monaco ocean week

22 | 28
MARCH 2021

monaco ocean week

"Monaco Ocean Week offers a unique opportunity for dialogue, networking, innovation and transparency"

HSH Prince Albert II of Monaco

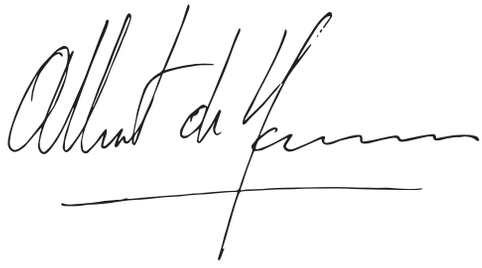
© Michel Dagnino

We stand at a juncture where our world is preparing to rebuild itself, after a year of tragedy, crisis and uncertainty, and is seeking to do so in a more sustainable and more responsible manner.

This reconstruction offers us an unprecedented window of opportunity (…) We now need to prepare for the many diplomatic and environmental meetings ahead and of shaping the prospects for economic recovery which are being developed. I believe that the best way of doing this is to create dialogue between the various stakeholders concerned. To pool our knowledge, expertise and resources. To establish shared diagnostics, ambitions and strategies. And to increase our understanding of the way in which these various issues and various events are intertwined and bolster each other (…)

That is why we will speak about international negotiations first. They are diverse, as demonstrated by the meetings I just mentioned. And they involve a wide range of players. Those from the international organisations concerned of course. The ocean rallies together institutions as diverse as UNEP, FAO, UNESCO, IMO, to name only the UN agencies. However, these negotiations also concern civil society, private initiatives and NGOs, which can and must make a contribution, as my Foundation has been doing since COP 21 in Paris (…) With each of these issues, I believe we have a great deal to learn from everybody's experiences, a great deal to understand and a great deal to develop together."

Excerpt from the speech by HSH Prince Albert II of Monaco, during the 12th edition of the *Monaco Blue Initiative*, 22 March 2021.



HSH Prince Albert II of Monaco

07

THE CORAL CHALLENGE

17

POLLUTION AND HEALTH

35

THE BLUE ECONOMY
AND FINANCE

61

TRANSITION AND SOLUTIONS

83

BLUE INNOVATIONS

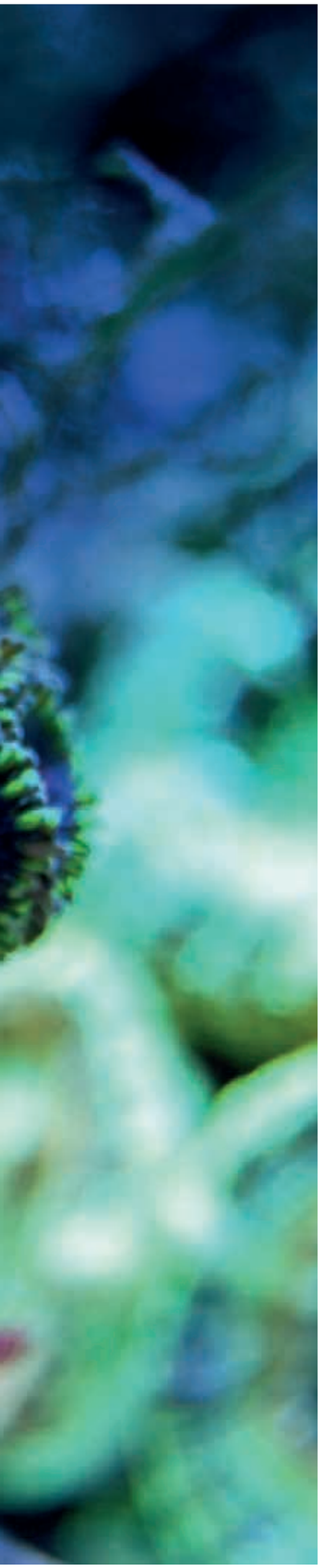
SUMMARY

103

THE BLUE GENERATION

110

IN BRIEF



07

THE CORAL CHALLENGE

/ **08** Research continues on precious coral biology

/ **10** The future of coral reefs

/ **13** A global coral protection fund

IN SIGHT

Professor Denis Allemand and Dr Françoise Gaill, as well as Frédéric Grangié, President of Watches and Jewellery at Chanel.
© Michaël Alesi

"Our company is proud to partner with the prestigious Monaco Scientific Centre, and to work closely with Monaco on the issue of sustainable development", ***Frédéric Grangié****, President of Watches and Jewellery at CHANEL*

RED CORAL

Research continues on precious coral biology

CHANEL and the Monaco Scientific Centre are continuing to work together for a better understanding of red coral in the Mediterranean.

Eighteen months after CHANEL and the Monaco Scientific Centre signed an agreement on the creation of a research unit on precious coral biology, members of the second steering committee met during *Monaco Ocean Week* on 23 March 2021, led by H.R.H. the Princess of Hanover.

At the end of the day, a press conference presented the purpose of this partnership agreement, to develop basic research programmes on Mediterranean red coral. Launched in 2019 for a 6-year period, this scientific programme seeks to better understand the growth and colour mechanisms of this endemic coral, and to study innovative solutions likely to promote its conservation. Passionate about protecting our oceans, CHANEL thus consolidates its commitment alongside top scientific experts on corals.

RESEARCH FOCUSED ON PROTECTION

Overexploited for many years, red coral is a natural Mediterranean treasure which must be protected. The Mediterranean red coral fishery is a regulated industry, carried out by certified coral fishermen (350 in total) wearing a diving suit at 80 to 150 metres. A minimum size is required, and some countries have set quotas. However, in order to address the scarcity of this resource, we urgently need to develop new management methods and alternatives, like coral farming, allowing the jewellery sector to use red coral without exhausting natural stocks. The partnership between the Monaco Scientific Centre and CHANEL is aligned with this approach, given that there is a lack of information on the biology of precious coral in general, and red coral in particular. The research unit on precious coral biology aims to address these shortcomings, notably through careful studying of the biological process of biomineralisation, for which the researchers at the Monaco Scientific Centre are amongst the world's leading specialists. ■

MEDITERRANEAN RED CORAL

Corallium rubrum has been used in jewellery since ancient times, both for its beauty and for its presumed magical properties. Its colour has earned it nicknames like “the blood of Christ” or “red gold”, distinguishing it from tropical corals - its distant cousins - whose porous, white skeleton does not have the same appeal. A source of fascination, this deep red coulour nearly caused the loss of a species which grows very slowly (1 to 3 millimetres per year).

AN AMAZING ANIMAL

Historically, red coral was the first organism to be given the name “coral”. Despite its use and trade for a thousand years, the nature of red coral remained a mystery until the 18th century, when the Marseille-based doctor Jean-André Peyssonnel demonstrated that it belonged to the animal kingdom. It was later discovered that like other biominerals, its skeleton is made of an organic matrix embedded in a mineral cement of calcium carbonate. This organic matrix contains the pigments which give it its colour, brightness and value.

A GLOBAL INITIATIVE

The future of coral reefs

The International Coral Reef Initiative (ICRI) reveals its initial conclusions from a widely anticipated report, underlining the alarming condition of coral worldwide, but also its resilience and reasons to be hopeful.

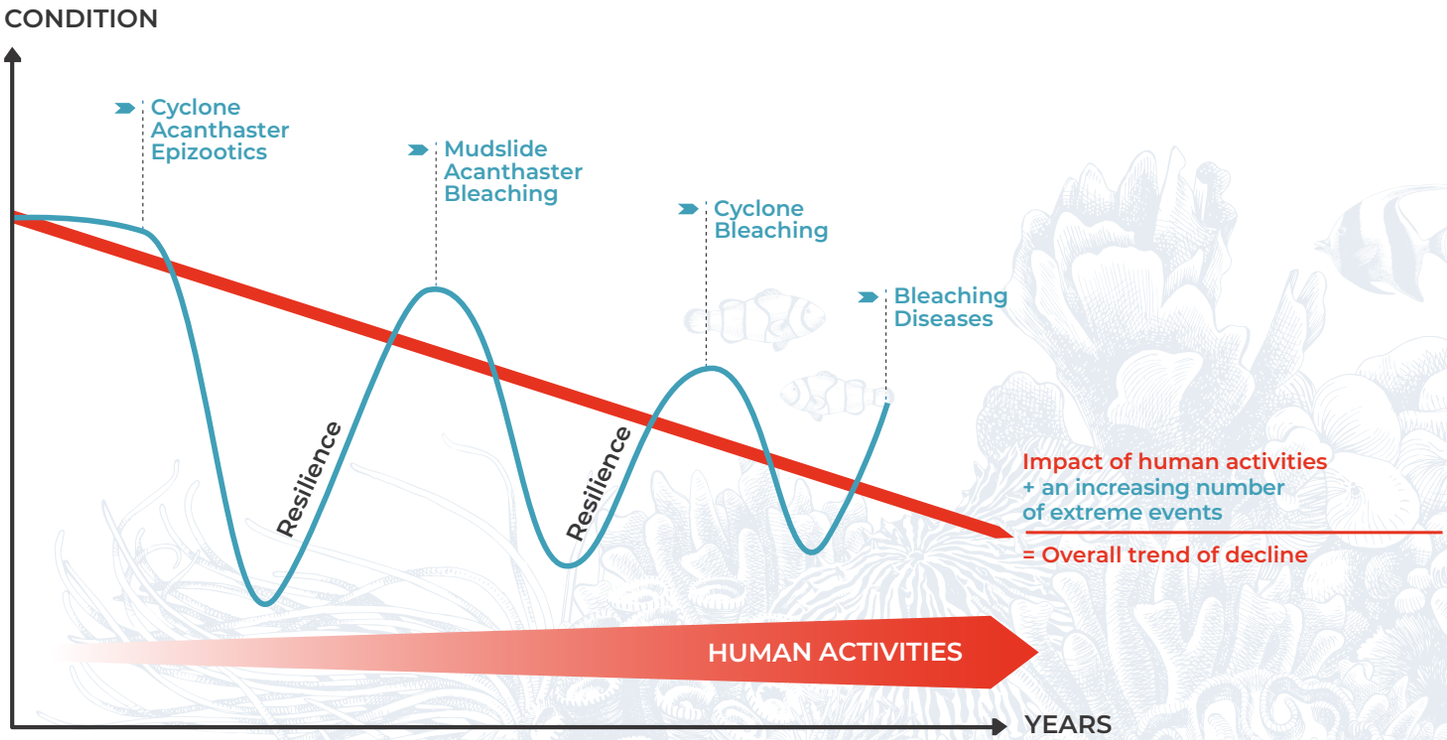
The ICRI's leading coral reef experts held a digital meeting on the afternoon of 25 March 2021. In his opening address, H.E. Bernard Fautrier, special adviser to HSH Prince Albert II of Monaco on the environment and co-chair of the initiative, looked back at the history of the ICRI, founded in 1994, which now has 90 members. It is currently chaired by Monaco, Australia and Indonesia. They will soon be handing over the reins to the United States, which has returned to the fray on major environmental issues. *"It is important"*, underlined H.E. Mr Bernard Fautrier, *"to consider indications of coral reef health on an international scale. And we are delighted to see that nearly all our proposals will be presented during the next Conference of the Parties (COP) meeting on biological diversity, which will be held in China this year".*

IN FIGURES

World Coral Conservatory
- 17 partner aquariums
- 1,000 species expected

Coral reefs cover just 0.2% of the world's surface, but are home to 1/4 of marine life.

© CoralReefImageBank - Hannes Klostermann



Changes to coral reefs over time
(source 2020 review of coral reef condition ©IFRECOR)

THE CONDITION OF CORAL REEFS WORLDWIDE

The ICRI presented its initial conclusions from the global report on the condition and changes to coral reefs.* A summary (the first since 2008) which should resonate strongly with scientific, governmental and international committees. The report, which focuses specifically on hard corals and algae, offers an overall analysis, with some sites having recorded more than 20 consecutive years of data. It includes 10 regional chapters, as well as themed topics such as restoration and reef diseases.

