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# MAP's Contribution to the Implementation of Sustainable Development Goal 14 – Life Below Water

## Introduction

On September 25th 2015, 193 countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. Each Sustainable Development Goal (SDG) has specific targets to be achieved by 2030. The 17 goals and their targets cover the full range of sustainable development issues and enabling conditions. Reaching these goals by 2030 will require a significant coordinated effort from governments, the private sector, civil society organizations and individual citizens. The Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs) is working on developing indicators for the targets. To ensure the targets are met, they will have to be adapted to local, national and regional realities.

Issues relating to the oceans are addressed in SDG14 which has 10 targets covering critical issues. The targets are: ecosystem restoration, pollution, ocean acidification, illegal fishing, protected areas, fisheries subsidies, SIDS, research capacity and technology transfer, small scale fisheries and multilateral agreements (see Box 1). Other goals also have targets that are important for ocean sustainability. For example, SDG 16 (*Promote just, peaceful and inclusive societies*) targets 6, 7 and 8 (*develop effective, accountable and transparent institutions at all levels, ensure responsive, inclusive, participatory and representative decision-making at all levels, broaden and strengthen the participation of developing countries in the institutions of global governance*) are critical for effective governance of oceans.

**SDG Goal 14: Conserve and sustainably use the oceans, seas and marine resources**
**Targets**

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

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

14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

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

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

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

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

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

14.B Provide access for small-scale artisanal fishers to marine resources and markets

14.C Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, 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

## The Marine Affairs Program (MAP)

Created by the Canadian International Centre for Ocean Development (ICOD) and Dalhousie University in 1986, MAP has grown over the past 30 years to become the foremost provider in Canada of interdisciplinary graduate-level education for marine management professionals in some 59 countries and still counting (Figure 1). **Our underlying mission is the advancement of sustainable ocean uses and healthy marine environments at local, national, regional and international levels**. As such, through our teaching, research and outreach activities and in partnership with our global network of alumni, organizations, agencies and supporters, MAP plays both a direct and indirect role in the advancement of SDG 14 and its 10 targets. The following examples highlight just some of MAP's efforts towards the implementation of SDG 14 at a variety of spatial scales.

## Exploring interactions between private and public governance in the fisheries sector

MAP's efforts towards research involving interactions between private seafood governance, such as seafood certification and traceability, and public governance, and the way that countries cooperate to manage shared fish stocks, is led by Assistant Professor Megan Bailey. For example, Megan and her doctoral student Hussain Sinan are studying how allocation approaches for tuna resources can be fair and equitable, while still abiding by international fisheries frameworks and having conservation impact (Target 14.c and 14.7). Two of Megan's other doctoral students, Laurenne Schiller and Helen Packer, are studying the implications of corporate social responsibility and seafood certifications on equity and market access for small-scale developing world fishers (Target 14.b), building on Megan's work contributing to ideas of how seafood value chains govern sustainability. Megan also works with NGOs, government and industry in Indonesia to study the extent to which governments and markets can and should govern to combat illegal, unregulated, and unreported fishing (14.4), and quantified the extent of subsidies fisheries in the global tuna sector in her doctoral dissertation (Target14.6).

As part of her membership in the Canadian Healthy Oceans Network (CHONe), Megan supervises doctoral student Adrian Gerhartz, who is assessing tradeoffs in the design of marine protected areas (Target 14.5), in consultation with Fisheries and Oceans Canada, and will contribute to Canada's attainment of its target for 10% marine protection by 2020.

