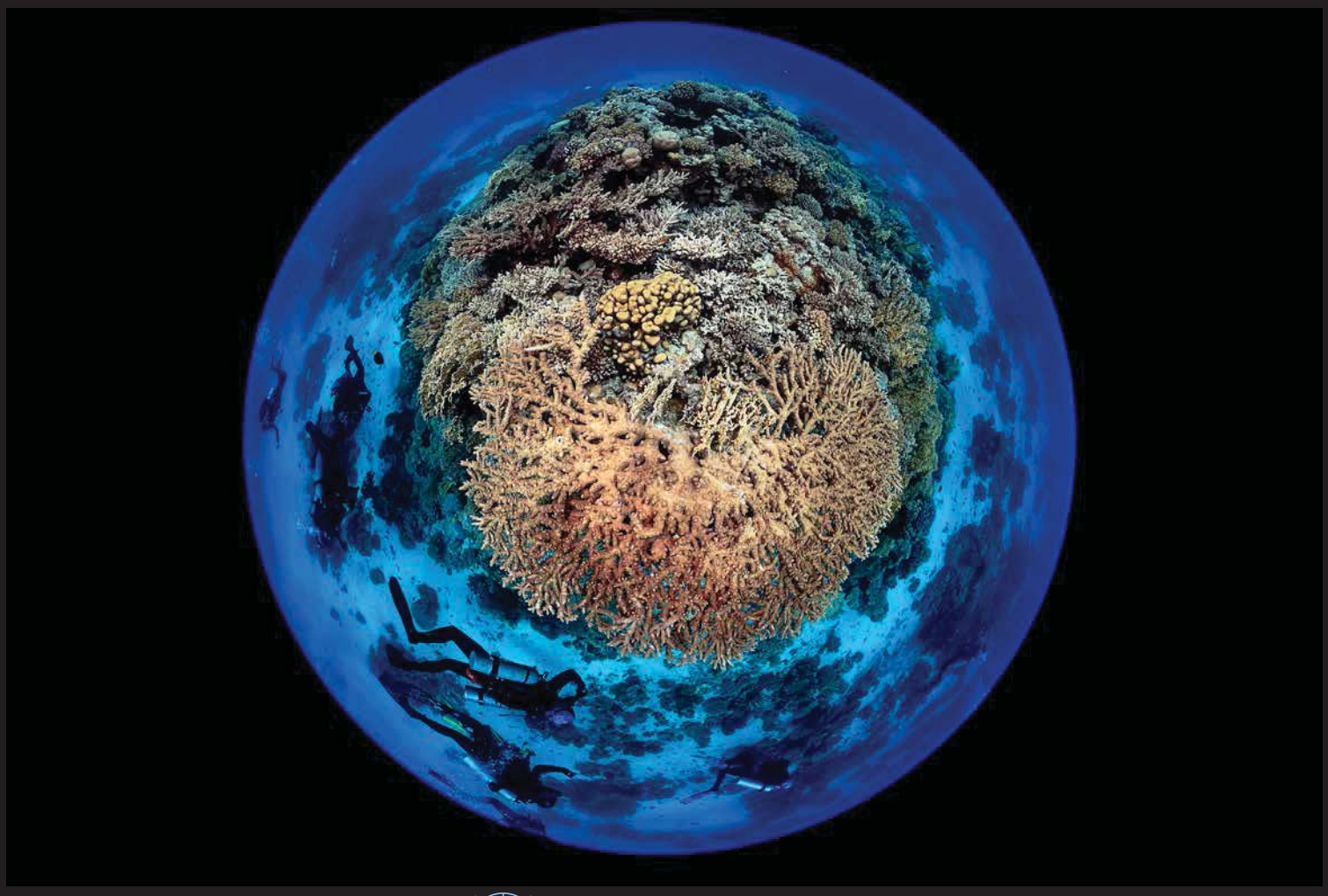
The Second World Ocean Assessment

WORLD OCEAN ASSESSMENT II

Volume I



United Nations

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Foreword

by the Secretary-General

The past year has presented unprecedented challenges. The coronavirus disease (COVID-19) pandemic has disrupted lives and livelihoods and exposed our societies' fragility. Sadly, the pandemic is not the only crisis that humanity faces. Climate change and biodiversity loss continue unabated, threatening sustainable development and our viability as a species. These challenges are particularly evident when we look at the state of our planet's life support system, the ocean.

In 2015, the first *World Ocean Assessment* warned that many areas of the ocean had been seriously degraded, the greatest threat to the ocean being the failure to deal with the many pressures caused by human activities. The message in the second *World Ocean Assessment* is that the situation has not improved, with the many benefits that the ocean provides at risk. The *Assessment* advises that, to ensure sustainability, we must work together to improve integrated ocean management, including through joint research, capacity development and the sharing of data, information and technology.

The ocean plays a crucial role in the achievement of the Sustainable Development Goals and the livelihoods of billions of people. We urgently need to change how we interact with it. The forthcoming United Nations Decade of Ocean Science for Sustainable Development and the United Nations Decade on Ecosystem Restoration provide opportunities for us to understand more and to reverse the damage that has already been done. The information in the second *Assessment* can assist in this process, as well as inform relevant intergovernmental conferences scheduled for 2021.

I urge leaders and all stakeholders to heed the warnings in the *Assessment* as we work to conserve and sustainably manage our planet's marine environment. Let us foster not only a green but also a blue recovery from the COVID-19 pandemic.

António Guterres

Summary

In its resolutions 57/141 and 58/240, the General Assembly decided to establish a regular process under the United Nations for global reporting and assessment of the state of the marine environment, including socioeconomic aspects, both current and foreseeable, building on existing regional assessments. In its resolution 71/257, the Assembly recalled that the scope of the first cycle of the Regular Process focused on establishing a baseline and decided that the scope of the second cycle would extend to evaluating trends and identifying gaps. The programme of work for the period 2017–2020 of the second cycle of the Regular Process includes the preparation by the Group of Experts of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, of the second *World Ocean Assessment*, building on the baselines established by the First Global Integrated Marine Assessment (first *World Ocean Assessment*). In its resolution 72/73, the Assembly decided that the Group of Experts should proceed on the basis of a single comprehensive assessment. The present document was prepared by the Group of Experts in accordance with those decisions.

Preface

The goal for the General Assembly in creating the Regular Process for the Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, was to ensure a comprehensive overview of the ocean and the relationships between the ocean and humans, covering all environmental, social and economic aspects. Such an overview would serve as a background to the many decisions that must be taken in that field at the international, national and local levels in pursuit of sustainable development. The first *World Ocean Assessment* was completed in 2015 and represents a major step towards that goal.

Inevitably, with such an ambitious goal, not only were some aspects not fully covered in the first output of the Regular Process, but also, as time passed, the assessment that was made up to 2015 needed to be updated. The General Assembly therefore provided for further global integrated marine assessments to record developments from the baseline provided by the first Assessment and, where possible, to show trends. In 2016, it decided that a second comprehensive assessment should be prepared by the end of 2020.

The present volume contains the second *World Ocean Assessment*. It provides more information on aspects of the ocean and its relationships with humans, including separate assessments of the abyssal plains and marine hydrates, and brings together in specific chapters matters that were addressed in different sections of the first Assessment, such as the state of fish species and marine infrastructure.

As with the first Assessment, the production of the present Assessment has been a major task, relying essentially on voluntary efforts of hundreds of experts in many fields, with support from the regular budget of the United Nations. As before, it has been a privilege for the Group of Experts of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, to organize, contribute to and finalize the Assessment. Crucial support has again been provided by the Secretariat, including the Division for Ocean Affairs and the Law of the Sea, several international organizations and a number of States Members of the United Nations, as detailed in chapter 2. The Group of Experts is grateful to all those people and institutions but, under the terms of reference and working methods endorsed by the General Assembly, is ultimately responsible for the final text.