**The Global Coral Reef Monitoring Network (GCRMN) report*
40 years of data
2 million observations
12,000 sites monitored
75 countries with reefs

STATE OF EMERGENCY
Corals are amongst the species most at risk of extinction. 90% of reefs could disappear by 2050, even if global warming was limited to 1.5°C. *(source: IPCC)*

RESTORING THE REEFS

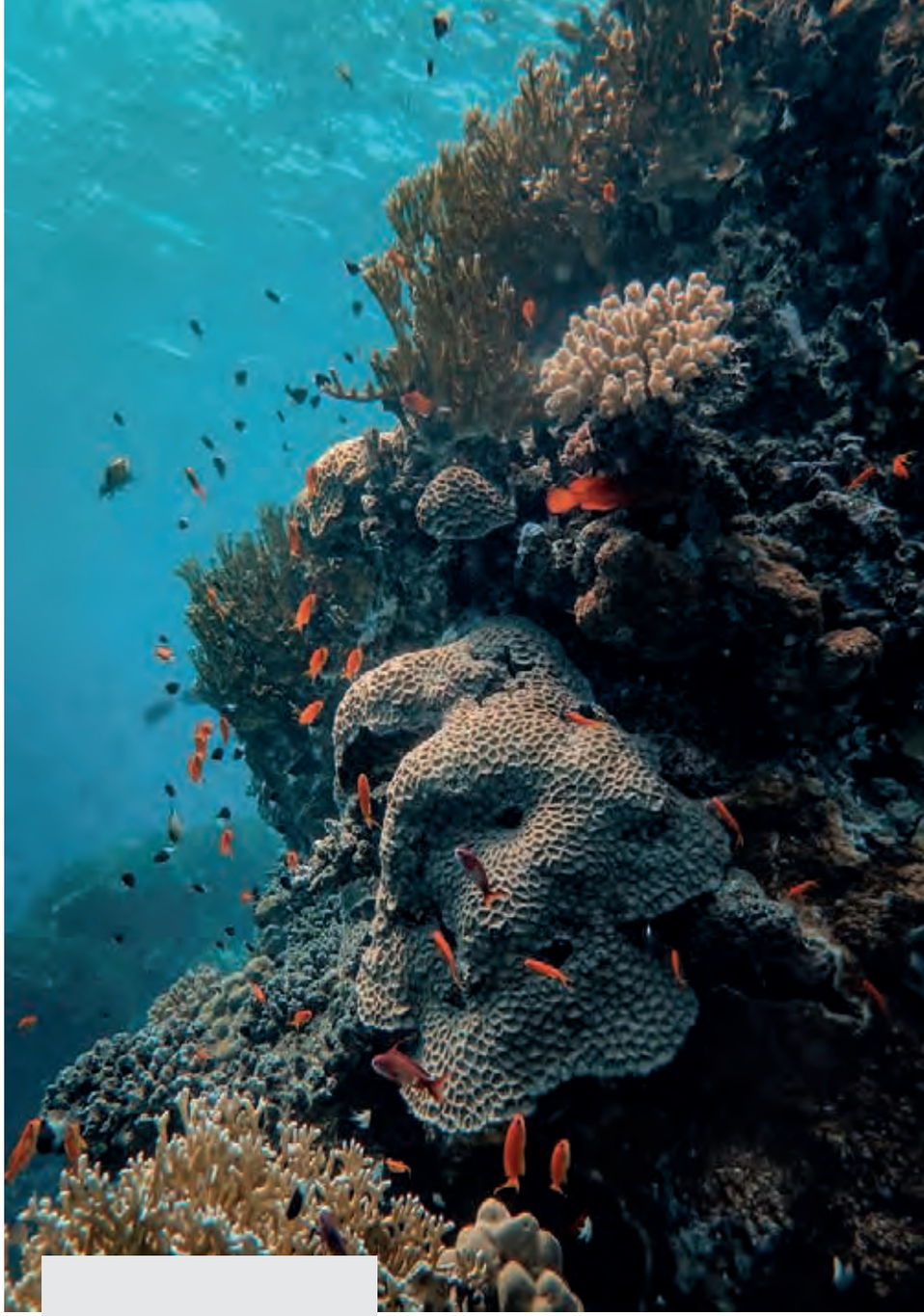
An expert in reef restoration, Margaux Hein - a consultant with the United Nations Environment Programme (UNEP) - presented an ICRI and UNEP report from January 2021, which offers technical guidelines to optimise reef restoration in order to improve ecosystem services. *"This solution should be supported by more general initiatives, like climate action"*, the scientist added.
Reef restoration will soon be able to rely on collections of the World Coral Conservatory, which should house 2/3 of known species in a network of aquariums meeting high environmental standards to *"protect precious biological assets"*, explains researcher Nadia Ounais, from the Oceanographic Institute of Monaco. *"DNA collected from these corals should help us improve the study of these species in a natural setting, and develop biomedical applications including assisted evolution techniques to make coral more resistant to climate change"*, adds Professor Didier Zoccola, from the Monaco Scientific Centre.

THE THREAT OF BLEACHING

Gabriel Grimsditch, Programme Management Officer within UNEP's Coral Reef Unit, presented the projected future coral bleaching conditions using IPCC models, emphasising two results: identification of climate refuges for coral, and exposure to severe bleaching by 40% of reefs. *"Corals must be considered a global asset with direct and indirect economic stakes. Their loss would have major consequences. That is why these ecosystems require consistent monitoring"*, notes Emily Corcoran, ICRI consultant.

MAJOR CHALLENGES

What strategy should we adopt to achieve global action? *"Even with the best scientific innovation, saving coral reefs will require a well-funded, well-designed, and rapidly executed strategy with political and social commitments at the level of other grand challenges."* That is the conclusion of a study recently published in the journal Biological Conservation. The lead author, Joanie Kleypas, from the US National Center for Atmospheric Research, suggests drawing inspiration from major challenges confronted in the past, such as the Apollo 11 mission, or efforts to cure cancer, which has involved very high level organisations and significant funding for 50 years. *"The fight against cancer would certainly be the best model to organise an effective global strategy to protect corals. We have 20 to 30 years, we must act quickly"*, explained the leading US oceanographer, provoking strong reactions on the *Monaco Ocean Week* chat. ■



STAYING ALERT

BLEACHING IN PERSPECTIVE

The 3rd global coral bleaching event (2014-2017) was the longest ever recorded.
This could become the norm in the next two decades, as shown by the severe event seen in 2020 on the Great Barrier Reef.

IN FIGURES

- **1 billion people depend on coral reefs for their food, protecting their coastline, cultural practices and earnings.** *(sources : MIT)*
- **$375 billion**
  Estimated annual value of resources and services offered by coral reefs
- **The GFCR aims to invest $500 million in coral reef conservation over the next 10 years**

- MAP OF CLIMATE CHANGE RESILIENT REEFS -

INNOVATION

A global coral protection fund

The Global Fund for Coral Reefs, a new paradigm to protect an ecosystem on the brink of extinction.

The meeting dedicated to the Global Fund for Coral Reefs during *Monaco Ocean Week* reflected the unifying nature of this unique initiative. Orchestrated by the head of the UNDP's coral reef conservation programme (Penny Stock), declarations by representatives of governments, United Nations agencies, universities, NGOs and civil society were all underpinned by two conclusions: the urgent need for action, and the funding shortfall for coral reefs. Combining conservation and the blue economy, encouraging public funding and private investment and applied at a local and global level, this Fund offers a unique and particularly promising response in the context of major changes. It is the first common United Nations fund dedicated to Sustainable Development Goal 14 (Life Below Water), which is particularly underfunded.

PROFILE

The GFCR is a multi-stakeholder initiative which includes the following partners:

- philanthropic organisations (Prince Albert II of Monaco Foundation and Paul G. Allen Family Foundation)
- financial institutions (BNP Paribas and Mirova)
- United Nations agencies (UNDP, UNEP, UNCDF)
- development partners (Germany, UK, France) and national organisations

The German Federal Foreign Office, the Prince Albert II of Monaco Foundation and the Paul G. Allen Family Foundation were early contributors to the Fund, which is managed by the United Nations Multi-Partner Trust Fund Office.

A GREAT START

Considering the objectives set when it was devised in 2018 in Monaco, the Global Fund for Coral Reefs (GFCR) is off to a *"great start"* according to Olivier Wenden, who also reiterated the Principality's historic commitment to coral reefs. *"The principle and methods of the Global Fund for Coral Reefs are incredibly important, and reflect our Foundation's goal of a healthy planet"*, the Vice President of the Prince Albert II of Monaco Foundation added, who also emphasised the growing interest of countries, partners and investors, and underlined *"the creation of an Executive Committee for the Fund and the first cycle of grants awarded to proposals from 6 countries for coral reefs which are particularly threatened but identified as resilient"*. The Fund specifically targets reefs able to adapt to impacts of climate change in their surroundings.

A jewel of numerous archipelagos affected by climate change and local causes of deterioration, coral reefs are central to the economic issues experienced by small developing island countries. The Minister of Fisheries, Marine Resources and Agriculture in the Maldives, Zaha Waheed, underlined the significant impact of reef deterioration on the economy of the Indian Ocean archipelago. The same can be seen in the Philippines, Indonesia or Fiji, selected by the Fund to develop their pilot projects. The ambassador of Fiji, Luke Daunivalu, was pleased that *"local and international stakeholders have done an excellent job to lay the groundwork to protect reefs, which are crucially important for all our island communities, their economies, their culture and their resilience to climate change"*.

RAISING PRIVATE AND PUBLIC CAPITAL

Faced with the clear discrepancy between the value generated by coral reefs and the low levels of investment to protect them, panel members promoted the private sector, which can play a key role alongside governmental, intergovernmental and philanthropic organisations and NGOs. The GFCR drives a sustainable and innovative financial ecosystem, based on the growing practice of blended finance, as explained by Jennifer Topping, executive coordinator of the UN Multi-Partner Trust Fund Office.

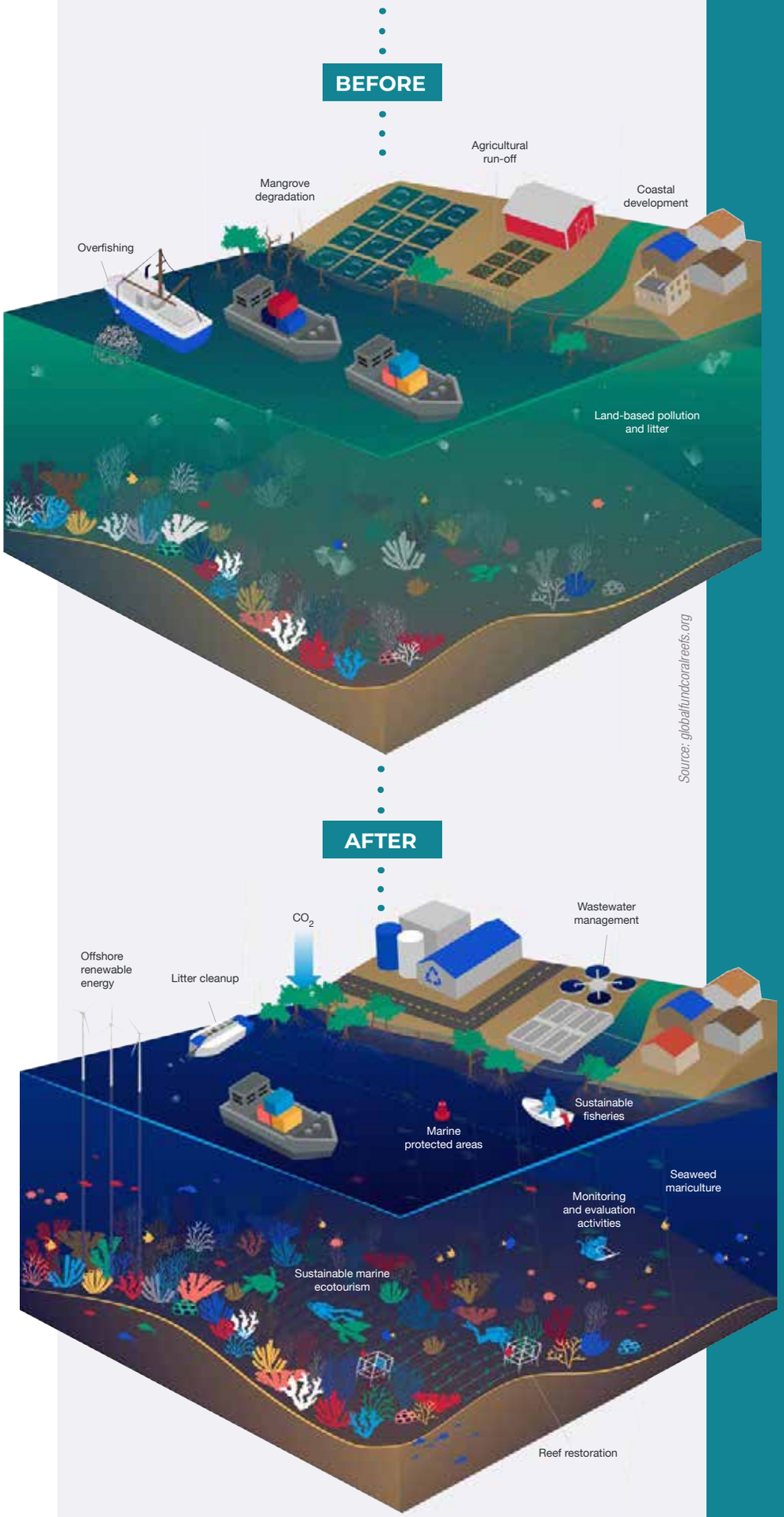
INVESTING FOR THE FUTURE

The panel of experts then focused on looking for solutions, conservation initiatives and alternative economic options, with the focus being to sustainably finance the resilience of these vulnerable ecosystems. This meeting - in preparation for the major international events in 2021 - concluded on the ambitions of this Global Fund, which aims to strengthen the balance of affected communities and countries, contributing to greater global security. ■

