SYNTHESIS

Looking Ahead: Ocean Governance Challenges in the Twenty-First Century

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In her career, Elisabeth Mann Borgese provided an eloquent and enduring analysis of ocean governance. This collection of over eighty essays endeavors to honor, update, and advance her exceptional contributions. The contents of this book also reflect, to a considerable extent, substantial elements of the International Ocean Institute’s long-standing training programs which she initiated. In this final chapter, we offer a synthesis of the essays, highlighting some of the most significant future challenges of ocean governance and, by implication, capacity development.

Our approach involves two basic steps. First, we identify major present-day pressures, problems, and concerns that are raised repeatedly in this book and link these concerns to fundamental and persisting ocean governance themes, originally highlighted by Elisabeth Mann Borgese. Chief among these are the progressive development of the 1982 United Nations Convention on the Law of the Sea (UNCLOS); sustainable development of renewable and non-renewable ocean resources; conservation and protection of the marine environment; maritime security and transportation; enhancement of marine science and technologies; and addressing the interrelated problems of ocean space as a whole and their interactions. Finally, we point to key questions, challenges, and opportunities that are likely to confront practitioners of ocean governance and the development of capacity over the coming decades of the twenty-first century.

When considered in their entirety, the essays in this book reveal a significant number of overarching and frequently mentioned concerns with ocean governance, the marine environment, and human use and impacts on the ocean. We suggest that they fit broadly into four major categories:

1. The first category includes major environmental problems and population pressures. As many scientific studies have clearly demonstrated, marine environments and ecosystems have been threatened for years

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1 E. Mann Borgese, *Ocean Governance and the United Nations* (Halifax: Centre for Foreign Policy Studies, Dalhousie University, Revised Edition, August 1995), see p. 231, Article 20.

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and are facing daunting pressures from climate change, overfishing, and seemingly relentless urbanization and population growth in coastal areas.

2. The second category deals with institutional responses to these problems and pressures. The emergence of modern regimes of ocean governance and multi-faceted responsibilities since the implementation of UNCLOS—a multilateral treaty advanced and emphatically supported by Elisabeth Mann Borgese—led to great advances in ocean governance. However, major challenges remain, particularly in seeking its effective implementation in a globalized world.

3. The third category includes modern technology, as almost all uses of the ocean and ocean-related knowledge generation depend on it. Technology can cause many problems, but it can also be a positive force considering the almost ubiquitous reach of communications and advances in marine navigation, safety, and ocean observation capabilities. The challenge is to maximize the benefits and minimize the problems.

4. The subject matter of the fourth category relates to the principle of responsible governance itself. Past failures in ocean governance, exemplified by several high-profile fishery collapses, led to increasing attention to participatory approaches and the broad involvement of coastal communities, and civil society as a whole. Achieving the right level of such engagement remains a challenge in many countries and within many regional and global bodies.

Below, we provide a synthesis of the interrelated environmental, institutional, technological and societal issues that have a significant bearing on the future of ocean governance and, by extension, on the development of our capacity to advance its responsible application.

What Are the Major Environmental Problems and Pressures Facing the Ocean Today?

The most significant pressure and impact on the marine environment over the coming decades will be exerted by an ever-expanding human population from currently 7.5 billion people to an estimated 11 billion by the end of this century. Fundamental reforms in human society are needed if we are to shift the current trajectory based on outdated political and economic systems toward a future guided by the principles of a sustainable ecological civilization. Problems will be amplified by the fact that major population centers and related infrastructure will be further concentrated along coastal areas exposed to sea level rise in an age of global climate change. The science-related essays
in this volume have identified some of the challenges facing the oceans and how leading-edge research, aided by rapid technological advances, can address them. Understanding ocean health and regular state-of-the-ocean reporting through global ocean assessments are critical to policy formulation and decision-making for effective ocean governance. As the UN World Ocean Assessment Report for 2016 has shown, the value of science and communication for pinpointing the most pressing environmental problems is enormous.\(^2\)