The bulk of the text was written before the outbreak of the coronavirus disease (COVID-19) pandemic. Some mention of the effects of that pandemic has been included (for example, in the sections of chapter 8A dealing with fisheries, shipping and tourism), but the full implications of the pandemic on human interactions with the ocean are still being worked out and will need to be explored fully in the third cycle of the Regular Process. Nevertheless, the ocean and the services that it provides will have an important role in the recovery from the pandemic. It is hoped that the information in the present Assessment will help with that process.

As with the first Assessment, the present document contains no policy analysis or recommendations, in line with the guidance endorsed by the General Assembly. It is therefore for national Governments and competent international authorities to decide what action should be taken in the light of the assessments under the Regular Process.

Renison Ruwa and Alan Simcock
Joint Coordinators of
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Member of the Group of Experts of the
Regular Process, assisting the Joint Coordinators

Contents

Volume I

Volume II

Chapter 1
Overall summary

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Keynote points

- Understanding of the ocean continues to improve. Innovations in sensors and autonomous observation platforms have substantially increased observations of the ocean. Regional observation programmes have expanded, with better coordination and integration.
- Some responses for mitigating or reducing pressures and their associated impacts on the ocean have improved since the first *World Ocean Assessment*.[1] They include the expansion and implementation of management frameworks for conserving the marine environment, including the establishment of marine protected areas and, in some regions, improved management of pollution and fisheries. However, many pressures from human activities continue to degrade the ocean, including important habitats, such as mangroves and coral reefs. Pressures include those associated with climate change; unsustainable fishing, including illegal, unreported and unregulated fishing; the introduction of invasive species; atmospheric pollution causing acidification and eutrophication; excessive inputs of nutrients and hazardous substances, including plastics, microplastics and nanoplastics; increasing amounts of anthropogenic noise; and ill-managed coastal development and extraction of natural resources.
- There continues to be a lack of quantification of the impacts of pressures and their cumulative effects. A general failure to achieve the integrated management of human uses of coasts and the ocean is increasing risks to the benefits that people draw from the ocean, including in terms of food safety and security, material provision, human health and well-being, coastal safety and the maintenance of key ecosystem services.
- Improving the management of human uses of the ocean to ensure sustainability will require improved coordination and cooperation to provide capacity-building in regions where it is lacking, innovations in marine technology, the integration of multidisciplinary observation systems, the implementation of integrated management and planning and improved access to, and exchange of, ocean knowledge and technologies.
- The coronavirus disease (COVID-19) pandemic is having a major effect on many human activities carried out in the ocean. The full implications of the pandemic on human interactions with the ocean are still to be fully assessed.

1. Introduction

The ocean covers more than 70 per cent of the surface of the planet and forms 95 per cent of the biosphere. Changes in the ocean drive weather systems that influence both land and marine ecosystems. The ocean and its ecosystems also provide significant benefits to the global community, including climate regulation, coastal protection, food, employment, recreation and cultural well-being. Those benefits depend, to a great extent, on the maintenance of ocean processes, marine biological diversity and related ecosystem services.

[1] United Nations, *The First Global Integrated Marine Assessment: World Ocean Assessment I* (Cambridge, Cambridge University Press, 2017).

Concerned by the declining state of the ocean, States Members of the United Nations, through the General Assembly, established the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects. The aim of the Regular Process is to provide an evaluation of the state of the global ocean, the services that it provides and the human activities that influence its state. The first *World Ocean Assessment* was completed in 2015. It concluded that many parts of the ocean had been seriously degraded and that, if the problems that it described were not addressed, they would produce a destructive cycle of degradation in which the ocean could no longer provide many of the benefits on which humans rely. As part of the work identified for the second cycle of the Regular Process, three process-specific technical abstracts were produced, summarizing the content of the first *World Ocean Assessment* in relation to climate change, biodiversity in areas beyond national jurisdiction and Sustainable Development Goal 14, on life below water (see General Assembly resolution 70/1).

The second *World Ocean Assessment* provides an update to the first Assessment, taking into account developments and changes known to have occurred since 2015, and complements it by describing further human interactions with the ocean. Most of the text of the second Assessment was written before the outbreak of the COVID-19 pandemic, and it will take time for the full implications of the pandemic to become apparent. Where appropriate, the second Assessment provides an evaluation of how the developments and changes since the first *World Ocean Assessment* contribute to the achievement of relevant Sustainable Development Goals. Developments and changes relevant to the societal goals of the United Nations Decade of Ocean Science for Sustainable Development (see resolution 72/73) are also indicated.

2. Drivers

In the second *World Ocean Assessment*, drivers are characterized as social, demographic and economic developments in societies, including changes in lifestyles and associated consumption and production patterns that apply pressures to the ocean (chap. 4). Relationships between drivers and pressures (and their impacts) are complex and dynamic, with interlinkages leading to cumulative interactions. The drivers identified in chapter 4 are:

(a) **Population growth and demographic changes.** The world's population continues to grow, although the rate of growth has slowed from the rates observed in the late 1960s, with rates of international migration also increasing. The extent to which an increasing global population places pressure on the marine environment varies, depending on a range of factors, including where and how people live, their consumption patterns and technologies used to produce energy, food and materials, provide transport and manage waste;

(b) **Economic activity.** Economies continue to grow globally, although at a slower pace than reported in the first *World Ocean Assessment*, as a result of weaker manufacturing and trade. As the global population has grown, demand for goods and services has increased, with associated increases in energy consumption and resource use. Many countries have developed, or are developing, strategies for growing ocean-based economies (the blue economy). However, an important constraint on the growth of ocean economies is the current

declining health of the ocean and the *pressures being placed on it;*

(c) **Technological advances.** Advances in technology continue to increase efficiency, expand markets and enhance economic growth. Innovations have enabled outcomes for the marine environment that are both positive (such as increasing efficiencies in energy generation) and negative (such as overcapacity in fisheries);

(d) **Changing governance structures and geopolitical instability.** At both the international and national levels, improved methods of cooperation and implementation of effective policies across some regions have contributed to reducing some pressures on the ocean. However, in regions where there is conflict over access to resources and maritime boundaries, policies and agreements focused on sustainability can be undermined;

(e) **Climate change.** Anthropogenic greenhouse gas emissions have continued to rise, causing further long-term climate changes, with widespread effects throughout the ocean that will persist for centuries and affect the ocean. The impacts of climate change have been recognized by the Conference of the Parties to the United Nations Framework Convention on Climate Change in its decision 1/CP.21, by which it adopted the Paris Agreement,[2] aimed at strengthening the global response to threats from climate change.

The global influence of the five drivers is not uniformly distributed. Human populations are not evenly dispersed, and population growth varies among countries and regions. Geographical disparities in economic growth have been increasing since the 1980s. Associated differences in technological advances mean that some countries can extract resources from previously inaccessible areas, with the probability of increased pressures in those regions. Many regions, in particular those with least developed countries, still lack access to technologies that can assist in using marine resources sustainably.[3] Regional disputes and geopolitical instabilities may impede the implementation of global and regional treaties and agreements, thereby affecting economic growth, the transfer of technologies and the implementation of frameworks for managing ocean use. The effects of climate change are also not uniform, with some regions, including the Arctic Ocean, warming at higher rates than the global average (chap. 5).

3. Cleaning up the ocean

The lack of appropriate wastewater treatment and the release of pollutants from the manufacturing industry, agriculture, tourism, fisheries and shipping continue to put pressure on the ocean, with a negative impact on food security, food safety and marine biodiversity. Marine litter, ranging from nanomaterials to macromaterials, is a further problem, given that, in addition to the damage caused by its presence, it can also carry pollutants and non-indigenous species over long distances (chaps. 10–12).

2 See FCCC/CP/2015/10/Add.1, decision 1/CP.21, annex.

3 Unless otherwise indicated, "sustainable" and "sustainability" are used with reference to all aspects – environmental, social and economic.