IN SIGHT

"Over the next ten years, the Global Fund for Coral Reefs aims to deploy a mix of public and private funding to test blue economy models able to generate positive effects on coral reef ecosystems, allowing them to resist and survive when confronted with multiple human and climate pressures",
Pierre Pascal Bardoux Chesneau,
UNDP Senior Portfolio Manager

A BUSINESS MODEL TO SAVE CORAL REEFS



THE GFCR SUPPORTS THE PHILIPPINES

The blended finance programme managed by Blue Finance in the Philippines, which targets three coral reef areas, has received the GFCR's support for an amount of $350,000. Income-generating activities will include eco-tourism, blue carbon, sustainable fishing and aquaculture. The grant will help to develop versatile funding dedicated to the effective management of over 200 marine protected areas in the Philippines, hoping to secure $50 million in investment capital by 2030.

THE GFCR SUPPORTS FIJI

Funding earmarked for Fiji ($1 million in 2021) will help develop reef-positive business models and include sustainable management of the Fiji marine protected area network. Associated with educational programmes, the GFCR programme will also support a change in farming practices (non-synthetic fertiliser for sugar cane plantations), the development of sanitary landfill and a waste collection system limiting the spread of toxic pollutants in mangrove swamps and reefs. The result of collaboration with United Nations agencies (UNDP, UNCDF, UNEP), WWF-Pacific, Matanataki, Blue Finance, local stakeholders and the Fiji government, this programme hopes to secure $50 million in investment capital by 2030.

17

POLLUTION AND HEALTH

/ **18** Acidification on the rise

/ **22** Combatting plastic pollution

/ **28** A toxic mix for the blue planet

/ **30** REMARCO: tracking the seas in Latin America and the Caribbean

/ **32** Colombia's contributions to the Blue Challenges

IN FIGURES

■ **417,85 ppm**

Record CO_2 level reached in 2021, the highest for thousands of years *(source: NOAA)*

URGENT ACTION REQUIRED

Addressing acidification in the Mediterranean

GOA-ON experts have come together to tackle this invisible threat, which disrupts seawater chemistry and threatens the balance of the Mediterranean social ecosystem.

Despite long-term research programmes and significant awareness-raising efforts in the Mediterranean region, strategies and actions specifically targeting ocean acidification are still rare. After a presentation on the science of ocean acidification in the Mediterranean region, a webinar on 24 March 2021 led by the International Union for Conservation of Nature (IUCN) and the Mediterranean GOA-ON* studied the reasons for the lack of specific policies, before discussing priority measures at national and regional level, as well as opportunities related to growing global interest in climate change.

A GLOBAL CLIMATE INDICATOR

At a time when CO_2 concentrations in the atmosphere have exceeded 416.46 ppm[1], ocean acidification is now recognised as a global climate indicator. It is included within United Nations Sustainable Development Goal 14. The increased emphasis on this phenomenon follows a long scientific battle started over 15 years ago by the Monegasque Association for Ocean Acidification, which continues during this 3rd regional meeting of GOA-ON members working on the Mediterranean.

A MAJOR ACIDIFICATION STUDY LABORATORY

GOA-ON researchers are working on the impact of the phenomenon in eight ocean regions, *"with the Mediterranean being the smallest, but including the most countries"*, as underlined by the Lebanese oceanographer Abed El Rahman Hassoun (CNRS-Lebanon), who leads the Mediterranean research group. 56 experts from 10 Mediterranean countries are involved in this GOA-ON Mediterranean "hub", and study acidification in the unique context of this almost completely enclosed sea: *"It is clear that the Mediterranean is more vulnerable to ocean acidification than the global average"*, summarised Patrizia Ziveri from the University of Barcelona, who coordinates a research group on marine and environmental biogeosciences. *"As the water circulation period is quite quick (80 to 100 years), new Mediterranean surface waters are frequently exposed to atmospheric CO_2. Highly saline and subject to warming, they are more likely to absorb CO_2, which increases acidification"*.

1. February 2021, source: NOAA.

Get involved with the science community on ocean acidification by registering on the platform:
www.oainfoexchange.org

PROFILE

Supported by the Prince Albert II of Monaco Foundation, the Ocean Acidification international Reference User Group (OA-iRUG) was founded to share scientific results on ocean acidification with non-scientific audiences and science end users, specifically political leaders and policy-makers. This historic group, one of the first to address the phenomenon of ocean acidification, has worked with several groups and projects such as EPOCA (the first European project on the topic), the Monegasque Association for Ocean Acidification (AMAO), as well as the GOA-ON (Global Ocean Acidification Observing Network) research network.

SCIENTIFIC COOPERATION: A PRIORITY

The meeting was an opportunity to review the topic, which is becoming more widely studied in the Mediterranean thanks to the support of international initiatives. Whilst the response of habitats, the impact on benthic ecosystems and on some hundred target species are closely studied, the socio-economic implications remain poorly understood. Researchers note a geographic bias, with most data focused on the north-west of the Mediterranean. As a result, researchers are targeting a new, less Eurocentric coordinated research programme, which is focused on societal processes and a unique ecosystem approach. The Mediterranean GOA-ON should allow this coordination, as well as support for scientists from low-income countries, notably by establishing regional centres of excellence. *"We need a general framework which reflects the environmental threat"*, warns Donata Melaku Canu, researcher at the National Institute of Oceanography and Applied Geophysics in Trieste, suggesting the option of a unique treaty on ocean acidification, similar to plastics.

BIOSOLUTIONS AND INTEGRATED STRATEGIES

The second half of the meeting involved a discussion by experts from various maritime sectors, notably fishing, aquaculture, and representatives of government agencies and international organisations working on the topic.
The significant impact of poorer water quality in the Mediterranean on fishing resources and shellfish farming was highlighted. Marine protected areas emerged as important means to combat acidification, a *"real threat which is not yet on the political agenda"*, condemned a representative from the MED-SEA Foundation. To take action, biosolutions based on the marine environment have been put forward, with *"scientific information reaching more politicians"*, concluded senior official Vahakn Kabakian, from the Lebanese Ministry of the Environment, representing UNDP, drawing a conclusion for the meeting: *"We need integrated strategies"*. ■

THE CONTEXT

DISRUPTED OCEAN CHEMISTRY

The planet's oceans have absorbed nearly 1/3 of CO_2 emissions over the last 50 years (even more according to the most recent research), mitigating the effects and severity of climate change. But this invaluable service comes at a cost. Radical changes occur in the ocean's water chemistry: the lower its pH, the more it acidifies. This change has numerous consequences on marine life, particularly organisms which need limestone to build their shells and skeletons (notably plankton, molluscs and crustaceans).

ACTION PLAN

What if the solutions came from the ocean?

The latest flagship project by AMAO has looked at ocean-based solutions to combat the triple threat faced by the planet's primary ecosystem.

The Monegasque Association for Ocean Acidification (AMAO)'s scoping workshop which took place during *Monaco Ocean Week* was an opportunity to look back at the insight offered by the *Ocean Solutions Initiative* which ended in 2020, following four years of research. Around 15 international experts were able to review the potential of solutions able to support climate action and help combat ocean acidification and rising sea levels.

13 SPECIFIC MEASURES

Measures which could play a key role include protection and restoration of ecosystems capturing and storing carbon, as well as the development of renewable marine energies. However, whilst several offer interesting potential on a global level, there are too many uncertainties or associated risks to recommend large-scale deployment. This includes so-called "geoengineering" measures, which include managing solar radiation to limit global warming, e.g. by adding foam on the ocean's surface. Many planned options lack scientific approval. The "solution" lies in combining global and local measures, some of which are ready to be deployed on a large scale. AMAO calls for coordinated international cooperation.

SUPPORTED BY SCIENCE

Reliant on scientific excellence, the *Ocean Solutions Initiative* was also able to contribute to IPCC reports via top-level scientific papers (notably in *Frontiers in Marine Science* and the prestigious journal *Nature*). The exploratory workshop which took place on the second day of *Monaco Ocean Week* helped to outline AMAO's future priorities to develop knowledge of an ecosystem confronted with numerous threats, as well as the search for reliable solutions to limit its effects. ■

THE OTHER CO_2 PROBLEM

CO_2 absorption modifies the chemical composition and pH of the ocean. Often referred to as "the other CO_2 problem", ocean acidification is up 26% since the start of the industrial era. At current emission levels, it may increase 150% by 2100.

IN FIGURES

The Ocean Solutions Initiative

- **18** scientific publications and policy briefs
- **4** workshops on ocean-based solutions and atoll preservation
- **80** articles published
- **2** animated films for awareness-raising

PROFILE

Founded in 2013 by the Prince Albert II of Monaco Foundation to focus on the issue of ocean acidification, AMAO brings together the Government of Monaco, the IAEA environment laboratories, the Monaco Scientific Centre and the Oceanographic Institute of Monaco, as well as representatives from IUCN and the CNRS.

MEDITERRANEAN

A sea of plastic: research and solutions

The IUCN's careful work has established a foundation to offer a better response to a pollution threatening the Mediterranean, but which remains poorly considered.

IN FIGURES

Without radical changes, by 2040, plastic waste in the Mediterranean will double, exceeding 500,000 tonnes per year.
(source: UICN)

Through the conference “The Mediterranean: a sea of plastic, what are the practical solutions?” on 24 March 2021, the initiative Beyond Plastic Med (BeMed) sought to promote the latest reviews of plastic pollution in the Mediterranean, as well as practical actions implemented to address this problem.

MARE PLASTICUM

Firstly, Mercedes Muñoz Cañas from the International Union for Conservation of Nature (IUCN) presented the conclusions of the report *The Mediterranean: Mare Plasticum*, published by the IUCN in 2020. Plastic pollution is varied, spreading on the surface, infiltrating the water column in microscopic form and covering the sea floor. How polluted is the Mediterranean? A very busy and almost completely enclosed sea, the Gordian knot of major rivers in a densely populated and plastic producing region (38 million tonnes per year), the Mediterranean faces multiple aggravating factors. In 10 years, it will have amassed 1.2 million tonnes of plastic in its waters - a prudent estimate by the scientific report’s authors, who envisage a concentration 3 times higher depending on the data used. This is because plastic sinks, dissolves and easily slips under the researchers’ radar.

Dealing with the challenges of this phantom pollution, despite ubiquitous signs, the IUCN’s summary is the first of its kind to precisely combine an estimate of plastic accumulated in the sea, and the estimated plastic leaks from land. It also includes an assessment of actions likely to help counter plastic pollution in the Mediterranean.

WARNING: THE “PLASTIC TAP” IS LEAKING

Experts estimate that 229,000 tonnes of plastic are leaked into the Mediterranean each year (94% macroplastic), which is the equivalent of 500 containers per day. Egypt, Italy and Turkey seem to be the worst offenders. Plastic hot spots tend to appear close to the mouth of major rivers, near to major cities or urban areas, as well as in certain areas which experience the effect of currents.