Climate change generates major pressures on ocean ecosystems with significant effects on marine biodiversity. It results in changing water temperatures, sea level rise, loss of polar (Arctic and Antarctic) ice cover, increased acidification, stronger storms, and enhanced coastal erosion, amongst other impacts. This exacerbates the effects of many ocean uses. In particular, fisheries and aquaculture (especially small-scale) contribute greatly to food security in many nations. Some fisheries severely impact marine habitats and both target species and non-target bycatch species to the point where fishing is now recognized as the dominant and enduring driver of ecological change. Scientific studies have recognized other pressures as well. The ocean is too often a dumping ground, with increasing levels of persistent and bio-accumulative chemical contaminants, excessive nutrients, plastics and microplastics. Undersea noise from ships and industry is an increasing concern, as are deep-sea mining, and offshore wind farms. Coastal ecosystems will likely degrade further due to the cumulative effects of such pressures, unless more regulations are enacted and enforced under national legislation of coastal states and under established international law. Despite some progress, the human footprint remains huge, costly, and often permanent.

On the positive side, monitoring the state of the ocean using innovative tools and ecological indicators has added greatly to our knowledge of this footprint. Much of our knowledge of the above problems is gained through rapid advances in ocean technologies, such as tracking species of interest by satellite and applying genomics in marine ecotoxicology and aquaculture. Complementing the efforts of governments, educational institutes, and non-governmental organizations, such monitoring activities should engage all parts of society, allowing citizen science to play an increasingly vital role to observe and measure physical, chemical, biological, as well as ecological aspects of ocean health and coastal habitats. Notably, local communities worldwide can be involved in both monitoring and action to improve marine and coastal environments, as well as in the oversight of marine protected areas and

\(^2\) “United Nations World Ocean Assessment 1,” United Nations (last accessed 2 April 2018), http://www.worldoceanassessment.org.
marine spatial planning processes, integrated coastal management, ocean assessments, and marine problem resolution.

As more people live in coastal cities and on remote islands, recognizing the threats and benefits of the ocean related to public health and well-being will become a major imperative for marine environmental protection. In this century, the ocean sciences, health professions, ocean technology, and citizen science will increasingly be inter-connected and linked to the practice of ocean governance at all levels.

**Are Current Institutional Arrangements and Principles Robust Enough to Deal with Future Ocean Governance Challenges?**

As Elisabeth Mann Borgese advocated, the ocean has been a focal point for achieving improved global governance. A pragmatist, she understood the importance of compromise and the incremental pace of change with so many interests, institutions, and issues involved. It is positive news, therefore, that the international community has 'edged forward' in developing and integrating ocean governance principles in the legal order and related institutional arrangements, transcending the traditional concept of sovereignty. The progressive development and implementation of **UNCLOS** provides a framework for examining ocean governance institutional arrangements and actions at the local, national, regional, and global levels—confirming the ‘commons’ nature of the ocean and its resources.

Despite decades of progress, numerous issues remain inadequately addressed or are only slowly emerging in the ocean governance system. Examples include climate change and the ocean, the protection of marine biodiversity in areas beyond national jurisdiction, integrated bioregional coastal and marine spatial planning, and the Arctic regimes. Ocean renewable energy and offshore aquaculture hold great promise for addressing human security needs but will require appropriate governance. Addressing the situation of coastal communities and small island developing states in the face of climate change-related events is a priority. Exploitation of the mineral resources of the deep seabed will trigger disputes involving states, contractors, and the International Seabed Authority. Conflicting maritime boundaries and long-standing disputes, for example in the South China Sea, remain unresolved. Continuing problems such as piracy and the waves of human migration by sea illustrate the need for holistic approaches across national, regional, and international agencies.
There remains the imperative of applying the principle of common heritage in ocean management measures. A vehicle for this is Agenda 2030’s Sustainable Development Goal 14 (SDG 14), “Conserve and sustainably use the oceans, seas and marine resources for sustainable development.” SDG 14 explicitly recognizes the importance of oceans, and its related targets reaffirm the objective of implementing international law as reflected in UNCLOS. At the same time, a key requirement is to link together the SDGs, so that Elisabeth Mann Borgese’s vision of the oceans as a means to improve social and economic justice is reflected in how SDG 14 connects to other SDGs on poverty reduction and food security, for example.