3.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.1:
By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

Decade of Ocean Science outcome:
A clean ocean where sources of pollution are identified and reduced or removed

Concentrations of some pollutants (such as persistent organic pollutants and metals) in some regions are declining, but information on concentrations is not spatially uniform. Knowledge gaps remain with regard to not only recognized but also emerging pollutants. In several regions, capacity gaps remain in applying consistent, coherent policies and related enforcement to prevent and control inputs of pollutants into the ocean (chaps. 10–12 and 20).

The particular ways in which progress towards other Sustainable Development Goals will assist in the achievement of target 14.1 are set out in table 1, and the particular ways in which the achievement of that target will assist with progress towards other Goals are set out in table 2.

3.2. Nutrient pollution

Anthropogenic inputs of nitrogen and phosphorus into coastal ecosystems from direct discharges, land run-off, rivers and the atmosphere have generally continued to rise, even though better control of their release is reducing inputs into some bodies of water. Owing to excessive inputs of such nutrients, eutrophication is an increasing problem, and the number of hypoxic zones (sometimes called "dead zones") has increased from more than 400 globally in 2008 to approximately 700 in 2019. The ecosystems most affected include the northern part of the Gulf of Mexico, the Baltic Sea, the North Sea, the Bay of Bengal, the South China Sea and the East China Sea. It is estimated that coastal anthropogenic nitrogen inputs will double during the first half of the twenty-first century. In addition, deoxygenation is projected to worsen through increases in ocean temperatures and changes in stratification and ocean currents driven by climate change (chap. 5), in particular in coastal regions of Africa, South America, South and South-East Asia and Oceania (chap. 10).

3.3. Hazardous substances

Industrial development and the intensity of agriculture have continued to increase, resulting in both ongoing and new inputs of hazardous substances into the ocean. New types of input include pharmaceuticals, personal care products and nanomaterials that cannot be removed by wastewater treatment in many parts of the world. The detection of pharmaceuticals and personal care products is increasing across the ocean, including in the Arctic Ocean and the Southern Ocean. A number of such products have been observed to cause harm to plants and animals, but the scale of the impact on marine organisms is unknown, largely because they are generally not monitored (chap. 11).

Although the Stockholm Convention on Persistent Organic Pollutants[4] has generally had a positive effect on global concentrations, persistent organic pollutants continue to be detected in marine areas and in marine species far from their sources of production and use. Even low concentrations have been shown to reduce reproductive success in marine species, including Arctic seals. In most ocean regions, information on trends is lacking (chap. 11).

[4] United Nations, *Treaty Series*, vol. 2256, No. 40214.

The Minamata Convention on Mercury[5] has generally reduced global mercury concentrations, with evidence, in most regions, that mercury concentrations in the ocean are levelling off. However, a slight increase in concentrations of some metals in higher trophic organisms has been reported. To better assess metal concentration trends, expanded coastal time-series analyses are needed globally, including of levels of metal nanomaterials in the ocean (chap. 11).

Concentrations of most radioactive substances continue to decrease through the decay of historical inputs. There have been no major nuclear accidents since 2011, and discharges from nuclear reprocessing plants in Europe continue to decrease substantially. Smaller amounts of radionuclides continue to be released by nuclear power reactors in 30 countries (chap. 11).

Globally, the number of shipping accidents has continued to decrease: an annual average of 88 ships of more than 100 gross tonnage were lost between 2014 and 2018, compared with 120 in the preceding five years. Progress is being made in reducing air pollution from ships. The number of oil spills has remained low: an annual average of 6 spills of more than seven tons from oil tankers occurred between 2010 and 2018, compared with an annual average of 18 spills in the previous decade. Offshore oil and gas installations also release hydrocarbons into the marine environment, but the long-term impacts of such releases remain unknown (chaps. 11 and 19).

3.4. Solid waste

Inputs of solid waste into the ocean (including marine litter) from unintentional releases and the intentional dumping of waste are largely unquantified around the world. Plastics represent up to 80 per cent of marine litter, with annual inputs into the ocean from rivers estimated at 1.15–2.41 million tons. The presence of plastics has been recorded in more than 1,400 marine species. Less is known about the effects of microplastics (pieces of less than 5 mm) and nanoplastics (pieces of less than 100 nm), although nanoplastics have been observed to enter the cells of organisms. Those two groups of plastics are derived from both the breakdown of macroplastics and deliberate manufacture (e.g., as ingredients in personal care products). The dumping of sewage sludge and organic and inorganic waste remains limited, with the dumping of sewage sludge continuing to decline as a result of the implementation of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter of 1972 (the London Convention)[6] and the 1996 Protocol thereto,[7] and many regional conventions. However, insufficient reporting under those agreements remain, resulting in uncertainties in the extent of the dumping of waste. Munitions dumped at sea continue to present low risks to the marine ecosystem and (when caught in nets) to fishers. Recent research, however, suggests that the release of compounds from munitions might have sublethal genetic and metabolic effects in marine organisms (chap. 12).

3.5. Noise

Anthropogenic noise affecting the oceans comes from many sources (e.g., vessels, oil and gas exploration and extraction, industrial activities and sonar) and varies across space and time. The regions most affected are those characterized by heavy industrial use, such as the Gulf of Mexico, the North Sea and the Atlantic Ocean. Unlike many other sources of marine pollution, noise does not persist once the sound source has been removed from the

5 UNEP(DTIE)/Hg/CONF/4, annex II. The Convention entered into force on 16 August 2017.
6 United Nations, *Treaty Series*, vol. 1046, No. 15749.
7 The London Protocol entered into force on 24 March 2006.

environment. Understanding the impacts of anthropogenic noise on marine biodiversity has increased over the past two decades, with a range of direct and indirect impacts observed across a number of taxa, from zooplankton to marine mammals. Understanding of those impacts has improved in parallel with increasing recognition of the need to monitor noise entering the marine environment and to identify and reduce its impacts. While some efforts are being made to reduce noise created by a variety of sources, increasing use of the ocean is likely to offset those efforts (chap. 20).

3.6. Key knowledge and capacity-building gaps

Methods for standardizing the monitoring of pollutants, including noise, and data sets are needed urgently, so that both spatial and temporal differences in pollutants can be evaluated and priorities established. Capacity-building is needed to reduce the input of pollutants into the ocean, in particular through the introduction of cleaner production, quieter technologies and cheaper and readily deployable wastewater-processing technologies. To reduce the duplication of efforts, the creation of a general database on hazardous substances and a baseline of ambient noise would be desirable to support risk assessment and modelling. As the extent of transboundary marine pollution is poorly understood in many parts of the world, in particular with regard to airborne pollutants, more accurate data on their emissions and transport are needed. Lastly, it is necessary to gain a much better understanding of the effects of pollutants, including anthropogenic noise, on the marine environment (chaps. 10–12 and 20).

4. Protecting marine ecosystems

The main threats to marine ecosystems come from human activities, such as fishing, aquaculture, shipping, sand and mineral extraction, oil and gas exploitation, the building of renewable energy infrastructure, coastal infrastructure development and pollution, including the release of greenhouse gases.

4.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.2:
By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

Sustainable Development Goal target 14.5:
By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

Decade of Ocean Science outcome:
A healthy and resilient ocean where marine ecosystems are understood, protected, restored and managed

Many marine species and habitats continue to be adversely affected by increasing anthropogenic pressures (chaps. 6A–G and 7A–Q; see also sect. 5 below). Understanding of the distribution and status of species and habitats and how they are being affected by anthropogenic pressures is improving. In 2020, marine protected areas covered 18 per cent of the ocean within national jurisdictions, representing approximately 8 per cent of the entire ocean, while about 1 per cent of marine areas beyond national jurisdiction had been protected (chap. 27).

The particular ways in which progress towards other Sustainable Development Goals will assist in the achievement of targets 14.2 and 14.5 are set out in table 1, and the particular ways in which the achievement of those targets will assist with progress towards other Goals are set out in table 2.

