

International Institutions and Policy Affecting Welfare of Marine Animals

This document aims to highlight several of the many issues that International Intergovernmental Organizations are addressing that have implications for the welfare of marine animals. It is mainly drawn from a larger draft document on marine governance and its impacts on the welfare of fish and other underwater creatures that can be obtained via the email address on this page below.

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Illegal, Unreported and Unregulated (IUU) Fishing

As many as one out of every five fish sold is a product of illegal, unreported and unregulated (IUU) fishing, likely more than a hundred billion individual fish each year caught and killed in violation of international agreements.

In 2001, the UN's Food and Agriculture Organization (FAO), based in Rome, adopted an [International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing \(IPOA-IUU\)](#).

It was elaborated within the framework of the [FAO's Code of Conduct for Responsible Fisheries](#) and is a voluntary instrument that applies to all States and to all fishers. It includes a statement of objectives and principles and measures to prevent, deter and eliminate IUU fishing, which "focus on all State responsibilities, flag State responsibilities, coastal State measures, port State measures, internationally agreed market-related measures, research and regional fisheries management organizations. Special requirements of developing countries are then considered, followed by reporting requirements and the role of FAO."

A [2006 research report](#) indicated that compliance with the FAO Code of Conduct of Responsible Fisheries was deficient in many respects, "Overall, the five questions on which countries scored worst concerned introducing ecosystem-based management, controlling illegal fishing, reducing excess fishing capacity and minimizing bycatch and destructive fishing practices"

There are a variety of internationally agreed measures that aim to assure proper identification of fishing vessels and restriction of their activities to permitted times and places and allowed catch. For example, [The Straddling Fish Stocks Agreement](#), a multilateral treaty created by the UN and effective since 2001, spells out "the duties of flag States including those related to registration and records of vessels, authorisations, MCS [monitoring, control and surveillance] compliance and enforcement. Cooperation in international, regional and sub-regional enforcement is also addressed, along with boarding and inspection procedures and port State measures."

The [Agreement on Port State Measures \(PSMA\)](#), which entered into force in June 2016, was the first binding international agreement to specifically target IUU fishing. Its provisions apply to fishing vessels seeking entry into foreign ports – ports of a State other than their flag State. According to its Foreword: "The Agreement lays down a minimum set of standard measures for port States to apply when foreign vessels seek entry into their ports or while they are in their ports. Through the implementation of defined procedures to verify that such vessels have not engaged in IUU fishing and other inspection and enforcement measures, fish caught from IUU fishing activities could be blocked from reaching national and international markets, thereby reducing the incentive for perpetrators to continue to operate."

Published in February 2019 by OECD, [Intensifying the Fight Against IUU Fishing at the Regional Level](#) aimed to inspire and guide Regional Fisheries Management Organizations

and member countries to strengthen the fight against IUU fishing by "measuring the extent to which RFMOs apply best practices against IUU fishing and pointing to the remaining gaps." It indicates progress is being made. However, "Some RFMOs still do not make public their lists of authorised vessels, making it difficult to check them against lists of IUU fishing vessels, and only few RFMOs have implemented catch documentation schemes to certify legal catches in a standardized way. IUU vessels lists are often incomplete, and the lack of comprehensive information makes the identification of IUU fishing vessels and tracking their beneficial owners difficult. Protocols for sharing IUU vessel lists currently in place are not standardised and not always followed in practice. The use of sanctions by RFMOs is also not common as only few RFMOs have provisions for imposing sanctions on member countries for not adhering to adopted [Conservation and Management Measure] CMMs. Then, even when provisions for sanctioning are in place, these are not applied systematically.

The OECD makes the following recommendations:

"1. Adopt minimum standards on monitoring, control and surveillance tools and practices. In particular:

- Make mandatory the publication of comprehensive lists of authorised vessels that can be easily checked against existing lists of IUU fishing vessels.
- Adopt catch documentation schemes certifying legal catches in a standardized way, in line with the Voluntary Guidelines on Catch Documentation Schemes of the Food and Agriculture Organization of the United Nations.
- Co-operation between RFMOs could help identify and define the most appropriate standards.

2. Build information-rich IUU vessels lists by investing in gathering the necessary information from various stakeholders. In particular, step up efforts to include:

- The identification numbers of the International Maritime Organization (IMO), as flags and names can be easily changed;
- Information on vessels' beneficial owners to verify that authorised operators have no legal, personal, financial or other ties to those sanctioned for illegal fishing.

3. Tighten co-operation between RFMOs over the mutual recognition of IUU vessel lists.

4. Create strict and transparent sanctioning mechanisms for countries that fail to fulfil their obligations as RFMO members.

5. Regularly review the compliance of RFMO members with agreed CMMs and data submission requirements. Publicly and transparently report on this process.

6. Establish voting protocols that are more efficient than consensus-based decision making at allowing adoption of measures against IUU fishing and sanctioning non-compliant parties.

When objection procedures are in place, their format should be well defined so that the objectives of the proposed CMMs are not compromised;

7. The OECD also encourages countries with vested interests in resources in the areas of competence of RFMOs, but which are not members, to join and actively contribute to the enforcement of adopted CMMs."

In respect to RFMO decision-making procedures, the report explains that some RFMOs seek full agreement for decisions, with no obligation to provide justification for any objections. Some others do require a rationale to be provided. And some "consider inconsistency with the convention or unjustified discrimination against the objecting party as the only admissible

grounds for an objection". While some "require objectors to present alternative measures consistent with the objective of the relevant conservation and management measures."

OECD also in 2019 published a companion paper, Closing gaps in national regulations against IUU fishing (OECD Food, Agriculture and Food Paper N°120), which tracks implementation of best policies and practices by individual countries and provides guidance on how to strengthen efforts against IUU fishing.

