



References:

EASAC, 2016. Marine Sustainability in an Age of Changing Oceans and Seas. Reports and Statements, European Academies' Science Advisory Council (EASAC). Available online; retrieved 24 May 2020. <https://easac.eu/publications/details/marine-sustainability-in-an-age-of-changing-oceans-and-seas/>

FAO, 2016. The FAO Agreement on Port State Measures (PSMA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Available online; retrieved 24 May 2020: Rome: FAO. <http://www.fao.org/port-state-measures/en>

FAO, 2020. The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome. Available online; retrieved 9 June 2020: <https://doi.org/10.4060/ca9229en>

IPBES, 2019. Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondizio E.S., H. T. Ngo, M. Güèze, J. Agard, A. Armeth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razaque, B. Reyers,

■ Photo: Wonjoon Shim

R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBES secretariat, Bonn, Germany. 56 pages.



IPCC, 2019: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.W. Weyer (eds.)].

UNESCO, 2020a. Ocean Literacy Portal. Available online; retrieved 16 May 2020: <https://oceanliteracy.unesco.org>

UNESCO, 2020b. United Nations Decade of Ocean Science for Sustainable Development (2021–2030). Available online; accessed 24 May 2020: <https://en.unesco.org/ocean-decade>

■ Photos: IAP/Peter McGrath



Academies that have endorsed the IAP Statement on Protection of Marine Environments

Albanian Academy of Sciences
Algerian Academy of Sciences and Technology
Academia Nacional de Ciencias Exactas, Fisicas y Naturales de la Republica Argentina
Academia Nacional de Medicina de Buenos Aires, Argentina
National Academy of Sciences of Cordoba, Argentina
Australian Academy of Science
Bangladesh Academy of Sciences
Academie Nationale de Sciences, Arts et Lettres du Benin
Academy of Sciences and Arts of Bosnia and Herzegovina
Brazilian Academy of Sciences
Academia Nacional de Medicina, Brazil
Bulgarian Academy of Sciences
Bulgarian Academy of Sciences and Arts
Cameroon Academy of Sciences
Royal Society of Canada
Chilean Academy of Sciences
Chinese Academy of Sciences
Chinese Academy of Engineering
Colombian Academy of Exact, Physical & Natural Sciences
Academia Nacional de Medicina de Colombia
Croatian Academy of Arts and Sciences
Cuban Academy of Sciences
Czech Academy of Sciences
Royal Danish Academy of Sciences and Letters
Academia de Ciencias de la Republica Dominicana
Academy of Scientific Research and Technology, Egypt
Ethiopian Academy of Sciences
Council of Finnish Academies
Academie des Sciences, France
Academie Nationale de Medecine, France
Union of German Academies of Sciences and Humanities
German National Academy of Sciences, Leopoldina
Ghana Academy of Arts and Sciences
Academia de Ciencias Medicas, Fisicas y Naturales de Guatemala
Hungarian Academy of Sciences
Academy of Sciences of the Islamic Republic of Iran
Royal Irish Academy
Israel Academy of Sciences and Humanities
Accademia Nazionale dei Lincei, Italy
Science Council of Japan
Kenya National Academy of Sciences
National Academy of Sciences, Republic of Korea
Korean Academy of Science and Technology
Lebanese Academy of Sciences
Lithuanian Academy of Sciences

Akademi Sains Malaysia
Mauritius Academy of Science and Technology
Mexican Academy of Sciences
Mongolian Academy of Sciences
Royal Netherlands Academy of Arts and Sciences
Nicaraguan Academy of Sciences
Pakistan Academy of Sciences
Palestine Academy for Science and Technology
National Academy of Science and Technology, Philippines
Polish Academy of Sciences
Macedonian Academy of Sciences and Arts
Romanian Academy
Russian Academy of Sciences, Siberian Branch
Rwanda Academy of Sciences
Serbian Academy of Sciences and Arts
Academy of Science of South Africa
National Academy of Sciences, Sri Lanka
Sudanese National Academy of Sciences
Royal Swedish Academy of Sciences
Tunisian Academy of Sciences, Letters and Arts *Beit al Hikma*
Turkish Academy of Sciences
Uganda National Academy of Sciences
Royal Society, UK
National Academy of Sciences of Uruguay
The National Academy of Sciences (NAS)
Caribbean Academy of Sciences
Islamic World Academy of Sciences
Global Young Academy
The World Academy of Sciences (TWAS)
World Academy of Art and Science

Working Group
Suam Kim (Republic of Korea, chair)
Leif Anderson (Sweden)
Antje Boetius (Germany)
Jaime Ricardo Cantera Kintz (Colombia)
Luiz Drude de Lacerda (Brazil)
Alaa Eldin Abdel-Mouty Mohamed Eissa (Egypt)
Judith Gobin (Trinidad & Tobago)
Sung Yun Hong (Republic of Korea)
Jeffrey A. Hutchings (Canada)
Lekelia Jenkins (USA)
Monika Kedra (Poland)
Youn-Ho Lee (Republic of Korea)
Syed Wajih Ahmad Naqvi (India)
Japhet Micheni Ntiba (Kenya)
Hugh Possingham (Australia)
Yoshihisa Shirayama (Japan)
Richard Thompson (UK)
Jaehyoung Lee (Republic of Korea, KAST project manager)