KEY ACTIONS

First and foremost, we must significantly reduce the amount of plastic entering the Mediterranean: improving collection systems, banning single-use plastics, reducing household use of plastic, and cleaning certain significantly polluted areas (e.g. the Nile dam).

In the second half of the conference, the 2020 BeMed awardees presented around twenty initiatives implemented in 14 Mediterranean countries, including the smaller islands: waste management, innovative recycling, raising awareness of local stakeholders, concerted actions, etc. The presentations, watched by more than 60 people, led to lively discussions and generated significant interest. BeMed awardees from previous years were able to ask questions throughout the conference, and offer their experience to the entire BeMed network. ■


© Mariano Cebolla

A LEGAL MATTER

Plastic pollution in the hands of the law

International environmental law continues to make progress to curb plastic pollution. A global problem, a legal quandary.

On the initiative of Pascale Ricard, CNRS research officer at the University of Aix-Marseille's Centre of International and Community Legal Studies and Research, an entire workshop morning was dedicated to this topic addressed by international environmental law, alongside marine sciences. On 24 March 2021, during the *Monaco Ocean Week*'s digital meeting, experts offered their point of view on a burgeoning field involving various disciplines.

THE LAW OF THE SEA, A PIONEER

Plastic pollution emerged in the law of the sea around forty years ago, when the International Maritime Organization legislated on plastic waste dumped by vessels. So the law of the sea was the first to offer a response to this pollution, which mainly comes from land (80%). Since then, environmental law has expanded, adjusted and structured itself around the plastic problem, a global, polymorphic and often invisible "disease", with the oceans showing the symptoms.

"100% of the samples we took from European rivers were contaminated with microplastics", confirmed Jean-François Ghiglione at the start of the session, CNRS head of research at the Microbial Oceanography Laboratory in Banyuls-sur-Mer, following the scientific mission "Microplastics 2019", which he led on board the schooner Tara. Rivers are the main carriers of plastic pollution into the oceans, which, *"if nothing is done, could increase threefold in 20 years. But with a proactive policy, we can reduce this pollution by 80%!"* the marine biologist continued. What support can we expect from international law? What is the latest progress made by environmental law on this topic? The key shortcomings which must be addressed? The *Monaco Ocean Week* workshop focused on these questions, fostering a constructive dialogue.

THE LEGAL OVERVIEW

Researchers firstly established an overview of legal texts considering the plastic issue on an international level. The key legal texts mentioned included the London Convention, but above all the MARPOL Convention, which regulate marine dumping (including plastics). The latter, which is by far the most unifying (159 signatories), has been reviewed to further limit the impact of marine transport and industrial activities at sea. According to Sophie Gambardella, CNRS research officer at the University of Aix-Marseille, the International Maritime Organization is expanding its legal framework to combat plastic pollution of the oceans. It is also behind several cooperation programmes between international organisations with similar purposes. The matter requires a rigorous and dynamic approach, particularly in the field of international law, which tends to be slow to respond.

THE LATEST PROGRESS

More generally, scientific literature on plastic pollution in the oceans has developed since the 2000s, with legal texts having a better grip of the specific marine aspects of the problem. In 2016, the United Nations Environment Assembly recognised the presence of plastics in the oceans as a serious, global problem which requires an urgent international response. An international treaty on plastic pollution, which is currently being finalised, reflects international efforts relying on scientific data.

Multilateral environmental agreements regulating plastic waste and hazardous additives have also received significant amendments: on 1 January 2021, following a vote by 176 countries, the Basel Convention become the sole binding legal instrument which specifically governs plastic waste, regulating its trade, collection, recycling and removal.

"Thanks to this agreement, which recognises the health risk of plastic waste, the Parties have a series of legal tools, guidance and even technical assistance to leverage the resources, interest and expertise of companies, governments, universities and civil society", explains Kei Ohno Woodall from the Geneva offices of the Basel, Rotterdam and Stockholm Convention Secretariat. The Stockholm Convention has added new persistent toxic additives used in plastics which spread in the sea to the list of hazardous products.

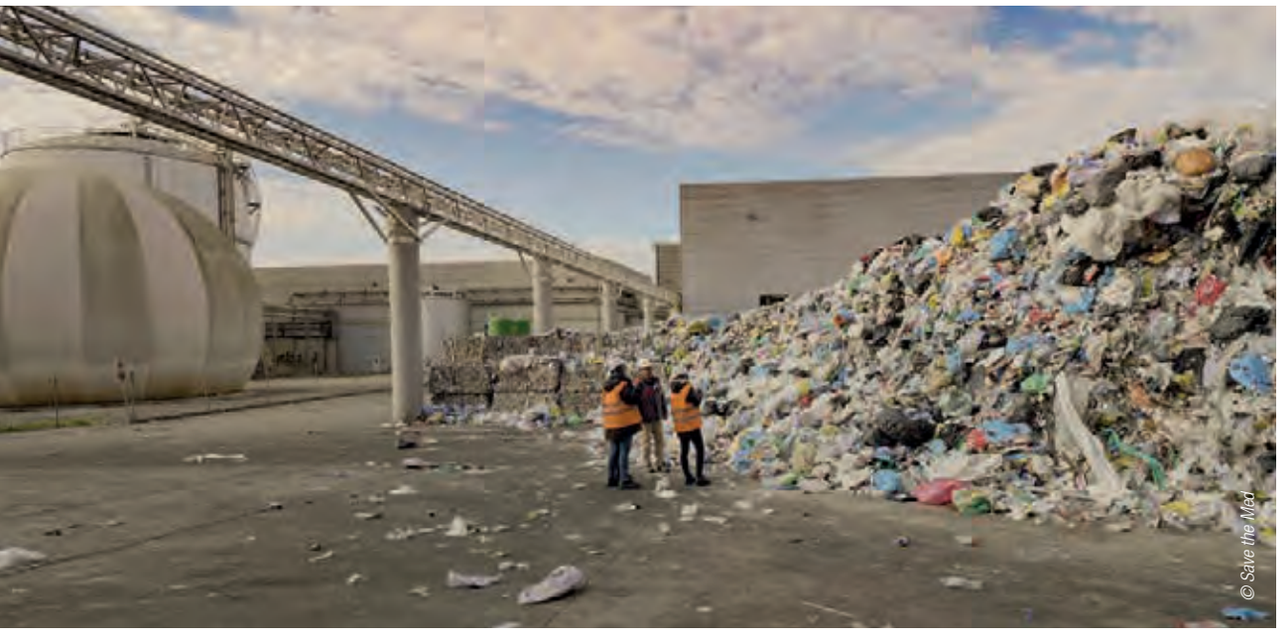
AT ALL LEVELS

This notable progress reflects international momentum seen at national, regional and European level, with Europe *"a key part of the battle"*, insists Eve Truilhé, Director of CERIC at the University of Aix-Marseille. The lawyer presented work done within the environmental legal clinic, which tends to measure the relevance of rules adopted by companies or institutions to combat this pollution. Other panel members underlined the importance of involvement by all parts of society, as the only way to relay legal standards. Adélie Pomade, lecturer at the University of Western Brittany, listed a certain number of non-legal tools which allow the incorporation or even pre-empting of legal texts.

"It's all systems go", confirmed Jean-François Ghiglione, who sees potential for action in the ecological crisis, and a real opportunity in this interdisciplinary discussion.

Research methods are emerging, such as digital experimentation in comparative environmental law, presented by the PhD student Odeline Billant, for the regulation of plastic bags across the Atlantic region, which should lead to new tools adapted to ocean-specific issues.

Whilst plastic pollution of the oceans has the opportunity to be better managed by environmental law, the law remains patchy. The panel's researchers warned of *"overriding uncertainty regarding the regulatory scope of a future global agreement"* (Raphaël Maurel, lecturer in public law at the University of Burgundy), as well as the need for more transparent regulation of international plastic waste trade (PhD student Daria Vasilevskaia from the University of Aix-Marseille). ■


© Save the Med

DELIVERING A GLOBAL TREATY ON PLASTIC

At the United Nations Environment Assembly, the group of experts on plastic pollution created in 2017 held its latest meeting online from 9 to 13 November 2020. The option of a treaty was discussed and is still one of the options presented to the Assembly in February 2021. The European Union is in favour of a new treaty, alongside Norway and the United Kingdom. It is also a matter of creating a dedicated intergovernmental platform of experts, a sort of plastic IPCC, which could include hesitant countries (like the United States). *"The COVID-19 crisis has increased the production of single-use plastic. The situation has got worse, but it might encourage countries to take a stance and speed up the process"*, explained CNRS expert Pascale Ricard (University of Aix-Marseille).

© Lucile Courtial

POLLUTION AND HEALTH

A toxic mix for the blue planet

The Monaco Commission on Human Health and Ocean Pollution has looked further into this topic, which is expected to shape the next "Monaco Declaration" for the ocean.

Founded during the previous edition of *Monaco Ocean Week* in 2019, this international scientific commission was able to meet for its second session on Tuesday, 24 March 2021. Commission members reviewed the report presented a few months earlier in Monaco, during the symposium dedicated to the impact of ocean pollution on human health. They referenced scientific news on the topic, as well as future prospects for action. New experts joined the 12 core founding members of the group, and presented their research interests.

RESEARCH OPPORTUNITIES

During this digital meeting led by Doctor Hervé Raps from the Monaco Scientific Centre, there were discussions on the epigenetic study of marine bacteria's adaptive mechanisms in view of environmental stress, the development of early warning systems on exceptional marine events (harmful algal blooms, flooding, etc.) and progress on tracking tools and indicators, which are crucial for bacteriological prevention. The *"Vibrio Map Viewer"* developed by the European Centre for Disease Prevention and Control emerged as a future tool. Researchers also mentioned the need to consider the risk of extreme climate events and the risk of water contamination in construction strategies. Finally, acting as a substrate of pollutants and micro-organisms, plastic waste is subject to enhanced studies which reveal a new aspect - nanoplastics.

THE CURRENT SITUATION

In the second part, Professor Philip Landrigan, environmental health expert at *Boston College*, presented conclusions from the report which reviews the current situation in terms of the impact of ocean pollution on human health[2] – a report introduced by HSH Prince Albert II of Monaco and published in the review *Annals of Global Health*. The mix of persistent, organic, microbiological and nanochemical pollution has a significant effect on ocean health, and therefore on human health. Based on 700 scientific papers, the report's 40 authors gathered the results of the latest research on the topic, compiling alarming analyses at an international level. At the end of this summary, the scientists emphasised examples of resilience or decontamination, which were promoted during the *Monaco Ocean Week* conference.