Its stated aim was to investigate the degree to which countries met their responsibilities:

- as flag states, to regulate domestically-flagged vessels fishing in areas beyond their national jurisdiction and in foreign waters;
- as coastal states, to regulate vessels in their domestic exclusive economic zone;
- as port states, to apply port controls and regulate the flow of products to the market;
- as markets, to prevent the purchase of illegal seafood and detect it within the supply chain;
- as regulators, in all the above roles, to enforce regulation through monitoring, control and surveillance, as well as sanctioning; and
- as members of the international community, to engage in co-operation and crosscountry initiatives against IUU fishing.

One major deficit cited was that in 2016, only 6% of surveyed OECD countries were making "data on fishing authorisations of foreign vessels in their domestic waters easily accessible to both the public and other arms of government. A third of the OECD countries surveyed did not have fully functioning mechanisms allowing the use of trade information to target the movement of IUU fishing products along the value chain."

The report provided 17 key recommendations to countries towards eliminating IUU fishing, and those are all listed on page 8 of the report.

Identifying Fishing Vessels: The Cape Town Agreement

The 2012 Cape Town Agreement adopted by the London-based International Maritime Organization (IMO) could, if fully adopted and implemented, ensure automatic identification systems on fishing vessels that would help deter IUU fishing, identify and investigate fishers who operate illegally, and help ensure that crews have safe and decent working conditions. It needs at least 11 more countries to join as parties before it can go into effect.

[According to the Pew Charitable Trusts](#), the Agreement "outlines design, construction, and equipment standards for fishing vessels of 24 meters or more in length and details regulations that countries that are party to the agreement must adopt to protect fishing crews and observers. It also calls for harmonized fisheries, labor, and safety inspections.

"The agreement will enter into force once 22 States, with an aggregate fleet of 3,600 eligible fishing vessels, become parties to it. Its implementation will complement existing treaties, like the Port State Measures Agreement, and could serve as a vehicle for mandating IMO numbers and automatic identification systems on fishing vessels. These measures would

enable States to accurately identify and track vessels, improving transparency and providing a means to assess vessel safety and crew welfare.

“Putting these elements in place will make it easier for countries to deter IUU fishing, identify and investigate fishers who operate illegally, and help ensure that crews have safe and decent working conditions.”

As of March 19, 2019, the only countries that had thus far become parties to the agreement were: Belgium, Congo, Denmark, France, Germany, Iceland, Netherlands, Norway, Saint Kitts and Nevis, South Africa, and Spain.

According to the International Maritime Organization (IMO): “The work being done to promote the implementation of the Cape Town Agreement on the safety of fishing vessels and other activities to improve safety and sustainability in the fishing sector and fight IUU fishing is also being supported by international governmental and non-governmental organizations. These include the General Fisheries Commission for the Mediterranean (GFCM), the North East Atlantic Fisheries Commission (NEAFC), the Organisation for Economic Co-operation and Development (OECD), the Institute of Marine Engineering, Science and Technology (IMarEST), the International Transport Workers Federation (ITF), the Pew Charitable Trusts, the World Animal Protection and the World Wide Fund for Nature (WWF).”

Representatives of the International Maritime Organization (IMO) and FAO have been meeting regularly in a Joint FAO/IMO ad hoc Working Group on IUU fishing since 2000.

The report of its most recent meeting, in 2015, included items presented for consideration such as:

- a proposal by the U.S. delegation “to explore the possibility of expanding the use of the IMO number to all fishing vessels operating outside waters under national jurisdiction.”

- a suggestion by WWF and the Institute for Fishing and Marine Sciences (IHSM) “to extend the IMO number to all decked, motorized inboard fishing vessels of any hull-type construction of over 12 metres LOA, with a current valid authorization on an RFMO vessel list.”

- notification that the International Labour Organization (ILO) “makes reference to the IMO number for fishing vessels in its Guidelines on flag State inspection of working and living conditions on board fishing vessels, and that the legislation of various States and the recommendations of a number of RFMOs have been updated to make the IMO number compulsory for certain categories of vessels.”

Marking Fishing Gear

According to the FAO's Code of Conduct for Responsible Fisheries,

"6.6 Selective and environmentally safe fishing gear and practices should be further developed and applied, to the extent practicable, in order to maintain biodiversity and to conserve the population structure and aquatic ecosystems and protect fish quality. Where proper selective and environmentally safe fishing gear and practices exist, they should be

recognized and accorded a priority in establishing conservation and management measures for fisheries. States and users of aquatic ecosystems should minimize waste, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species."

Regional Fisheries Management Organizations may develop Conservations and Management Measures (CMMs) that prescribe the types of gear that can be used, with compatible rules then incorporated into regulations of member countries.

In 2011, FAO had published [International Guidelines on Bycatch Management and Reduction of Discards](#) which included focus on improvement of the design and use of fishing gear that might, for example, include changes in the size and shape of mesh and hooks, escape panels in traps, acoustic alarms, biodegradable panels, square mesh panels, underwater lights, sorting grids, and turtle excluder devices.

In respect to reducing the impact of lost or abandoned ("ghost") fishing gear, the FAO recommended: "identification of gear ownership, reduction of gear losses, development of gear retrieval procedures and programs, and reducing, and where possible eliminating, fishing power of lost gear, e.g. through the use of degradable materials."