IAP appreciates the initial contribution of the Zero Draft Committee members (C. Brown, S. Kang, J.S. Khim, S. Kim, Y-H. Lee and W. Shim) assigned by KAST



June 2021

The InterAcAdemy Partnership

Under the umbrella of the InterAcademy Partnership (IAP), more than 140 national, regional and global member academies work together to support the vital role of science in seeking evidence-based solutions to the world's most challenging problems. In particular, IAP harnesses the expertise of the world's scientific, medical and engineering leaders to advance sound policies, improve public health, promote excellence in science education, and achieve other critical development goals. Statements such as this one are prepared by a working group comprising experts nominated by member academies, and are released once they have been endorsed by more than half the member academies of the network.

This work is © the InterAcademy Partnership and is licensed under Creative Commons Attribution 4.0 International

Additional copies of this statement can be downloaded from: www.interacademies.org/statement/protection-marine-environments

Contacts

✉ iap@twas.org

📧 @IAPartnership
🌐 www.linkedin.com/company/interacademypartnership
📺 <https://tinyurl.com/IAPyoutube>

www.interacademies.org



IAP Statement on Protection of Marine Environments

The ocean, connected over approximately 71% of the Earth's surface, supports humankind. Human well-being and our economy have benefited from the ocean for oxygen to breathe, fish and seafood to eat, leisure and healing places to visit, seaways for transportation, and the many jobs associated with ocean activities. However, unregulated and excessive human activities and recent climate change are causing the deterioration of the marine environment, reducing biodiversity and threatening its ecosystem services. Key areas of concern include:

- **A healthy ocean** is indispensable to human well-being and vitality and to the homeostasis of life on Earth. **Ocean health** is threatened by excessive human activities and has already been compromised on many levels. Facilitation of holistic ocean sciences and cooperation of diverse stakeholders are needed to understand complex processes in the marine environment and to implement solutions to protect and restore ocean health.
- The world's oceans are experiencing extensive **habitat destruction** due to both direct impacts (e.g. coastal development) and indirect impacts (e.g. climate change, invasive species, pollution). In particular, coastal areas, including coral reefs, kelp forests, mangroves, seagrass beds and intertidal mudflats, have suffered from massive habitat degradation and loss. This destruction increasingly extends to the deep sea. Multiple anthropogenic stressors damage ecosystem structure and function, as well as the capacity for marine habitats to provide ecosystem services. Most of these sensitive habitats are in need of immediate measures for protection, conservation and rehabilitation.
- Anthropogenic **environmental contaminants** continue to disrupt marine ecosystems. Accumulation of excessive nutrients, toxic chemicals, heavy metals, and marine debris including macro-, micro- and nano-plastics, destabilizes ecological processes, degrades natural resources and inflicts major economic losses. Strict controls for the management of environmental contaminants should be implemented immediately.



■ © Korea Institute of Ocean Science and Technology (KIOST)

and maintaining and replenishing fish and shellfish stocks.

The UNESCO philosophy of Ocean Literacy for All seeks appreciation of the ocean at all levels throughout all cultures (UNESCO, 2020a). The objective is a large-scale behavioural transformation toward a global constituency that fully grasps the completeness of our reliance on the ocean and subscribes to the sustainable management and use of marine resources. Dynamic cooperation among interdisciplinary ocean-related sciences is essential.

2. Habitat destruction

Coastal areas have long been threatened by habitat destruction due



■ Photo: Unhyuk Yim

1. Ocean health

Exploitative approaches to marine resources have led to declining ocean integrity. Consequently, a shared appreciation of ocean conservation is highly recommended. We have little time to nurture the ocean's resilience, remove threats and eliminate disruptions, especially because climate change has an increasing impact on ocean health. The recovery and protection of the ocean is contingent on the development of inclusive and integrated marine sciences, with public access to scientific data, information and knowledge. A holistic approach to the ocean requires universal recognition of our common interest in and dependence on the status of the ocean. Marine interventions can have substantial ecological benefits. For example, Marine Protected Areas are accepted worldwide as an economically viable means of enhancing biodiversity,

substantially to the maintenance of biodiversity and to the succession of generations of marine organisms (IPBES, 2019). Nursery areas in particular are substantial determinants of ocean health and biodiversity. Environmental integrity in these marine habitats must be protected and, in many cases, rehabilitated.

3. Environmental contaminants

Excess loading of nutrients and organic matters from terrestrial human activities and coastal aquaculture (eutrophication) causes algal blooms leading to the expansion of dead-zones, with mass mortality of fish and other marine life. Some algal species also produce toxins that may even lead to human casualties.



■ © National Institute of Fisheries Science, Korea/
Photo: Hyun Woo Kim

and nano-plastics are everywhere in the marine environment, including marine food webs, and even in the human diet.