A FUTURE DECLARATION FOR THE OCEAN

Finally, this meeting was an opportunity to position the topic at the centre of the future Monaco Declaration. Professor Landrigan also reiterated that *"thanks to legislative and binding measures taken during the Montreal Protocol in 1989, substances responsible for destroying the ozone layer have fallen by 70%"*. Presented with this encouraging example, commission members ruled in favour of a call for global action for the ocean, which will be launched in Monaco during upcoming international meetings. ■

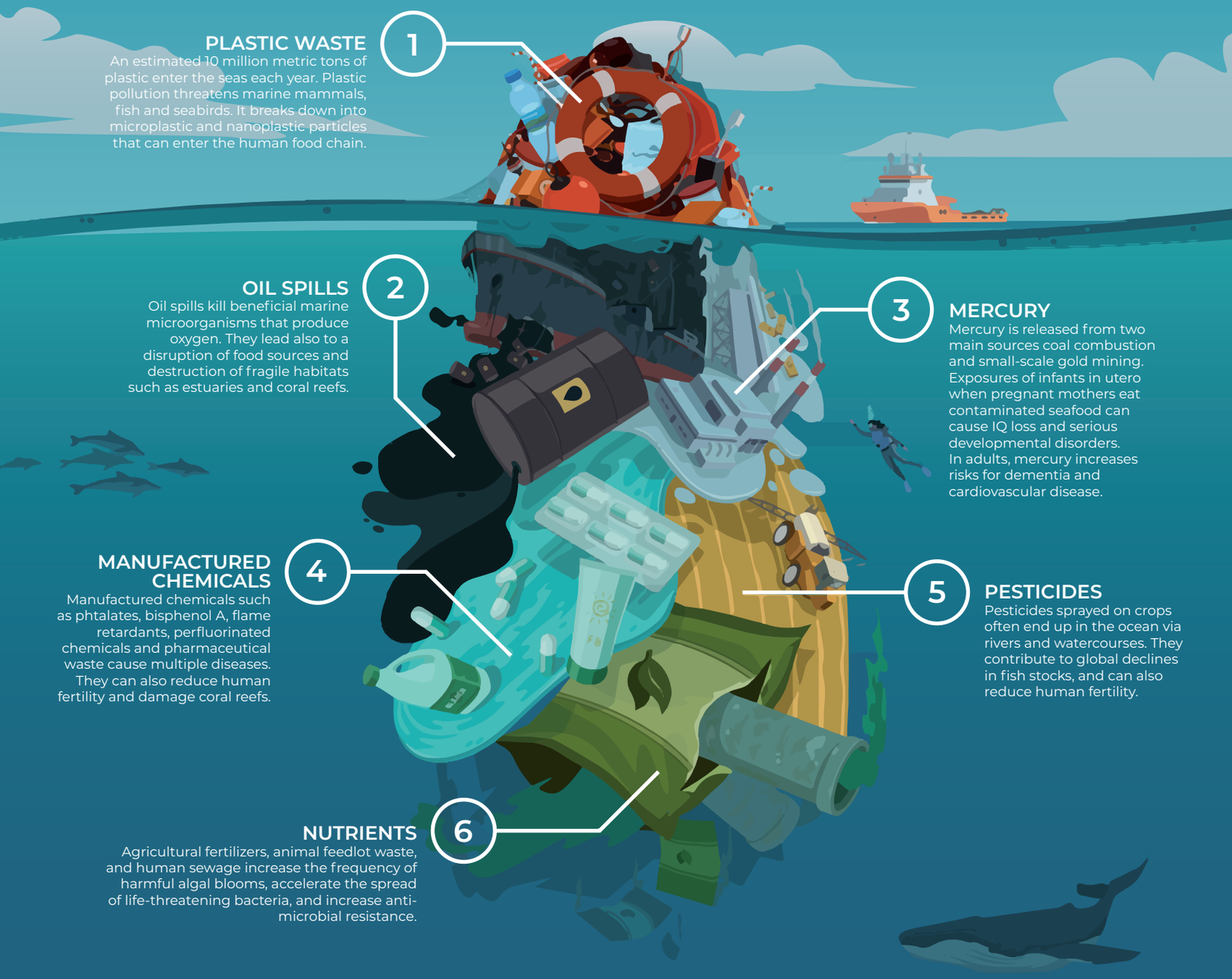
2. Landrigan P. et al. "Human Health and Ocean Pollution", *Annals of Global Health*, 2020.

PROFILE

The Monaco Commission on Human Health and Ocean Pollution, co-chaired by Professor Patrick Rampal (Monaco Scientific Centre) and Professor Philip Landrigan *(Boston College)*, brings together around thirty leading international researchers.

IN FIGURES

- 140,000 new chemicals have been invented and synthesised over the last 75 years. Most of them persistently contaminate the ocean.



1 PLASTIC WASTE

An estimated 10 million metric tons of plastic enter the seas each year. Plastic pollution threatens marine mammals, fish and seabirds. It breaks down into microplastic and nanoplastic particles that can enter the human food chain.

2 OIL SPILLS

Oil spills kill beneficial marine microorganisms that produce oxygen. They lead also to a disruption of food sources and destruction of fragile habitats such as estuaries and coral reefs.

3 MERCURY

Mercury is released from two main sources coal combustion and small-scale gold mining. Exposures of infants in utero when pregnant mothers eat contaminated seafood can cause IQ loss and serious developmental disorders. In adults, mercury increases risks for dementia and cardiovascular disease.

4 MANUFACTURED CHEMICALS

Manufactured chemicals such as phtalates, bisphenol A, flame retardants, perfluorinated chemicals and pharmaceutical waste cause multiple diseases. They can also reduce human fertility and damage coral reefs.

5 PESTICIDES

Pesticides sprayed on crops often end up in the ocean via rivers and watercourses. They contribute to global declines in fish stocks, and can also reduce human fertility.

6 NUTRIENTS

Agricultural fertilizers, animal feedlot waste, and human sewage increase the frequency of harmful algal blooms, accelerate the spread of life-threatening bacteria, and increase anti-microbial resistance.

BOSTON COLLEGE

CSM CENTRE SCIENTIFIQUE DE MONACO

WIII DESIGNED IN 2020 BY WILL STAHL-TIMMINS

ENVIRONMENTAL MONITORING

REMARCO: tracking the seas in Latin America and the Caribbean

The Latin America and Caribbean communication and research network aims to facilitate decision-making by 18 member states dealing with the vulnerabilities of coastal and marine environments in the region.

The digital conference organised by the Colombian research institute INVEMAR, with the support of the International Atomic Energy Agency, presented the progress made by the interdisciplinary network REMARCO. Founded 13 years ago, it now involves 18 countries in Latin America and the Caribbean, with a focus on marine problems in this huge region bordered by 3 oceans. *"REMARCO's four priorities are chemical pollution, microplastics pollution, harmful algal blooms and ocean acidification"*, underlined Francisco Arias, director general of INVEMAR, in his opening speech.

CUTTING-EDGE TECHNIQUES

Representatives from the International Atomic Energy Agency (IAEA) explained the technical cooperation programme, which aims to develop the knowledge and capacity of 147 partner states, including 31 in Latin America and the Caribbean. Magali Zapata-Cazier, IAEA programme management officer, underlined the importance of a regional network like REMARCO, involving scientists, policy-makers and communicators: *"Environmental problems do not stop at borders - they require national and regional responses"*. With the support of the IAEA, REMARCO reinforces the capacities of participating countries to use cutting-edge techniques (nuclear and isotopic techniques) and can track different indicators, working with top laboratories and relying on experiences shared between experts. *"To carry out studies at this level, the network ensures standardisation of analysis methods to be able to compare data and benefit from real expertise which helps with decision making"* adds Carlos Alonso Hernandez, analyst with the IAEA environment laboratory in Monaco.

REMARCO, SUPPORTING DECISIONS

As reflected by its participation in *Monaco Ocean Week*, the REMARCO network advocates communication to improve visibility of these problems amongst policy-makers and the general public. By offering a comprehensive overview of the region's environmental quality, the marine and coastal ecosystem surveillance network can inspire policy-makers to play their part in the global effort for the oceans "*which is led by Monaco"*, as underlined in a conclusion by the Colombian researcher Francisco Arias, director general of INVEMAR.

IN FIGURES

- **65%** of the Caribbean region depends on the ocean and its ecosystem services

4 AREAS IN THE SPOTLIGHT

In line with United Nations Sustainable Development Goal 14, REMARCO plays its part to reduce ocean pollution, the impacts of ocean acidification and to establish sustainable management of marine and coastal environments.

❶ Network members notably study changes to the level of pollutants in marine sediment across the region. It has emerged that three sites on the coasts of Haiti, Cuba and Colombia (countries which have ratified the Minamata Convention) could be considered

mercury hot spots. *"Network measures should allow us to target the effectiveness of this international mercury convention"*, explains the researcher Ana-Carolina Ruiz Fernández from the Mexico Institute of Marine Science and Limnology..

❷ Microplastic contamination trends are also tracked to the nearest micron in the water column like sediments, and recorded on a map which, over time, will offer precise information on the distribution and concentration of this emerging pollutant.

❸ Also closely monitored, harmful algal blooms are increasingly common, increasing in severity and with a severe economic impact.
"Thanks to the standardised protocols which we have developed, we gather long-term data within the region's laboratories, and we implement effective science-based management, for example for ciguatera", explains Rebecca Quintanilla, from the marine toxins laboratory at the University of El Salvador.

❹ Finally, the network is focusing on ocean acidification in the region. *"We created the first coastal acidification observatory in four countries, an observatory which has expanded to the entire Latin American region, with water pH monitoring stations"*, explains Professor Joan-Albert Sanchez-Cabeza, from the Mexico Institute of Marine Science and Limnology. The observatory has reported acidification on the Cuban coastline for several months. *"We must keep up coordinated efforts in the long-term, which is new in the region"*, the professor summarises. ■

IN FIGURES

- **N°. 2 coral reef** in the Caribbean
- **N°. 3 for mangrove** swamps in Latin America
- **13.8% of protected marine** and coastal areas
- **10 times more** marine protected areas between 2010 and 2020

COLOMBIA BLUE CHALLENGES

Colombia bets on blue

With half of its territory facing the ocean, Colombia is doubling its efforts to protect its marine and coastal ecosystems and promote innovative blue carbon initiatives.

In a video conference on 24 March 2021 between representatives of government and environmental organisations in Colombia during *Monaco Ocean Week*, the country's efforts were presented in terms of conservation and sustainable use of marine and coastal ecosystems.

In her opening address, the ambassador of Colombia, Viviane Morales, insisted on the need to combine scientific knowledge, technologies and political action on marine and coastal issues, above all in the context of the pandemic, which has reminded us of the significant interdependence between humans and ecosystems. The ambassador also insisted on the role of oceans to combat climate change, and underlined the ambition of Colombia, a hotspot of global biodiversity, to continue its efforts to protect its natural assets over time, relying on international ambitions in the matter and sometimes even pre-empting them.

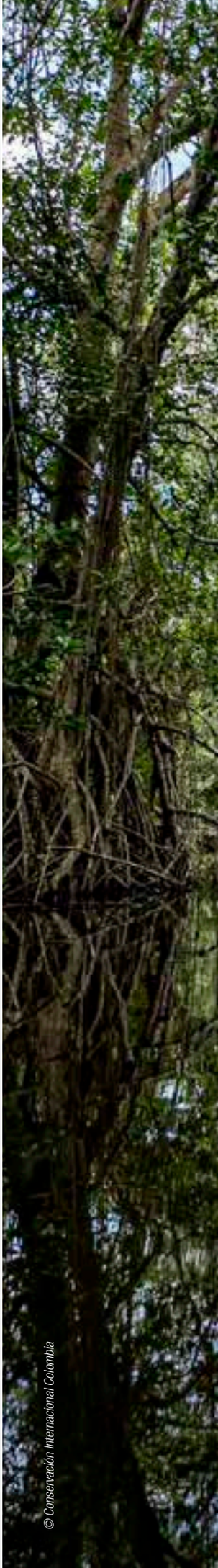
A BLUE CARBON LEADER

The Colombian Minister of the Environment, Carlos Correa, underlined the close ties between Colombia and Monaco in terms of protection of the coastal and marine environment, establishing scientific capacity and promoting sustainable development. He also referred to Prince Albert II of Monaco's visit to Colombia in 2018, the first Sovereign to visit the island of Malpelo, a biodiversity sanctuary which has been a UNESCO world heritage site since 2006. The founder and director of the Malpelo Foundation, Sandra Bessudo, reports findings drawn from the latest telemetric tracking of sharks visiting this Pacific island: *"The Colombian and Panamanian Pacific coasts are very important for the future of sharks which reproduce there. We must protect these areas further"*, summarised the former Minister of the Environment, encouraging a globally consistent approach.