FAO has now published [Voluntary Guidelines on the Marking of Fishing Gear](#) which aims to "improve the state of the marine environment, and to enhance safety at sea by combatting, minimizing and eliminating abandoned, lost or otherwise discarded fishing gear (ALDFG) and facilitating the identification and recovery of such gear. The Guidelines assist fisheries management and can be used as a tool in the identification of illegal, unreported and unregulated (IUU) fishing activities. The Guidelines address the purpose and principles, the scope of application and the implementation of a gear marking system and its associated components, including reporting, recovery and disposal of ALDFG or unwanted fishing gear and commercial traceability of fishing gear." Effective advocacy could hasten adoption of those Guidelines.

The FAO has also (February 2018) issued a [Report of the Technical Consultation on Marking of Fishing Gear](#) (FAO Fisheries and Aquaculture Report No 1236). That Technical Consultation considered "how the guidelines should be implemented, controlled and monitored and identified the importance of gear marking in combating abandoned, lost or otherwise discarded fishing gear (ALDFG) as well as the role that gear marking could play in reducing or eliminating Illegal, Unreported and Unregulated (IUU) fishing."

The Technical Consultation further recommended that FAO's Committee on Fisheries (COFI) consider "the development of a comprehensive global strategy to address ALDFG which could include the establishment of a mechanism to facilitate the sharing of information on the global implementation of these guidelines as well as data collected by national ALDFG reporting systems, and recommending to States the development and implementation of national action plans to address ALDFG."

FAO has noted that the switch to an alternative gear may also take place through regulations that make the use of certain gear types illegal, like the trawl bans that have been, to some

degree, imposed in Indonesia, and the U.N. moratorium on high seas large-scale driftnets that was passed in 1989, followed by a worldwide ban in 1992.

Protecting the Seabed in Areas Beyond National Jurisdiction

The United Nations Convention on the Law of the Sea declared the deep seabed that lies beyond national jurisdiction to be the "common heritage of mankind" while giving the International Seabed Authority (ISA), which is based in Kingston, Jamaica, the mandate to manage the seabed's mineral resources.

There has been rapidly growing commercial interest in deep-sea mining and on March 28, 2019, ISA issued draft regulations on exploitation of the mineral resources in the international seabed area and stated: "The new draft exploitation regulations will build on the exploration regulations already in place by ensuring adherence to robust environmental standards, including baseline studies, environmental impact assessments, environmental monitoring and management." The draft regulations were developed by ISA's Legal and Technical Commission, a 30-member expert advisory body, and the draft will be considered at ISA's Council meeting at its Jamaica headquarters, July 15-29, 2019.

In its 2019 Report, "[30x30: A Blueprint for Ocean Protection](#)", Greenpeace identified as potential adverse impacts of deepsea mining:

- Direct removal of seafloor habitat and organisms
- Alteration of substrate and its geochemistry
- Modification of sedimentation rates and food webs
- Creation of changes in substrate availability, heterogeneity and flow regimes
- Release of suspended sediment plumes
- Release of toxins and contamination from extraction and removal processes
- Noise pollution
- Light pollution
- Chemical leakage from mining machinery

and continued by asserting that a recent scientific analysis (Deep-Sea Mining with No Net Loss of Biodiversity – An Impossible Aim) demonstrates that biodiversity loss from DSM will be unavoidable.

In 2018, 50 NGOs had [jointly signed an appeal to ISA](#) expressing deep concern about the potentially irreversible losses of biodiversity likely to result from deep-sea mining and calling on it:

- to amend the mission contained in its Strategic Plan so that the obligation for any activities in the Area to ensure effective protection for the marine environment from harmful effects is the fundamental objective of the ISA;
- to act on civil societies' requests for fundamental reforms of the ISA operations, including among others the establishment of an Environment Committee, the opening up of the Legal and Technical Committee for observers, and public access to data and information;
- to establish a process to investigate comprehensively and in a participatory and science-based manner the fundamental questions about the need for deep seabed mining and its long

term consequences for the planet and humankind, ensuring that more sustainable alternatives are fully assessed and fed into the debate in an open and transparent manner;

- in the meantime, to end the granting of contracts for deep-sea mining exploration and to not issue contracts for exploitation.

The [Deep Sea Conservation Coalition \(DSCC\)](#) based in Amsterdam, The Netherlands is a coalition of over 70 non-governmental organisations concerned with protection of the deep sea that has been an observer organisation to the ISA since 2014. It cites its two overarching goals as being:

- To substantially reduce the greatest threats to life in the deep seas; and
- To safeguard the long-term health, integrity and resilience of deep-sea ecosystems.

DSCC opposes deep-sea mining until there are effective regulations in place ensuring that that marine habitats, biodiversity and ecosystem functions are effectively protected, including establishment of a network of marine protected areas and reserves.

DSCC has used the analogy: “Deep-sea bottom trawling, where the gear drags along the seabed, is like clear cutting a rainforest to catch tree frogs.”

Seamounts as Vulnerable Marine Ecosystems (VME)

Mountains that were formed by volcanic activity and are fully under water are known as seamounts. They are now recognized as ["biological hotspots that support a dazzling array of marine life"](#).

In respect to "vulnerable marine ecosystems" including seamounts, a [2006 UN General Assembly Resolution 61/105](#) called on regional fisheries management organizations and arrangements to take measures including closing such areas to bottom fishing "unless conservation and management measures have been established to prevent significant adverse impacts" (paras 80-89)

The resolution concurrently called upon States to cease to authorize fishing vessels flying their flag to conduct bottom fisheries in areas beyond national jurisdiction where there is no regional fisheries management organization or arrangement with the competence to regulate such fisheries and no other conservation and management measures implemented to effectively protect such ecosystems.

The subsequent measures taken to protect vulnerable marine ecosystems (VME), including seamounts, are commonly criticized as insufficient.

