

The background of the entire poster is a photograph of a sunset or sunrise over a body of water. In the foreground, a small sailboat is on the water, its reflection visible. In the middle ground, several wind turbines are silhouetted against the colorful sky. The sky transitions from a deep blue at the top to a warm orange and pink near the horizon. The water is calm, reflecting the colors of the sky and the silhouettes of the boats and turbines.

monaco

BLUE INITIATIVE

9th
edition

April
8th & 9th
2018

EDINBURGH

Old College,
University of Edinburgh

SUMMARIES



Participants of the Monaco Blue Initiative 2018 - Edinburgh

© Douglas Robertson

Launched in 2010 upon the initiative of HSH Prince Albert II of Monaco, the Monaco Blue Initiative is a platform for discussion co-organized by the Oceanographic Institute, Prince Albert I of Monaco Foundation and the Prince Albert II of Monaco Foundation. Its members meet annually to discuss the current and anticipate the future global challenges of ocean management and conservation. This event provides a valuable framework for fostering discussions between business, scientific representatives and policy makers, and for analysing and highlighting the possible synergies between the protection of the marine environment and socio-economic development.

INTRODUCTION WORDS

H.E. Mr Bernard Fautrier,

Vice-President and CEO,
Prince Albert II of Monaco
Foundation

Mr Robert Calcagno,

CEO, Oceanographic Institute,
Prince Albert I
of Monaco Foundation

We would like to thank each of the 100 participants who attended the 9th edition of the MBI held in April 2018 at Old College, in partnership with the University of Edinburgh, for their participation and strong input in the event. The MBI was proud to welcome delegates from 15 different countries as well as young generations representing the future of the sustainable use of the Ocean, as 12 students from 8 countries enrolled in the University of Edinburgh participated in the event.

This fruitful MBI edition examined the main challenges and discussed new perspectives for the *Blue Economy in the northern seas*: from aquaculture, fishing and marine biotechnology to seabed mining, ocean energy, and coastal tourism. As the ocean represents the 7th largest economy, the sustainable use of its resources and conservation measures need to be the mandatory conditions for any new development, keeping in mind the dependency of local livelihoods on the natural environment. Today more than ever, increased transparency, international cooperation, research, investment and accountability are necessary to achieve blue growth.

While recent Marine Protected Area (MPA) growth has been impressive (according to the IUCN, 6,97% of the Ocean is now covered by MPAs), it is insufficient both with regard to numbers and size to ensure effective conservation of ocean biodiversity and ecosystem services. It is crucial to make MPAs more effective by connecting them, making sure that they are science-based and that small locally managed marine protected areas are integrated into the network. This was discussed during the second session on *Marine Protected Areas and Climate Change* as the panel explained the role of MPAs in climate change mitigation and adaptation.

The third session addressed *Marine Protected Areas and Aquaculture*. While aquaculture is one of the fastest-growing marine activities, in many places in the world, irreversible damage to the marine environment could result if the industry follows through on planned growth. It has been proven possible to combine MPAs and aquaculture, both benefiting each other. An integrated approach and tools such as Marine Spatial Planning would reduce risks of negative impacts on the environment and would allow for better acceptance and mobilization of local stakeholders around projects combining conservation and production.

The MBI also gave an overview of the ongoing international discussions and negotiations towards better ocean governance during the *Ocean Updates*. In September 2018, after a decade of preliminary discussions, parties agreed to officially open the negotiations for the creation of a legally binding international agreement on Biodiversity in Areas Beyond National Jurisdiction (BBNJ). This step forward can be a turning point for ocean conservation but the mobilization of a wider range of actors, including citizens, civil society and the private sector, is necessary to encourage governments to follow through and implement concrete measures.

Young generations are key as they are tomorrow's decision makers and actors of change. Their participation in congresses such as IMPAC4 in Chile highlights the importance of people in marine conservation and the sustainable use of marine resources. IMPAC5 in Canada will continue that focus, while

addressing the need to do more to reach marine protection targets and ensure MPAs are not mere "paper parks".

Given the urgency of climate issues and the collapse of biodiversity, we have no choice but to do things better and faster. A healthy and sustainable Ocean will only be possible if all of civil society, including the highest level of leadership commits to urgent and strong actions. This was the sense given by the debates and keynote speeches by HSH Prince Albert II of Monaco, HRH The Princess Royal, Chancellor of the University of Edinburgh, Mr. Peter Thomson, UN Special Envoy for the Oceans and the Honourable Dominic LeBlanc, Minister of Fisheries, Oceans and the Canadian Coast Guard of Canada.

More than ever, it is essential to develop and amplify this positive momentum towards a new governance in line with future international events. As Sylvia Earle recalled, it is a question of the Ocean's future and the future of our children.

This is the main objective of the Monaco Blue Initiative. This summary booklet will allow the reader to access the discussions' content which will, we hope, inspire further debates.





| TABLE OF CONTENTS |

Executive Summary	6
Welcome words by Prof. Alexander Tudhope, Professor of Climate Studies, University of Edinburgh	10
Welcome Address by HSH Prince Albert II of Monaco	12
SESSION 1	14
Blue Growth in our changing Northern Seas: achieving synergies	
SESSION 2	22
Marine Protected Areas and Climate Change	
SESSION 3	30
Marine Protected Areas and Aquaculture	
Ocean Updates	40
Keynote Speeches	44
Closing Address by HRH The Princess Royal, Chancellor of the University of Edinburgh	48
The participants expressed...	52
List of Participants	54
Hosted by	56
Co-organizers	58

EXECUTIVE SUMMARY

The Monaco Blue Initiative held its 9th edition in Edinburgh, Scotland from April 8th to 9th, 2018. MBI is an annual platform for discussion on sustainable ocean management and conservation co-organised by the Oceanographic Institute, Prince Albert I of Monaco Foundation and the Prince Albert II of Monaco Foundation.

Hosted by the University of Edinburgh under the patronage of HRH The Princess Royal, Chancellor of the University, MBI 2018 gathered some 100 participants from around the world. Attendees from government and policy circles, international organisations, civil society, science and the private sector exchanged views and experiences around three themes: Blue Growth; Marine Protected Areas and Climate Change; and MPAs and Aquaculture.

The Scottish venue provided the opportunity to look more closely at the North Sea and Arctic regions, which present specific challenges and opportunities in the context of climate change and growing food and energy needs. The day opened and closed with addresses by HSH Prince Albert II of Monaco and HRH The Princess Royal respectively, and featured keynote speeches by UN Special Oceans Envoy Peter Thomson and Canada's Minister of Fisheries and Oceans, Dominic LeBlanc.

The first session was on **Blue Growth in the Northern Seas**, referring to development of emerging maritime activities including aquaculture, biotechnology, seabed mining and ocean energy, alongside fisheries, oil and gas. The ocean sector is growing faster than the general economy today, making oceans the world's 7th largest economy. The panel examined the challenges of ensuring that North Sea and Arctic Blue Growth is conducted responsibly, and ways to assist with this process.

Panellists mostly agreed conservation could be compatible with economic development, while diverging at times on where and how. Some advised against rushing into new forms of ocean exploitation when the seas were already experiencing an acute ecological crisis.

The Arctic requires particular caution, as its ecosystem is of critical importance to global chemical, physical and biological processes. Climate change is already disrupting these processes; opening the region to extractive industries would accelerate the release of greenhouse gases and greatly exacerbate global warming. Indigenous peoples there merit particular consideration as their culture, way of life and livelihoods depend on the health and biodiversity of the Arctic ecosystem.

The cultural, socioeconomic, environmental and food contributions of responsible small-scale fisheries should also be recognised and must not be sacrificed to Blue Growth, it was noted.

Emphasis was placed on habitat restoration alongside or before developing new activities, as restoring habitats restores livelihoods and biodiversity, while increasing carbon storage potential. Involving local communities in coastal habitat restoration is part of the European Union's fisheries policy. The EU's North Seas fishing fleet is increasingly profitable, while fishing within sustainable limits, suggesting that appropriate conservation policies make economic sense.

The EU but also regional conventions such as OSPAR have a role to play in sharing data, science and best practices while pushing members to adopt marine spatial planning and an ecosystem approach to reconcile economic and environmental interests. The IEA's Ocean Energy Systems group fulfils that function with regard to ocean energy, which has the potential to reduce carbon emissions and pollution while providing energy security, jobs and a return on investment.

The panel agreed that increased transparency, international cooperation, research, investment and accountability were necessary to achieve sustainable Blue Growth. The main policy tools identified for doing this were marine spatial planning and ecosystem-based management, supported by strong science and environmental impact assessments. Conservation goals may also be advanced by taking more of a business approach to ensure

measures are applied more rigorously and with greater cost efficiency.

The second session concerned **Marine Protected Areas and Climate Change**, examining how to help MPAs better fulfil their potential in climate change mitigation and adaptation. By relieving other human pressures on ecosystems, MPAs could improve their chances of surviving the impacts of global warming. Connectivity among MPAs and managing them as networks increase their effectiveness. More research needs to be done on how MPA networks can help organisms survive.

Well-managed MPAs can also play an important role as sentinel sites to isolate, track and understand the specific effects of climate change. Their potential role as carbon sinks merits that future MPAs be identified and implemented specifically for that capacity, and not only for biodiversity. Scotland's National Heritage is working actively on how its MPAs can help capture and store carbon following an audit of all the blue carbon stored there.

When planning MPAs as climate change refuges, Islands merit particular attention, as they combine vulnerability, opportunity and valuable traditional knowledge. Their customary systems for managing resources can be very effective. Small locally managed marine areas need to be better integrated within networks of larger sites to allow MPAs to be ecologically resilient while remaining socially relevant.

The UNESCO World Heritage Convention is a useful tool for advancing marine protection. There are 49 marine World Heritage sites in 37 countries. UNESCO has had many successes in cases where it combined investment with cooperation among NGOs, local authorities and governments. However, despite the universal legal obligation to protect these areas, destructive activities continue in many of them. Greater accountability and a business approach are needed to achieve and accelerate effective protection.

Transparency, big data and knowledge sharing are key. Tools for that include the IUCN's World Database on Protected Areas and its future list of MPAs according to their progress towards implementation, and what level of activity they allow. The IUCN has also produced a synthesis of global conservation standards to help MPA planners and managers.

Ambition behind larger sites and better cross-site collaboration is needed, in order to cover as much area as species may need, especially migratory ones. Anticipation is also important, using technology to model what might occur in the near future and protect areas for which the traditional rationale might not yet exist.

In light of ongoing threats, even to areas that have already been designated, more needs to be done, both better and faster, particularly in the High Seas, to ensure that Marine Protected Areas can fully deliver on their potential to make oceans and communities more resilient to climate change.

The third session addressed **Marine Protected Areas and Aquaculture**. It explored the current relationship between the two, the potential role of farmed seaweeds and invertebrates, and how to ensure aquaculture is sustainable. As aquaculture is one of the fastest-growing marine activities, an integrated approach is necessary to define sustainable aquaculture and how it might work effectively with MPAs.

Finfish and particularly salmon farming as conducted today is problematic. Whether in Scotland, Norway, or Chile, it appears to have harmed wild salmon stocks through sea lice, genetic and antibiotic contamination. In Chile in particular, it has destroyed precious fjords to such an extent some can no longer even support aquaculture.

In Scotland, salmon farming is the main form of aquaculture and growing rapidly. The Scottish Parliament's environment committee recently concluded that irreversible damage to the marine environment could result if the industry followed through on planned growth. Finding more sustainable feed sources than fishmeal is one priority.

The Aquaculture Stewardship Council helps to ensure greater transparency, accountability and sustainability through its certification standards, ongoing site audits, and work to raise consumer demand for responsibly farmed seafood. It is also working on a new feed standard. ASC-certified farms ought to be compatible with MPAs, it was suggested.

The development of insect-based protein holds promise both as a more sustainable feed source for aquaculture than fishmeal, but also to partially replace farmed fish with other protein sources.

A certain consensus emerged that farming of seaweed and invertebrates had much greater potential for integration with MPAs than finfish, although they require far more ocean space to produce the same amount of food. Locally Managed Marine Areas (LMMAs) in tropical coastal regions offer positive examples of synergies between invertebrate aquaculture and MPAs in a context of community co-management. Non-fed species like sea cucumbers, seaweeds and sponges farmed within protected waters provide alternative livelihoods while advancing conservation objectives. Responsible entrepreneurship and investment are needed to develop such models on a wider scale.

Integrated Multi-Trophic Aquaculture combining fish, seaweeds and invertebrates was broadly seen as sustainable and compatible with MPAs. Shellfish, seaweeds and invertebrates contribute to habitat restoration and health through extractive, re-use and filtration processes, while helping to mitigate the impacts of climate change. The value of these ecosystem services – and not just the biomass value of grown crops – needs to be calculated to create financial and regulatory incentives.

Marine spatial planning is necessary to accompany aquaculture's growth, especially if it begins moving out into more open water. While MSP is broadly seen as the answer, progress on its implementation is insufficient. Impacts on local communities must always be considered; if MPAs mean displacement of local populations or harm their livelihoods,

they do not work. They must be part of a viable local society and economy, as in Scotland's Loch Creran, it was suggested.

Before intensively farming the oceans, it would be irresponsible not to learn the lessons from unsustainable land-based agriculture. Circular economy models such as IMTA, where waste from one farmed species feeds another, are among the most efficient, sustainable food systems and the most promising for development within MPAs.

The day's final session provided brief updates on two topical issues. The first was on the current status of UN-based discussions towards a legally binding international agreement on **Biodiversity in Areas Beyond National Jurisdiction (BBNJ)**.

Since late 2017, notable progress has been made towards this agreement, which would extend the UN Convention on the Law of the Seas to the conservation and sustainable use of biodiversity in the High Seas. The ocean community regards this as a crucial step towards enabling protection of high-seas areas critical to the global ecosystem, indigenous cultures, and the climate.

After a decade of preliminary discussions, parties agreed to officially open negotiations and changed voting rules to one of a two-thirds majority rather than unanimity. They also agreed on four themes for discussion, scheduling the first official talks for Sept. 2018.

Several powerful states remain sceptical or opposed. The mobilisation of public opinion, civil society and the private sector will be necessary to help governments to follow through and obtain the hoped-for results for conservation and sustainability.

The second update was on **IMPAC4 and IMPAC5**. The fourth International Marine Protected Areas Congress (IMPAC4) took place in Sept. 2017 in Chile, and the fifth will be held in Vancouver, Canada in 2021. IMPAC brings together MPA managers, conservationists, scientists and other stakeholders from around the world to share experiences, knowledge and best practices.

IMPAC4 emphasised youth participation and the interdisciplinary nature of marine conservation. It produced a Call for Action highlighting the importance of people in marine conservation and the sustainable use of marine resources. This was particularly appropriate in the Chilean context of recent rapid MPA growth involving remote indigenous communities.

