata for printed report

Page 8, Figure B (Number of certified fisheries in each country's EEZ in 2015): Exclusive Economic Zone of China should appear coloured (light blue) because as of December 2015 there is 1 certified fishery in China.

Page 9, Figure A (Number of fisheries): The description of the orange line should read "suspended" rather than "suspended or withdrawn". This figure does not contain any data on withdrawn fisheries.

Page 9, Paragraph 7 (Number of tuna fisheries): The number of tuna fisheries achieving MSC certification should be 11, with a further 10 fisheries in full assessment. These fisheries represent 14% of globally landed tuna. (Data reported for up until 31 December 2015)

Page 44, Paragraph 1 (Number of tuna fisheries): The number of tuna fisheries achieving MSC certification should be 11, supplying around 720,000 tonnes of tuna and over 640 consumer-facing products, with another 10 fisheries in full assessment. (Data reported for up until 31 December 2015)