The ongoing challenge is to overcome the fragmented governance of the global ocean that has emerged. The rule of law (or rules-based order) is vital to the future stability of ocean governance. Legal institutions established under UNCLOS, such as the International Tribunal for the Law of the Sea, have helped to ensure effective dispute resolution and establishment of maritime boundaries. Key ocean governance issues for maritime transportation have been addressed through a more proactive International Maritime Organization (IMO) resulting in, for example, emission control areas and the 2004 Ballast Water Management Convention. The shipping industry has actively engaged in developing the necessary common environmental and security governance systems through entities such as the Global Maritime Forum and the IMO.

Achieving security on the ocean and along its coasts will require the adoption of a ‘comprehensive human security’ approach to governance. Improving enforcement and compliance, particularly on the high seas, will require inter-sectoral cooperation among governance bodies. The continuing struggle to implement modern management principles such as the precautionary approach in decision-making and the ecosystem approach affects sustainability of the broader marine ecosystem. Going forward, a coherent and integrated governance framework will be essential to achieving pacem in maribus.

The necessary conditions for responsible ocean governance go beyond legal and institutional arrangements and policies, although these are fundamental. Ethics and shared values are essential tools for the conduct of decision-making. Responsible governance requires the use of the best scientific knowledge, including information from Indigenous knowledge systems, to improve our understanding of ocean systems and to meet our responsibilities to all living beings and generations yet to come. Human capacity development, knowledge transfer, and enhanced public awareness are essential to broaden participation in governance institutions at all levels. Technological advancements and
innovation are further avenues to strengthen institutional arrangements for ocean governance and enhance cooperation among stakeholders.

What Are the Technological Challenges and Opportunities?

Applications of science and technology are expanding in many marine domains, becoming essential information infrastructure elements for society and the individual. They manifest themselves daily in the spread of Internet connectivity, more detailed marine environmental forecasts, transportation efficiency, and renewable and non-renewable resource exploitation capabilities. Moreover, the spread of Internet connectivity offers opportunities for increasing the scope and range of capacity development and training and for transcending gender barriers.

Widespread and timely access to data and information will be key to enhancing ocean governance. Information gathering and sharing via geospatial data infrastructures will be essential not only for synoptic marine-environmental observation, state-of-the-ocean reporting, and more detailed exploration of ocean space, but also for ensuring safety and security for the growing number of marine operators and improving fisheries management practices. Designing data and information products for the purpose of decision-making and compliance monitoring will require good coordination among technology providers and users. Given the high stakes and far-reaching outcomes, they will also need political will, governance structures, and effective institutional environments. Cybersecurity will likely present critical challenges for marine operators; GPS and ‘Internet of Things’ hacking are key vulnerabilities for which technological solutions are still needed. In maritime transportation, blockchain technology and cryptocurrencies will alter global trade transactions. The adoption of autonomous shipping will be likely a niche opportunity for the industry, but this may change over the long term.

Spurred on by Agenda 21, Rio+20 and Agenda 2030, recognition of the societal benefits of the ocean has grown immensely, as they provide essential value to human beings, entire industries, nations, and indeed the world. However, although the reach of technology in this digital age is pervasive, the benefits are not universal, their distribution is not equal, and they come at a price, presenting ongoing and increasing challenges for governance. In the future, broad-based and equitable access to the benefits of technologies will be even more important. Digital technologies can offer many opportunities; they play a supporting, even transformative, role in bridging the scientific and technological knowledge gap between developed and developing economies and governance systems. As a case in point, the development and deployment of
underwater robotics and space-based observation and navigation technologies may be the domain of relatively few actors, but use of and benefit from these systems can be realized by multiple stakeholders and broad-based communities of practice. The reach of technology will become even more pervasive, not only in spatial–temporal terms concerning frequent global and site-specific monitoring, but importantly in terms of the proliferation of users—witness the development of two-way data mapping platforms for participatory geographic information systems to facilitate collaboration and communication among governments and citizens.

It remains unclear what the evolving technology situation will be. The shipping industry, among other ocean industries, needs transition time to incorporate new technologies. Transition time is also needed to protect existing investments. The adoption of autonomous shipping, robotics for underwater observations and drones is already presenting opportunities for ocean industries, which will require new infrastructure to transfer large volumes of data. Over the long term, increasing technological capacity will broaden the scope of how we monitor and utilize the ocean; it may even transform how humans relate to and interact with ocean space. Will technology resolve the mysteries of the deep sea? Likely not, but within the confines of good ocean governance and adequate capacity development, it can illuminate them and should help to better protect and preserve the marine environment.