IMPAC5 in Vancouver will continue this focus, while addressing the need to do more to reach marine protection targets and ensure MPAs are not mere "paper parks". It will also make extensive use of social media to continue to reach younger generations. During the run-up to that event, its organisers invited the marine community to help establish the conference's themes based on the latest science and technology.

WELCOME WORDS

Prof. Alexander Tudhope

Professor of Climate Studies,
University of Edinburgh

Opening the conference, **Alexander Tudhope** saluted the University of Edinburgh and the Principality of Monaco as pioneers of modern oceanography. Alumni of the university included Charles Darwin himself, who had theorised not only evolution but also the structure and distribution of coral reefs.

The early explorers required courage, decisive action, collaboration, and the ambition to think beyond single elements and embrace the ocean as a whole system. These were all values of the Monaco Blue Initiative, he said.

The University of Edinburgh, the Oceanographic Institute, Prince Albert I of Monaco Foundation and the Prince Albert II Foundation also had in common their efforts to propel creative thinking, research and action to support the protection and recovery of our oceans. Hosting MBI was just a natural extension of their ongoing partnership.

This year's venue offered the opportunity to benefit from the perspective of the North Sea, where the effects of climate change were manifesting most rapidly, and whose peoples had a very long and distinctive social and cultural connection with the sea.

Scotland like other places had a history of overexploitation of resources but also of innovative solutions and conservation traditions; the UK's oldest voluntary conservation area was just down the coast from Edinburgh, Tudhope noted.

He welcomed the presence at the conference of 12 students from eight countries enrolled in the University of Edinburgh's Marine Systems and Policies Masters programme, who represented the future of the sustainable use and conservation of the oceans.





© Douglas Robertson

WELCOME ADDRESS

HSH Prince Albert II of Monaco

Minister,
Mr. President,
Your Excellencies,
Ladies and Gentlemen,
Dear friends,

First of all, I would like to thank Alexander Tudhope for his welcome and his words that really touched me.

Through him, I would like to extend my thanks to our host today, the University of Edinburgh, and in particular its School of GeoSciences.

This extremely prestigious university, with its long and rich history, is particularly dear to my heart. I have already had the pleasure of visiting it on several occasions. Two years ago, I was honoured to receive the distinction of Doctor Honoris Causa here. Moreover, my Foundation has forged a very productive relationship with this institution.

Therefore, I would once again like to express my gratitude to those in charge for their hospitality.

But I would also like to express my gratitude to all of you for being here today, at this ninth edition of the Monaco Blue Initiative.

As you know, the Monaco Blue Initiative aims to help change our approach to the oceans, by prioritizing specific, collective and operational solutions.

In this respect, the Initiative was created as the result of an observation, a requirement and an aim.

The observation is that of the great complexity of the subjects related to the

conservation of our oceans, which combine different levels of action, technical expertise and complementary aims. We need to act in line with multiple rationales, taking into account sometimes contradictory requirements, reconciling the needs of humanity with those of nature, as well as current crises and our duties to the future. But we need to act quickly.

Because the requirement is to progress rapidly in the face of the dangers that each year are becoming increasingly specific and, above all, increasingly serious. Whilst there is still time, we must do everything we can to avoid irreversible tragedies. Tragedies that we can already see looming on the horizon, when we observe the deterioration of precious, fragile ecosystems, the spread of plastic pollution, and the daily disappearance of different plant and animal species. In order to succeed in reversing the cycle of decline, we must adopt a new approach, respectful and based on diminishing our resource use. We must stop taking the Ocean for granted and believing it is permanent, that we can take from it and pour into it without consequences.

Finally, the aim is to bring together skills and means that are all too often dispersed, to encourage dialogue between experts, and to mobilise concerted action. We must act together. Otherwise, we won't be able to progress in the right direction.

Acting alone, we would run out of ideas. Acting alone, we would run out of means. Acting alone, we would run out of determination. Acting alone, we would above all be less efficient.

We must never forget these multiple demands, this complexity and this complementarity, which are essential in order to make a real difference. We must never forget the reality.

As David Hume, one of Scotland's most distinguished sons, ordered, we must "be a philosopher; but, amidst all your philosophy, be still a man".

Indeed, being "a man" means precisely looking at the different aspects of a problem and trying to reconcile them. And that is why we need to work together.

In this respect, today I would like to extend a

special welcome to Mr. Peter Thomson, the United Nations Secretary General's Special Envoy for the Ocean. Through his work, he embodies this collective commitment by the nations of the world to the oceans and their importance to humanity.

His appointment to this post shows a new awareness by the international community, which, like him, is equipped with remarkable skills and new means.

In 2015, during COP21, organised in Paris, the issue of the oceans was for the first time officially included in the negotiating agenda, and it was also referred to in the preamble to the Paris Agreement. In 2016, COP22 devoted a specific day to the issue of the oceans.

That year, the IPCC complied with the request made notably by the Principality of Monaco and my Foundation, to devote an interim report to the oceans and the cryosphere, after including a chapter on the oceans in its latest report. Work on this interim report was launched in Monaco just over a year ago now, and is due to finish in the Principality in autumn 2019.

Also in 2016, the United Nations stated that one of the Sustainable Development Goals was to "Conserve and Sustainably Use Oceans, Seas and Marine Resources for Sustainable Development". In June 2017, the UN organised a major international conference, which I participated in, on the implementation of this Goal No. 14.

In parallel with this, negotiations were launched for the adaptation of the International Law of the Sea, which was designed at a time when environmental and climate issues appeared different from the way they are today. In 2016, a project on marine biodiversity in areas beyond national jurisdiction was thus launched, in which Monaco plays a very active role.

All these changes are essential. They are essential because of the progress they allow. But above all because of the spirit that they demonstrate: a spirit of collective responsibility.

Today, this spirit needs to be extended beyond diplomatic and political circles. It must be shared with economic players. It

must be introduced into civil society. This is why we are here today. This is why, year after year, and after nine years now, the Monaco Blue Initiative aims to encourage dialogue and promote reflection, to identify solutions and assess their efficiency, focusing on the same issues.

The issue of blue growth and its infinite potential, the problems affecting marine protected areas, which are occurring increasingly frequently across the globe, and the development of aquaculture, so essential for our collective future. There is an endless list of subjects that are advancing continuously, and which we therefore need to return to periodically, to refine our analyses and fill in the gaps in our knowledge.

There are so many issues that require specific solutions.

This is an essential requirement and the one we have come together to focus on today.

Thank you very much.



SESSION 1

Blue Growth in our changing Northern seas: achieving synergies

Moderator

Dr. Lisa Emelia Svensson,
Coordinator, Marine and Coastal
Ecosystems Branch, United Nations
Environment Program

Panellists

Mr. Felix Leinemann,
Head of Unit "Blue Economy Sectors,
Aquaculture and Maritime Spatial
Planning" at European Commission

Dr. Ricardo Serrão Santos,
Member of European Parliament

Ms. Susana Salvador,
Executive Secretary OSPAR
commission

Mr. Henry Jeffrey,
Member of the Ocean Energy
Systems at the International Energy
Agency and Senior lecturer at
University of Edinburgh



THE CONTEXT

"Blue growth" refers to the current and potential development of activities in the maritime space, from aquaculture, fishing and marine biotechnology to seabed mining, ocean energy and coastal tourism. While these activities contribute to national economies, blue growth raises many questions as to its environmental and social sustainability. With a focus on the North Sea and Arctic regions, this panel examined the challenges of ensuring blue growth is conducted responsibly, and explored the tools in place or in development to assist with this process.

Moderator **Lisa Emelia Svensson** of UNEP began by noting that Blue Growth meant different things to different people. The ocean belonged to everyone – or rather, to no one. The issue was how to ensure that "First come, first served" was not applied to the oceans and that the growth of the Blue Economy was sustainable.

The Baltic seas were some of the world's most polluted, despite being surrounded by its most environmentally friendly countries. The economic model of intensive industrialisation after World War II was not sustainable, and when moving into the ocean space we must not repeat the same mistakes made on land.

The oceans constitute the world's 7th largest economy. Svensson called for a move from philanthropy towards an innovative business model for the oceans. She highlighted a contradiction: "If we have sustainable use, do we need conservation? Is conservation a failure of policies, and of politics?"

Felix Leinemann of the European Commission briefed participants on the EU's work to support sustainable Blue Growth. In 2014 the EU's North Sea fishing fleet earned record profits, while remaining within maximum sustainable yields, he noted, which showed sustainability was compatible with economic rewards. This should be a lesson not just for fisheries but for the entire Blue Economy.

Aquaculture – which now represented 50 percent of seafood consumed worldwide – was growing rapidly, as was the bioeconomy sector. Offshore wind power now employed 150,000 people in the EU, as many as did fisheries, in a sector that hardly existed 20 years ago. Indeed, the Blue Economy was growing faster than the general economy, Leinemann noted.

Sustainability was key to the EU's Blue Growth strategy, organised by sea basins: Arctic, Western Mediterranean, Atlantic and Baltic. Some 1,200 new maritime projects had been set up in the Atlantic for a total value of 6 billion Euros; over 500 projects, worth 2 billion, directly benefited the environment, he said.

Transatlantic research cooperation was central to the Atlantic strategy, exemplified by the 2013 Galway Statement between the EU, US and Canada. Other EU-financed trans-boundary projects included a strategic environmental assessment in the North Seas. Bordering countries were also working on a North Seas Energy Declaration. For the region to become the "Saudi Arabia of offshore wind" by 2050, with a production target of 250 GW, they needed to work together on electricity interconnectors, and to ensure wind parks respected the ecosystem approach, Leinemann said.

An EU directive on Marine Spatial Planning required European states to set up maritime spatial plans in their waters by 2021. Reconciling diverse users within one area was increasingly important as space became scarce, he noted. The 2020 MUSES (Multi-Use of Space in European Seas) research project – which involved the University of Edinburgh – was examining possible synergies, such as whether offshore wind parks could be compatible with fisheries or as aquaculture sites.

Other possibilities included using wave energy instead of diesel to power aquaculture farms, and cultivating seaweed between wind parks to act as carbon sinks and optimise use of the space. There was no lack of ideas nor



of innovative entrepreneurs who wanted to change how we dealt with the sea, but they needed investment and encouragement, as public money would never be enough, Leinemann warned.

To that end, in May 2018 the EU was hosting Blue Invest, a matchmaking event for investors and businesses with the goal of creating a Blue Economy financing platform by the end of this year. The EU recently presented the Sustainable Blue Economy Finance Principles Initiative together with the WWF, the European Investment Bank and the Prince of Wales International Sustainability Unit.

The initiative established ocean-specific standards to ensure investment would promote implementation of Sustainable Development Goals, and particularly SDG 14. The partners hoped to build an international coalition and have these principles adopted at the 2018 **Our Ocean** conference in Indonesia.

The EU Commission's scientific advice mechanism recently submitted a report on how to obtain more food and biomass from the oceans while protecting them, Leinemann noted, which concluded that we must move from capture to sustainable mariculture, concentrating on macro- and microalgae.

Ricardo Serrão Santos is a member of the European Parliament and of the Paris Oceanographic Institute's scientific council. The kind of growth pursued until now had had disastrous environmental impacts, he said. He noted the discrepancy between population growth and that of human consumption from the seas: while since 1930 humans had increased 3.7-fold, fish extraction had grown fivefold. One major issue, alongside overconsumption, was waste, which represented 35 percent of caught fish and seafood.

Instead of urgently attending to waste management, impact mitigation, habitat recovery, circular economy development and ecosystem conservation, we planned so-called Blue Growth as a new opportunity at a time of low job growth. Yet growth *per se* was

a trap, Serrão Santos warned, suggesting we adopt the term "Blue Development".

The Arctic was until recently seen as untouchable. Now, it was under the spotlight for the worst of reasons: an unprecedented rate of change due to anthropic factors disturbing both the climate and the chemistry of our oceans and atmosphere. The situation was very complex both in regard to environmental challenges and to disparate, politically driven plans, Serrão Santos said.

Some viewed the Arctic's melting just as a way to increase profits by reducing distances, expanding fisheries and opening up new oil, gas and mineral reserves. Yet the Arctic was a unique ecosystem of critical importance to the chemical, physical and biological balance of the entire globe. Its current melting jeopardized ecological processes in multiple ways. This was why everyone on the planet, from the tropics to the North Seas, should have a voice on the Arctic.

Local peoples merited particular consideration: humans had long been part of the Arctic system, which was still home to more than 4 million people. Its biodiversity had been central to their way of life for millennia, and remained a vital part of their material and spiritual existence.

Industrial exploitation of renewable and non-renewable natural resources posed a special challenge in the Arctic and required strengthened international cooperation. These extractive activities would accelerate the release of greenhouse gases and contribute to global warming on a global scale, which was like feeding a fire with gasoline, Serrão Santos declared.

The fate of the Arctic should be seen as a canary in the coal mine, as it foreshadowed the fate of the planet. Ecosystem-based management and stronger cooperation must be the basis of our strategy for mitigating human industrial processes inducing global warming.



Establishing Ecologically and Biologically Significant Areas was key, Serrão Santos affirmed. A few months ago, together with regional Baltic Sea partners the CBD had approved 77 Arctic marine EBSAs and 13 super-EBSAs fulfilling scientific selection criteria. Unfortunately, in the NE Atlantic a mix of political sensibilities and industrial interests had shelved the process up to now, he said.

Two years ago the European Parliament approved a joint resolution supporting regulation of the Arctic prior to its exploitation under a precautionary, ecosystem approach. It had welcomed the identification of Arctic EBSAs as an important step in ensuring the effective conservation of Arctic biodiversity. The cost of inaction was increasing exponentially, Serrão Santos warned.

The EU was in a privileged position to facilitate cooperation among member states and third countries. It and many member states had already set strategies for the Arctic. The principles that had emerged were: protection, sustainable use and international cooperation. Combined with knowledge, these constituted the four pillars of the European approach to the Arctic and the North Seas.

Susana Salvador is executive secretary of the **OSPAR** Commission, a regional Convention of 15 Contracting Parties and the European Union. OSPAR's main objective was to prevent and eliminate pollution and protect the marine environment from adverse impacts of human activities while promoting the sustainable use of goods and services, she explained.

OSPAR cooperated with contracting parties while requiring that they apply best available techniques in their activities, taking a precautionary, polluter-pays, and ecosystem approach. Through data collection, regular assessments, and monitoring, OSPAR provided information on the impacts of human activities and identified priorities for action. Its North Atlantic strategy was subdivided under five themes: Biodiversity and the Ecosystem, Hazardous Substances, Eutrophication, Offshore Industry and Radioactive Substances. An important achievement was last year's

intermediate assessment evaluating the marine environment for the first time based on individual, measurable indicators to better reflect the impacts of human activities, Salvador said.