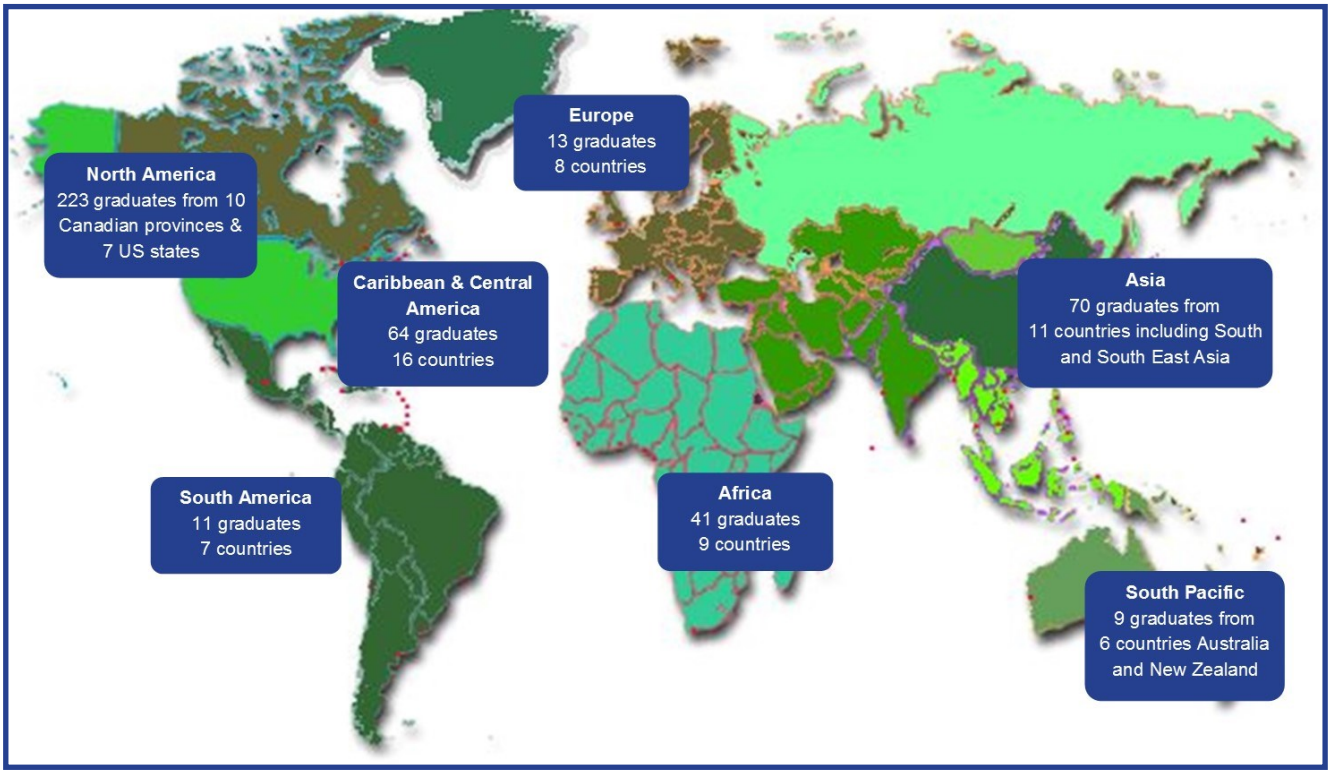


Figure 1. Global distribution of MAP graduates in key ocean-related decision-making roles spans 59 countries

Photo 1. Tuna handline vessels in Indonesia.

In 2016, Dr. Bailey led a group of 18 fisheries and ocean researchers in Canada to publish a policy paper outlining the imperative for ocean policy to better align with ocean science[1]. The current Canadian government is tackling many of the issues raised in this paper, including better marine protection and assessing changes to Canada's Fisheries Act. Her research into transboundary governance between Canada and the US provides evidence that these neighbours are not well-equipped to cooperatively govern shared resources in the face of climate change[2], and her work on global fisheries cooperation and allocation[3] has contributed to a series of allocation meetings led by the Republic of the Maldives and Indian Ocean Tuna Commission coastal states. She has advised on what indicators could be used to help states objectively quantify their dependence on tuna resources.

## Making the connection between climate action, life below water, and promoting just and inclusive societies

Turning his attention to the connection between "life below the water" and "life on the ice", Director of MAP, Dr. Claudio Aporta's research focuses on the documentation, representation and analysis of indigenous environmental knowledge, with emphasis on Inuit understanding of marine and coastal spaces in Arctic Canada. His work has helped develop awareness of Inuit intensive use of the sea ice, as well as of the cultural and historical dimensions of Arctic waters[4,5]. This has brought to light the significance of mobility in Inuit Arctic occupancy by showing that Inuit make systematic use of marine spaces through a well-established network of trails and routes (Figure 2). Claudio's work is helping create novel imageries of the Inuit homeland, providing new frameworks of understanding to properly engage Inuit in Arctic governance and management in light of a rapidly changing climate (SDG 13). As such, his research intends to answer the question of how indigenous communities should be properly involved in issues concerning management and policies of their homelands, consistent with the targets of SDG 14 and in line with Goal 16, promoting just and inclusive societies.


Figure 2. Detail of a map portraying Inuit trails across Nunavut

From a policy perspective, Dr. Aporta's research addresses the representation and communication of indigenous narratives as spatial data, through the creation of atlases (e.g. Inuit *siku* (sea ice) Atlas, Pan Inuit Trails) and the inclusion of indigenous knowledge in marine spatial planning. His work[6] has been highlighted in different fora, including a special exhibit in Parliament Hill in October 2016 (Liberal Senate Forum Blog Inuit Highways, Inuit Highways: A MAP Exhibit).