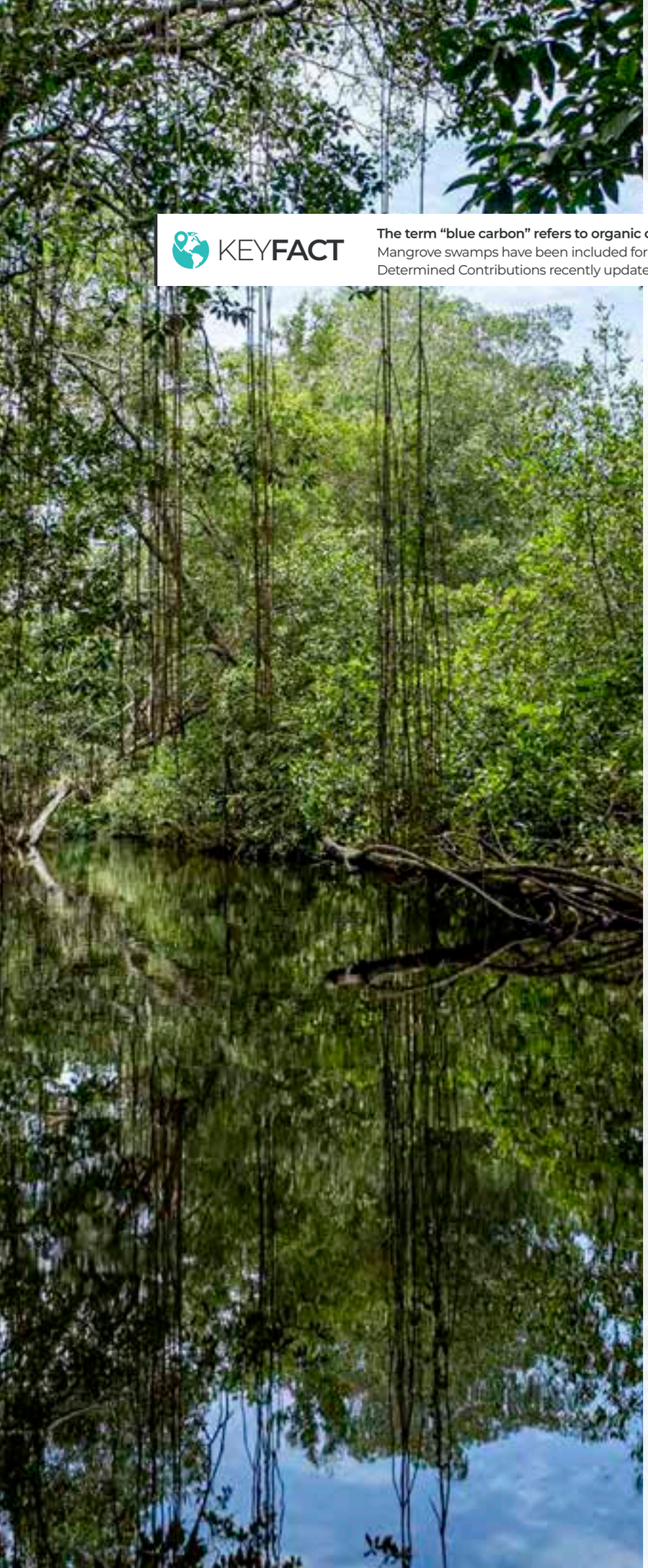
And the country, which is targeting a 51% reduction in greenhouse gas emissions by 2030, is refining its ocean coastline preservation strategy. *"With our efforts to achieve carbon neutrality, all countries' eyes are on us. We must encourage greater advocacy, and do everything we can to protect the value of our largest ecosystem"*, urged the Colombian minister Carlos Correa, before introducing the project which makes Colombia a leading country in blue carbon.

DID YOU KNOW?

The ultimate blue carbon, mangrove swamps are recognised for their exceptional ability to capture and store carbon, 16 times greater than land ecosystems.



© Conservación Internacional Colombia



KEYFACT

The term "blue carbon" refers to organic carbon stocks captured by plant organisms in marine and coastal ecosystems. Mangrove swamps have been included for the first time as blue carbon ecosystems, with two objectives in the Nationally Determined Contributions recently updated by Colombia.

MANGROVE SWAMPS IN THE SPOTLIGHT

Based on sustainable management of mangrove swamps in the Gulf of Morrosquillo (Caribbean), the "Vida Manglar" project aims to significantly reduce greenhouse gas emissions caused by deforestation. The first blue carbon strategy dedicated to protecting these ecosystems encompasses the creation of a large nursery, reforestation and recovery of the gulf's mangrove swamps. It is currently being environmentally certified. The initiative enjoys the support of the Regional Autonomous Corporation of Valles del Sinú and San Jorge (CVS), *Conservation International,* the Marine and Coastal Research Institute (INVEMAR), the Omacha Foundation and 14 community organisations in this region. "Vida Manglar" is expected to expand: the implementation of six blue carbon initiatives in Colombia is on the Colombian government's national development plan.

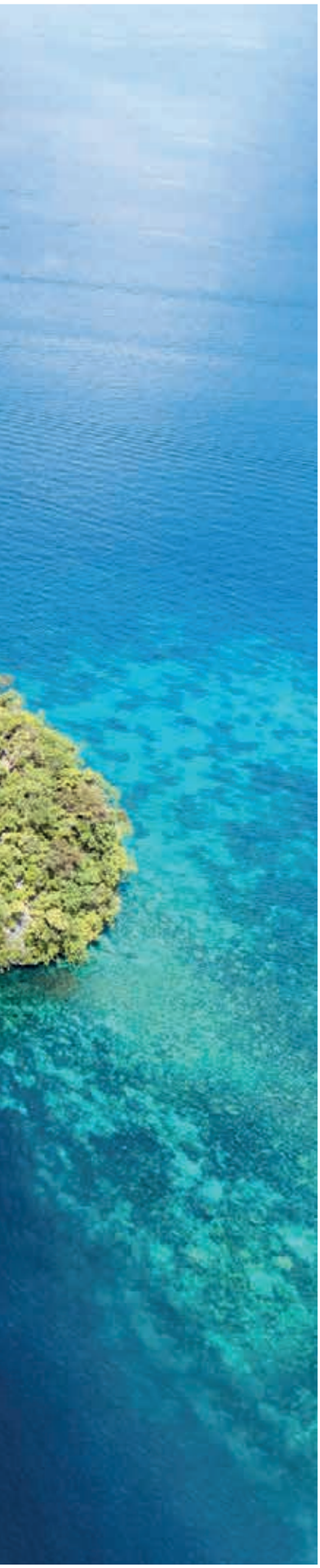
COPING WITH CYCLONES

Hurricane Iota (category 5) in November 2020 marked a change in route and intensity of tropical cyclones. The impact of these major climate events on marine and coastal ecosystems specifically affects coral colonies, seagrasses and mangrove swamps. Speakers highlighted the importance of national, coordinated efforts to improve prevention of climate disasters and restore these areas of major ecological importance.

COMMITMENTS

The Colombian Ocean Commission (COC) took part in the event through its executive secretary, Captain Juan Camilo Forero, who promoted the creation of a National Committee for the Ocean Decade to be able to examine and agree on actions and measures to take to achieve targets set by the United Nations. Cesar Toro, director of the UNESCO Office for the Caribbean, mentioned a proposal to create a global collective research forum to address shortcomings in terms of capacities of regional states. Finally, with CONPES 3990, Colombia has committed to create planning instruments for its coastal marine space, translating its ocean conservation and sustainable use targets to all regional levels. ■


© R.Brooks - MonacoExplorations



35

THE BLUE ECONOMY AND FINANCE

/ **36** Building back blue

/ **44** A new era of finance

/ **48** An environmental fund financing Mediterranean MPA

/ **52** The IHO and CIESM sign a new agreement

/ **56** A change of paradigm on the horizon

/ **58** The perpetual ocean

MONACO BLUE INITIATIVE

Building back blue

A real precursor to upcoming international negotiations on the future of the ocean, the 12th edition of the *Monaco Blue Initiative* was held on 23 March 2021, led by HSH Prince Albert II of Monaco, on the theme of the blue economy.

More than 200 participants worldwide were able to connect and follow the busy day of conferences and debates in hybrid format (in-person/digital), with a small group of participants in attendance at the plenary room of the Oceanographic Museum of Monaco.

At the start of this event, co-organised by the Oceanographic Institute, the Prince Albert I of Monaco Foundation and the Prince Albert II of Monaco Foundation, the Sovereign reiterated the backdrop of current international negotiations on sustainable ocean governance, and prospects for post-pandemic economic recovery. *"We have an unprecedented opportunity to build back better"*, the Sovereign argued, as a keen supporter of the oceans.

The *Monaco Blue Initiative* - which leverages the expertise of leading figures in ocean conservation and governance - has once again offered an invaluable platform for discussions on sustainability and responsibility of the blue economy and finance. But these new pillars - which largely rely on a healthy ocean - must be strengthened. *"We can see opportunities for the biggest economic transformation witnessed since the Industrial Revolution"*, confirmed H.E. John Kerry, United States Special Presidential Envoy for Climate, confirming commitments made by President Biden's government, which is keen to rejoin the Paris Agreement.

Led by renowned and experienced moderators, three themed sessions served as the basis for discussions between stakeholders in finance and industries linked to the ocean, scientists, representatives from governments, international organisations, and members of civil society. At the start of each session, government officials from the United States, France, the European Union, Portugal, Colombia and Norway gave opening addresses, reviewing their country's involvement in the issue of the financialisation of the ocean and its sustainable management.

"The blue economy must be the cornerstone of countries' post-COVID recovery plans. We must build back better, and blue, develop new means of investment such as blue bonds[3], as well as risk sharing mechanisms between public and private stakeholders to finance more advanced technologies."

***Annick Girardin**, Minister of the Sea, France*

3. *"Blue bonds"* are an innovative form of ocean finance which allow funds to be allocated to projects deemed ocean-friendly.

© Michel Dagnino

IN SIGHT

"In order to really take stock of our relationship with the ocean and hope to change it, we must open up dialogue with all relevant stakeholders, to better understand the issues which link the seas and humanity: this will allow us to place the ocean at the heart of our development paradigm."

HSH Prince Albert II of Monaco

"We cannot protect the oceans without addressing the climate crisis, nor address the climate crisis without the power of the ocean. We must sustainably exploit the potential of marine renewable energies, we must protect and restore our blue carbon coastal ecosystems, and we must decarbonise the international maritime transport sector."

***H.E. John Kerry**, United States Special Presidential Envoy for Climate*


© Michel Dagnino

MONACO BLUE INITIATIVE

The role of international negotiations

The panellists involved in current or future negotiations shared and made recommendations to allow these major global meetings on the oceans to deliver significant results. The priority is not reviewing the protection objectives as such, but more efficient implementation. For Sophie Mirgaux, special envoy for the ocean (Belgium), the future treaty on protecting high seas biodiversity (BBNJ) - which is still being negotiated - is a framework which would allow the global implementation of the lofty ambitions set by the highest international bodies, which must be relayed by effective regional agreements.

"We must make a deeper, more tangible commitment to tackle this global issue which has three parts: the climate, the ocean and biodiversity."

Susan Gardner,
Director, Ecosystems Division at UN Environment

SUPPORTED BY SCIENCE

The speakers all shared the sense of urgency, and they all emphasised the importance of global governance based on a solid scientific foundation. Bruno Oberle, Director General of the IUCN, underlined the importance of sufficient tracking, control and monitoring to transform the legally binding instrument into holistic ocean governance. He supported the use of a top-level panel dedicated to the ocean, which would represent all States and which would be supported by science. The moderator, Sébastien Trayer, Executive Director of the Sustainable Development and International Relations Institute in Paris, emphasised the importance of consolidating scientific knowledge. *"There are considerable data gaps on the oceans, notably for developing countries and the deep sea, 90% of which is not mapped"*, remarked Alexander Shestakov, from the Secretariat of the Convention on Biological Diversity, which is keen to involve non-coastal countries which still benefit from the ecosystem services offered by oceans.

WORKING TOWARDS OCEAN DEMOCRACY

Many options were mentioned. One of these was a legal status for the ocean(supported by France), which was raised and contrasted with specific problems, such as deep sea mining. The legal recognition of nature's rights, like in Ecuador or New Zealand, was mentioned as a new stage of innovative ocean management. Greater consistency between States, as well as between knowledge and actions, emerged as a major milestone in the developing "ocean democracy", the emerging voice of the people and the oceans which should be considered in future international negotiations.

"When we have a set of objective data which describes the ocean, we can reach an agreement on shared ideas and bringing about major change. We must also consider the ocean's spiritual value. We should establish a new set of morals in our relationship with the ocean."

Vladimir Ryabinin,
Executive Secretary of the Intergovernmental Oceanographic Commission of UNESCO and Assistant Director General of UNESCO

MONACO BLUE INITIATIVE

The development of a sustainable and transparent blue economy

"The COVID-19 pandemic has underlined the fact that there is no option other than hastening our transition towards sustainable development": this conclusion by moderator Marie-Claire Daveu, Chief Sustainability Officer and Head of International Institutional Affairs at Kering, set the tone for the second panel discussion on the transition to a blue and sustainable economy. How can we incorporate ocean issues and the Sustainable Development Goals (particularly SDG 14) into CSR strategy? Representatives from businesses or NGOs in the blue economy working in sectors as diverse as offshore wind energy, ocean start-up incubation, aquaculture or development consulting discussed the challenges linked to aligning economic performance and healthy oceans.