OSPAR had a legally binding agreement for offshore activities covering discharge of chemicals and produced water, oil spills, and the decommissioning of offshore installations. It produced guidance for wind farm development and annually collected data on all tidal, wave and wind power installations.

With observer status at the Arctic Council, OSPAR collaborated on Arctic issues, particularly new exploration and offshore renewables, and on marine litter, in which it co-led a project, Salvador noted. It also worked with other regional seas under the Barcelona, Abidjan and Helsinki Conventions.

Between 2010 and 2016, protection of the entire OSPAR maritime area grew from 1 percent to 6 percent. Seven of the existing MPAs were in Areas Beyond National Jurisdiction. OSPAR aimed to reach the CBD Marine Protected Areas target of 10 percent of coastal and marine areas by 2020, Salvador affirmed.

More work was needed for ecological coherence and better management of the MPA network. Progress had been made in public awareness, scientific knowledge and cooperation with other regional bodies; one example was OSPAR's Collective Arrangement with the North-East Atlantic Fisheries Commission (NEAFC). Launched in 2014 as a bilateral instrument for area-based management, it now aimed to become an integrated platform for regional and cross-sectoral collaboration, she said.

Salvador acknowledged a certain overlap among regional governance mechanisms. Marine Spatial Planning based on the ecosystem approach was very important as an area-based management tool to reconcile different and often opposed interests; it naturally required regional and global cooperation mechanisms to work effectively.

Henry Jeffrey is chairman of the Ocean Energy Systems (OES) group at the International Energy Agency. OES works through international cooperation and information exchange to advance research and development of ocean renewable energy, whether from tides, waves, currents, or thermal and salinity gradients. OES's overall vision was to make a viable, respectful use of the ocean to exploit the energy available there, he said.

International collaboration was extremely important – as the Prince said, no one could meet these challenges on their own. OES had 24 member countries worldwide including the European Commission; Monaco and the Monaco Blue Initiative were also part of the group, which incorporated government, industry and research organizations.

OES activities included an initiative on how to feed ocean energy into the land grid with minimal impact while earning a return on investment. Another OES tool popular among policy makers and industry was its GIS database mapping current and future sites around the globe where ocean energy was or could be most efficient. OES was strongly focused on the cost of different technologies to ensure an effective return on investment for all stakeholders, Jeffrey noted.

Ocean energy offered three main advantages: security of supply, carbon savings, and economic development. Indeed, such projects were often located in fragile, remote coastal communities in need of economic benefits, and especially jobs. OES's goal was for ocean energy to generate 300 GW globally by 2050, equivalent to 20 percent of the UK's total energy needs. This would save 500 million tons of carbon and provide over ¾ million high-quality jobs, Jeffrey affirmed.

Most important was OES's work on environmental effects and the consenting process to ensure ocean energy was done respectfully, as putting these devices in the sea would have impacts. An OES taskforce led by the US Department of Energy was analysing and synthesising current global marine science to prevent duplication or replication

and enable countries to share lessons learned on best practices where there were impacts, or know where there weren't, Jeffrey said.

As ocean energy was an emerging sector, the OES focus was on adaptive management. Ongoing learning had already been of great help informing and sometimes comforting regulators with regard to consent, he affirmed. The OES countries all had different approaches; research organisation WavEC Portugal was coordinating work on the consenting process to provide a holistic view and best practices to ensure that any ocean energy deployment was done in a way acceptable to all.

Large-scale deployment of ocean energy represented a great opportunity for energy security, high-quality jobs and carbon savings but there was a clear need for awareness of the connection between marine spatial planning and the consenting process to enable a global strategy on deployment, Jeffrey concluded.

The floor was opened to questions and comments. **Tiago Pitta e Cunha** of Portugal's Oceano Azul Foundation applauded Serrão Santos' term Blue Development, while noting that EU maritime policy raised important questions. Rather than adopting a human-centered concept, we needed to take a science-based ecosystem approach to deep-sea mining, and condition blue growth on a vision for the oceans.

The oceans' ecological crisis was so acute that first we needed to save what was left, Pitta e Cunha said, while working towards meeting societal challenges that may be contradictory such as food security, demographic expansion, and de-carbonisation. Solutions must integrate and bridge economic and conservation needs, whether ocean-sourced protein, energy, or energy-efficient transport. Blue Natural Capital might be a good concept to achieve that integration, he suggested.

Jeremy Percy of the European Low Impact Fishers Association cautioned against lumping all fishing together. Although fully 80 percent of EU fishing was small-scale, it had far less

impact than industrial fishing. Alongside sustainable aquaculture and reduction of negative fishing impacts, a place must be retained for the cultural, social, economic, environmental and food benefits of well-managed small-scale fisheries, he affirmed. Small-scale fishers were the original Blue Economy, and we needed to ensure that the benefits that accrued from them were not thrown out with the bathwater in the thrust for Blue Growth.

Bill Sanderson of Heriot-Watt University is Research Director for the Dornoch Environmental Enhancement Project, which is working to restore native wild oysters to Dornoch Firth. These habitat types used to be very widespread in the North Sea and the North East Atlantic, including a 20-mile-long oyster bed here in the Firth of Forth. These habitats mattered for biodiversity, carbon storage and sustainable livelihoods, Sanderson said. Restoring oysters to their historical habitat fostered the growth of other species, multiplying benefits to fishers.

He emphasized the importance of looking systematically during marine planning at what we could have rather than what we did have, because restoring habitats restored livelihoods. Developing synergies with built structures and ocean energy was one way to actively involve recovery in Blue Growth.

Ricardo Serrão Santos responded to Pitta e Cunha's reference to blue natural capital and noted that the EU Commission was financing projects studying possible future impacts of deep-sea mining. The MIDAS project on Managing Impacts of Deep-Sea Resource Exploitation did wonderful work, he said. However, although their conclusion was that deep-sea mining would cause huge losses of biodiversity, it would probably be done anyway.

He added that the European Parliament was very active in the defense of traditional low-impact fisheries. Some industrial fisheries were very organised, and worked well. But IUU – illegal, unreported and unregulated fishing – was a cancer. Some of the small

fisheries needed to do better, especially in the Mediterranean, where many of the problems with sustainable fishing were due to them and not to industrial fisheries, he said.

Tony Long of Global Fishing Watch stressed the importance of transparency. The only way to achieve efficient synergies among stakeholders was to get information out into the open, which raised the question of how to do that when it was proprietary.

Serrão Santos recognized transparency was difficult to achieve, noting that in the past, EU member states had lied about their fish takes. Another problem was opacity regarding the final beneficiary; in many cases we did not know who owned a ship, he said, adding that a number of non-EU countries were not transparent.

Felix Leinemann noted that the right policies, namely the common fisheries policy, had reduced overexploitation. The EU's strong focus on local, community-led development where fishers quickly saw the results of conservation played an important role. Local EU-financed projects integrated fisheries with other environmentally beneficial coastal activities such as ecosystem restoration, he said. Indeed, although the EU Commission had been criticised for no longer referring to Integrated Maritime Policy but just Maritime Policy, that simply reflected how far they had come, and that for them, integration was self-evident.



SESSION 2

Marine Protected Areas and Climate Change

Moderator

Dr. Sebastian Troeng,
Senior Vice-President for Marine Conservation, Conservation International

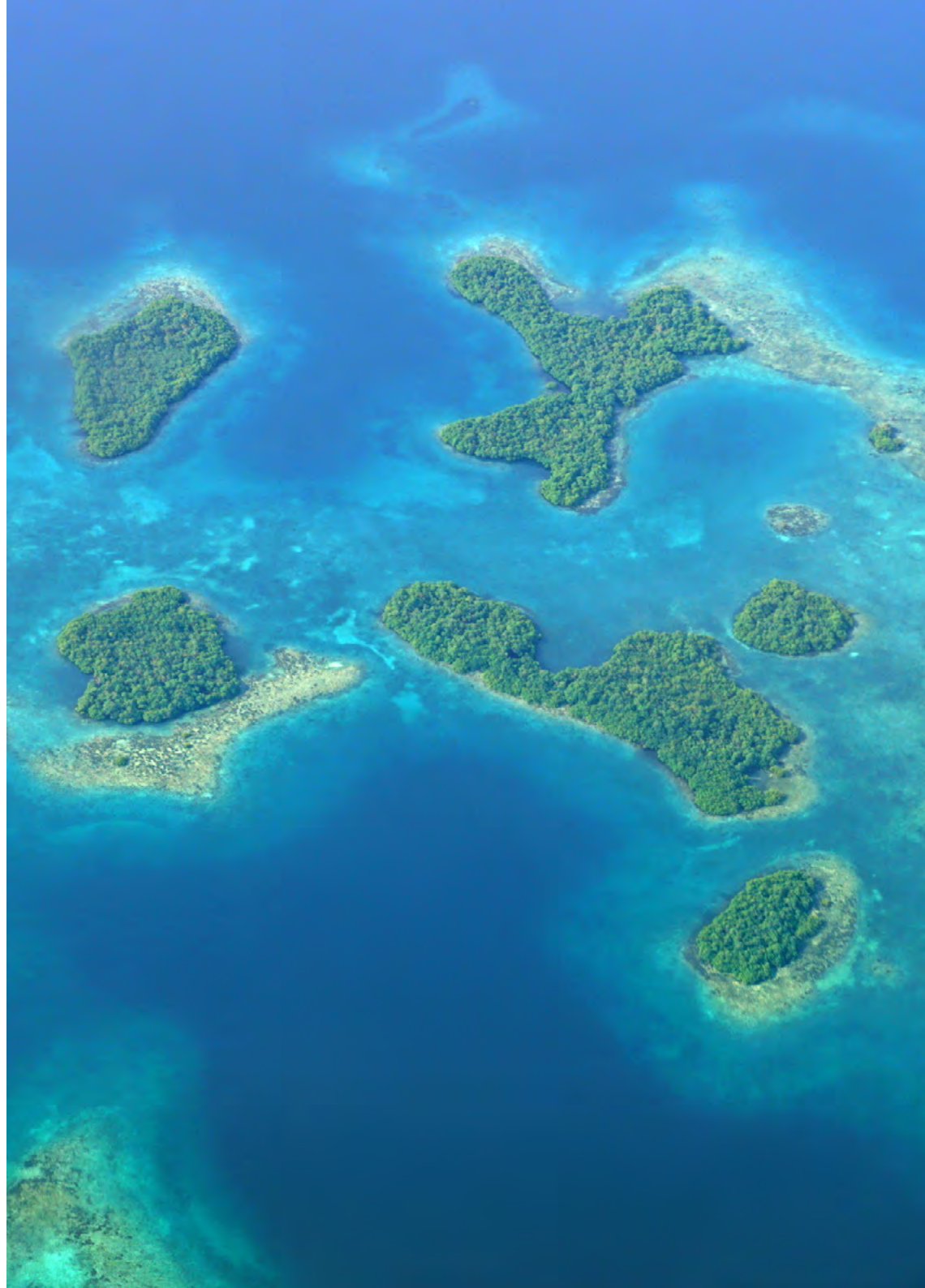
Panellists

Dr. Fanny Douvere,
Coordinator of the World Heritage Marine Programme at UNESCO

Dr. Meriwether Wilson,
Senior Lecturer, Marine Science & Policy at University of Edinburgh, School of GeoSciences

Prof. Dan Laffoley
Marine Vice Chair, IUCN's World Commission on Protected Areas

Prof. John Baxter,
Principal adviser at Scottish Natural Heritage



THE CONTEXT

Marine Protected Areas (MPAs) have proven to be an effective tool to resist the growing threats to the marine environment and afford marine ecosystems greater resilience to the impacts of climate change. Healthier oceans provide greater adaptive capacity to climate change for both ecosystems and the people that depend upon them. In addition, MPAs covering habitats like mangroves, seagrass beds and salt marshes can mitigate climate change by sequestering carbon. While recent MPA growth has been impressive, it is insufficient both with regard to numbers and size to ensure effective conservation of ocean biodiversity and ecosystem services. The panel discussed how to make MPAs more effective by making them bigger and better connected and how to do so more quickly.

Moderator **Sebastian Troeng** of Conservation International recalled that the history of Scotland's seas was emblematic of the oceans in general, as one of past abundance followed by overexploitation. While 150 years ago 500,000 oysters were harvested from the Firth of Forth each week, by 1957 not a single oyster was to be found there. The story of cod was similar, despite some recent progress, he said.

There were few places left of marine abundance, yet examples existed, such as Costa Rica's Cocos Island, Ecuador's Galapagos Islands and the Malpelo MPA in the Eastern Tropical Pacific. The Colombian government had expanded Malpelo several times over the last decade, secured UNESCO World Heritage status, and put their political will and muscle behind enforcing it, all while fighting an armed conflict. This showed what could be achieved with sufficient commitment, Troeng affirmed.

But with pollution, overfishing and increasing impacts of climate change such as coral decline, acidification and sea-level rise destroying precious marine habitats such as mangroves, we needed more places like Malpelo, he urged, inviting the panel to explore how to achieve this.

John Baxter of Scottish National Heritage emphasized the importance of connectivity, blue carbon and good management with regard to MPAs. As an aside following a remark during Session 1, he noted that in fact there were oysters in the Firth of Forth, but sadly, these were non-native oysters that needed to be eliminated.

Scotland's extensive MPA network counted 194 sites in the waters out to the 200-mile limit, and were concentrated in the west; in the eastern and outer areas, the country needed to do more. While roughly 20 percent of Scottish waters were designated, Scotland had to work harder to convert designated areas into properly managed sites, lest they be mere "paper parks." This distinction between designated and effectively protected MPAs was an important one for everyone, Baxter affirmed.

One reason that more needed to be done was that many features for which Scottish MPAs were designated were vulnerable to climate change pressures such as sea temperature rise and acidification, he noted. MPAs could help relieve other human pressures on organisms, giving these animals and plants a better chance of surviving climate change.

MPAs that functioned as a network were more effective, which implied connectivity. A lot more work and research needed to be done on the relationships between MPAs, as assumptions didn't always prove correct, Baxter cautioned.

Scottish research on genetic connectivity between different MPAs had shown that marine organisms' larvae under stress in one MPA didn't necessarily move to an adjacent one, but could be found hundreds of kilometers away, for example, as other factors such as currents came into play. In light of this, Baxter stressed the importance of carefully examining what constituted a network that would really help organisms to respond to and survive the rigors of climate change.

Well-managed MPAs could also play an important role as sentinel sites: having

alleviated other pressures within them, we would be better able to detect the impacts of climate change at an early stage, he explained. Unless we knew what and where impacts were having an effect, we would be blind as to what to do to help. For that reason, we should be identifying key sentinel sites around the world to help isolate and track the effects of climate change.