[According to Dr. Les Watling](#), a professor in the Department of Biology at the University of Hawaii: “As part of the management of high seas bottom fisheries, when VME indicator species are encountered the vessel must stop fishing and move some distance away from where the encounter occurred. This is referred to as the ‘move-on rule.’ The problem, of course, is how to define an ‘encounter,’ and then how to decide how far the vessel should move.”

But the current standard methods for identifying encounters with indicator species seem to miss more encounters than they identify. According to Watling, trawling on the Louisville Seamounts resulted in only 4 qualifying VME encounters in 255 trawl tows. While all seamounts there that have so far been surveyed by cameras “have been found to have abundant VME indicator species distributed on their sides and summits... the distribution of VME species is far more extensive than trawl data would suggest.”

In compliance with rules of the South Pacific Regional Fisheries Management Organization (SPRFMO), Watling indicated, a recorded encounter with a VME species would require the vessel to move 5 km away from the site of encounter and if a fishing vessel were “required to survey an area where it wanted to trawl with a camera rather than wait to see what comes up in the net, there would be nowhere on the seamount where trawling could occur.”

“The only rational decision, then,” Watling continued, “would be to stop worrying about VME indicator species, encounter and move-on rules, and accept the fact that seamounts are, in the language of United Nations General Assembly resolution 61/105, Vulnerable Marine Ecosystems. They are islands of biodiversity in an otherwise depauperate ocean, they are home to dozens of fragile and long-lived species who can easily be wiped out by the indiscriminate and heavy trawl gear. As true VMEs, they should be off-limits to bottom tending fishing gear and should be protected for all time from other forms of human disturbance, including the mining of crusts from some old seamounts.”

The Deep Sea Conservation Commission has used the analogy: “Deep-sea bottom trawling, where the gear drags along the seabed, is like clear cutting a rainforest to catch tree frogs.” It reports that the EU Parliament in January 2017 [implemented a new EU regulation](#) banning all bottom trawling below 800 meters in EU waters of the Northeast Atlantic, and an obligation to close deep-sea areas to bottom fishing to protect vulnerable marine ecosystems.

Anthropogenic Underwater Noise

The June 2018 meeting of the UN’s Informal Consultative Process on Oceans and the Law of the Sea (ICP-19) mainly focused on Anthropogenic Underwater Noise. Leading up to that meeting, the IISD Reporting Service [stated](#):

“For many marine animals, sound is the preferred sensory medium. Underwater noise has increased with expansion of industrial activities in the marine environment, affecting many types of marine biota. Most relevant international rules, standards and recommended practices are non-legally binding, largely sectoral, and focused on specific activities or affected species. Regional and national efforts tend toward guidelines and codes of conduct. Significant data and knowledge gaps hinder development of effective management measures to protect marine species.”

That 2018 meeting at the UN included attention to [Resolution 12.14 on Adverse Impacts of Anthropogenic Noise on Cetaceans and Other Migratory Species](#) that had been adopted the previous year at the 12th Meeting of the Conference of the Parties to the Convention on

Migratory Species (CMS). The Resolution urged Parties to ensure that Environmental Impact Assessments take full account of the effects of activities on CMS-listed marine species and their prey, and its Annex included extensive Guidelines on Environmental Impact Assessments for Marine Noise-generating Activities, which encompass:

- Military and Civil High-powered Sonar
- Shipping and Vessels Traffic
- Seismic Surveys (Air Gun and Alternative Technologies)
- Construction Works
- Offshore Platforms
- Playback and Sound Exposure Experiments
- Pingers (Acoustic Deterrent/Harassment Devices, Navigation)
- as well as other Noise-generating Activities (Acoustic Data Transmission, Wind, Tidal and Wave Turbines).

An [extensive set of panel presentations](#) focused on the sources of anthropogenic underwater noise, its impacts on marine life, and international cooperation attempting to mitigate the damage. And presentations at a side event included:

- Dr. Weilgart (Dalhousie University): "[What science tells us. The impact of anthropogenic ocean noise pollution, a risk to prey species and food supply](#)";
- Ms. Frisch-Nwakanma (CMS Secretariat): "[How the CMS Family Noise EIA Guidelines support the assessment of the potential impacts of noise generating activities](#)", and
- Nicolas Entrup (OceanCare): "[Best practice. Regional, technical and capacity-building approaches. A way forward](#)".

[According to Professor Hildebrand](#) of the Marine Physical Laboratory at Scripps: "We've demonstrated that the ocean is a lot noisier now than it was 40 years ago. The noise is more powerful by a factor of 10. If we've doubled the number of ships and we've documented 10 times more noise, then the noise increase is due to both more ships and noisier individual ships than in the '60s. And that may be because the ships are now bigger, faster and have more propulsion power."

Eleonora Panella of IFAW [writing in EurActiv](#) further explained: "Research has found that in the Pacific Ocean, for example, shipping noise has doubled every decade for the past 40 years, that's a shocking 1,600% increase! In the meantime, the ability of blue whales to interact and navigate has been radically impacted with the distance over which they communicate reduced by a staggering 90%."

"In the European Union (EU)", she continued, "the situation is not much better. While the 2008 Marine Directive required member states to take action to reduce levels of underwater noise by 2020, the European Commission declared last year [2018] that governments would fail on their own binding commitments."

Evaluating whether existing vessel-quieting applications for military vessels and scientific research vessels could be feasibly and economically "scaled-up" for large commercial vessels was identified as a key action item at a 2004 symposium on "Shipping Noise and Marine Mammals" hosted by the US National Oceanic and Atmospheric Administration ([NOAA](#)).

A subsequent, more targeted symposium convened by the NOAA in 2007 with support from Germany-based Okeanos – Stiftung für das Meer (Foundation for the Sea) included (1) analysis of the feasibility and estimated costs/benefits of applying existing and future quieting technology to large commercial vessels and (2) focus on non-regulatory incentives to reduce sound emission from large commercial vessels. [A final report was produced](#). The following year Okeanos convened “An International Workshop on Shipping Noise and Marine Mammals” and which was also followed by an in-depth [report](#).