RETHINKING THE PRIVATE SECTOR

In the private sector, it has become a priority to help companies incorporate objectives on the sustainable management of marine resources. The challenge of this fledgling sustainable blue economy is to realise environmental objectives: improving pollution tracking, identifying shortcomings, tangibly reducing impacts, involving all sectors, from the business model to incorporating sustainable practices across the entire supply chain and amongst all partners.

Having reached the point of no return, Thomas Thune Andersen, from the Danish company Ørsted (the world's leading offshore wind operator), argued for a long-term global framework which can protect the ocean's potential. New tools were presented which could help companies and investors to align their objectives with the SDGs and map their services and products, considering the specific nature of the oceans, like a roadmap offering guidelines to companies. *"Corporate social responsibility must be considered at all levels of a company. These objectives must be part of the company's mission statement, with support from NGOs to create genuine momentum"*, added the lawyer Bruno Monteferri, Executive Director of Conservamos por Naturaleza, which seeks to tackle bluewashing and promote universal access to the ocean.

FROM INNOVATION TO THE BUSINESS MODEL

The momentum of any innovative company attempting to tackle the challenges of the future will come up against the fundamental question of economies of scale. The co-founder and director of the company *Innovafeed*, Clément Ray, presented the example of his insect-based alternative protein production model for aquaculture.


© F.Buyle - MonacoExplorations

"We will not achieve the targets of the European Green Deal without the blue economy, i.e. the thousands of companies, investors, innovators and consumers in or around the sea and coastal areas."

***Virginijus Sinkevičius**, European Commissioner for Environment, Oceans and Fisheries.*


© M.Boussion - MonacoExplorations

"Access to the ocean is as important as access to green spaces. Even near a major city, there must still be the option of positive experiences with nature. These matters involve both policy-makers and residents."

***Bruno Monteferri**, Executive Director, Conservamos por Naturaleza and Head of Marine Governance, Peruvian Society for Environmental Law.*


© D.Théron - MonacoExplorations

"Blue companies are particularly likely to include corporate social responsibility elements. Oceans hold the answers and the tools for some of the most pressing challenges facing our society, like climate change and food security, health and wealth."

***Ricardo Serrão Santos**, Minister of Maritime Affairs, Portugal*

MONACO BLUE INITIATIVE

Blue finance

What is the financial sector's role in managing risks linked to the loss of biodiversity? What are the specific financial motivations of the blue and sustainable economy? Moderated by Sylvie Goulard, Second Deputy Governor of the Bank of France, panellists at the MBI's third session dove into the relatively unexplored waters of blue finance. Drawn from the insurance, private banking, conservation finance and consultancy sectors, they discussed the specifics of this fledgling financial sector and ways to increase sustainable investment in the oceans, particularly in the context of an economic recovery after the COVID-19 pandemic.

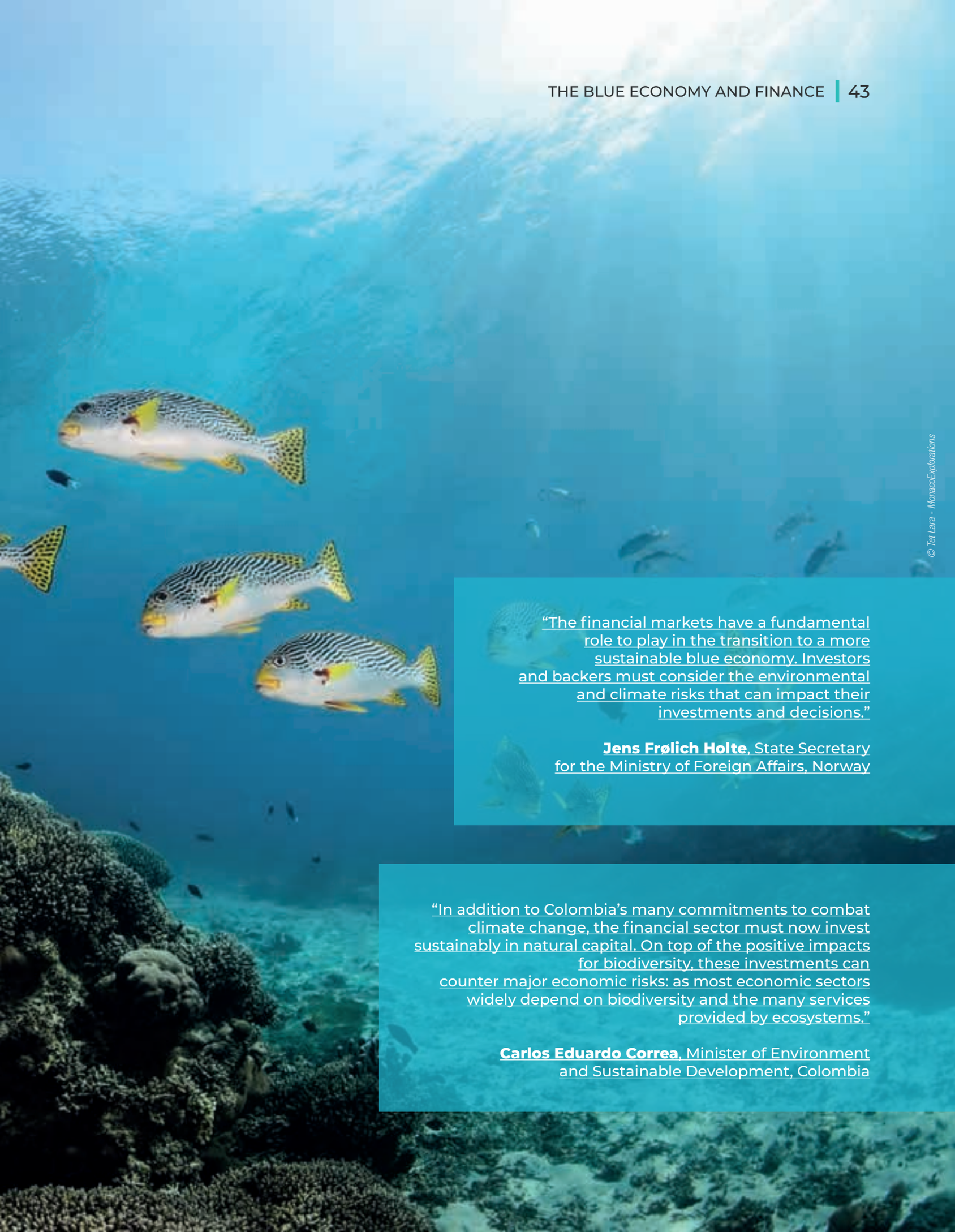
BLUE VS. GREEN

Will blue finance follow the path taken by green finance, an initiative which emerged around fifteen years ago? The panellists agreed that the existing principles and instruments of green finance could be tailored to blue finance, without changing the paradigm. The two could be considered as inseparable parts of the global economy. However, some natural features and legal aspects specific to the ocean - a widely shared, freely accessible resource liable to be damaged - must be taken into consideration. Several recent guides on blue finance looking further into these questions were referenced.

The speakers agreed that we need to bring together scientific communities and economic policy-makers to identify opportunities for private investment in key ocean sectors (offshore wind power, sustainable food production, decarbonisation of maritime transport, eco-responsible tourism, ecosystem conservation and restoration), all in view of SDG 14.

RISKS TO BE CONSIDERED

Several obstacles were identified, starting with the financial sector's lack of expertise, the need to determine suitable economies of scale and management of economic risks linked to ocean damage. The option of establishing a more symbiotic relationship between blue finance and the global economy was put forward. Mixed finance systems lead the way, like the Global Fund for Coral Reefs, combining public, philanthropic and private financing to breathe life into profitable projects which can finance long-term conservation. Finally, to be sustainable and profitable whilst supporting ocean health, blue finance must support resilient economies within the most closely involved communities. ■



© Tet Lara - MonacoExplorations

"The financial markets have a fundamental role to play in the transition to a more sustainable blue economy. Investors and backers must consider the environmental and climate risks that can impact their investments and decisions."

Jens Frølich Holte, State Secretary for the Ministry of Foreign Affairs, Norway

"In addition to Colombia's many commitments to combat climate change, the financial sector must now invest sustainably in natural capital. On top of the positive impacts for biodiversity, these investments can counter major economic risks: as most economic sectors widely depend on biodiversity and the many services provided by ecosystems."

Carlos Eduardo Correa, Minister of Environment and Sustainable Development, Colombia

BLUE AND SUSTAINABLE

A new era of finance

The Impact Agora panel discussed logical changes to finance and investment within the emerging framework of the ocean economy.

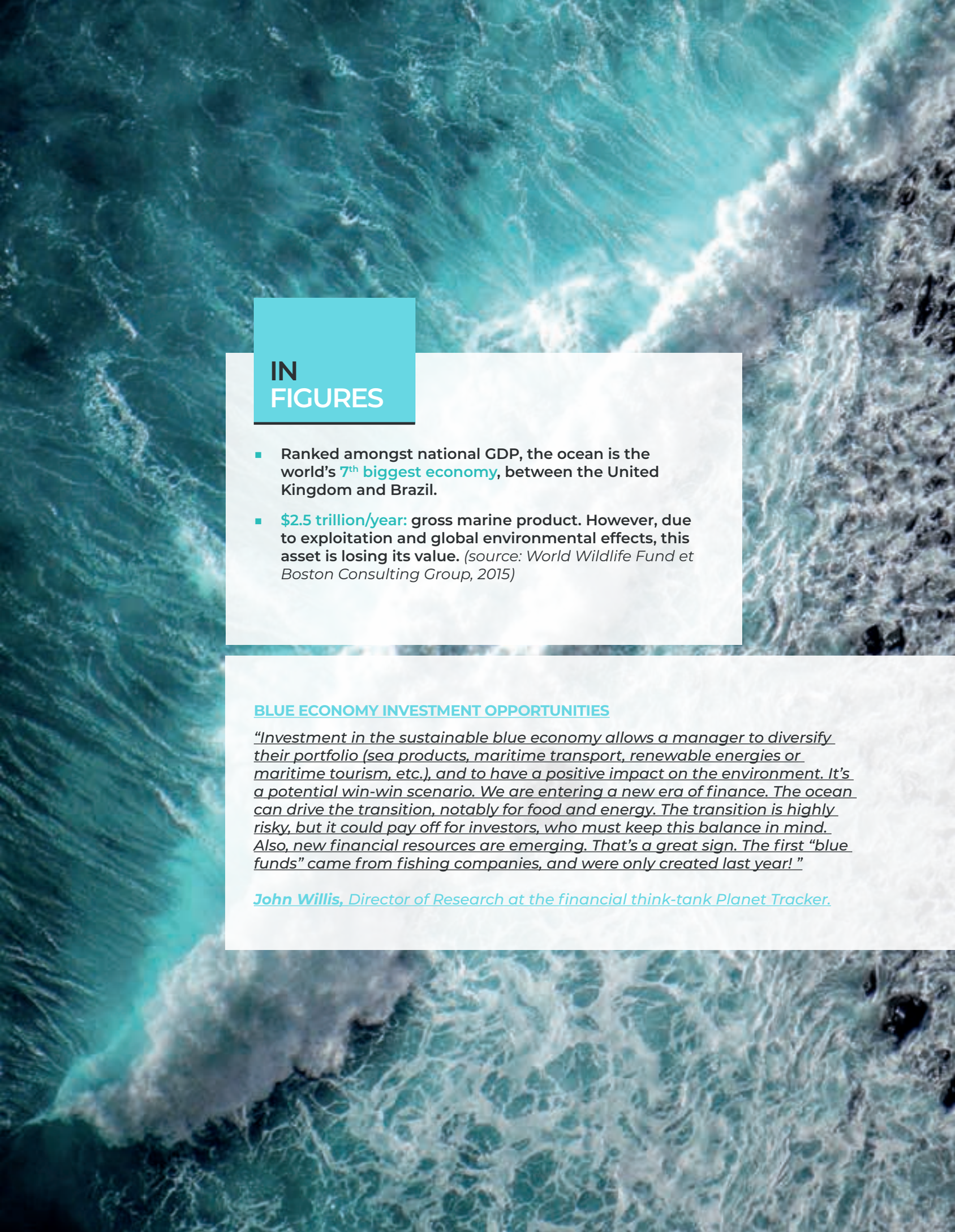
At a time when environmental concerns affect all business sectors, the new impact investment platform by Barclays Private Bank - *Impact Agora* - invited five experts to a virtual panel discussion on themes linked to investment in emerging technologies, business models and other investment products linked to the ocean.