Baxter said Scottish National Heritage was also looking at how MPAs could help with the capture and storage of carbon. Scotland with its universities conducted an audit of all the blue carbon stored in its MPAs, which gave a rough estimate of 60 million tons already stored and an annual accumulation of 0.5 million tons.

Baxter believed the real figure to be greater, citing as an example the Wyre Sound MPA in the Orkney Islands, where an initial estimate of 400K tons of carbon stored in the small MPA's ancient maerl (red seaweed) beds was revised upwards to 720K tons after taking deeper core samples. Some of that carbon was at least 4,000 years old, he said, and was a precious resource. The beds were no longer threatened by trawling, as fishing had been banned there, but were vulnerable to acidification.

Finally, Baxter recommended that future MPAs be identified, designated and protected specifically for their carbon sequestering and storage capacity, over and above biodiversity, as some potential sites might not be interesting from a biodiversity standpoint.

Fanny Douvère of UNESCO's World Heritage Marine Programme then spoke on how World Heritage status could help reinforce MPAs' effectiveness. First she thanked Prince Albert II of Monaco for his year-round leadership on the oceans, as well as for MBI and a recent partnership signed at UNESCO for Marine World Heritage protected sites. She also offered thanks and recognition to Ocean Elder and Mission Blue president Sylvia Earle for all she had achieved, at a time when women didn't have the possibilities we had today.



The UNESCO World Heritage Convention protected over 1,000 sites today, both cultural and natural. Of these, 49 were marine sites in 37 countries, one being St. Kilda here in Scotland, she said, noting that the marine programme was only 8 years old. Having such sites came with the responsibility on the part of countries to protect them and the exceptional value behind their designation.

Change had to be sustainable both environmentally and socioeconomically; cooperation among UNESCO, NGOs, local authorities and governments coupled with investment had led to many successes, Douvère noted. Until last year, shipping crossed the Tubbahata Reef Park in the Philippines; thanks to an agreement with the International Maritime Organisation ships now avoided these unique coral areas. In Belize last December the government had banned all oil exploration in its waters.

These examples showed that coordination and minimal investment could be the catalysts for lasting change, Douvère affirmed. However, despite day-to-day work on these 49 sites, we were still nowhere near achieving our goals, and were far from reaching the Convention on Biological Diversity (CBD) Aichi targets.

Some 30 percent of World Heritage MPAs still had illegal and unreported fisheries going on within them, such as Costa Rica's Cocos Island where 2 tonnes of shark fins were seized recently. A coal plant was being built in another site next to the world's biggest mangrove between Bangladesh and India, and certain fish and marine mammal species were on the brink of extinction because of international trade in a single luxury ingredient like totoaba bladder, she said.

None of this made sense given that 193 countries had a legally binding commitment to protect these areas recognized as being of universal value to humanity. If we saw these kinds of problems in World Heritage MPAs, it was just a symptom of the larger scale problem in ocean conservation today, Douvère suggested.

It was necessary to start building accountability, she said. This ought to be achievable, but it would require calculating concretely what needed to be done – in her area of marine sites, this mostly meant fighting illegal fishing – and at what cost. Douvère called for taking more of a business approach, identifying targets and the financial, technical and time resources required to live up to them.

Moderator Sebastian Troeng noted that the threat of having WHS status taken away or being placed on the endangered list was a powerful tool that could concentrate minds: when politicians lost their way, if they heard they might lose World Heritage status they paid attention.

Meriwether Wilson of the University of Edinburgh's Marine Science and Policy programme expanded on the role of MPAs as climate change "refugia" both for marine species and for people. She noted an exciting trend towards ever-larger, species-driven MPAs. These large reserves offered protection and connectivity to migratory species to help them adapt to climate change. Enforcing them was a challenge; the anchors of many large MPAs were often small islands and there was a tension between conservation and the economic opportunities of blue growth.

Alongside these were locally managed MPAs taking a livelihoods approach, providing ecosystem services such as shore protection and food security. These were very effective, yet they received less advocacy than the large MPAs, and there wasn't enough cooperation between the two, Wilson said.

Islands merited particular attention, as they combined fragility and opportunity with regard to biodiversity and the impacts of climate change. They also possessed valuable traditional knowledge. The specificity of islands was first recognized in 1994 with the Barbados Convention, and it was the Pacific Island nations that had led the drive to get SDG 14 established. Small island states' emerging "ownership" of the blue space, previously dictated by overseas territories, represented a flipping of the power dynamic, Wilson affirmed.



She underlined UNESCO's current and potential role in creating trans-boundary multi-site corridor MPAs to give large-scale momentum to small protected areas, as it had legal mechanisms others didn't. She called for transparency, knowledge-sharing and less of a top-down approach: we needed big data and remote observing systems but also to empower local people and island states, and not just rely on international expertise.

Lastly, Wilson said, MPAs must be big enough to be ecologically resilient, while remaining small and local enough to be socially relevant.

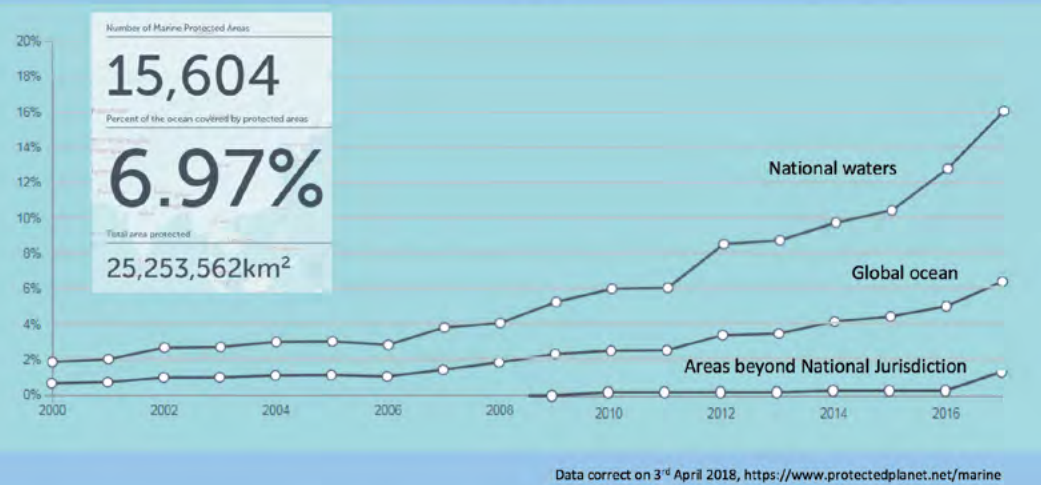
The IUCN's **Dan Laffoley** highlighted the need for standardisation to maximise the effectiveness of MPAs. If we were to adapt to climate change we needed to know what we had done, how we had done it, and how well, he asserted. Communication had been insufficient in the past, but the IUCN had two new tools that would help with this and with regard to connectivity.

One was an open-access marine mapping tool (at www.protectedplanet.net) from the World Database on Protected Areas, developed by the IUCN and UNEP's World Conservation Monitoring Centre. The database showed in real time how much of the oceans were protected, and where. Currently, it listed 15,604 MPAs covering 6.97 percent of the seas.

Only 1.18 percent of the high seas (BNJ) were protected though they constituted 60 percent of the planet, Laffoley pointed out. The website also showed who had done what: MPAs created by the US, UK and France alone accounted for half of the total protected area.

Over 15 million additional square kilometres that had been pledged to MPAs did not show on this map, Laffoley cautioned. The difficulty was to determine the degree of effective protection and implementation, as opposed to designation. A tool was in the pipeline breaking down MPAs according to where they were in that process, and what degree of protection or activity they offered. This would be useful for mediating conflicts and planning for the future, he said.

Growth in ocean protection



The second tool available to ocean stakeholders was the IUCN's new 4-page synthesis of global conservation standards for MPAs, which centralised the existing quantitative and qualitative elements necessary for success in establishing and managing such areas. This would give much greater transparency to enable stakeholders to plan, Laffoley explained.

Speaking from the audience, **Maximiliano Bello** of the Pew Charitable Trust, while applauding the efforts of Chile, Mexico and Brazil, deplored that in the U.S. and Australia today ocean conservation was going backwards. Faster progress was needed on MPAs, particularly in Antarctica and the High Seas, he said.

This would be a key year for achieving a strong agreement on Areas Beyond National Jurisdiction, and without considering them, there was no way we could reach the target of 30 percent MPA protection. Monaco had been an incredible leader in calling attention to the High Seas, Bello noted. This momentum must be maintained.

Yolanda Arjona of the UK's Joint Nature Conservation Committee recalled that the UK had designated 600 sites representing 23 percent of its waters. As someone working in fisheries management within Marine Protected Areas, she asked the panel to comment on how climate change would affect species and what the best management was for protecting mobile species in a climate change environment. Doing so was much more difficult than just protecting habitats, Arjona said.

John Baxter replied that it was necessary to gain a better understanding of mobile species' biology and behaviour, such as whether their movements were seasonal. If they were moving because of climate change, we needed much better understanding of the implications. Some would move further north, but others were seen going deeper, instead. Before acting, it was necessary to understand what reaction species would have to climate change pressures.

On the other hand, we couldn't wait to have all the answers before taking action, or it would be too late. Therefore, we had to be more ambitious about encompassing as much area as these species may need, especially the mobile ones, Baxter said. This meant large sites, or in the case of migratory species, collaboration among sites and countries to ensure fish from protected areas did not end up in ones that were not protected.

Meriwether Wilson emphasised the importance of paying attention to life cycles, to understand what species needed, when, and how that might change. We needed to be quite progressive and forward-looking, protecting areas in the near future for which the traditional rationale might not exist right now.

We could study existing upwelling or naturally acidic areas and use them as proxies for species that were functioning well to try and understand the dynamics and adaptation mechanisms, she suggested. Technology, from in situ underwater sensors to remote sensing, would help reveal the intricacies of these species to develop correspondingly complex policies and planning measures.

In summary, Sebastian Troeng stated that in light of ongoing threats, even to areas that had already been designated, more needed to be done, both better and faster, particularly in the High Seas, to ensure that Marine Protected Areas could fully deliver on their promise and potential to make the oceans and people more resilient to climate change.

SESSION 3

Marine Protected Areas and Aquaculture

Moderator

Mr. François Simard,
Deputy director, Global Marine and Polar Program, IUCN

Panellists

Mrs. Kitty Brayne,
UK Conservation Programme Manager, Blue Ventures

Prof. Paul Tett,
Coordinator of the European project AQUASPACE, Scottish Association for Marine Science

Mr. Iain Pollard,
Standards coordinator, Aquaculture Stewardship Council

Mr. Rory Moore,
Project manager, Blue Marine Foundation

Prof. Thierry Chopin,
Canadian Integrated Multi-Trophic Aquaculture Network

THE CONTEXT

While Marine Protected Areas can be one of the most effective tools for ocean conservation and restoration, it is increasingly apparent that they will not fulfil their function if they fail to integrate human concerns such as food security, poverty alleviation and economic and coastal resilience. Aquaculture is part of the solution to this equation and its rapid growth makes it impossible to ignore, making it both a challenge and a potential opportunity for MPAs. Building on the discussions of the Monaco Blue Initiative's previous editions, the panel further explored possible synergies, in particular drawing on Scotland's experience, which illustrates both the difficulties and the promise of aquaculture in protected waters.

Moderator **François Simard** recalled that the IUCN's current goal for MPA coverage of the seas was of 30 percent with strong protection. While the 10 percent Aichi target would probably be reached within the next two years, not all of that would be well managed. We needed to go much further, taking an integrated approach that included examining how aquaculture and conservation could work together more effectively.

Simard recalled the IUCN's MPA classification under six categories according to the level of human activity allowed. Aquaculture was one of the fastest-growing marine activities, which required a common approach and a search for synergies with MPAs. This meant defining what constituted sustainable aquaculture by looking at factors including feed and energy sources, but also transport.

Simard first asked the panel to comment on current trends in the relationships between MPAs and aquaculture, and whether and how aquaculture could contribute positively to their creation and long-term viability.

Professor **Paul Tett** of SAMS noted Scotland's goal of increasing farmed salmon production to 200,000 tonnes from the current 160-180K tonnes by 2020. Industry was aiming for even more. This would require

more ocean space and bigger fish farms, raising the question of potential conflicts between aquaculture and conservation.

Today there was little overlap between MPAs and aquaculture, with just 40 of Scotland's 625 fin- and shellfish farms located in Special Areas of Conservation. A recent review of existing literature on the environmental effects of Scottish aquaculture came to the general conclusion that their relationship was "working out okay," except for negative impacts on maerl beds and of acoustic devices on porpoises and whales.

Specifically, however, a more sensitive issue in Scotland was the relationship between wild and farmed salmon. Recreational fishing for wild salmon in the rivers was a popular activity, and wild salmon were culturally important in Gaelic culture, but today wild salmon were in decline, Tett said. The causes were unclear, as it was difficult to quantify the impact of factors such as declining marine feed sources and rising river and ocean temperatures.

Salmon farming had been accused of harming wild salmon through the transmission of sea lice and genes. While there was little Scottish data, Norway's indicated this did have an impact. While there were no MPAs designated for wild



salmon, Scotland had protected rivers that were breeding habitats, and there was a clear link between marine activity and freshwater conservation, Tett concluded.

Rory Moore of the Blue Marine Foundation expressed both excitement and concern about the prospects for coexistence between MPAs and aquaculture. With such rapid growth of aquaculture, there was a danger of “the cart leading the horse,” with aquaculture taking precedence over marine conservation. We should be protecting 30 percent of the oceans by 2030; industrial aquaculture should not be allowed to stop us from doing that, he said.

While in Scotland today farming dictated land management, this didn’t have to be the case in the oceans – conservation should dictate where aquaculture was allowed. Reconciling ocean protection with feeding the world was difficult, but if there was a system in place and it was managed properly, it could be done. Using Chile’s intensive, environmentally damaging aquaculture as a cautionary tale, Moore advocated for legislation to keep salmon farms out of Scotland’s pristine fjords, and for using MPAs to stop unsustainable aquaculture.

Moore then gave an example of how aquaculture could actually help with conservation, citing the first ever MPA in the Caspian Sea of Azerbaijan, created by Blue Marine with the help of the IUCN. It was designated to protect six critically endangered species. In this instance, conservationists were themselves farming fish to produce genetically strong, healthy individuals of these species to be released into the new MPA.

Generally, there were many ways to look at the relationship between MPAs and aquaculture, but we should approach it with great caution, Moore concluded.

Blue Ventures’ **Kitty Brayne** then recalled her experience of locally managed marine areas (LMMAs) in poor tropical regions. Conservation in these coastal areas was

very complex. Given local dependence on fishing, the key was to allow people to make a living from not extracting wild seafood, as putting protection measures in place came with a huge opportunity cost and would be ineffective if it alienated communities.