In 2014, the [Marine Environment Protection Committee \(MEPC\)](#) of the International Maritime Organization (IMO) approved [guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life](#) – (MEPC.1/ Circ.833). Those both address design considerations for propellers, hulls, and onboard machinery, as well as operational and maintenance considerations in respect to propeller cleaning, underwater hull surface maintenance, selection of ship speed, and re-routing to avoid sensitive areas.

As Eleanora Panella of IFAW stated, “In addition to reduced speeds, requiring the use of existing quieter technologies would also support the efforts to reduce ocean noise from shipping, as would ocean noise exclusion zones. A last incentive would be for governments to understand that this does not require a long-term implementation before results can be expected: unlike other forms of marine pollution, when ocean noise stops, the pollution disappears. As soon as solutions are implemented, the results will be immediate.”

Especially severe anthropogenic underwater noise results from seismic surveys. [As explained by the Surfrider Foundation](#): “Seismic surveys are used to locate and estimate the size of offshore oil and gas reserves. To carry out such surveys, ships tow multiple airgun arrays that emit thousands of high-decibel explosive impulses to map the seafloor. The auditory assault from seismic surveys has been found to damage or kill fish eggs and larvae and to impair the hearing and health of fish and marine mammals, making them vulnerable to predators and leaving them unable to locate prey or mates or communicate with each other. These disturbances can disrupt and displace important migratory patterns, pushing marine life away from suitable habitats like nurseries and foraging, mating, spawning, and migratory corridors.”

A [January 2019 article in the New York Times](#) quoted Douglas Nowacek, a professor of marine conservation technology at Duke University, as stating that air guns “fire approximately every 10 seconds around the clock for months at a time... They have been detected 4,000 kilometers away. These are huge, huge impacts.”

The article further indicated that “As part of the [Trump administration’s plans to allow offshore drilling](#) for gas and oil exploration, five companies are in the process of seeking permits to carry out seismic mapping with the air guns all along the Eastern Seaboard, from Central Florida to the Northeast, for the first time in three decades.”

A coalition of environmental groups has filed suit asserting that allowing the seismic blasts would violate a variety of laws, including the U.S. Endangered Species Act.

World Trade Organization and Fishing Subsidies

At WTO's 2001 Doha Ministerial Conference, it was decided to "clarify and improve" WTO rules that apply to fisheries subsidies. The mandate was expanded at the 2005 Hong Kong Conference with the intention of prohibiting a variety of fisheries subsidies that contribute to overcapacity and overfishing.

The process was accelerated when, in 2015, UN Sustainable Development Goals were adopted that include SDG 14.6: "By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU fishing, and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation."

At the WTO's 2017 Ministerial Conference in Buenos Aires (MC-11) ministers determined to conclude the negotiations by adopting, at the 2019 Ministerial Conference, an agreement consistent with SDG 14.6

As of November 2018, [a working document had been produced](#). And, in 2019, the Negotiating Group on Rules has been meeting, [striving to develop an agreement](#). They have, for example, discussed [two draft texts addressing prohibitions on fisheries subsidies](#): Australia's on prohibiting subsidies for fishing of overfished stocks and New Zealand and Iceland's draft on prohibiting subsidies that contribute to overfishing and overcapacity of fleets. Additional drafts are being developed including to address elimination of subsidies to illegal, unreported and unregulated (IUU) fishing.

In [Trade and Fisheries: Key Issues for the World Trade Organization](#), Frank Asche and Martin Smith had explained: "Trade actions of individual countries or groups of countries have the potential to fall under the jurisdiction of, and possibly conflict with, a wide range of WTO rules, including sanitary and phytosanitary measures, anti-dumping, subsidies and countervailing measures, and technical barriers to trade and rules of origin. Depending on how broadly protection of human health and the environment are interpreted, efforts to promote marine conservation could lead to a proliferation of trade restrictions that are allowable under WTO rules. "

Marine Protected Areas (MPAs)

The [Convention on Biological Diversity \(CBD\)](#) in 2004 had committed to the establishment of a global network of marine protected areas by 2012 and reaffirmed its support in 2010 by agreeing to the "Aichi targets" which included calling for 10 per cent of coastal and marine areas to be conserved by 2020 through "well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape."

And the [United Nations Environment Programme \(UNEP\) \(aka UN Environment\)](#) currently states: "We cannot survive without healthy oceans. Yet, they have been under too much

stress, from too many human activities, for too many years. Overfishing, resource extraction, tourism, recreation, coastal development and pollution are damaging habitats and reducing populations of marine species at a frightening rate.”

“UN Environment assists countries in approving the effectiveness and equitable use of marine protected areas by providing technical expertise and capacity building support on governance of marine protected areas, and their use within wider integrated ocean and coastal management systems.”

Work towards the implementation of that goal is among the activities of the [Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction](#), which was convened by The United Nations General Assembly to develop an international legally binding instrument (ILBI) on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction (BBNJ). The IGC has been scheduled to meet in four sessions, with the first in 2018, two in 2019 and the last in 2020.

The Pew Charitable Trusts, The Natural Resources Defense Council, Ocean Unite, and Greenpeace are among the NGOs that have [endorsed protecting](#) “at least 30% of the planet’s key coastal and marine areas by 2030, through effectively and equitably managed, ecologically representative and well-connected systems of fully or highly protected marine protected areas (MPAs).”