Who Will Shape the Future of Ocean Governance?

Addressing all of the above challenges is no simple task. Ocean governance can be a ‘wicked problem’, demanding a transdisciplinary perspective and embracing holistic and innovative approaches to understanding problems and finding solutions. Fortunately, there is—around the world—an ‘ocean community’ with the passion and ideas to take on the challenge, based on a commitment to the principle of the ocean as our common heritage and to the rule of law. The ocean community is itself made up of coastal communities, with their collective desire to maintain healthy and productive ocean environments close to home, as well as ocean users dependent on and making a living from the sea. The ocean community also includes a diverse range of actors—researchers, educators, practitioners, managers, and the public—covering many research areas, professions, vocations, cultures, and interests. There are also all the related governance institutions, funding agencies, and civil society organizations worldwide, with national, regional, and international mandates and areas of interest.
All of this complexity and diversity can create obstacles to as well as opportunities for effective cooperation. But ultimately, we have confidence in the collective action of people, their communities, and their institutions, to make the difference. There is no end to what can be achieved by a motivated coastal community, or a motivated nation.

Effective ocean governance at all levels, from the local to the global, requires identifying and agreeing upon priorities and goals. Globally, international agreements and institutions, based on UNCLOS, are effective when they have support and advocacy from the diverse ocean community. Nationally, governments can, through determined political will, take the leadership needed to meet national commitments and targets.

These global and national initiatives draw strength and support from the ocean community—those engaged in ocean concerns worldwide. As the challenges of ocean governance continue to grow, so too can the strength and support of the ocean community—through engaging more people, more coastal communities, and more institutions. In order to develop this capacity, effective communication, networking, and partnerships are needed. On the one hand, effective communication needs clear expression of goals and alternatives, and skillful storytelling by everyone in the ocean community—scientists, educators, Indigenous peoples, coastal residents, advocates and more. On the other hand, networking and partnerships build engagement and strengthen the ocean community. This comes through participatory governance—whether local, national, regional, or global—that is rooted in shared values that embrace human rights and gender equity. Such governance benefits from up-to-date connections of people and institutions, to identify and take advantage of opportunities, and to deal with threats. Particularly important are partnerships with, and learning from, Indigenous communities and organizations, which bring traditional knowledge, as well as proven approaches, to sustainability.

A final point, as we work to improve future ocean governance, is to keep in mind those who are most vulnerable among coastal residents and ocean users. This was, for Elisabeth Mann Borgese, a crucial imperative. The implication is that the impacts of ocean governance innovations must be carefully examined. In seeking to broaden the ocean community, there is a need to engage and empower the vulnerable, so that they, too, have the capacity to play their role in shaping the future of ocean governance. The complexity and the global scale of ocean issues and conflicts are causes for humility. We live in an uncertain world, so there is no obvious path to success. There is, instead, a need to be adaptive and flexible, to cope with upcoming events and crises that we cannot predict. This will be a challenging way forward, but one that
the ocean community will undertake together to forge the future of ocean governance.

Looking Ahead

Looking ahead, there are numerous uncertainties in dealing with the multitude of challenges facing the ocean and advocacy for comprehensive security, sustainable development, and respect and dignity of marine and human life. Major pitfalls lie in further fragmentation of ocean governance, losing sight of the guiding principles of responsible governance, and weakening the concepts of common heritage and environmental stewardship of ocean space. The ocean community would do well to remind itself of the advice offered by Elisabeth Mann Borgese:

A vision of the future is our best defense. ... The disintegrative forces are powerful. But so are the integrative forces. Analyzing them, utilizing them, building on what they have already achieved, trying to contribute to a vision of the future ....\(^3\)

These are tasks that we have to focus on. As an integrative force, the innovations she initiated toward developing the necessary capacity, including professional training, continuous knowledge exchange, and learning about the ocean, are in themselves essential conduits for building a successful future of ocean governance.

\(^3\) Mann Borgese, *supra* note 1, 243 and 246.