Photo 2. Pond Inlet, Nunavut

## Contributing the scientific knowledge required to enhance marine-based food security

MAP's newest Assistant Professor, Dr. Ramon Filgueira, focuses his research on sustainable aquaculture, and as such has relevance to many of the targets of SDG 14 with a specific connection to Target 14.a. Ramon has pioneered the integration of ecological resilience into the management of shellfish aquaculture sites[7]. This work embraces an ecosystem approach to aquaculture grounded on a holistic understanding of ecosystem functioning. It is implemented via mathematical models, which allow the simulation of alternative management scenarios. Scenario building allows us to address key questions on ocean sustainability and productivity but also on specific spatially-explicit questions from key stakeholders, which are critical for coastal management and marine spatial planning.

This conceptual approach has been used to inform Canadian government regulators on the potential implications of the expansion of shellfish aquaculture in Malpeque Bay, PEI [8] (Figure 3). Given that this approach is based on basic principles of biology, the same approach can be applied to: (1) different type of systems, e.g. Lysefjord (Norway) and Bahia de Sechura (Perú); and (2) different temporal periods, allowing the exploration of climate change effects[9]. Additionally, the policy implications of Dr. Filgueira's work lie in the recognition that the implementation of *a priori* management scenarios requires cost-effective monitoring strategies to evaluate the performance of the management plan and inform potential adjustments of the plan. Accordingly, managers and policy-makers require objective ecological indicators, which motivate a substantial component of his research. The same ecosystem-level approach has been used to define a monitoring framework using bivalve performance as indicator of ecosystem health and as an early warning indicator of critical transitions in aquaculture sites, providing the foundation for the integration of ecological indicators into regulatory regimes.

Photo 3. Oyster Culture

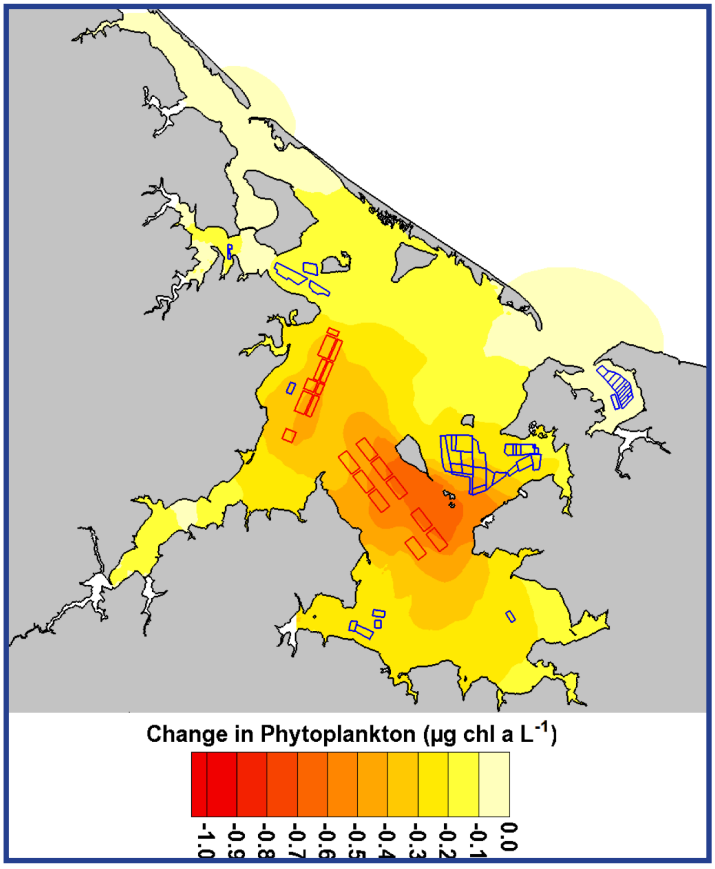


Figure 3. Net change in phytoplankton concentration, expressed in terms of chlorophyll, caused by projected leases (red polygons). Current leases are represented by blue polygons.

## Working towards SDG implementation from "local to global"

Understanding that the goal of "life below the water" can only be achieved by addressing the differing needs at multiple spatial and jurisdictional scales, the research of Dr. Lucia Fanning (MAP Professor) provides insights into the horizontal and vertical connections necessary for effective ocean governance. At the international level, in collaboration with colleagues at the University of the West Indies, her research has contributed to the first baseline assessment of ocean governance focusing on the large marine ecosystems[10] of the world (Figure 4) and the mechanisms in place for governing the open ocean (onesharedocean.org). Regionally, her focus has been on strengthening the capacity of regional organizations in the Caribbean to play a leading role in assisting countries with the implementation of SDG 14 targets, with particular emphasis on Target 14.b. This target is providing the means by which many of the other targets can be pursued, including enhancing economic benefits