The protection of marine ecosystems is embedded in various international agreements, such as the United Nations Convention on the Law of the Sea[8] and the Convention on Biological Diversity,[9] as well as in regional conventions and national legislation. Notwithstanding the objectives of such agreements and conventions, the status of many marine species and habitats continues to decline globally, thereby putting the functioning of ecosystems at risk. In addition, climate change is resulting in ocean warming, acidification, changes in circulation, dissolved oxygen concentrations and water cycle amplification. As a result, the transfer of nutrients associated with primary productivity from surface waters to the deep sea is declining. Globally, about 2,000 marine species have been introduced outside their natural range as a result of human activities (chaps. 5, 6A–G, 7A–Q and 22).

Many management frameworks for protecting marine ecosystems have a sectoral focus and can therefore have differing objectives for the protection of the marine environment across sectors. Management tools can be area-based (such as marine protected areas and fishery closures) or non-area-based (such as global emission controls, catch and effort controls and technical restrictions). Management approaches are increasingly moving away from being focused on sectoral use towards including diverse links between ecological and social, economic and cultural aspects. The ecosystem approach integrates environmental, social and economic aspects at the global, regional, national or local level. Cultural information is becoming an integral part of management frameworks, both in the context of community-based management and for safeguarding the cultural dimension of the marine environment. Such information can be diverse and intangible, such as traditional marine resource use, sea routes, ancient navigational skills, maritime identities, legends, rituals, beliefs and practices, aesthetic and inspirational qualities, cultural heritage and places of spiritual, sacred and religious importance (chap. 27).

In some areas, in particular in South-East Asia, "blue infrastructure development", as well as such approaches as nature-based solutions, are being introduced in an attempt to harmonize coastal development and protection with habitat and ecological protection (chaps. 8A, 13 and 14).

4.2. Coastal ecosystems

Notwithstanding increases in marine protected areas and the expansion of Ramsar Sites,[10] mangroves (except in the Red Sea) and seagrass meadows (in particular in South-East Asia) continue to decline, with 19 per cent of mangroves and 21 per cent of seagrass species identified as near-threatened. The combined effects of ocean warming and human activities are increasingly affecting tropical and subtropical coral reefs and kelp forests globally. In recent years, coral reefs have undergone mass bleaching on an annual basis, while kelp forests have been affected by marine heatwaves (chap. 9), resulting in rapid losses (chaps. 6G, 7D and 7H).

Overall, about 6 per cent of known fish species and nearly 30 per cent of elasmobranch species are listed as Near Threatened or

8 United Nations, *Treaty Series*, vol. 1833, No. 31363.
9 Ibid., vol. 1760, No. 30619.
10 See Convention on Wetlands of International Importance especially as Waterfowl Habitat (United Nations, *Treaty Series*, vol. 996, No. 14583).

Vulnerable. Globally, the status of marine mammals varies, with 75 per cent of species in some groups (sirenians, freshwater dolphins, polar bears and otters) being classified as Vulnerable, Endangered or Critically Endangered. Many large whale species are now recovering from past harvesting as a result of prohibitions on and the regulation of commercial catches and national recovery plans. The conservation status of marine reptiles has varied greatly: protection in certain regions has increased some populations, while those in other areas are declining because of continuing or increasing threats. The global conservation status of seabirds has worsened, with over 30 per cent of species now listed as Vulnerable, Endangered or Critically Endangered (chaps. 6C–F).

4.3. Open ocean and deep-sea ecosystems[11]

The open ocean continues to be affected by ocean warming, acidification, deoxygenation and marine pollution. Nutrient inputs derived from the Amazon River and brought up by upwelling off the coast of West Africa appear to have fuelled a massive seaweed bloom of floating sargassum: the 20-million-ton bloom began to develop in 2011 in the equatorial Atlantic Ocean and, by 2018, had extended 8,850 km across that area (chaps. 7N, 10 and 12).

Understanding of the distribution of cold-water corals has increased, and they are known to occur along continental margins, mid-ocean ridges and seamounts worldwide. They and other deep-sea features (seamounts, pinnacles, ridges, trenches, hydrothermal vents and cold seeps) remain under threat from fishing, offshore oil drilling, deep-sea mining and pollution, including plastic waste, and, to a lesser extent, climate change. Some efforts to curb deep-water bottom trawling and establish marine protected areas where cold-water corals occur have partially restored some damaged cold-water coral communities. However, such habitats can take decades or even centuries to recover, making it difficult to identify trends of improvement (chaps. 7E, 7L, 7O and 7P).

4.4. Key knowledge and capacity-building gaps

Since 2015, on average, one new species of fish has been described per week, highlighting how much remains to be discovered. Although knowledge of ecosystem composition and functioning has improved since the issuance of the first Assessment, gaps remain, in particular with regard to deep-sea ecosystems and open-ocean planktonic and benthic species. Gaps also remain in understanding the biology and ecology of coastal species, in particular in the territorial waters of developing countries. There is no well-organized structure to study the approximately 2,000 non-indigenous species that have spread to new areas as a result of human activities and their impacts on natural ecosystems. The conservation status of less than 1 per cent of macroalgal species has been assessed (chaps. 6A–C, 6G, 7N and 22).

While the ecosystem approach has been widely acknowledged as an effective framework for managing human impacts, further research and capacity-building are needed to realize its full potential across the world's oceans. In many regions, there is a lack of information needed to establish links between ecological causes and effects in order to balance them against socioeconomic priorities, in decision-making. Enhanced collaboration in monitoring will help in sharing capacity across sectors and institutions and provide more efficient monitoring, data and information. Increased capacity in understanding management approaches and implementing them will support Governments and other stakeholders in understanding options for the management and governance of marine areas (chap. 27).

[11] See chap. 2, sect. 4, for a definition of the terms "open ocean" and "deep sea".

5. Understanding of the ocean for sustainable management

The sustainable use of the ocean cannot be achieved before acquiring a deep understanding of ocean processes and its functioning, as well as coherent knowledge of the impacts of human activities on the ocean (chaps. 8A and 27).

5.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.3:
Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

Sustainable Development Goal target 14.a:
Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries

Decade of Ocean Science outcomes:

- **A predicted ocean where society understands and can respond to changing ocean conditions**
- **An accessible ocean with open and equitable access to data, information and technology and innovation**
- **An inspiring and engaging ocean where society understands and values the ocean in relation to human well-being and sustainable development**

The input of carbon dioxide into the ocean is continuing, albeit in an irregular manner, resulting in acidification of the ocean. Compounded with other pressures, it has a negative impact on a wide range of organisms, in particular those that form calcium carbonate shells, with the potential to alter biodiversity and ecosystem structure. Ocean acidification, combined with rising temperatures, sea level rise, deoxygenation and increasing extreme climate events, further threatens the goods and services provided by coastal ecosystems (chaps. 5 and 9).

Scientific understanding of the ocean, its functioning and the impacts on it grows ever faster. However, in many parts of the ocean, knowledge and capacity-building gaps remain, in particular in areas beyond national jurisdiction. Quantification of the cumulative effects of pressures on the ocean is nascent, as is the quantification of comprehensive and standardized indicators of ocean health. The capacity to enable people to have access to and use scientific understanding remains a requirement for applying integrated approaches to the management of human impacts on the ocean (chaps. 3, 25 and 27).

The particular ways in which progress towards other Sustainable Development Goals will assist in the achievement of targets 14.3 and 14.a are set out in table 1, and the particular ways in which the achievement of those targets will assist with progress towards other Goals are set out in table 2.

5.2. Global scientific understanding

Innovations in technology and engineering related to sensors and autonomous observation platforms have allowed for ocean data collection at finer temporal and spatial resolutions and expanded those observations into remote areas. Cost-effective and user-friendly sensors, along with mobile applications, the enhanced participation of citizens and the deployment of sensors on non-scientific ships, are also facilitating the expanded collection of ocean observations. Such developments have increased understanding of physical and

biogeochemical systems in the ocean and how the ocean is changing in response to climate change, as well as enhanced ocean modelling capabilities on the global and regional scales (chaps. 3 and 5).