Global analyses had identified places of unexpectedly healthy coral reefs and abundant biomass, bucking the global trend. These turned out to be places where local people were driving management and conservation, often through customary systems. This had lessons to be applied where such management systems were no longer in place, Brayne suggested.

In southwest Madagascar, 9 of 10 people made a living from fishing and 99 percent of their protein came from fish. Blue Ventures had looked at how to sustainably farm species that were being overexploited there in the wild. Now, community-based aquaculture of sea cucumbers and seaweed within LMMAs were providing alternative livelihoods while advancing conservation objectives.

Brayne suggested that to have a bigger conservation impact on a global scale we needed to consider it from a human rights perspective, as for these communities fishing was a question of survival and of cultural identity.

Iain Pollard of the Aquaculture Stewardship Council then gave an overview of how the ASC worked towards ensuring aquaculture’s environmental sustainability. It had developed certification standards through multi-stakeholder dialogue, which took seven years. Six hundred farms producing an annual total of 1.5 million tonnes were now certified around the world and sold under the ASC label.

The ASC fed data from the programme back into a database to evaluate aquaculture’s impact on the marine environment over time. Each certified farm had an ongoing onsite audit that collected data which was available through the ASC’s online tools, ensuring transparency.



In Southern Ireland, two ASC-certified salmon farms operated within Marine Protected Areas. Limits on sea lice numbers, chemical use and escapes were all criteria for certification, Pollard said, asserting that “If you’re farming properly, it shouldn’t be a problem for MPAs.”

Seaweed farms also had to meet certain requirements to operate within protected areas, such as not reducing the structure and function of ecosystems and habitats in a way that could cause irreversible harm. Pollard was confident that despite aquaculture’s rapid growth, its ill effects could be mitigated.

Thierry Chopin of the University of New Brunswick suggested a middle way, between western countries’ strict hands-off approach to MPAs and the more pragmatic one of developing countries such as Brazil, which allowed certain levels of activity. Integrated Multi-Trophic Aquaculture combining fish, seaweeds and invertebrates was both sustainable and compatible with MPAs.

MPAs could also be used to as a tool to change destructive practices in aquaculture, Chopin noted: if shrimp farms already existed within a newly designated MPA, for example, their right to stay could be conditioned on their modification of harmful practices.

He cautioned that while securing the first 5 percent of ocean protection under MPAs had been fairly simple, the next 5 percent would not be, as it involved more areas with human populations and activities. A mosaic of small MPAs was not the solution, he said, adding that we should apply lessons from terrestrial National Parks, many of which had turned out to be too small or too disconnected. Lastly, if MPAs meant displacement or did not allow livelihoods for local populations, they would not work.

Felipe Paredes Vargas of Chile’s environment ministry posed an open question to the panel regarding his country’s intensive salmon farming industry. There were over 2,000 farms in the unique ecosystem

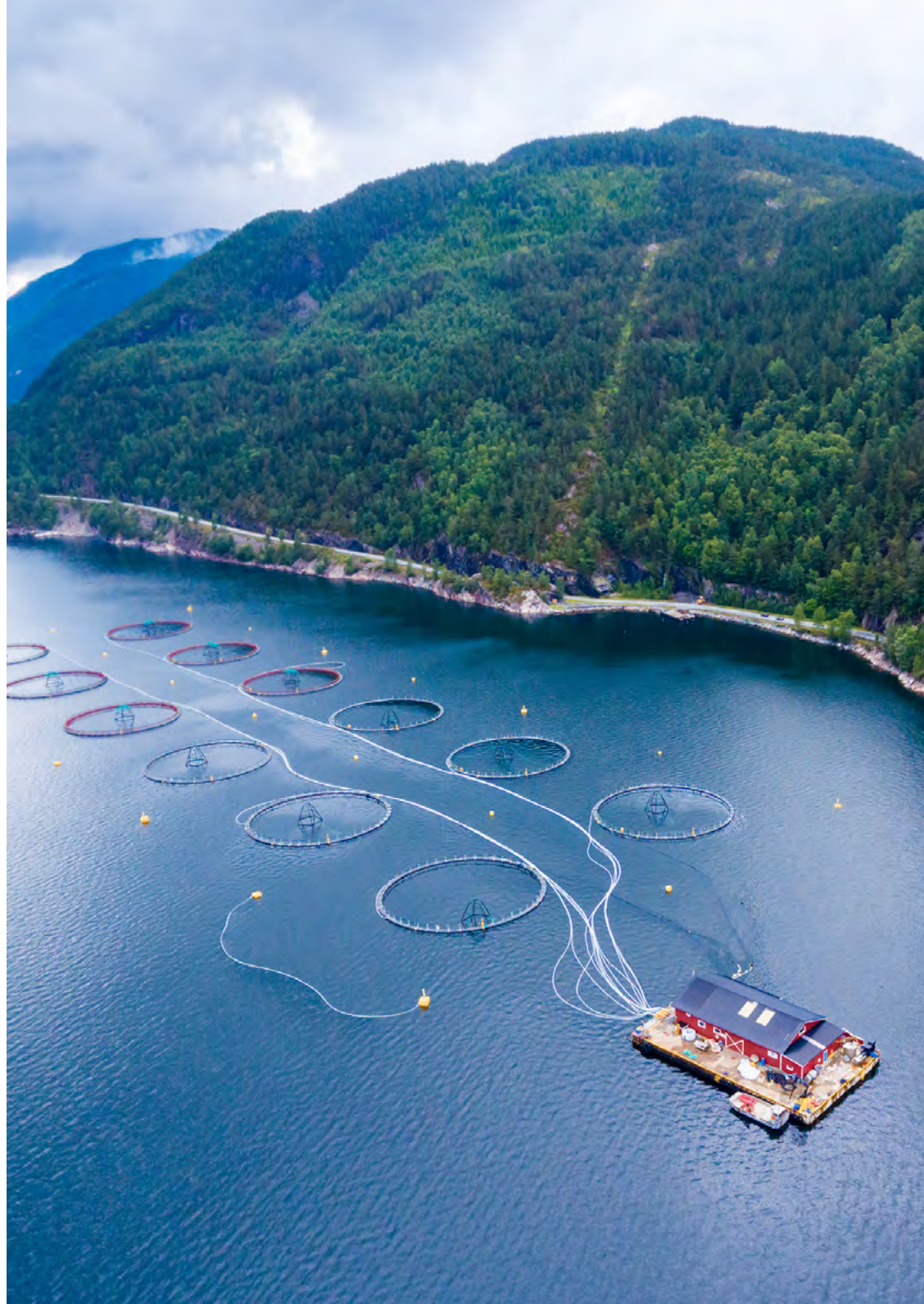
of Patagonia, which had been in place before marine conservation measures. Chile's new multi-use MPAs did allow aquaculture, and their management plans were now being developed, but current regulation was not enough, he explained, asking, "What kind of higher standards can we ask for, and with what incentives?"

Calum Duncan of the UK's Marine Conservation Society, which had a dedicated aquaculture program, mentioned the need to secure more sustainable salmon feed sources. The Scottish Parliament's environment committee recently concluded that if aquaculture growth targets were pursued, irreversible damage to the marine environment could result.

The decline in wild sea trout was particularly worrying, Duncan noted, and was related to sea lice from farmed fish. Before expanding aquaculture to meet growth targets or considering aquaculture in or near MPAs in Scotland, we needed to get salmon farming on a more sustainable footing, he said.

The Pew Charitable Trust's **Max Bello** had witnessed first-hand the destruction of Patagonia's fjords by salmon farming, from antibiotics contamination to entire "dead zones" where even farmed salmon could no longer grow. "This is an example we must not follow," he warned. Yet the industry wanted to expand even more, and was lobbying against further MPA creation. Indeed, said François Simard, it was absolutely clear, and important to recall, not all forms of aquaculture were compatible with conservation.

Pierre Erves of BioMarine agreed that finfish aquaculture was "terrible," and that IMTA was the right approach. Lower trophic species such as sea cucumbers, echinoderms, crustaceans and molluscs, but also algae should be developed as future sources of protein.



The sea cucumber was a high-value crop that also provided biomolecules for the cosmetics and pharmaceutical industries, he said.

François Simard then turned the discussion to farming of seaweed and invertebrates as a lower-impact environmental and economic tool to reduce coastal communities' dependence on wild stock.

Blue Ventures' work with tropical coastal communities showed it was possible to integrate aquaculture into conservation if the income was sufficient to incentivise people not to continue harmful practices, Kitty Brayne reiterated. Sea cucumber farms within locally managed marine areas were earning households up to \$150 per month, roughly five times the average income in Madagascar. Locals owned the farms, offering many women employment close to home, while a portion of earnings were fed back into conservation and social development, she said.

In places not appropriate for the high-value sea cucumber, Blue Ventures had developed seaweed farming to produce carrageenan. Labour-intensive and relatively low-value, seaweed did not replace fishing, but it supplemented and diversified household incomes. Sponge aquaculture in Zanzibar was also promising; responsible entrepreneurship was necessary to develop these models.

Rory Moore strongly advocated farming invertebrates such as mussels and oysters, whose filtering capacity helped restore habitats. To that end, his Blue Marine Foundation was reintroducing one million native oysters to the Solent strait, which once employed hundreds of oystermen. Indeed, sometimes it was necessary to restore the habitat before you could have a viable fishery; shellfish culture was very important for this and fit much better within MPAs

than finfish farming. Conversely, shellfish grown near salmon farms picked up all the contaminants from farming, causing them to die out. If we were going to integrate aquaculture with MPAs, we had to start with invertebrates, Moore declared.

From a food standpoint, it was not so simple, countered Paul Tett, giving Scotland's Loch Creran as an example. This fjord of about 10 square kilometers had a salmon farm which could potentially feed 4,000 people a year; if that production was converted to mussels it would feed only 700. The public might not accept the amount of space required to farm shellfish extensively enough for it to become a significant food source, he cautioned.

It was analogous to windfarms: Scotland would need 10 to 20 percent of its landmass to power the country with wind, which many people would find objectionable. Therefore, although it would be far more sustainable to farm shellfish, or better still, seaweeds, rather than carnivorous salmon, public education would be necessary to move down the food chain, Tett said.

Thierry Chopin noted that Integrated Multi-Trophic Aquaculture was not just a question of protein sourcing. IMTA's diversity of crops, from fish to seaweeds to invertebrates, also provided ecosystem services through extractive and re-use processes. It was necessary to place a value on these – and not just on the biomass value of grown crops – to use as financial and regulatory incentives.

Farmed seaweeds' function removing nitrogen, phosphorus and carbon was worth billions of dollars, he noted. Chopin advocated creation of a nitrogen and phosphorus credit trading system like that for CO₂. Moreover, the IMTA multi-crop approach could help mitigate economic risk and impacts from climate change and coastal acidification.

Pierre Erwes added that IMTA, and particularly algae, produced food and ecosystem services without using fresh

water, a huge advantage which would be increasingly important in the future.

Martin Atrill of Plymouth University's Marine Institute agreed it was important to recognize the ecosystem services shellfish aquaculture provided in MPAs. Within what was becoming Europe's largest mussel farm in South Devon, mussel farming was restoring a badly degraded seabed and attracting tiny edible crabs that then fed wild fish, reviving the local fishery.

A methodology was needed to understand the costs and benefits of ecosystem services. To that end, Atrill's institute together with the Prince Albert II Foundation had created a modelling tool exploring management's role in delivering ecosystem services in MPAs. It charted the links between ecosystem services, the functions that supported them, and the impacts of human activity on their sustained delivery.

Peter Thomson asked whether seaweed and shellfish were less susceptible to ocean acidification. Most seaweeds would manage, Thierry Chopin replied, noting that seaweeds produced oxygen and consumed CO₂. While we would never grow enough seaweed to change ocean pH, we could mitigate acidification in coastal waters, with significant local implications. In a coastal IMTA farm, seaweed tanks could de-acidify seawater before it was pumped into larval tanks, for instance.

Louise Heaps, WWF UK's Chief Marine Adviser, said aquaculture would be key to achieving SDG targets for food security; she would like the panel to address marine spatial planning with regard to how aquaculture fitted into broader coastal management.

Paul Tett, who heads a European project to develop marine spatial planning tools for aquaculture, said that until now only Germany had fully implemented MSP. Scotland had just two regional marine spatial plans; in most fish-farming areas, planning was at local government level. Marine spatial planning would be necessary

to accompany aquaculture's growth, especially if it began moving out into more open water. In short, Tett said, MSP was broadly seen as the answer, but we were not very far along in implementing it.

François Simard suggested this would make a good topic for next year's MBI: how Marine Spatial Planning could be used to reconcile conservation and Blue Growth.

Patricia McHugh of the Whitaker Institute emphasized the value of participatory approaches to conservation such as Blue Ventures' Locally Managed Marine Areas. She also mentioned the Rare organization's Pride campaigns as an effective way of changing behaviour by bringing together communities' socioeconomic interests with their environmental concerns and values.

Peter Thomson noted that while aquaculture growth was inevitable if we were to meet the planet's protein needs, Chile's example showed the devastation it caused in fjords. He asked the panel to comment on the potential of offshore, open-seas aquaculture such as that being developed at great cost by the Norwegians.

Maye Walraven from Innovafeed highlighted her company's development of insect-based protein as a more sustainable feed source for aquaculture than fishmeal, which today consumed over 30 percent of wild caught fish. This was one of aquaculture's most harmful impacts, and one that had been little discussed today. Solutions could be found far from the ocean, both to assist aquaculture but also to partially replace it with other protein sources, she noted.

With this, François Simard steered the discussion to the question of aquaculture's sustainability.

Iain Pollard noted that ASC certification required farms to limit or eliminate antibiotics and move to non-medical treatments for diseases like sea lice. The ASC was also working with markets to drive demand for sustainably farmed fish.

Under its Feed Dialogue project, it was developing a sustainable feed standard, which would become a requirement. The project would promote innovative ingredients like insects or worms while working with the fishing industry to adopt more sustainable practices.

Kitty Brayne emphasized the importance of looking holistically at impacts on systems and favouring non-fed species that did not require habitat modification but provided ecosystem services, as with sea cucumbers. Products that could be shipped dried, rather than frozen, should be preferred, to reduce CO₂ emissions.

The impact on local communities must always be considered. Good partnerships were also important, such as one between her organisation and a Madagascar shrimp-farming company seeking to integrate conservation objectives, both as a commercial argument, through certification, and to protect the ocean systems it relied on.