In April 2019, Greenpeace issued a 96-page report explaining the rationale for such action and recommending steps for implementation: [30x30: A Blueprint for Ocean Protection: How we can protect 30% of our oceans by 2030](#).

It stated that “there is currently no comprehensive global framework to protect marine biodiversity in international waters, and the few high seas MPAs that do exist have so far been achieved through regional seas conventions. However, these agreements differ greatly in scope whereby the rules and standards they apply are not uniform... It should also be noted that the regional seas conventions only cover a small proportion of the high seas and there is no mechanism in place for creating, let alone effectively managing, MPAs in most ABNJ.”

Greenpeace’s suggested methodology for designing the network relies on publicly available data on fishing, aims to minimize economic impacts, and would only displace around 20-30% of existing fishing effort.

Considerably more expansive bans on high seas fishing have been contemplated by others who have described potential benefits as a result, anticipating that the absence of fishing in the high seas would result in increasingly large populations of fish in EEZs. In March 2014, marine biologist Crow White and economist Christopher Costello published [Close the High Seas to Fishing?](#) in PLOS Biology and concluded that a comprehensive ban “both induces cooperation among countries in the exploitation of migratory stocks and provides a refuge sufficiently large to recover and maintain these stocks at levels close to those that would maximize fisheries returns. We find that completely closing the HS to fishing would

simultaneously give rise to large gains in fisheries profit (>100%), fisheries yields (>30%), and fish stock conservation (>150%)... a complete closure of the HS still returns larger fishery and conservation outcomes than does a HS open to fishing."

Currently, much of high seas fishing is conducted by industrialized fleets from relatively few countries. The White/Costello analysis suggests that "the handful of countries whose current fishing fleets specialize in fishing the HS (e.g., Japan, China, and Spain may be harmed by the closure. On the other hand, these countries' HS losses may be offset by enhanced fishing opportunities in their EEZs as stocks rebuild. Developing countries whose stocks are depleted by HS over-exploitation but who have not invested in HS fleets may benefit most from a HS closure."

In a September 2018 interview with Yale e360 magazine, Daniel Pauly, a professor at the University of British Columbia and principal investigator at the fisheries research group, the [Sea Around Us](#), explained his advocacy for a global ban on high seas fishing, including asserting:

- "Basically, we've destroyed all the protections that fish populations once enjoyed. Depth was a protection, cold was a protection, ice was a protection because we couldn't fish in those areas. We can now go everywhere the fish once sheltered. Moreover, we're destroying whole ecosystems with our destructive practices. Trawlers transform a pristine ecosystem — a diverse habitat of soft reef with corals, sponges, and other organisms — into sterile mud flats."
- "Because the fish are so widely scattered and hard to find, they can only be fished with massive subsidies from the country that they are based in. So for example, Spain can fish in the western and central Atlantic because their fleets are heavily subsidized. Japan fishes all over the tropics and that wouldn't work without subsidies. The Chinese fleet is a bottom-trawling fleet, it could do that only with massive subsidies. The same for Korea, the same for Taiwan."
- "If the catch were not being made by these big foreign fleets, it would be made by the coastal countries [that currently reap little benefit] — for example, East African and West African countries, Southeast Asian countries, and the Caribbean."

Among those providing influential support for development of MPAs is the International Union for Conservation of Nature (IUCN), based in Switzerland. Its 1300 members include both government and civil society organisations. It has six expert commissions dedicated to species survival, environmental law, protected areas, social and economic policy, ecosystem management, and education and communication.

Its most recent Congress, in 2016, had a strong ocean focus and [Resolution WCC-2016-Res-047-EN](#) included a call for the rapid identification, designation and effective management of an ecologically representative and well-connected system of marine protected areas, including reserves, in areas beyond national jurisdiction.

While [Resolution WCC-2016-Res-050-EN](#) encourages States to "to designate and implement at least 30% of each marine habitat in a network of highly protected MPAs and other effective area-based conservation measures, with the ultimate aim of creating a fully sustainable

ocean, at least 30% of which has no extractive activities, subject to the rights of indigenous peoples and local communities"

The World Organisation for Animal Health (OIE)

Paris, France

The OIE is the accepted global standard setting body for animal health and welfare. It has issued:

- Terrestrial Animal Health Code
- Manual of Diagnostic Tests and Vaccines for Terrestrial Animals
- Aquatic Animal Health Code
- Manual of Diagnostic Tests for Aquatic Animals

OIE's [Aquatic Animal Health Code \(2018\)](#) includes Section 7 regarding "Welfare of Farmed Fish" which consists of:

Chapter 7.1. Introduction to recommendations for the welfare of farmed fish

Chapter 7.2. Welfare of farmed fish during transport

Chapter 7.3. Welfare aspects of stunning and killing of farmed fish for human consumption

Chapter 7.4. Killing of farmed fish for disease control purposes

It is unclear when transport and slaughter standards will be expanded to include attention to crustaceans or when, for example, finfish and other marine animal welfare will be the focus of standards regarding breeding and husbandry practices in aquaculture production systems. As of April 2019, OIE stated that: "additional work is currently in progress on standards for pig production systems and the slaughter and killing of farmed reptiles for their skins and meat."

In respect to Chapter 7.3 and its focus on farmed fish slaughter practices, compliance is highly variable. In Europe, a leadership role in encouraging further adherence to OIE standards is being played by the [Aquaculture Advisory Council \(AAC\)](#) which was established in 2016 in the framework of the European Union's [Common Fisheries Policy](#). Based in Brussels, the AAC receives EU financial assistance and its governance includes industry representatives from finfish and shellfish aquaculture as well as other stakeholders, such as environmental and animal protection organizations. Its role is to provide recommendations and advice related to sustainable development of the aquaculture sector. In 2017, the AAC adopted the position paper [Farmed Fish Welfare During Slaughter in the European Union](#) and in July 2019 followed up with [Fish Welfare at Slaughter Recommendations](#) that stress the need for effective stunning techniques for fish being slaughtered.