The promotion of networking and the coordination of regional observation programmes have contributed to the further development of global ocean observations within an integrated system. The standardization and harmonization of observation methods are also being pursued through international initiatives. Platforms to share best practices in ocean observation, data-sharing and community dialogues have also been established, with the aim of improving the effective use of ocean data for the benefit of society (chap. 3).

5.3. Sustainable management

Over the past two decades, many frameworks for assessing interactions between human activities and natural events ("cumulative effects") have been developed using different approaches and terminologies and applied on differing scales. Along with other assessments of the environment, they include environmental impact assessments and strategic environmental assessments and are useful tools for informing marine spatial planning and resource management (chaps. 25–27).

Both marine spatial planning and management frameworks comprise a spectrum of processes but have unified objectives of identifying users of the marine environment, planning the activities of those users and effecting some form of regulation of that use to ensure sustainability. In general, marine spatial planning has been most effectively developed with the involvement of all relevant authorities and stakeholders and has included economic, environmental and social perspectives. Social perspectives and social and cultural values are increasingly recognized in management frameworks, but reconciling a multiplicity of heterogenous values is a challenge. Addressing multiple values is best done by engaging with affected communities, hence the need to recognize community-based management that is sensitive to the cultural dimensions of the sea within ecosystem approaches to management. Increased understanding of the rights, tenures and traditional and indigenous customary uses of inshore marine environments has catalysed recognition of the strengths of community-based management. Culture is potentially powerful, as both a factor to be managed and monitored and the foundation upon which management-incorporating ecosystem approaches may be developed in the context of sustainable development (chaps. 26 and 27).

5.4. Key knowledge and capacity-building gaps

Globally, disparities remain in knowledge to support ecosystem-based management. Most research and information available (based on the number of publications) relates to the North Atlantic Ocean, the North Pacific Ocean and the Arctic Ocean. Disparities in infrastructure and professional capacities limit ocean research, resulting in regional and national disparities in scientific understanding. To better monitor significant changes in physical and biogeochemical environments and their impacts on ecosystems and society, further integration of multidisciplinary observation systems and improved models are needed. Innovation in funding strategies is also required to sustain such systems (chap. 3).

Most assessments of cumulative effects tend to be focused on existing and past activities in the marine environment. Similarly, much marine spatial planning has been carried out in areas where activities are ongoing, and many management frameworks are applied to existing activities with regard to resource extraction and use, making them retrospective in nature. Assessments that allow for "foresighting" are needed to inform planning of future activities

and support management that is adaptive to future conditions and sustains ecosystems and human well-being. Developing such approaches is not straightforward and will require substantial effort. Increased capacity in transboundary cooperation, the strengthening of science-policy capacity, greater coordination between social and natural sciences and between science and civil society, including industry, and the recognition of traditional knowledge, culture and social history are needed to support holistic management (chaps. 25–27).

6. Promoting safety from the ocean

A wide range of events in and on the ocean threaten those who live near or work on the ocean or rely on it for food. Examples of such events are tsunamis, storm surges, rogue waves, cyclones, hurricanes and typhoons, coastal flooding, erosion, marine heatwaves and harmful algal blooms. The ocean plays an important role in driving hydrological variability, such as droughts and pluvials over land, on intraseasonal to interannual (and longer) timescales (chap. 9). Such events, together with various effects of hazardous substances and excessive nutrients, have the potential to threaten food security and hamper sustainable economic development.

6.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.1:
By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

Sustainable Development Goal target 14.3:
Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

Decade of Ocean Science outcome:
A safe ocean where life and livelihoods are protected from ocean-related hazards

Marine heatwaves and tropical cyclones, hurricanes and typhoons are increasing in frequency and severity as a result of climate change, but such increases can be reduced by climate change mitigation efforts. As indicated above, the ocean also drives hydrological variability over land. The construction of dams and reservoirs is, in some areas, reducing sediment supply to the coast by more than 50 per cent, leading to the erosion of deltas and adjacent coasts. As a result of nutrient pollution, harmful algal blooms are becoming more frequent. The number of pollutants in the ocean continues to increase, and therefore the mixtures to which biotas are exposed and that are integrated into food systems are becoming more complex (chaps. 9–11 and 13).

The particular ways in which progress towards other Sustainable Development Goals will assist in the achievement of targets 14.1 and 14.3 are set out in table 1, and the particular ways in which the achievement of those targets will assist with progress towards other Goals are set out in table 2.

6.2. Hazards from the ocean

In addition to continuing threats such as tsunamis, climate change is increasingly affecting areas and their associated communities not previously exposed to rising sea levels. Such rises can also exacerbate coastal erosion. Precipitation, winds and extreme sea level events associated with tropical cyclones have increased in recent decades, as has the annual

global proportion of category 4 or 5 tropical cyclones. There are increasing risks to locations that had historically not been exposed to storms, owing to unprecedented storm trajectories. The management of risks from changing storm trajectories and storm intensity proves challenging because of the difficulties of early warning and the reluctance of affected populations to respond (chaps. 9 and 13).

Over the past two decades, marine heatwaves have had negative impacts on marine organisms and ecosystems in all ocean basins. Such events are projected to increase in frequency, duration, spatial extent and intensity under future global warming, thus pushing some marine organisms, fisheries and ecosystems beyond the limits of their resilience, with cascading impacts on economies and societies. Coastal erosion, driven by, for example, decreased fluvial sediment supply to the coast owing to changed river management, coastal sand mining and longshore impoundment by coastal structures, is increasingly causing problems. Changes in the coastal profile following the destruction of mangroves, salt marshes and barrier islands add to such problems. Inputs of nitrogen and phosphorus to coastal ecosystems through river run-off and atmospheric deposition have increased owing to the use of synthetic fertilizers, the combustion of fossil fuels and the direct input of municipal waste. That is leading to an increase in harmful algal blooms, including toxic algal events, which, inter alia, can lead to shellfish and fish becoming poisonous, thus causing paralysis and other illnesses in humans (chaps. 9, 10 and 13).

6.3. Key knowledge and capacity-building gaps

Improved understanding of the ocean and its interrelation with the atmosphere is essential to improving human safety in extreme weather events. Similarly, better understanding of the scale, progress and distribution of pollution and of coastal dynamics is needed. The need to strengthen and harmonize warning systems for reducing the risks associated with ocean hazards is identified in the Sendai Framework for Disaster Risk Reduction 2015–2030.[12] Progress is needed on forecasting systems for hazards, emergency planning and warnings should be expanded and preparation frameworks should be implemented to ensure a rapid response for affected communities. Integrated systems that allow for forecasting, detection and response to multiple hazards are required (chaps. 9–14).

7. Sustainable food from the ocean

Animal protein from the seas provides about 17 per cent of all animal protein consumed by humans and supports about 12 per cent of human livelihoods. It is largely derived from wild fisheries, although the contribution of aquaculture to food security is growing rapidly and has greater potential for growth than capture fisheries. Fishing practices place multiple stressors on the marine environment in many regions, and the expansion of aquaculture brings new or increased pressures on marine ecosystems, in particular in coastal areas (chaps. 15–17).

[12] General Assembly resolution 69/283, annex II.

7.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.4:
By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

Sustainable Development Goal target 14.6:
By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated 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 World Trade Organization fisheries subsidies negotiation[13]

Sustainable Development Goal target 14.7:
By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

Sustainable Development Goal target 14.b:
Provide access for small-scale artisanal fishers to marine resources and markets

Decade of Ocean Science outcome:
A productive ocean supporting sustainable food supply and a sustainable ocean economy

The particular ways in which progress towards other Sustainable Development Goals will assist in the achievement of targets 14.4, 14.6, 14.7 and 14.b are set out in table 1, and the particular ways in which the achievement of those targets will assist with progress towards other Goals are set out in table 2.