Paul Tett again cited the example of the multi-use Loch Creran fjord, combining salmon, mussel and oyster farming with recreational and commercial boating and an MPA, as one of twenty years of happy coexistence. For this to work, MPAs had to be part of a viable local society and economy. Local people protected this conservation area, not police, he noted, adding that the biggest threat was from trawling and yacht anchors damaging the tubeworm reef.

Rory Moore commented that before intensively farming the oceans, we would be irresponsible not to learn the lessons from unsustainable land-based agriculture. Fertilizer run-off was probably more damaging to the sea than plastics, he said. Humans needed to be less picky about what they grew and ate, and we needed to restore habitats already damaged by aquaculture.

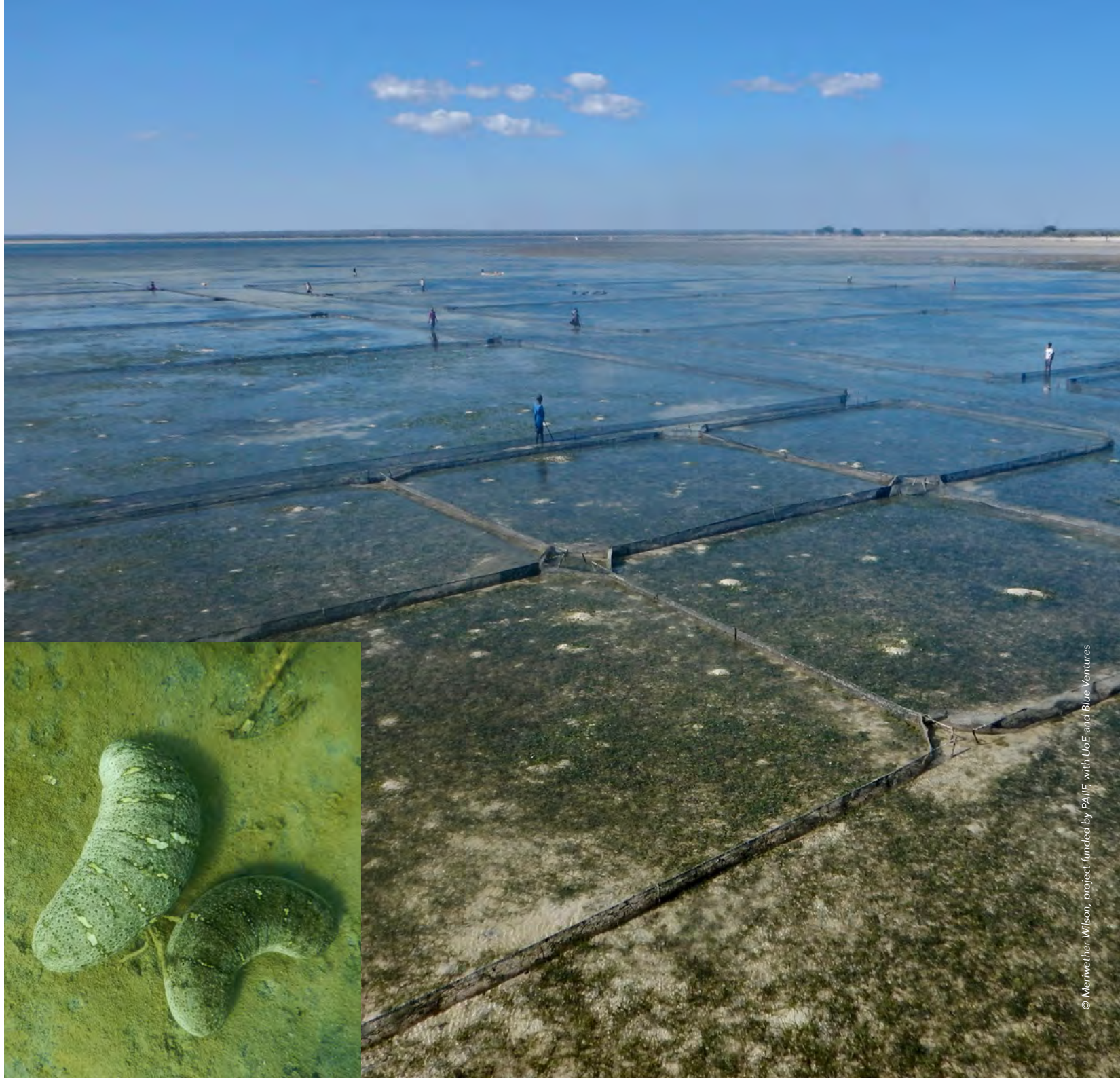
Thierry Chopin emphasized the sustainable, circular economy approach of IMTA, where co-products (waste) from one farmed

species became nutrients for another, which made it one of the most efficient food systems. It was time to make the Blue Economy greener, he said, and talk about “the Turquoise Economy.”

Mission Blue’s **Sylvia Earle** noted the panel had not discussed closed-system aquaculture, which many experts saw as part of the solution. One example was tilapia, a plant-eating fish whose waste fed hydroponic gardens, which cleansed the water and returned it to the fish. Earth itself was a closed system, and we needed to do better at accounting for what we took from the sea, the most important being not food or oil or gas but our very existence in the form of oxygen, she said.

Aquaculture was not a new idea, Earle pointed out. The Chinese had farmed carp alongside mulberry, cabbages, ducks and other crops in a circular economy model beginning thousands of years ago. Aquaculture was a question of food choice, not of food security, as far more sustainable solutions existed. We could eat plants, or phytoplankton, instead of using phytoplankton to feed fish, then catching them to feed to larger fish.

If we were talking about economic security, small island peoples could farm higher-value tropical fish or corals for aquariums. If we valued the air we breathed and the rain falling from the sky, not to mention the beauty of our oceans, we needed to wake up.



OCEAN UPDATES

"High Seas - Biodiversity Beyond National Jurisdiction":

H.E. Mr. Serge Segura,
Ambassador for the Oceans,
French Government

Serge Segura provided an update on UN-based discussions towards a legally binding international agreement on Biodiversity in Areas Beyond National Jurisdiction (BBNJ). This agreement would allow for implementation of the UN Convention on the Law of the Seas concerning the conservation and sustainable use of biodiversity in the High Seas.

Talks had been going on for a decade, with 2017 marking the end of two years of preparatory committees. These were not negotiations, Segura explained, but discussions to allow states to expose their positions and get a sense of their margins for manoeuvre.

On Dec. 24th, 2017, the UN General Assembly passed a resolution opening the intergovernmental conference to negotiate this agreement. This had been very, very difficult to achieve, and was a milestone. There would be four meetings between now and 2020, and crucially, the resolution allowed for moving ahead if the agreement wasn't ready by 2020, which it probably wouldn't be, Segura said.

Another milestone was the adoption of a change in voting rules for this agreement, from a requirement of unanimity, which effectively gave each country a veto, to one of a two-thirds qualified majority, which increased the hope of finding a solution. Agreement had also been reached on four major themes for negotiation. The first was

tools for protecting the oceans, with an emphasis on marine protected areas. No international definition of a marine protected area existed, which was no coincidence, given the lack of agreement, Segura said. Decisions would have to be made regarding the size of MPAs, the designation process, and surveillance.

The second theme was environmental impact assessments, which would require each country to produce an evaluation of possible impacts before launching a new activity in the High Seas. Permission to pursue the activity would depend on the results of this assessment. A key issue would be whether this requirement would also apply to existing activities, he noted.

The third theme was genetic marine resources, where there was disagreement between poor and rich countries over whether such resources should be proprietary or considered as universal human heritage. Segura expressed optimism that common ground would be found through discussion. Finally, as was traditional in this type of agreement, the fourth theme was aid for development and training.

Segura noted that the Preparatory Committees and the UN General Assembly talks had given an idea of how forces lined up. A majority was strongly in favour of an agreement, but a few states were not: Russia was outright opposed; Japan, Norway and Iceland were sceptical, while some others were not yet showing their cards.

The first meeting to decide on procedure would be held the third week in April 2018 in New York, and was very important, Segura said. Negotiations on the content of the agreement would begin with a meeting in Sept. 2018.

Governments could not do this alone, Segura warned. He called on public opinion, NGOs and the private sector to mobilise in favour of this agreement. Only with the support of civil society would governments be able to negotiate seriously and obtain the hoped-for results for conservation and sustainability.

"International Marine Protected Areas Congress, IMPAC4 / IMPAC5":

Mr. Carl Gustaf Lundin,
Director of Global Marine
and Polar Programme, IUCN

Mr. Felipe Paredes Vargas,
Department of Protected Areas,
Ministry of the Environment, Chile

IMPAC is an international forum on Marine Protected Areas that facilitates designation and management of MPA networks by bringing together managers, conservationists, scientists and other stakeholders from around the world to share experiences, knowledge and best practices.

Carl Gustaf Lundin began by briefing participants on the fourth International Marine Protected Areas Congress (IMPAC 4), which took place in Sept. 2017 in Chile, and the fifth, IMPAC 5, to be held in Vancouver, Canada in 2021.

When the first IMPAC was held in Australia in 2005, less than one percent of the oceans was protected, compared to today's nearly 7 percent. This showed a significant progression of commitment, Lundin noted. The 2013 Marseille IMPAC 3 had marked a milestone in bringing the community together; France had been an extraordinary leader in this process.

Holding IMPAC 4 in Chile had been important, as previously it had been felt that Latin America was lagging behind and this had represented an opportunity to bring experience and build a community there. Some 1,300 people had attended; the largest constituencies were from governments, NGOs and the scientific community. Geographically, IMPAC 4 had been dominated by Latin America. Lundin commented that private sector engagement

had not been what it needed to be.

Felipe Paredes Vargas noted that the support of the IUCN's World Commission on Protected Areas had been instrumental in organising IMPAC 4, as were UN agencies such as the FAO, UNEP, and the UNDP. The previous edition's organisers were also a great help in sharing their experience. France, Canada and the US were important country partners while big and small NGOs and foundations provided funding.

IMPAC 4 had been a celebration of marine conservation and of its interdisciplinary nature, he said. It also had brought in people not present previously. Engaging youth had been a priority, from Marquesas Islands schoolchildren who had shared French Polynesia's work in environmental education in MPAs, to a week-long ocean science camp to teach Chilean kids about marine conservation. Undergraduates, graduate students and young professionals had also been included, while thematic pavilions had allowed countries and organisations to present their work in detail.

IMPAC4's final day had been devoted to a high-level meeting attended by Prince Albert II of Monaco and presided by former Chilean President Michèle Bachelet. This had been the opportunity to communicate the work of the conference to political leaders.

A Call for Action had been endorsed by 10 maritime countries and three United Nations agencies, which emphasised the importance of people in marine conservation and the sustainable use of marine resources. Publication of conference highlights was being finalised and should soon be available, Paredes Vargas said.

IMPAC 4 had been the latest in a succession of ocean events in Chile in recent years, starting with the 5th edition of the Monaco Blue Initiative in Santiago in 2014 and the Our Ocean Conference in 2015. Chile was gathering momentum on ocean conservation and MPAs, Paredes Vargas said: it had finalised the creation of large MPAs in its offshore oceanic islands

including the Juan Fernández archipelago, Easter Island and Naxca-Desventuradas, protecting 1.5 million km².

The 240,000 km² Juan Fernández MPA, which was very isolated, with high endemism, had been proposed and supported by local fishermen. The Diego Ramírez MPA in Patagonia, where Chile's southern Atlantic met the Pacific, was also home to a unique ecosystem and a transition zone between the Antarctic and temperate zones.

Paredes Vargas' last example was Rapa Nui. This 580,000 km² multiple-use MPA had been preceded by a consultation with local indigenous peoples, who voted in favour, and was now run under community co-management and respect for traditional fishing.

Vancouver, BC had won the bid to host the fifth International Marine Protected Areas Congress in Sept. 2021, Lundin recalled. Looking ahead to IMPAC 5, he asked the marine community to help establish themes focussing on what needed to happen right now, bringing in the latest science and technology.

It would also be important to listen to Canada's indigenous peoples, who had seldom had input regarding these marine protected areas. If we made decisions without buy-in, we would have tools that did not work, he said. Canada offered a great opportunity to bring that perspective in and do something good with it.

While SDG 14 was important, we also needed to go beyond that and look at how we were meeting the Aichi and other targets such as the 30 percent marine protection goal, not just in terms of numbers of MPAs but what they meant, and how we ensured they were not just paper commitments that didn't actually oblige people to improve their management.

IMPAC 5 also needed to be more innovative to attract young people. Sharing the event through social media had been very effective for IMPAC 4 to reach many more people than the privileged few who attended, Lundin noted. Other goals for IMPAC 5 included increased local participation and public engagement; scientific innovation; identifying new partners and finally, having an interactive programme allowing us to "get our fins wet."



© Felipe Paredes Vargas – International Marine Protected Congress 4



© Olivier Borde – Monaco Explorations

KEYNOTE SPEECHES

Mr. Peter Thomson,

UN Special Envoy
for the Oceans

United Nations Special Oceans Envoy Peter Thomson thanked Prince Albert II of Monaco for his leadership on behalf of the oceans. As a 5th generation Fijian of Scottish and maritime ancestry, the oceans were in Thomson's blood. Islanders knew the ocean's joys and hardships; Fiji was currently having its second tropical cyclone in a month. Extreme weather events were more and more frequent due to climate change.

To face the growing challenges to ocean health, the UN had focused first on small island developing states before developing a broader coalition. This led to the inclusion of SDG 14 in the Sustainable Development Agenda, which was adopted by all 193 countries of the United Nations in 2015, Thomson recalled.

SDG 14 was the one universal thing by which all citizens on the planet were committed by their governments to work on ocean action. It had been put into place despite great opposition from mainly large countries, and now needed integrity. Last year's UN Ocean Conference had been a great success in raising awareness of the need for concerted action; the next such conference would be held in Portugal in 2020.

It would be dishonest not to underline the extent of problems: the ocean was in deep, deep trouble from human industrial activity propelling climate change. Global warming was driving life out of the tropics and challenging many species' ability to live, as were acidification and deoxygenation, with up to 500 dead zones already identified, Thomson said. It was killing coral reefs, which from a Fijian standpoint was akin to all the historic buildings in Edinburgh

being demolished in an earthquake. Global warming was also causing sea-level rise, not just in far-off islands but in places like Florida, he noted.

This decline in ocean health was not an exaggeration. There was other bad news: 80 percent of fish stocks were overstressed and we had unconscionable levels of marine pollution. Ignorance of the ocean was an obstacle; marine science was far behind space science.

The good news was, we did have a plan, Thomson said: the Paris Climate Agreement was alive and working, while SDG 14 outlined a comprehensive plan to reverse the ocean's decline. As for those wedded to the combustion engine and other causes of climate change, now was the time to think of what we were stealing from our grandchildren.

A UN General Assembly resolution in December 2017 greenlighted a UN conference on Biological Diversity in Areas Beyond National Jurisdiction (BBNJ). For the first time, this would give us universally binding law on the High Seas.