Aquaculture is expanding far faster than human population growth world-wide and is being promoted and supported by development organizations, Regional Economic Communities and national governments. Many of these are OIE collaborating partners and members, and could benefit significantly from OIE guidance on the breeding, husbandry and housing of farmed fish.

There is already a coalition representing non-governmental animal welfare organizations from all over the world at the OIE, the International Coalition for Animal Welfare (ICFAW), and its

membership is growing. ICFAW now holds a [Memorandum of Understanding](#) with the OIE, strengthening the relationship between the two organizations.

The OIE is hosting Animal Welfare Forums to address animal welfare issues and ICFAW is providing feedback to the OIE to make these Forums more effective.

Regional AW Strategies have now been developed for all regions. And there are AW Platforms for Europe and Africa that will provide frameworks for the promotion of AW across whole regions.

Compliance with OIE standards including animal welfare provisions could be incorporated in trade agreements. And a global monitoring and evaluation framework for the OIE is being considered, which would provide a mechanism for regular reporting of animal welfare progress by member countries.

A major aspect of OIE's Initiative on Animal Welfare is the convening of global conferences on animal welfare, involving national OIE Delegates and animal welfare focal points as well as representatives of industry and civil society. And OIE has also been holding quadrennial global conferences on aquatic animal health:

- Panama, 2011 ([presentations](#)),
- Vietnam, 2015 ([recommendations](#))([presentations](#)) and
- Chile, 2019. ([recommendations](#)), ([presentations](#)).

Almost all OIE Member Countries have nominated a national Focal Point for Aquatic Animals, under the responsibility of the National OIE Delegate; the OIE is providing ongoing capacity building regional seminars for national Focal Points for Aquatic Animals to assist them to meet their responsibilities.

Altered Genetics Due to Breeding and Genetic Engineering

OIE holds quadrennial global conferences on aquatic animal health. At the 2019 conference in Chile a keynote speaker was Dr. George Chamberlain, president of the Global Aquaculture Alliance and a principal in a shrimp farm with breeding facilities in Hawaii.

Chamberlain [emphasized the potential for aquaculture to prolong its rapid growth](#) while particularly stressing genetic alterations resulting from breeding as a contributing factor. He said that "the rockstar in animal breeding is the chicken," with chickens growing four times faster now than they did in the 1940's. He then pointed to salmon, shrimp and tilapia whose increased rate of growth was each approaching or exceeding that of chickens although due to breeding programs that started much more recently.

"So why is it that aquaculture species have such a sharp trajectory," Chamberlain said, "and they're almost overtaking chicken after so few years. The geneticists say it's because of the short life cycle, it's because of the tremendous number of offspring per spawn, and the fact that they've only recently come from the wild so there's tremendous genetic variabilities still left. What this translates to is the opportunity to have 10 or even 15% improvement per

generation like compounding interest. And it's not just growth, it's disease resistance, it's reproductive performance. It's tolerance of soybean meal in the diet. So many factors and we haven't reached consumer traits that might be important like coloration or thickness of their shell or whatever factors might be important.”

In [Genetically Modified Organisms and Aquaculture](#), John Beardmore and Joanne Porter of the University of Wales state that: “Aquaculture has a further problem in that the (almost always unintended) escapes of genetically distinct farmed fish are unpredictable and often large in numbers. Stenquist (1996) in discussing transgenics in open ocean aquaculture, quotes some relevant figures. Thus, 15 percent escapes for Atlantic salmon, escapes of 150000 salmon and 50000 trout in Chile and catch statistics for Atlantic salmon off Norway in which 15-20 percent of the fish caught were of farmed origin... in species like salmon where the farmed populations outnumber the wild populations by orders of magnitude, the effects of escapes of any genetically distinct genotype upon natural populations may be both deleterious and of significant size simply as a result of ‘swamping’.” They assert that the effects of transgenics on the welfare of genetically modified fish in aquaculture are “very poorly understood” and cite Devlin et al. (1995b) who “reported changes in colouration, cranial deformities and opercular overgrowth and lower jaw deformation in coho salmon transgenic for AFP and GH. After one year of development anatomical changes due to growth of cartilage in the cranial and opercular regions were more severe and reduced viability was evident.”

Beardmore and Porter looked unsuccessfully to locate systematic data on the incidence of the kinds of effects Devlin had described, indicating that the absence was probably due to animal welfare not being sufficiently widely recognised as an issue in relation to the use of GMOs.

Development Banks and Funding for Aquaculture

Throughout the world, there are development banks operating on a regional or global basis, and some have substantial portfolios of projects that include aquaculture or marine fisheries. At the same time, many have adopted sustainability guidelines that appropriately inhibit such investments. For example, the [Operational guidelines regarding capture fisheries and aquaculture](#) of the West African Development Bank (BOAD) delineate many adverse environmental consequences.

Some key international financial institutions:

The [International Fund for Agricultural Development \(IFAD\)](#) (Rome, Italy) is a specialized agency of the United Nations and an international finance institution that focuses on supporting food production projects in developing countries “together with smallholder farmers, pastoralists, artisanal fishers and other rural people.” Its Independent Office of Evaluation in December, 2018 examined [IFAD’s support to livelihoods involving aquatic resources from small-scale fisheries, small-scale aquaculture and coastal zones](#), finding that IFAD financial resources allocated to aquatic resources have been relatively stable, at 8.4 per cent of the Fund’s portfolio over 38 years. And also that: “the poorest households have frequently not been the primary beneficiaries, and that IFAD interventions have frequently

tended to favour those whose pre-existing assets and entitlements allow them to take advantage of IFAD's investments... Furthermore, more attention should be given to emerging issues such as Safety at Sea and the Decent Work Agenda, which have direct relevance for the livelihoods of all poor people."