7.2. Marine capture fisheries

Estimated global landings of marine capture fisheries increased by 3 per cent to 80.6 million tons, valued at $127 billion (at 2017 prices), between 2012 and 2017. About 33 per cent of the world's fish stocks, especially at higher trophic levels, are classified as being fished at biologically unsustainable levels, with close to 60 per cent maximally sustainably fished.[14] The sustainability of many of the world's capture fisheries continues to be hampered by overexploitation, overcapacity, ineffective management, harmful subsidies, by-catch, in particular of threatened, endangered and protected species, and illegal, unreported and unregulated fishing, with ongoing habitat degradation and loss of gear creating further pressures on the marine environment. Overfishing is estimated to have led to an annual loss of $88.9 billion in net benefits. Fish markets continue to exhibit fast-paced globalization, thus increasing the vulnerability of small-scale fisheries to the depletion of locally important stocks. Negotiations under the auspices of the World Trade Organization on reducing harmful fishery subsidies have continued, although no firm agreement has yet been reached. Less than 40 per cent of States have signed the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing[15] of 2009. The application of information technology to help to expand the opportunities of small-scale fisheries in areas such as safety, the sharing of local knowledge, capacity-building and governance have been outlined by the Food and Agriculture Organization of the United Nations in its Voluntary

[13] Taking into account ongoing World Trade Organization negotiations, the Doha Development Agenda and the Hong Kong ministerial mandate.
[14] "Maximally sustainably fished" is used here in the sense explained in chapter 15.
[15] Food and Agriculture Organization of the United Nations, document C 2009/REP and Corr.1–3, appendix E.

Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication, and the growing use of human rights approaches is providing opportunities for the empowerment of such fisheries (chap. 15).

Promisingly, scientific stock assessments and management have been shown to lead to more sustainable outcomes across a number of regions. New approaches to identifying illegal, unreported and unregulated fishing are now being applied in some regions. Recent research has shown that, with appropriate governance, the median time required to rebuild overfished stocks could be less than 10 years, and, if reforms were to be implemented, 98 per cent of overfished stocks could be considered healthy by the middle of the twenty-first century.

The impacts of climate change are expected to include increases in the intensity of natural hazards and their frequency, thus affecting the local distribution and abundance of fish populations. Fishery-dependent developing States may be affected most severely and, because of expected changes in species distributions and consequent expected increases in transboundary migrations of stocks, future international governance may need to account for such redistributions (chap. 15).

7.3. Aquaculture

Aquaculture continues to grow faster than other major food production sectors, although its growth has slowed over the past decade. The sector was valued at $249.6 billion in 2017. It supports the livelihoods of 540 million people, 19 per cent of whom were women in 2014. The importance of that form of food production lies in its high content of proteins and essential micronutrients and fatty acids. The reliance of aquaculture on fish meal decreased from 4.20 million tons in 2005 to 3.35 million tons in 2015. Aquaculture sustainability is more likely to be closely linked with the sustained supply of terrestrial animal and plant proteins, oils and carbohydrate sources for aquafeeds. Diseases continue to pose a challenge to global aquaculture and are among the primary deterrents to aquaculture development for many species. In general, the environmental performance of aquaculture has improved significantly over the past decade. Challenges to be met in expanding aquaculture production include reducing impacts on valuable coastal ecosystems such as mangroves, the sustainable provision of external feed, the management of fish diseases and the effects of escaped fish on native species (chap. 16).

7.4. Seaweed production

Seaweed for direct human consumption amount to 80 per cent of total seaweed harvesting. Since 2012, global harvesting of seaweed has risen at a rate of about 2.6 per cent a year, mostly from aquaculture, to 32 million tons in 2017, with an estimated value of $12 billion. In addition to being used as food, seaweed is used increasingly in industrial applications, such as cosmetics, pharmaceuticals and nutraceuticals, and as feed for livestock. Macroalga cultivation amounts to 96 per cent of total aquaculture production. Benefits from production include the provision of high-quality food and the creation of new jobs and increased incomes for coastal inhabitants. In addition, such production supports carbon sequestration and oxygen production and reduces eutrophication (chap. 17).

7.5. Key knowledge and capacity-building gaps

There is limited understanding of the extent to which changing conditions could contribute to shifts in marine ecosystem structures and functioning and the subsequent impacts on marine productivity. There have been improvements in approaches to assessing fisheries and accounting for their contributions

in data-poor environments, but further work is needed to fill capacity-building gaps for coastal fisheries in developing regions. The science of fish stock propagation is still in its early stages, but shows some potential for increasing fishery yield beyond what is achievable through the exploitation of wild stocks alone. However, understanding of ecological consequences is lacking. Capacity-building gaps in the management of fisheries include those associated with identifying impacts on target species and incorporating the effects on other species into management frameworks. Ongoing capacity-building gaps in developing countries also hinder their ability to take part in regional and international negotiations for reaching consensus on management practices for sustaining healthy fish stocks.

To boost sustainable aquaculture development, improved extension services are needed. The training of extension services providers needs to incorporate information delivery methods, as well as practical farming techniques, to help them to better assist farmers in improving production practices. Information technology and media, farmers' associations, development agencies, private sector suppliers and others will need to come together to enhance sectoral training. The establishment of offshore aquaculture and mariculture will need to be supported by sufficient marine services to ensure the sustainability and safety of operations. Many knowledge gaps remain with regard to the large-scale production of seaweed and the likely impacts of climate change. Some efforts to address the knowledge and capacity-building gaps are under way. The biology of many seaweed species is still unknown, even for those species currently harvested or farmed (chaps. 15–17).

8. Sustainable economic use of the ocean

The ocean supports a wide range of economic activities, including maritime transport as part of world trade, tourism and recreation, extraction of natural resources such as hydrocarbons and other minerals, provision of renewable energy, and the use of marine genetic resources.

8.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.2: **By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans**

Sustainable Development Goal target 14.7: **By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism**

Sustainable Development Goal target 14.c: **Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"**

Economic use of the ocean has increased globally. Many countries are developing or have developed strategies for increasing such maritime activities as renewable ocean energy, aquaculture, marine biotechnology, coastal tourism and seabed mining (growth sectors of the blue economy – a term that can include environmentally sustainable shipping and fisheries). The distribution around the world of the economic benefits drawn from the ocean,

however, is still very uneven (chaps. 4, 8A, 18 and 28).

The particular ways in which progress towards other Sustainable Development Goals will assist with the achievement of targets 14.2, 14.7 and 14.c, among others, are set out in table 1, and the particular ways in which the achievement of those targets will assist with progress towards other Goals are set out in table 2.

8.2. Seabed mining

Seabed mining for sand and gravel within national jurisdiction has increased to supplement diminished land-based sources. The scale of extraction can have significant effects on the local marine environment and cause coastal erosion. The scale of other major mining activities (such as for diamonds, phosphate, iron ore and tin) remains more or less stable. Deep seabed mining in areas beyond national jurisdiction is closer to becoming a commercial reality; however, exploiting many mineral resources requires advanced technology and is thus largely limited to those able to access such technology (chap. 18).

8.3. Extraction of offshore hydrocarbons

The offshore oil and gas sector is expanding at the global level into deep and ultradeep waters. Over the next decade, growth is likely to be focused in such areas as the eastern Mediterranean Sea and areas off the coast of Guyana and the west coast of Africa. Mature areas such as the North Sea and the Gulf of Mexico are seeing the exhaustion of some resources and the resulting increased decommissioning of offshore installations, although some may be used for producing renewable marine energy. Extraction techniques continue to evolve to reduce their impact on the marine environment (chap. 19).

8.4. Maritime transport

The increase in tonnage of cargo carried by international shipping has mirrored the growth in world trade, following the recovery of the world's economy after 2012. Such growth, however, has occurred against a weak competitive background. A large proportion of the world's tonnage continues to be associated with a relatively small number of registries, and ownership and control of shipping remain concentrated in the hands of firms in a relatively small number of countries. This concentration has significant implications for future port development, as it may result in fewer and larger main ports serving as distribution hubs for intercontinental trade. There was a slight decline in the total number of attempted and actual cases of piracy and armed robbery against ships between 2015 and 2019 (chap. 8A).