4. Climate change

The continuous increase in atmospheric greenhouse gases is recognized as a global threat that needs ambitious goals and international collaboration to combat the resulting climate change. The ocean has absorbed 30% of total anthropogenic CO₂ emissions since the 1980s with enormous global impacts (IPCC, 2019). Climate change alters ocean circulation and mixing, biogeochemistry and ecosystems. These changes could interfere with the ocean's capacity for



entanglement and ingestion by marine organisms, dispersion of pathogens and non-indigenous species, and compromised benthic habitats. In addition, marine plastic debris can result in economic losses due to decline of tourism, damage to fishing gear and boats, and obstruction of nautical propellers and cooling systems. Micro-

ecosystem services such as food supply, carbon storage, oxygen generation and climate stability. Global warming leads to melting of glaciers and polar ice caps as well as thermal seawater expansion. In turn, these processes lead to worldwide sea level rise that is threatening for the many people living in coastal areas. Ocean acidification threatens carbonate shell synthesis, respiration, reproduction, early development, and the growth and survival of innumerable marine animals. Expanding oxygen-depleted dead-zones are uninhabitable by aerobic organisms. The IPCC Special Report (2019) highlights the extreme urgency of prioritizing timely, ambitious and coordinated action to address unprecedented and enduring changes in the ocean. One obvious priority measure is the protection of seagrass beds, salt marshes and kelp and mangrove forests, which utilize excess nutrients, generate oxygen, and sequester carbon in the form of organic matter through photosynthesis, thereby moderating global warming.

5. Overexploitation

Most fisheries stocks are fully exploited: more than 90% of marine stocks are either overfished (34.2%) or fished at maximum sustainable levels (59.6%; FAO, 2020). Additional disruptions result from illegal, unreported and unregulated (IUU) fishing, habitat degradation, pollution and gear abandonment. Capture fisheries yields plateaued in the late 1980s and are unlikely to increase. Maintaining even current yields (84.4 million tonnes in 2018) will require rethinking our husbandry of



■ © KIOST/Photo: Joon-Yeon Chung

marine environments and biodiversity, while Sustainable Development Goal (SDG) #14 of the UN 2030 Agenda refers to 'Life Below Water' with seven specific targets.

Through this Statement, the InterAcademy Partnership calls on governments, NGOs and IAP member academies to:

- Share scientific information and data, build comprehensive understanding of the ocean, and develop an international ocean knowledge database that is equitably accessible, for devising solutions and making policies and decisions.
- Coordinate actions to protect and restore ocean health with expansion of research capacity development, ocean literacy and mechanisms to promote the exchange of information at the science-policy interface.
- Implement inclusive protection measures for coastal and other sensitive marine habitats.
- Assess sources of environmental contaminants, address their distributions, fates and impacts on ocean health, and develop means to eliminate entry of land-based contaminants into the ocean and to reduce their marine impacts.
- Mitigate and adapt to the impacts of greenhouse gases and climate change on the ocean ecosystem in acidification, deoxygenation and redistribution and change of marine life, thereby avoiding failure in the livelihoods of people who depend on the ocean.
- Ensure improved scientific management of capture fisheries, strengthen enforcement against IUU fisheries, and promote environmentally sensitive marine aquaculture.
- Increase ocean literacy, encouraging the global society to understand its intricate connection to the oceans and to respect the role of the oceans in maintaining Earth's biodiversity and habitability.

practices toward sustainability and conservation-sensitivity is necessary to relieve pressure on wild, overexploited marine stocks.

6. Conclusions and Recommendations

Excessive exploitation of marine resources and products, the cumulative impacts of multiple stressors, and chronic disregard for marine ecosystems have left our oceans more in need of consideration than ever before. The ocean is subject to complex, poorly-understood problems, many of which

interact with one-another, collectively threatening the integrity and continuity of life on Earth. Earlier misconceptions of the ocean as an immense realm with unlimited resilience are no longer valid. The fundamental challenge that policy-makers must address is how to achieve a sustainable use of the oceans (EASAC, 2016). This situation urgently calls for a comprehensive and pervasive new approach, and fresh commitments of current and future generations and nationalities to the health of the ocean.

The United Nations has urged cooperation among global communities to solve threats to the ocean by proclaiming the UN Decade of Ocean Science for Sustainable Development (2021-2030; UNESCO, 2020b). Advancement of 'ocean literacy' will raise consciousness about the vital importance of the ocean to humanity and the essential contributions of the ocean's ecosystem services.

Other international initiatives such as the Convention on Biological Diversity (CBD), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and Biodiversity Beyond National Jurisdiction (BBNJ) also seek the conservation of



■ Photo: Deokbae Park

■ © National Institute of Fisheries Science, Korea/
Photo: Cheol Beom Kim

Academy of Science of South Africa (ASSAf)

ASSAf Research Repository

<http://research.assaf.org.za/>

A. Academy of Science of South Africa (ASSAf) Publications

E. ASSAf Statements

2021-07-07

IAP Statement on Protection of Marine Environment

Inter Academy Partnership (endorsed by ASSAf)

Inter Academy Partnership (endorsed by ASSAf)

<http://hdl.handle.net/20.500.11911/277>

Downloaded from ASSAf Research Repository, Academy of Science of South Africa (ASSAf)