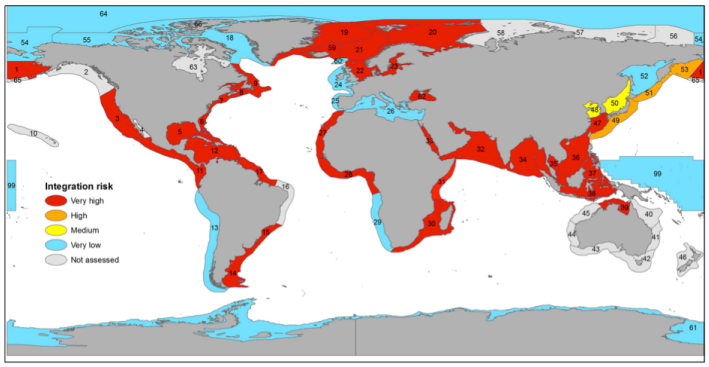


Figure 4. Level of perceived risks arising from calculated levels of integration across arrangements for fisheries, pollution and biodiversity for 50 multi-country LMEs

to Small Island Developing States (Target 14.7)[11]. Her research also serves to enhance the ability of countries to adopt and implement integrated approaches to managing coastal and ocean space, with a growing awareness of the need to integrate across the land-sea and science-management-policy divide to address key issues embedded in Targets 14.1, 14.2, 14.4 and 14.5. At the local level, Lucia brings aspects of SDG 14 into the classroom by having her graduate students in the Master of Marine Management program work with local stakeholders to monitor and make recommendations on minimizing land-based sources of marine pollution around Halifax Harbour (Target 14.1).

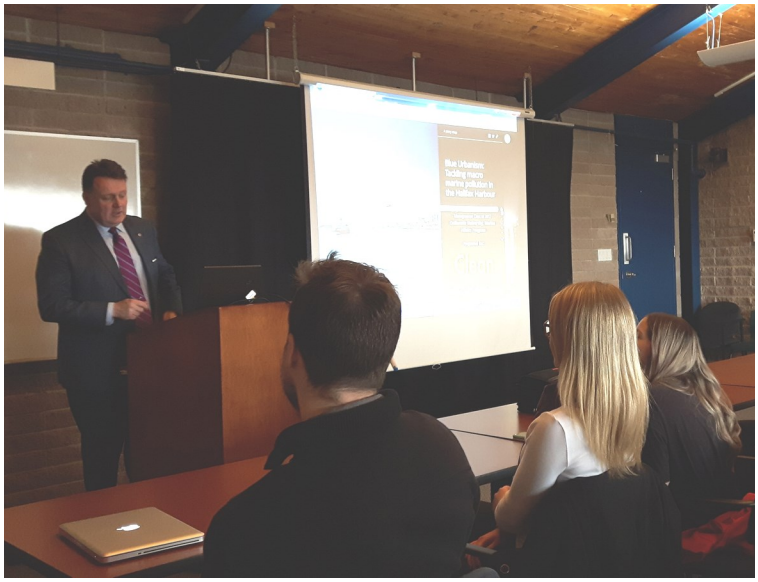

Photo 4. Halifax Regional Municipality Mayor Mike Savage responding to the students' findings on marine pollution in and around Halifax Harbour.

In terms of having an impact at the Canadian national level, Lucia is also participating in the CHONe and with Master's student Lauren Dehens and doctoral student Elizabeth Edmondson, efforts are aimed at Target 14.3, specifically understanding the social factors that influence whether or not the goals established for Canada's target of 10% of marine protected areas can be achieved. In addition, Lucia's SSHRC Partnership funded research (Fish-WIKS) is focused on understanding how western and indigenous knowledge systems can be incorporated to enhance decisions affecting fisheries governance and management on Canada's three marine and inland coasts (Target 14.2). This project directly connects with policy-making partners such as national and regional indigenous organizations, governmental decision makers and community level fishers and knowledge holders. Along with former Master's students Amber Giles and Erin Keenan ,and doctoral students Shelley Denny and Mirjam Wirz-Held, this research is demonstrating the benefits of including indigenous values and knowledge in decisions affecting the fisheries, particularly threatened, endangered or other species whose survival are at risk[12]. As with Dr. Aporta's research, this project also directly contributes to linking SDG 14 with SDG 16 as well as SDG 13.

## Conclusion

The global consensus on the Sustainable Development Goals adopted in 2015 speaks to the urgent need of the global community to collectively work towards their achievement. SDG 14 and its 10 targets aim to confront the challenges facing the world's oceans, including overfishing, habitat degradation and pollution with solutions focusing on protected areas, allowing access to small scale fishers and providing economic benefits in a socially just and inclusive manner, to mention just a few. With its mission to provide the education, research and outreach activities for advancing the sustainable use of the world's coastal and ocean environment, the Marine Affairs Program at Dalhousie University is committed to playing its role in ensuring the success of SDG 14. This brief attempt at highlighting our work provides only a sampling of the efforts being undertaken. For more information on MAP, please visit marineaffairsprogram.dal.ca

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