8.5. Tourism and recreation

International travel and associated tourism are economically important in many parts of the world, in particular in the "sun, sea and sand" type of tourism, which is concentrated in coastal marine regions. In all touristic areas, the major impact on the marine environment comes from coastal development, including the proportion of land covered by constructions, such as hotels, restaurants, retail shops and transport infrastructure, including airports and train terminals, and the need for "armoured" coastal defences, street lighting and sewerage. Snorkelling, diving and wildlife viewing continue to be significant elements in coastal tourism (chap. 8A).

8.6. Marine genetic resources

Marine genetic resources continue to be the focus of an expanding range of commercial and non-commercial applications. Rapidly shrinking costs of gene sequencing and synthesis, as well as rapid advances in metabolic engineering and synthetic biology, have

reduced dependency on the acquisition of physical samples from the ocean. Sponges and algae continue to attract significant interest for the bioactive properties of their natural compounds (chap. 23).

8.7. Marine renewable energy

The marine renewable energy sector (offshore wind energy, tidal and ocean current energy, wave energy, ocean thermal energy and osmotic power and marine biomass energy) is evolving and developing at different rates. Of those power sources, offshore wind technology is mature and technically advanced. Although in 2018 it represented only 1 per cent of total renewable energy sources, it is growing rapidly: between 2017 and 2018, it accounted for 4 per cent of all growth in renewable energy. From 2017 to 2018, it grew by 59 per cent in Asia and by 17 per cent in Europe. In the next decade, Asia and the United States of America could be major drivers of offshore wind power development and installation. Tidal energy converters have reached the commercial stage, while other marine renewable energy technologies are currently under development. Among emerging marine renewable energy sources, offshore solar energy is the most promising, as components of the relevant technology are well developed (chap. 21).

8.8. Key knowledge and capacity-building gaps

All maritime industries are highly dependent on technology to operate safely and without damaging the marine environment. With regard to marine genetic resources, capacity-building remains an issue, as most work in this field is carried out in a small number of countries. There is a need to build skills in many countries to plan and develop their blue economy sustainably and to manage the related human activities (chaps. 8A, 14, 18, 19, 21, 23, 25 and 27).

9. Effective implementation of international law as reflected in the United Nations Convention on the Law of the Sea

Effective implementation of international law as reflected in the United Nations Convention on the Law of the Sea (which sets out the legal framework within which all activities in the oceans and seas must be carried out), is essential for the conservation and sustainable use of the ocean and its resources and for safeguarding the many ecosystem services that the ocean provides, both for current and future generations.

9.1. Linkages with the Sustainable Development Goals and the United Nations Decade of Ocean Science for Sustainable Development

Sustainable Development Goal target 14.c: **Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"**

Steps have already been taken at all levels to strengthen the implementation of international

law as reflected in the United Nations Convention on the Law of the Sea, including by increasing the level of participation of States in the numerous global and regional treaties that supplement its provisions. Examples at the global level include international conventions such as the London Convention and the London Protocol, the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997[16] (including its annex VI on the reduction in sulfur emissions from ships, which entered into force in 2020), and the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing of FAO, which entered into force in 2016 (chaps. 8A, 11, 12, 15 and 28).

There are still major challenges to ensuring participation in international instruments, addressing resource and capacity constraints, strengthening intersectoral cooperation, ensuring coordination and information-sharing at all levels and developing new instruments to address emerging challenges in a timely fashion (chap. 28).

The particular ways in which progress towards other Sustainable Development Goals will assist in the achievement of target 14.c are set out in table 1, and the particular ways in which achievement of that target will assist with progress towards other Goals are set out in table 2.

9.2. Implementation of international law as reflected in the United Nations Convention on the Law of the Sea

The integration of environmental, social and economic dimensions is at the core of the United Nations Convention on the Law of the Sea. The Convention establishes a delicate balance between the need for economic and social development through the use of the ocean and its resources and the need to conserve and manage those resources in a sustainable manner and to protect and preserve the marine environment. The integrated approach to ocean management as reflected in the Convention is essential for promoting sustainable development, as sectoral and fragmented approaches lack coherence and may lead to solutions that are of limited benefit to the conservation and sustainable use of the ocean and its resources.

The Convention is, in many fields, supplemented by more specific, sectoral instruments. In addition to its two implementing agreements,[17] there are numerous global and regional legal instruments covering many aspects of ocean use. Effective conservation and sustainable use of the ocean and its resources will only be achieved through the full and effective implementation of this body of international law. Actions and efforts should focus primarily on implementation gaps or any regulatory gaps, especially in areas beyond national jurisdiction.

16 See www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx.

17 Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982; and Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

9.3. Implementation and regulatory gaps

Resource capacity, including financial capacity, remains a significant constraint for the protection and preservation of the marine environment and marine scientific research, while technological constraints are often an impediment to the effective implementation of a State's obligations. Gaps also exist with regard to the material scope (e.g., no comprehensive rules on plastics and microplastics) or geographical scope of application of relevant instruments (e.g., geographical coverage by the regional fisheries management organizations and arrangements) (chaps. 27 and 28). Many small island developing States and least developed countries lack access to the detailed knowledge and skilled human resources needed for ocean management, and resources for managing the large marine areas under their jurisdiction are often limited. Filling these gaps will ensure that economic benefits can be maximized in an environmentally sustainable manner. Specific challenges exist in the enforcement of management measures in areas beyond national jurisdiction, owing to regulatory gaps and a lack of cross-sectoral coordination. These issues are currently being discussed at the United Nations in the context of the intergovernmental negotiations on the development of an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (chaps. 27 and 28).

Table 1
Contribution made by other Sustainable Development Goals to achieving Goal 14

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributing to the achievement of Goal 14	Mechanism
Cleaning up the ocean		
Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Improved wastewater management
	Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Improved sources and efficiencies in energy and associated reduction in emissions
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Sustainable urbanization and reduction in the environmental impact of cities
	Goal 12: Ensure sustainable consumption and production patterns	Environmentally sound management of chemicals and all wastes, including by reducing waste generation
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributing to the achievement of Goal 14	Mechanism
Protecting marine ecosystems		
Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Improved wastewater management and protection and restoration of wetlands
	Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Improved sources and efficiencies in energy and associated reduction in emissions
	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Use of clean technologies and associated reduction in emissions
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Sustainable urbanization and reduction in the environmental impact of cities
	Goal 12: Ensure sustainable consumption and production patterns	Sustainable management and use of natural resources and reduction in waste along supply chains
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures
	Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Reduction in the degradation of natural habitats and loss of biodiversity, and prevention of the extinction of species
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Understanding of the ocean for sustainable management		
Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Enhancement of scientific research, upgrade of the technological capabilities of industrial sectors in all countries, in particular developing countries, and encouragement of innovation

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributing to the achievement of Goal 14	Mechanism
Target 14.a: Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Promoting safety from the ocean		
Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Goal 1: End poverty in all its forms everywhere	Reduction in exposure and vulnerability to climate-induced extreme events and building of resilience to environmental shocks and disasters
	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Strengthening of capacity to adapt to climate change, extreme weather and other disasters
	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Reduction in pollution, improved wastewater management and protection and restoration of water-related ecosystems
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Reduction in the number of people affected by disasters, strengthening of national and regional development planning and implementation of integrated policies and plans for mitigation and adaptation to climate change, resilience to disasters and the development and implementation of holistic disaster risk management
	Goal 12: Ensure sustainable consumption and production patterns	Environmentally sound management of chemicals and all waste
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Strengthening of resilience and adaptive capacity to climate-related and other natural disasters and support for impact reduction and early warning