Its recommendations included that "the recent and ongoing initiatives that introduced alternative livelihoods for fishing communities should be a source of lessons learned for the entire Fund."

The World Bank Group (Washington, DC, USA) has [Environmental and Social Safeguards \(ESS\)](#), which include animal husbandry and make reference to the [Good Practice Note: Improving Animal Welfare in Livestock Operations](#) developed by its member institution, the International Finance Corporation (IFC). The ESS refer to Good International Industry Practice (GIIP). And the Bank is now, itself, collaborating working to develop detailed Animal Welfare Good Practices in Agriculture Development. In 2013, it published a report [FISH TO 2030: Prospects for Fisheries and Aquaculture](#).

In 2018, [announcing an initiative](#) to raise \$3 billion US dollars in new sustainable development bonds, the World Bank stated that it "works with countries to promote strong governance of marine and coastal resources to support sustainable fisheries and aquaculture, make coastlines more resilient, establish coastal and marine protected areas, and reduce pollution. This 'Blue Economy' approach supports economic growth, social inclusion and the preservation or improvement of livelihoods while at the same time ensuring the environmental sustainability of oceans and coastal areas. The World Bank's active Blue Economy portfolio is worth US \$3.7 billion" and supports both marine animal and [seaweed](#) aquaculture.

The Global Program on Fisheries, known as [PROFISH](#), was established at the World Bank with the stated goal of engaging the Bank in improving environmental sustainability, human well-being, and economic performance in the world's fisheries and aquaculture, with a focus on the welfare of the poor in fisheries and fish farming communities in the developing world.

PROFISH played a lead role in coordinating the Blue Ribbon Panel to the Global Partnership for Oceans and its report [Indispensable Ocean](#). Its own publications include:

- [PROFISH Strategic Vision for Fisheries and Aquaculture](#) (2011)
- [PROFISH: Reforming Fisheries and Aquaculture for Global Benefits Evaluation Report](#) (2009)
- [Sunken Billions Revisited: Progress and Challenges in Global Marine Fisheries](#) (2017)
- [Fish to 2030: Prospects for Fisheries and Aquaculture](#) (2013)
- [Sunken Billions: The Economics Justification for Fisheries Reform](#) (2009)
- [Rising to Depletion? Towards a Dialogue on the State of National Marine Fisheries](#) (2009)
- [Reducing Disease Risk in Aquaculture](#) (2014)
- [Climate Change Adaptation in Fisheries and Aquaculture: Compilation of Initial Examples](#) (2014)

Some examples of Regional Development Banks supporting aquaculture:

- **[African Development Bank \(AfDB\)](#)** (Abidjan, Côte d'Ivoire) has been a principal supporter of [The Aquaculture Enterprise Development Project in Zambia](#). The development goal is to develop a domestic aquaculture subsector which serves as a viable and inclusive business opportunity through enhanced production and productivity to improve the livelihoods of men and women beneficiaries along the aquaculture value chain."
- **[Arab Bank for Economic Development in Africa \(BADEA\)](#)** (Khartoum, Sudan) has supported Regional Training Workshops on Aquaculture aiming to strengthen the capacity of African cadres working in the field of fisheries and aquaculture to increase production and enhance the strategy for food security.
- **[Development Bank of Latin America \(CAF\)](#)** (Caracas, Venezuela) has provided support for trout breeding and export microenterprises
- **[Inter-American Development Bank \(IDB\)](#)** (Washington, DC, USA) is currently supporting an aquaculture project in Lake Titicacaca in Peru that would entail use of a product "that introduces and expands IoT/data-driven practices in aquaculture mitigating the risk of overfeeding, which in turn decreases the risk of water pollution."
- **[European Investment Bank \(EIB\)](#)** (Kirchberg, Luxembourg) states that its "lending activities cover the whole agri-food and fishery value chain, ranging from input and equipment supply to wholesale and retail networks. The agriculture and fisheries sectors with their upstream and downstream industries are the key contributors to economic growth in the world's rural and coastal regions."

The degree to which such institutions in supporting aquatic animal aquaculture may require, and monitor, compliance with minimum standards for animal welfare, such as those developed by OIE regarding transport and slaughter, remains an open question and subject of potential communications.

Climate Change Mitigation

While there is much literature on the impacts of shifts in water temperature, ocean acidification, and other aspects of climate change on marine life, there is also now attention to how healthy populations of aquatic life play a key role in climate change mitigation.

Marine plants such as phytoplankton absorb carbon dioxide and are nourished by fecal plumes released by surfacing whales and nutrients stirred towards them by the movement of other sea creatures. Midwater (mesopelagic) fish tend to feed on plankton at the surface at night and then return to deep waters where their release of carbon-rich fecal pellets that sink toward the seafloor may sequester carbon for hundreds or thousands of years. When marine vertebrates die they may sink to the deep seabed with their carbon-rich remains becoming incorporated in marine sediments.

Relying on [work she and colleagues have accomplished](#) as part of the Grid Arendal [Blue Carbon Programme](#), marine biologist Heidi Pearson provides a helpful overview of those and other factors in [Sea creatures store carbon in the ocean – could protecting them help slow climate change?](#) and among her conclusions she asserts:

“Many governments and organizations around the world are working to rebuild global fish stocks, prevent bycatch and illegal fishing, reduce pollution and establish marine protected areas. If we can recognize the value of marine vertebrate carbon, many of these policies could qualify as climate change mitigation strategies. “

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