The challenge would be to make it a good, strong law. He called on all those present to use their influence on the governments negotiating the treaty. It was not just the job of lawmakers but of everyone to make a strong law for the High Seas, which should integrate MPAs to ensure protection of a large percentage of the area.

Also important was the International Decade for Marine Science, to run from 2021 to 2030 under the IOC at UNESCO. The goal was to have a World Bank of marine science accessible to all by 2030. Technology allowed for massive data collection – sensors and transmitters could be put on every craft in the world to advance marine science, measuring salinity, temperature, acidification levels and other parameters. This was achievable by 2021, Thomson said.

He congratulated Latin America on MPAs; Chile, Brazil and Mexico had recently expanded them significantly. Establishment of the Ross Sea MPA in the Antarctica late

last year was an important milestone.

Fiji, current president of COP23, had introduced an Ocean Pathway into the UN Framework Convention on Climate Change, while Canada had inserted an ocean action platform into the G7. Monaco was taking over the International Coral Reef Initiative (ICRI) from France in 2018, the international year of the coral reef. Thomson noted a WWF project to protect Fiji's Great Sea Reef, a "bunker of biodiversity" which combined a huge, resilient coral reef with a very extensive and dense mangrove.

China was doing fantastic work on marine pollution and energy efficiency, Thomson said. Another positive initiative was the Global Mangrove Alliance, which aimed to increase mangroves by 20 percent by 2030 to boost their known role in coastal resilience and carbon storage. There was also good momentum on making shipping greener and more energy efficient, as it contributed hugely to marine pollution.

From Kenya to the UK, governments were taking action on plastic; a game-changer would be the pending announcement of a Commonwealth Blue Charter, with a plastic pollution element. He recalled that two-thirds of the world's Exclusive Economic Zones were in Commonwealth countries.

Thomson mentioned two UN initiatives launched during his mandate. One was Friends of Ocean Action, which engaged in outreach to the private sector, civil society, NGOs and science. Alongside that were the Communities of Ocean Action, organised under nine themes to facilitate collaborative action towards achieving SDG 14.

Human-caused problems had human solutions, and it was urgent to restore respect and balance in our relationship with the ocean. As Nelson Mandela had said: "Everything is impossible until it's done." Thomson ended with Shakespeare: "There is a tide in the affairs of men, which, taken at its flood, leads on to fortune." On such a full sea are we now afloat.



The Honourable Dominic LeBlanc,

Minister of Fisheries,
Oceans and the Canadian
Coast Guard of Canada

Canada shared the Prince Albert II of Monaco Foundation's commitment to combating climate change, supporting sustainable development, and encouraging environmental protection, especially for our oceans.

Last summer, human activity killed 12 North Atlantic Right whales – of which only about 450 existed in the world – off the coast of Canada and the United States, LeBlanc recalled. They had been hit by ships and entangled in fishing gear, in a stark reminder of the impact humans were having on our oceans.

The oceans had been central to Canada's way of life for centuries, from fishing to shipping, and from the Pacific to the Arctic and Atlantic. Canada had introduced new legislation to enhance fish stock recovery and increase flexibility to protect species facing sudden threats. In addition, it was making unprecedented investments in marine safety through its \$1.5 billion Oceans Protection Plan, focusing on restoration of sensitive coastal ecosystems, LeBlanc said.

As a signatory to the UN Convention on Biological Diversity, Canada was committed to protecting at least 10 percent of its marine and coastal areas by 2020. It had already protected 7.75 percent, up from less than 1 percent only three years ago, he noted. Last year Mr. LeBlanc had introduced legislation that would allow Canada to freeze ocean activities while a Marine Protected Area was being created; he also had announced a panel on minimum standards at the Our Ocean Conference in Malta.



© Olivier Borde – Monaco Explorations

Mr. LeBlanc said he was thrilled that IMPAC 5 – the 5th International Marine Protected Area Congress – would be hosted in Vancouver, Canada, in 2021, adding that his country was developing stringent, science-based, meaningful criteria for Other Effective Area-Based Conservation Measures.

Government investments were helping Canadian researchers to monitor and study ocean change, while Canada was also improving its observation systems and availability of data to track ocean conditions and stressors, monitor risks, and forecast storm surges. It welcomed international partnerships for more robust global observational networks, hydrography and charting activities, and to improve data sharing.

To combat the massive economic and ecological losses from illegal, unreported and unregulated fishing, Canada was stepping up efforts to combat IUU fishing on the high seas through stronger international partnerships. By next year it hoped to ratify

the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.

LeBlanc asserted that Canada was a committed leader and partner on many international ocean initiatives, including the Hamilton Declaration on the Sargasso Sea, the high-seas home to juvenile fish, turtles, and the spawning American eel. Canada was also part of the agreement in principle to prevent unregulated commercial fishing in the central Arctic High Seas; this marked the first time a major international agreement had been reached before any commercial fishing took place.

Oceans were a major theme in Canada's G7 presidency this year. Previous G7 meetings on oceans led to important commitments to address marine litter; combat IUU fishing; enhance understanding of the ocean, including the seabed; and to address challenges faced by small island and other vulnerable developing states.

In conclusion, Mr. LeBlanc hearkened back to the North Atlantic Right whales. As they were dying last summer, commercial fishers, the shipping industry, scientists, environmental organizations and others put aside differences and came together to figure out how to save the whales. "Our oceans face the same fate as the North Atlantic Right whale: they are dying," he said.

But the flip side of humans' destructive force was our ingenuity and our potential to come together to solve the problems we had created and to build resilient communities able to face these challenges, too. Working together, we could protect our oceans for generations to come, and Canada stood ready to be a global leader in tackling the challenges ahead, he concluded.

Closing address HRH The Princess Royal, Chancellor of the University of Edinburgh



© Douglas Robertson

Princess Anne highlighted the need to look at the oceans in a holistic way, as the subject covered not just space but many different cultures, and attitudes. It was further complicated by factors such as ocean acidification, overexploitation, pollution, changing climates, and fashions in what people ate.

Despite this challenge, there were some creative opportunities and progress towards possibly halting, or even reversing, some of the worst impacts, while benefiting local and global economies and societies through a proper blue growth agenda, she said.

Princess Anne was struck by how far back she had seen examples of what she now saw as a much broader subject. Thirty years ago in Vietnam, a Save the Children project had replanted mangroves along the coast as a way of maintaining local communities and improving their health. The restored mangrove swamps provided an environment for shrimp locals could then fish, and helped stabilise coastal areas increasingly under threat from flooding, she recalled.

She now saw that as an early starting point for the sort of programmes needed today. This meant tailoring to what individual local communities wanted and needed for their own specific areas. Whether these were coastal, or further out, communities needed to be engaged and part of the problem solving.

While local communities may have been part of the problem, it was not entirely their fault, she said. Some of the things that they had been fishing or living on had become popular worldwide. While in economic terms this was an attractive proposition, it could also be quite destructive. It had powered the growth of big industrial aquaculture and fishing systems.

Learning how to mitigate the popularity that improved the local economy, without destroying the very things communities needed was something today's debate contributed to on a much wider scale. A seriously joined-up approach was required, learning from each other's positive examples to support those areas and understand the impacts of that popularity, the Princess suggested.

She had discovered not long ago there was only one native oyster farm left in Scotland. The Princess had met the only two fishermen left who farmed these oysters. They were in their seventies, and could not find any young people to work with them. This represented a challenge for the expansion of aquaculture, she noted: the maritime sector was quite a demanding one, which wasn't always easy to sell to modern generations.

Technology had quite an impact here as well. The "out of sight, out of mind" phenomenon should become less of an issue, while technology would allow us to see much more clearly what was going on, at depth. This would make progress on goals and the results of practices easier to evaluate.

Renewable ocean energy had its attractions but also required some cost-benefit analysis. If the average citizen was caught chucking huge amounts of concrete into a reef in Scotland, he would be arrested, Princess Anne said, but if it was done in order to put up a windmill, that was fine. There needed to be a discussion there. Tidal and wave power also required a great deal more work before they would make a big impact; all of those who had been involved in that side of research had discovered that the sea had a nasty habit of destroying what had worked so well in theory.

All of that would take some development, but Scotland was a good place to come for that discussion, the Princess said, recalling Edinburgh's long tradition of pioneering work, from the Granton Port research station back in 1884 to oceanographers Wyville Thomson and John Murray. However, if they were still around they might see some things cycling back around, being reinvented and relooked at, she cautioned; we must try not to do that.

Scotland had also launched interesting voyages of discovery and oceanography, hence the connection to Prince Albert. Prince Albert I of Monaco had helped the Scottish marine scientist William Speirs Bruce travel to the south Atlantic, where he and other Scottish scientists in his party did excellent work. Sadly, it was not very well known, partly because they neither got lost, nor lost anybody, nor did they sink.

The impact of their work was still visible today in South Georgia, which Princess Anne had visited. The UK had placed about 27 percent of its national waters in marine protected areas, and 50 percent of its overseas territory waters. Much of that was around South Georgia and the South Sandwich Islands, which were well protected. On her first visit, she had hardly seen a whale, but seven years later she saw them every day.

The increase in whales would have an impact on seals and their numbers as well. This was a hugely integrated subject where it was very difficult to get a grip on all those things that had an impact on each other. The Monaco Blue Initiative was an extraordinary attempt to bring those many strands together, the Princess said, offering her thanks.

She was particularly thankful for Prince Albert II's leadership. His foundation's partnership with the University of Edinburgh and the Oceanographic Institute, Prince Albert I of Monaco Foundation had been an enormous bonus, supporting some highly motivated, talented and international students to become the next generation of practitioners, researchers, and stewards of our oceans. Study and technology would hopefully enable a better overview of protected areas, so that they could be implemented more effectively.

Regarding food choices and sustainability, one of the reasons for today's predicament was that ever since discovering that cereals were easier to grow and live off than being hunter-gatherers, mankind – "perhaps I should say humankind, but I think I'll stick with mankind," – was fundamentally idle, and wanted to spend less time and energy feeding themselves.

That was a challenge we all faced: how to overcome the expectations of modern generations, and not act in a way that killed the very thing that was really needed, Princess Anne said. She thanked the participants for being part of this discussion, asserting that their various perspectives were a very important part of solving the problems of the future.



"The participants expressed..."

"Including students in MBI is a sure way to inspire and encourage future generations to take action for the oceans. This interaction will hopefully inspire those in higher positions to provide opportunities for younger generations."

Ms. Laura Labeur,
Student at the University of Edinburgh

"There is undeniably much reason to celebrate when the international target of 10% coastal and marine protected areas set nearly two decades ago is finally within reach. However, long-standing pressures like fishing, shipping and development are being compounded by a changing climate. It has never been more urgent to work across sectors and borders to plan a sustainable future for our ocean. That is why we at the UNESCO World Heritage Marine Programme are so pleased to join the MBI to discuss global trends and solutions in marine conservation."

Dr. Fanny Douvère,
Coordinator of the World Heritage Marine Programme, UNESCO

"As a scientist, participating in the MBI helps me to better understand what decision makers need in terms of information and to develop related scientific projects. Unlike other events, the MBI brings together scientists, institutions, decision makers, private companies and communication actors, thus creating networking opportunities. Thanks to this, I will develop projects with scientists, companies and students who want to commit to sustainable development."

Prof. Paulo Guidetti,
Director, Laboratoire ECOMERS,
Université de Nice

"I was impressed by the breadth of topics addressed during MBI and inspired by the solutions discussed from better management of MPAs to the various new technologies to make aquaculture more sustainable. The quality of the participants from both the private and the public sector was extremely high, enabling me to make valuable contacts which I'm confident will lead to many collaboration opportunities for InnovaFeed."

Mrs. Maye Walraven,
Head of Business Development, InnovaFeed

"MBI is one of the most important events on the now extensive ocean venues and gatherings, but more important is that this was the one of a kind, one of the first events to talk about the need of protecting the oceans, together. Since the beginning of the MBI meetings, Pew has always been involved. I see MBI was critical to the success we have seen in Chile or Brazil or Latin America. These events have proved the need of gathering to find the best solutions, no matter what the challenges are, we always need to work in a participative way. Pew and Prince Albert II of Monaco Foundation have a long history of working side by side in the same directions, continuing our engagement at the MBI is natural and necessary."

Mr. Max Bello,
The Pew Charitable Trust

"The MBI provided a wonderful opportunity to network and to hear first-hand and participate in the discussions about the advances being made in research into key areas such as MPAs and climate change, and Aquaculture and climate change, which have benefited from the support of the Prince Albert II Foundation. It was also good to be able to share the thinking and work that is underway in Scotland around the need for the development of a connected network of MPAs to help species adapt and survive in the face of climate change."