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributing to the achievement of Goal 14	Mechanism
	Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems, and reduction in the degradation of habitats
Sustainable food from the ocean		
Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics Target 14.6: By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated 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 World Trade Organization fisheries subsidies negotiation[b] Target 14.7: By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism Target 14.b: Provide access for small-scale artisanal fishers to marine resources and markets	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Increase in agricultural productivity (including aquaculture and mariculture), ensuring sustainable food production and maintaining ecosystems and the genetic diversity of wild species
	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Improved resource efficiency in consumption and production
	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Enhancement of scientific research and technological development, research and innovation in developing countries
	Goal 12: Ensure sustainable consumption and production patterns	Sustainable management and efficient use of natural resources, reduction in food losses along production and supply chains, including post-harvest losses, strengthening of scientific and technological capacity to move towards more sustainable patterns of consumption and production, implementation of methods to ensure that tourism remains sustainable, creates jobs and promotes local products, and phasing out of harmful subsidies, where they exist, to reflect their environmental impacts
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributing to the achievement of Goal 14	Mechanism
Sustainable economic use of the ocean		
Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans Target 14.7: By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Improved wastewater management and protection and restoration of wetlands
	Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Improved sources and efficiencies in energy and associated reduction in emissions
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Sustainable urbanization and reduction in the environmental impact of cities
	Goal 12: Ensure sustainable consumption and production patterns	Sustainable management and use of natural resources
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures
	Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Reduction in the degradation of natural habitats and loss of biodiversity, and prevention of the extinction of species
	Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Promotion of the rule of law at the national and international levels
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Effective implementation of international law as reflected in the United Nations Convention on the Law of the Sea		
Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Ensuring of sustainable food production systems, maintenance of ecosystems and strengthening of capacity to adapt to climate change, extreme weather, drought, flooding and other disasters
	Goal 3: Ensure healthy lives and promote well-being for all at all ages	Reduction in hazardous chemicals, pollution and contamination

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributing to the achievement of Goal 14	Mechanism
	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Reduction in pollution, improved wastewater management and protection and restoration of water-related ecosystems
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Protection and safeguarding of cultural and natural heritage
	Goal 12: Ensure sustainable consumption and production patterns	Environmentally sound management of chemicals and all wastes throughout their life cycle, within agreed international frameworks
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Integration of climate change measures into national policies, strategies and planning
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Enhancement of policy coherence for sustainable development

[a] Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

[b] Taking into account ongoing World Trade Organization negotiations, the Doha Development Agenda and the Hong Kong ministerial mandate.

Table 2
Contribution made by Sustainable Development Goal 14 to achieving other Goals

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributed to by the achievement of Goal 14	Mechanism
Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Goal 3: Ensure healthy lives and promote well-being for all at all ages	Reduction in hazardous chemicals, pollution and contamination
	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Reduction in pollution and the release of hazardous chemicals and materials and wastewater
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Sustainable urbanization and reduction in the environmental impact of cities
	Goal 12: Ensure sustainable consumption and production patterns	Environmentally sound management of chemicals and all wastes, including by reducing waste generation
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Target 14.2: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	Goal 1: End poverty in all its forms everywhere	Reduction in exposure and vulnerability to climate-induced extreme events and building of resilience to environmental shocks and disasters
	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Increase in agricultural productivity (including aquaculture and mariculture), ensuring sustainable food production and maintaining ecosystems and the genetic diversity of wild species
	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Provision of opportunities for sustained economic growth and sustainable tourism
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Preservation of and support for those ecosystems that afford protection from disasters to coastal communities
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Contribution to resilience to climate-related hazards

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributed to by the achievement of Goal 14	Mechanism
Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	Goal 1: End poverty in all its forms everywhere	Reduction in exposure and building of resilience to environmental shocks and disasters
	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Ensuring of sustainable food production systems, maintenance of ecosystems, strengthening of capacity to adapt to climate change and enhancement of cooperation in research and technological development
	Goal 12: Ensure sustainable consumption and production patterns	Support for developing countries in strengthening their scientific and technological capacity
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Increase in agricultural productivity (including aquaculture and mariculture), ensuring sustainable food production and maintaining ecosystems and the genetic diversity of wild species
	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Support for productive activities
	Goal 12: Ensure sustainable consumption and production patterns	Achievement of sustainable management and efficient use of natural resources, reduction in food losses along production and supply chains, including post-harvest losses, strengthening of scientific and technological capacity to move towards more sustainable patterns of consumption and production, and phasing out of harmful subsidies
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Enhancement of partnerships for sustainable development

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributed to by the achievement of Goal 14	Mechanism
Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Maintenance of ecosystems, strengthening of capacity to adapt to climate change, and enhancement of cooperation in research and technological development
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Preservation of and support for those ecosystems that afford protection from disasters to coastal communities
	Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Reduction in the degradation of natural habitats and loss of biodiversity, and prevention of the extinction of species
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Target 14.6: By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated 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 World Trade Organization fisheries subsidies negotiation[b]	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Support for productive activities
	Goal 12: Ensure sustainable consumption and production patterns	Achievement of sustainable management and efficient use of natural resources, reduction in food losses along production and supply chains, including post-harvest losses, strengthening of scientific and technological capacity to move towards more sustainable patterns of consumption and production, and phasing out of harmful subsidies
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Enhancement of partnerships for sustainable development
Target 14.7: By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	Goal 1: End poverty in all its forms everywhere	Reduction in exposure and building of resilience to environmental shocks and disasters
	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Increase in agricultural productivity (including aquaculture and mariculture), ensuring sustainable food production and maintaining ecosystems and the genetic diversity of wild species

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributed to by the achievement of Goal 14	Mechanism
	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Provision of opportunities for sustained economic growth and sustainable tourism
	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Enhancement of scientific research, upgrade of the technological capabilities of industrial sectors in all countries, in particular developing countries, and encouragement of innovation
	Goal 12: Ensure sustainable consumption and production patterns	Achievement of sustainable management and efficient use of natural resources, and strengthening of scientific and technological capacity
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Target 14.a: Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Enhancement of scientific research, upgrade of the technological capabilities of industrial sectors in all countries, in particular developing countries, and encouragement of innovation
	Goal 12: Ensure sustainable consumption and production patterns	Achievement of sustainable management and efficient use of natural resources, and strengthening of scientific and technological capacity
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Target 14.b: Provide access for small-scale artisanal fishers to marine resources and markets	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Increase in agricultural productivity (including aquaculture and mariculture), ensuring sustainable food production and maintaining ecosystems and the genetic diversity of wild species

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributed to by the achievement of Goal 14	Mechanism
	Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Improved resource efficiency in consumption and production
	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Enhancement of scientific research and technological development, research and innovation in developing countries
	Goal 12: Ensure sustainable consumption and production patterns	Sustainable management and efficient use of natural resources, and implementation of tools for monitoring sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Improved access to science, technology and innovation, enhanced knowledge-sharing and transfer of technology, and capacity-building
Target 14.c: Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Ensuring of sustainable food production systems, maintenance of ecosystems and strengthening of capacity to adapt to climate change, extreme weather, drought, flooding and other disasters
	Goal 3: Ensure healthy lives and promote well-being for all at all ages	Reduction in hazardous chemicals, pollution and contamination
	Goal 6: Ensure availability and sustainable management of water and sanitation for all	Reduction in pollution, improved wastewater management and protection and restoration of water-related ecosystems
	Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Improved sources and efficiencies in energy and associated reduction in emissions
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	Sustainable urbanization and reduction in the environmental impact of cities, and protection and safeguarding of cultural and natural heritage
	Goal 12: Ensure sustainable consumption and production patterns	Sustainable management and use of natural resources, environmentally sound management of chemicals and all wastes throughout their life cycle, within agreed international frameworks

Targets under Sustainable Development Goal 14	Sustainable Development Goals contributed to by the achievement of Goal 14	Mechanism
	Goal 13: Take urgent action to combat climate change and its impacts[a]	Implementation of climate change mitigation, adaptation and impact reduction measures, and integration of climate change measures into national policies, strategies and planning
	Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Reduction in the degradation of natural habitats and loss of biodiversity, and prevention of the extinction of species
	Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Promotion of the rule of law at the national and international levels
	Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	Enhancement of policy coherence for sustainable development

[a] Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

[b] Taking into account ongoing World Trade Organization negotiations, the Doha Development Agenda and the Hong Kong ministerial mandate.

Landscape of subgoals under Sustainable Development Goal 14 and relevant chapters