Prof. John M. Baxter,
Chief Editor - Aquatic Conservation

"The Monaco Blue Initiative is a great opportunity to learn about the remarkable initiatives launched worldwide for the protection of the ocean, in particular those which are scientifically-based and monitored, which allows for discussion on solid foundations. We have been very enthusiastic about the young generations who take action with passion and conviction. For the next MBI edition, our ambition is to play an active part and share our vision on the circular economy concept applied to the insular context"

François-Michel Lambert,
Member of Parliament, Founding President of
the Institute for Circular Economy, France

LIST OF PARTICIPANTS

Mrs. **Yolanda ARJONA**, Marine Fisheries Advisor, Joint Nature Conservation Committee, United Kingdom
 Mrs. **Jessica ARNULL**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Prof. **Martin ATTRILL**, Director of Marine Institute, Plymouth University, United Kingdom
 Mr. **Charles BARBER**, Chairman Switzerland for the Oceans, Switzerland
 Mrs. **Alexandra BARDY**, Monaco Blue Initiative Head of Communication, Oceanographic Institute, Prince Albert I of Monaco Foundation
 Mr. **Steve BARNETT**, President Our World-Underwater Scholarship Society, United Kingdom
 Mrs. **Amy BARRETT**, Conference writer, France
 Prof. **John BAXTER**, Principal Adviser, Scottish Natural Heritage, United Kingdom
 Mr. **Matthieu BECKAERT**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Mr. **Terry BEECH**, Parliamentary Secretary to the Minister of Fisheries, Oceans and the Canadian Coast Guard, Government of Canada, Canada
 Mr. **Max BELLO**, Senior Adviser, The Pew Charitable Trust, USA
 Ms. **Catherine BLEWETT**, Deputy Minister for Fisheries and Oceans, Government of Canada, Canada
 Ms. **Kitty BRAYNE**, UK Conservation Programme Manager, Blue Ventures, United Kingdom
 Mr. **Felix BUTSCHEK**, European Rolex Scholar 2016, Our World-Underwater Scholarship Society, United Kingdom
 Mr. **Robert CALCAGNO**, Chief Executive Officer, Oceanographic Institute, Prince Albert I of Monaco Foundation
 Mr. **Pedro CARROLO**, Chief Operating Officer, Buggypower, Portugal
 Prof. **Thierry CHOPIN**, Scientific Director, Canadian Integrated Multi-Trophic Aquaculture Network, University of New Brunswick, Canada
 Mr. **Chris COX**, Vice Principal, Philanthropy & Advancement, University of Edinburgh, United Kingdom
 Mr. **Fabiano D'AMATO**, Creative Director, Manaia Productions, Switzerland
 Ms. **Sanne DIJKSTRA-DOWNIE**, Development Manager, School of Geosciences, The University of Edinburgh, United Kingdom
 Dr. **Lindsey DODDS**, Head of UK Marine Policy, WWF – UK, United Kingdom
 Dr. **Fanny DOUVERE**, Coordinator UNESCO, World Heritage Marine Programme, France
 Mr. **Olivier DUFOURNEAUD**, Director for Ocean Policy, Oceanographic Institute, Prince Albert I of Monaco Foundation
 Mr. **Calum DUNCAN**, Scottish Officer for the Marine Conservation Society, The Marine Conservation Society, United Kingdom
 Dr. **Sylvia EARLE**, Founder & Chairman, Mission Blue, USA
 Mr. **Pierre ERWES**, President BioMarine Organization, Hong-Kong
 Mrs. **Véronique ERWES**, Directrice générale, BioMarine Organization, Hong-Kong
 Mr. **Pedro ESCUDERO**, President, Buggypower, Portugal
 H.E. Mr. **Bernard FAUTRIER**, Vice President and Chief Executive Officer, Prince Albert II of Monaco Foundation, Monaco
 Mr. **Sebastien FERRAZ**, Chief scientific officer, SARL Lagosta, France
 Ms. **Sarah FOUNTAIN SMITH**, Deputy High Commissioner for Canada to the United Kingdom of Great Britain and Northern Ireland and Alternate Permanent Representative to the International Maritime Organization, Government of Canada, Canada
 Ms. **Lara FUNK**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 H.E. Ms. **Evelyne GENTA**, Ambassadeur Extraordinaire et Plénipotentiaire, Ambassade de Monaco au Royaume Uni, Monaco
 Mr. **Roger GILBERT**, CEO, International Aquafeed, United Kingdom
 Mr. **Pierre GILLES**, Project Manager, Secretary Monaco Blue Initiative, Oceanographic Institute, Prince Albert I of Monaco Foundation
 Prof. **Paolo GUIDETTI**, Directeur, Laboratoire ECOMERS, Université de Nice, France
 Ms. **Ana Maria GUTIERREZ**, Environmental Engineer, Advisor in Sustainability, Municipality of Easter Island, Chile
 Mrs. **Marjorie HAGOBIAN**, Assistant of François-Michel Lambert, France
 Dr. **James HARRISON**, Senior Lecturer and expert on Marine Law, University of Edinburgh, United Kingdom
 Mrs. **Louise HEAPS**, Chief Adviser, Marine, WWF – UK, United Kingdom
 Mr. **Sebastian HOWELL**, Policy Adviser, Roseanna Cunningham's envoy, United Kingdom
 Mr. **Jonny HUGHES**, Chief Executive, Scottish Wildlife Trusts, United Kingdom
 Mr. **Henry JEFFREY**, Member of Ocean Energy Systems, International Energy Agency, United Kingdom
 Ms. **Maria JOAO VIVEROS**, Ricardo Serrao Santos's spouse, Portugal
 Ms. **Bianca JONES**, Public Affairs Assistant Canadian High Commission, Canada
 Ms. **Zoe KAHN**, Chief of Staff to the Deputy Minister Catherine Blewett, Government of Canada, Canada
 Dr. **Andy KERR**, Director, Edinburgh Centre for Carbon Innovation, University of Edinburgh, School of GeoSciences, United Kingdom
 Mr. **Nicholas KIRKHAM**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Ms. **Laura LA BEUR**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Prof. **Dan LAFFOLEY**, Marine Vice Chair, IUCN's World Commission on Protected Areas, International Union for Conservation of Nature, Switzerland
 Mr. **François-Michel LAMBERT**, Député des Bouches du Rhône, Assemblée Nationale française, Président-fondateur de l'Institut national de l'économie circulaire, France
 Dr. **Olivia LANGMEAD**, Research Fellow, Blue Communities, School of Psychology (Faculty of Health & Human Sciences) Plymouth University Marine Institute United Kingdom

Mr. **Kevin LAVIGNE**, Director of Operations, Office of the Minister of Fisheries Oceans, and the Canadian Coast Guard, Canada
 Honourable **Dominic LeBLANC**, Minister of Fisheries, Oceans and the Canadian Coast Guard, Government of Canada, Canada
 Mr. **Elvin LEECH**, Chairman & Vice President, European Operations, Our World-Underwater Scholarship Society, Switzerland
 Mr. **Felix LEINEMANN**, Head of Unit "Blue Economy Sectors, Aquaculture and Maritime Spatial Planning", European Commission, Director in DG Maritime Affairs and Fisheries, Belgium
 Mr. **Tony LONG**, President, Global Fishing watch, United Kingdom
 Mr. **Carl Gustaf LUNDIN**, Director of Global Marine and Polar Programme, International Union for Conservation of Nature, Switzerland
 Ms. **Erin McFADDEN**, European Rolex Scholar 2011, Our World-Underwater Scholarship Society, United Kingdom
 Dr. **Patricia McHUGH**, Postdoctoral Researcher and Social Innovation, Participation and Policy (SIPP) Cluster Leader, Whitaker Institute at the National University of Ireland Galway, Ireland
 Mr. **Vince McNEIL**, Chef de Cabinet, Office of the Minister of Fisheries Oceans, and the Canadian Coast Guard, Canada
 Mr. **Christophe MAIER**, Founder and CEO, SARL Lagosta, France
 Mr. **Francois-Regis MARTIN-LAUZER**, Chairman & CEO, Argans Ltd, United Kingdom
 Ms. **Gracia MARTINS**, Head of communication, Buggypower, Portugal
 Prof. **Peter MATHIESON**, Principal and Vice-Chancellor, University of Edinburgh, United Kingdom
 Ms. **Freija MENDRIK**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Ms. **Eliana MERCY ARAUJO**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Dr. **Philippe MONDIELLI**, Scientific Director, Prince Albert II of Monaco Foundation, Monaco
 Mr. **Rory MOORE**, Project manager, Blue Marine Foundation, United Kingdom
 Prof. **David MUNRO**, Honorary Professor University of Dundee, United Kingdom
 Dr. **Peter NELSON**, Operations Director, The Glenmorangie Company, Executive Team Leader of the DEEP Project, United Kingdom
 Mr. **James NIKITINE**, Managing Director, Manaia Productions, IUCN Marine Young Professional, France and United Kingdom
 Mr. **Felipe PAREDES VARGAS**, Division of natural resources and biodiversity, Department of Protected Areas, Ministry of the Environment, Chile
 Mr. **Jeremy PERCY**, Executive Director, Low Impact Fishers of Europe, Belgium
 Ms. **Auriane PERTUISOT**, Marine Projects Manager, Secretary Monaco Blue Initiative, Prince Albert II of Monaco Foundation, Monaco
 Dr. **Tiago PITTA E CUNHA**, Chief Executive Officer, Oceano Azul Foundation, Portugal
 Mr. **Iain POLLARD**, Standards coordinator, Aquaculture Stewardship Council, United Kingdom
 Dr. **Linda ROSBOROUGH**, Chair, Scottish Wildlife Trusts, United Kingdom
 Mr. **Mario RAY**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Prof. **Dave REAY**, Professor of Carbon Management and Education, University of Edinburgh, School of GeoSciences, United Kingdom
 Prof. **Dave ROBERTSON**, Head of the College of Science and Engineering, University of Edinburgh, United Kingdom
 Prof. **Howard ROE**, Director of the National Oceanographic Centre in Southampton; representative of the Sargasso Sea Commission, United Kingdom
 Rt Hon **Frank ROSS**, Lord Provost and Lord Lieutenant of the City of Edinburgh, Edinburgh City Council, United Kingdom
 Ms. **Susana SALVADOR**, Executive Secretary OSPAR Commission, United Kingdom
 Dr. **Bill SANDERSON**, Associate Professor, Programme Director of the DEEP project, Heriot Watt University, United Kingdom
 H.E. Mr. **Serge SEGURA**, Ambassador for the Oceans, French Government, France
 Dr. **Ricardo SERRAO SANTOS**, Member of Parliament, European Parliament, Portugal
 Mr. **François SIMARD**, Deputy director, Global Marine and Polar Programme, International Union for Conservation of Nature, Switzerland
 Ms. **Maria SMITH**, Controller and Director of Contracts, Catalina Sea Ranch, USA
 Dr. **Lisa Emelia SVENSSON**, Coordinator, Marine and Coastal Ecosystems Branch, United Environment Programme, Kenya
 Mr. **Ryan TARTRE**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Ms. **Kathryn TAYLOR**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Prof. **Paul TETT**, Coordinator the European project AQUASPACE, Scottish Association for Marine Science, United Kingdom
 Mr. **Peter THOMSON**, Special Envoy for the Oceans, United Nations, Fiji - Kenya
 Dr. **Sebastian TROENG**, Senior Vice President for Marine Conservation, Conservation International, Colombia
 Prof. **Alexander TUDHOPE**, Professor of Climate Studies, University of Edinburgh, United Kingdom
 Mr. **Jacques VILLEMOT**, MSc Student in Marine Systems and Policies, University of Edinburgh, United Kingdom
 Prof. **Martin VISBECK**, Physical Oceanographer, GEOMAR Helmholtz Center for Ocean Research Kiel, Germany
 Ms. **Maye WALRAVEN**, Head of Business Development, InnovaFeed, France
 Dr. **Meriwether WILSON**, Senior Lecturer, Marine Science & Policy, University of Edinburgh, School of GeoSciences, United Kingdom

The Monaco Blue Initiative wishes to deeply thank the Glenmorangie Company and Buggypower Company for offering the participants a nice tasting experience.

THE UNIVERSITY OF EDINBURGH

The University of Edinburgh has been influencing the world since 1583. Its global reputation is built on pioneering research and innovation, and world-class teaching. Set in the heart of the beautiful Scottish capital, in a country which is passionate about international relationships, the University aims to make a significant, sustainable and socially responsible contribution to Scotland, the UK and the world. The University of Edinburgh has a long history of generating knowledge for the public good and nurturing some of the world's best students to make a difference to the world. Working in partnership with others, it wants to contribute to a collective understanding of the changing world, solve global problems and educate the next generation of leaders and influencers.

For more information: www.ed.ac.uk
www.facebook.com/UniversityOfEdinburgh/
www.youtube.com/user/EdinburghUniversity
twitter.com/EdinburghUni



THE UNIVERSITY
of EDINBURGH



CO-ORGANIZERS

OCEANOGRAPHIC INSTITUTE, PRINCE ALBERT I OF MONACO FOUNDATION

Founded in 1906 by Prince Albert I, the Oceanographic Institute is a foundation officially recognised as serving the public interest, ensuring the link between the ocean policy of the Principality, the scientific community, socio-economic actors and the general public. In order to carry out its mission in environmental mediation - launched by HSH Prince Albert II of Monaco - the Institute initiates numerous projects on both the national and the international stage: art exhibitions, projections of films and documentaries, seminars and conferences, publications, awards, teaching, programmes...

The Oceanographic Institute is also a stakeholder in The Monaco Explorations. This scientific and awareness-raising campaign lasting 3 years and travelling around the world was launched by HSH the Prince in July 2017.

With its focus on raising awareness about the wealth and fragility of the oceans, the Institute is supported by its two institutions: the Oceanographic Museum in Monaco and the Maison des Océans in Paris.

Rising to a height of 85 metres above the waves, with its 6,500m² open to the public, the Oceanographic Museum offers a dazzling dive into the marine world: historical and scientific collections, a cabinet of curiosities, whale skeletons, Mediterranean and tropical aquariums... A place of exchange and culture, the Museum welcomes on average over 600,000 visitors every year, thus becoming one of the centres of attraction of the Principality.

The Maison des Océans in Paris is host to numerous events each year. Under its roof are the offices of important actors in the environment and the protection of the oceans (Fondation pour la recherche sur la biodiversité, la Plateforme Océan et Climat, the Pew Charitable Trusts, le CRILOBE...), making it a veritable centre for the environment.

For more information: www.institut-ocean.org

Tel: +377 93 15 36 00

Twitter: www.twitter.com/oceanomonaco



PRINCE ALBERT II OF MONACO FOUNDATION

In June 2006, HSH Prince Albert II of Monaco decided to set up his Foundation in order to address the alarming threats hanging over our planet's environment. The Prince Albert II of Monaco Foundation works for the protection of the environment and the promotion of sustainable development. The Foundation supports initiatives conducted by public and private organizations within the fields of research, technological innovation and activities to raise awareness of the social issues at stake. It funds projects in three main geographical regions: the Mediterranean Basin, the Polar Regions and the Least Developed Countries. The Foundation's efforts focus on three main sectors: Climate change and renewable energies, biodiversity, and integrated and sustainable water management together with the fight against desertification.

The Prince Albert II of Monaco Foundation is strongly involved in marine ecosystem awareness and conservation as they have been an integral part of the Principality of Monaco's history since the end of the 19th century. Since 2010, the Foundation is involved in the protection of our of the most endangered mammals, the Mediterranean monk seal, supporting projects in the field and more recently coordinating a group of international experts. In 2013 the Foundation created an Environmental Fund to manage Marine Protected Areas in the Mediterranean. The BeMed project was launched in 2015 to fight plastic pollution in the Mediterranean.

In 2017, the Prince Albert II of Monaco Foundation launched the first edition of Monaco Ocean Week. This week of events, which includes the MBI, brings together local and international actors from all sectors to share their experiences and find solutions to develop a "blue economy".

For more information: www.fpa2.org

Tel: +377 98 98 44 44

Facebook: Prince Albert II of Monaco Foundation

www.facebook.com/FondationPrinceAlbertIIdMonaco/



monaco BLUE INITIATIVE

In partnership with



Hosted by



THE UNIVERSITY
of EDINBURGH

Co-organized by



PRINCE ALBERT II
OF MONACO
FOUNDATION



Oceanographic
Institute

Foundation Albert I, Prince of Monaco

Contact :

www.monacoblueinitiative.org

Secretariat of the Monaco Blue Initiative

secretariat@monacoblueinitiative.org

**The 10th Edition Monaco Blue Initiative
will be held in Monaco on
24th-25th March 2019**

For any question, please contact
the Secretariat of the MBI