At the start of the meeting, the crucial role of finance, *"a real driver of the transition towards a sustainable blue economy"*, was underlined by the Vice-President of the Prince Albert II of Monaco Foundation, Olivier Wenden. *"If correctly oriented, investments can direct capital flows to activities which support environmental protection, and more specifically the ocean"*, explained Damian Payiatakis, Head of Sustainable Investing at Barclays Private Bank, and who coordinated this session, in collaboration with the event's sponsors, Barclays Private Bank and the Prince Albert II of Monaco Foundation.

Outlining the investment landscape and industrial sectors, the panellists warned about one point: the growth in blue economy activities could increase man-made pressure on ocean resources, which are already under threat. They all insisted on an essential ingredient, the spice added to finance: sustainability. This leads to pioneering business solutions to tackle the challenges of the ocean economy and innovative financing structures (*blue bonds*, conservation finance, etc.), and the ocean even emerges as a new and critical area of investment, as the cornerstone of the climate solution.

THE BLUE SECTORS OF FINANCE

- **Renewable energies**
- **Sustainable fishing**
- **Aquaculture**
- **Protecting marine ecosystems (coral, mangrove swamps, kelp forests, etc.)**
- **Navigation**
- **Combatting plastic pollution**
- **Eco-tourism**



IN FIGURES

- **Ranked amongst national GDP, the ocean is the world's 7th biggest economy, between the United Kingdom and Brazil.**
- **$2.5 trillion/year: gross marine product. However, due to exploitation and global environmental effects, this asset is losing its value.** *(source: World Wildlife Fund et Boston Consulting Group, 2015)*

BLUE ECONOMY INVESTMENT OPPORTUNITIES

"Investment in the sustainable blue economy allows a manager to diversify their portfolio (sea products, maritime transport, renewable energies or maritime tourism, etc.), and to have a positive impact on the environment. It's a potential win-win scenario. We are entering a new era of finance. The ocean can drive the transition, notably for food and energy. The transition is highly risky, but it could pay off for investors, who must keep this balance in mind. Also, new financial resources are emerging. That's a great sign. The first "blue funds" came from fishing companies, and were only created last year! "

John Willis, *Director of Research at the financial think-tank Planet Tracker.*

INTER
VIEW

Damian Payiatakis
Head of Sustainable & Impact Investing at Barclays Private Bank.

How would you explain the concept of impact investment?

Impact investment intentionally seeks opportunities which can generate financial returns, but also promote solutions to our pressing social and environmental problems. This sets it apart from other sustainable investment approaches, like ethical or responsible investment.

Is the ocean the next big sector in sustainable finance?

It's possible, but there's a lack of visibility, and it's likely that the ocean will continue to be underfinanced. Until now, the ocean economy has not attracted major capital like other sustainable finance areas. This is partially explained by the fact that many opportunities were created at an early stage, and at a small scale. It has also not enjoyed the same visibility as "green" investments.

But given that the ocean would be the world's 7th biggest economy, and that it plays an essential role in the climate and biodiversity, there are significant market opportunities: renewable energies, fishing, aquaculture, maritime transport, plastics, conservation, tourism... This market has the potential to grow quickly, with little competition for early investors.

Could the pandemic be a driving force of sustainable impact investment?

The pandemic was a turning point for the sustainable investment market. Firstly, investment flows and performance during this period allowed sustainable investment to undergo its first real-world test. We also saw customers change their way of thinking about investment practices. Our study "Investing for Global Impact" revealed that two thirds of families now want to extend the risk assessment to include more environmental, social and governance factors. Finally, the study highlighted the systemic risks which we face on a global level. We encourage our customers to draw lessons from the pandemic and make their portfolios more sustainable.

Policy-makers have set a target to protect 30% of ecosystems by 2030. Have we reached a turning point for finance?

We are at a turning point in terms of awareness, but we must take action more quickly. The OECD recently valued the benefits from natural ecosystems at around $125 trillion, whilst the loss of biodiversity continues at a global level, which shows that their economic importance is starting to be recognised. Also, the Dasgupta report[4] sent a clear message on the need to change how we "think, act and measure success" around nature. It seems that we are still looking for the spark which will allow us to take more action at a global level. Efforts to come together, like Monaco Ocean Week, are becoming even more essential to organise, direct and expand the discussions and actions required to achieve the 30x30 targets.

What is the market position of the Impact Agora investment platform?

Impact Agora has established an institutional marketplace for impact investment at an early stage, a fragmented sector, which makes it difficult to identify investors and opportunities. To tackle sustainable investment challenges, Impact Agora has established a technological infrastructure and a community of member institutions which can share their operations and funds. This reduces barriers to investment, and improves and expands capital flows. Since its launch in April 2020, this platform has attracted more than 80 new members from 12 countries. Trusted members have shared over $1.4 billion in investment opportunities through 50 companies and funds. In March, it promoted 8 opportunities and members linked to SDG 14, and made the community aware of the opportunity and need to develop ocean finance.

Does *Monaco Ocean Week* offer an opening into ocean-related opportunities?

This event encompasses all the values that we uphold. The ocean has always been part of the Principality's history and heritage. Prince Albert I of Monaco was one of the founders of modern oceanography. HSH Prince Albert II has made a commitment to protect the environment and support sustainable development on an international scale. Thanks to the support of Monaco Ocean Week and Barclays Private Bank, we have been able to improve visibility and access to ocean-related opportunities by existing and new stakeholders.

4. *According to The Economics of Biodiversity: The Dasgupta Review* (February 2021), a study led by Cambridge University for the British government, global economic development has caused the value of humanity's "natural capital" to decline by 40%.

INVESTMENT FUND

An environmental fund financing Mediterranean MPAs

Launch of *"Build back a blue and stronger Mediterranean"*, an integrated global project to manage the Mediterranean's Marine Protected Areas, which have been made vulnerable by multiple factors.

In recent decades, we have witnessed an escalation in the general decline of marine and coastal environments in the Mediterranean. Although many marine protected areas (MPA) have been created in the Mediterranean (around 7% of the sea), the majority do not offer effective marine conservation.

THE NEW GEF PROJECT

To address these shortcomings, the MedFund, an environmental fund for Mediterranean MPAs developed by the Prince Albert II of Monaco Foundation, and MedPAN, a network of Mediterranean MPA managers, devised an ambitious project funded by the Global Environment Facility (GEF), which was launched during *Monaco Ocean Week*, during the digital meeting on 24 March 2021. In his introduction, the chair of MedFund, special adviser to HSH Prince Albert II of Monaco, H.E. Mr Bernard Fautrier, recalled the creation of MedFund, an initiative supported by Monaco, France and Tunisia, which aims to support around twenty MPA's in the Mediterranean by 2025. The GEF's substantial financing will help scale up and allow long-term action to support the Mediterranean.

A UNIQUE PARTNERSHIP

New prospects are emerging for Mediterranean Marine Protected Areas, notably in the South and East regions. The chair of MedPAN, the Spanish biologist Puri Canals, offered an overview of the project: *"The cooperation model which we are developing today is relevant for Mediterranean partners and can be reproduced in other maritime regions. This is the best model to be able to achieve the targets set by the international community for 2030"*. Christian Severin, Coordinator of the GEF's International Waters department, presented the ambitions for the next five years: encouraging cooperation in the Mediterranean and beyond to achieve international objectives to create and manage MPAs, which have been made more vulnerable as a result of the COVID-19 pandemic.

THE FIRST SIX BENEFICIARY COUNTRIES

Albania, Algeria, Lebanon, Montenegro, Morocco and Tunisia then announced their contributions and expectations. Access to sustainable finance solutions to cover the costs of managing these MPAs and technical, organisational, strategic and institutional support will contribute to national policies to protect marine environments. Optimising these conservation costs should allow the Mediterranean region to offer a strong response to global changes and provide long-term socio-ecological benefits, including in the context of post-COVID recovery.

© AMP Tavolara-Punta Coda Cavall - SMILO isola di Tavolara

KEYFACT

The 1,215 MPAs cover a surface area of 171,362 km², which is 6.81% of the Mediterranean (mainly in EU waters). They cover 40% of Posidonia meadows and 33% of coralligenous communities in the Mediterranean.
(source: MAPAMED 2016 database)

PROJECT COMPONENTS

"We need multiple scientific, technical and financial tools", explained Romain Renoux, Executive Director at MedFund. *"We have several opportunities for investment, as the architecture of this fund allows sustainable and renewed funding of MPAs".* Supported by Marie Romani, Executive Secretary at MedPAN, he set out the project roadmap and explained the expected results: building the capacities of MPA practitioners and managers, more dynamic regional and international cooperation, technical and financial support for management... Achievements which will support the implementation of political commitments to Mediterranean MPAs, particularly those made by countries which signed the Barcelona Convention.

A POLITICAL NOTE

The chair of MedFund ended the meeting on a political note: *"During the One Planet Summit organised in January 2021 by President Macron, an action plan for the Mediterranean was drawn up for 2030, seeking protection of 30% of the Mediterranean, including 10% with enhanced environmental protection. This plan, which should be approved during upcoming international events, receives significant support from this project."*

PROFILE

- **The MedFund** is an environmental trust fund based in Monaco which grants sustainable funding to marine protected areas in the Mediterranean.
- **MedPAN** is the network of managers of marine protected areas in the Mediterranean.
- The ***Global Environment Facility*** **(GEF)** funds are made available to developing countries and countries with a transitioning economy to achieve the targets of international conventions and agreements on the environment.

INTER
VIEW

Christian Severin

Coordinator from the GEF's International Waters Department, leading the "Build back a blue and stronger Mediterranean" project.

As the lead of this ambitious project, how do you see the next few years?

We are just at the start of this adventure. The real work starts now, and I'm very excited! The amount we have invested is also part of the solution. We hope that the partnerships we have formed might inspire other stakeholders and co-funders to join this project in the coming years: private investors, philanthropists...

What is the key for this project's success?

Obviously it's great to focus on the oceans. But we will fail unless we manage the different pressures on the ocean, like land pollution, tourism, economic activities, development, fishing... MPAs are a tool to facilitate this process, and reduce the pressures. These initiatives must not only involve teams who are passionate about the sea like us, but must rely on partnerships with upstream land-based economic sectors which are linked to the maritime sector. That is what we would like to see emerge with the investments we manage.

How has the current pandemic affected Mediterranean marine protected areas (MPA)?

In some places, there was less pressure: the ocean did not need to deal with tourism, there was less fishing and business. However, some marine protected areas have experienced more significant local pressure, as the population had fewer food supplies and needed to fish more often. If we do nothing, the pandemic could undermine decades of conservation efforts.

How can we move beyond the protection/economic development differences within MPAs?

For many years, 21 countries have shared the abundance of resources offered by the Mediterranean ecosystem. But these resources are no longer abundant due to man-made pressures. The aim is to protect those that are left! The MPAs are a part of the solution which could help us succeed. By protecting resources, they generate benefits within and around protected areas, and this could be foundation of local and national start-ups. This is at least the direction of global discourse, and we are on the same path.

Is the Mediterranean region a unique space for this kind of project?

The GEF is very proud to work in the Mediterranean. Just think: the Mediterranean covers less than 1% of the world's ocean surface, but has 10% of its biodiversity! Whilst certain economic sectors are interested in biodiversity, for politicians, it's the economy that matters. If we can make the link between economic growth, job creation, ecosystems and ecosystem services, we might have an opportunity to change our relationship with the Mediterranean. We must not lose sight of what this set of resources means for each country in the area. For our generation and future generations, the Mediterranean must remain, with all the services that its ecosystems provide: biodiversity, food resources, climate regulation, protection against storms, carbon sequestration - not forgetting that it is the world's leading tourism destination! That is why we must protect and encourage this system's resilience. I hope that my children and grandchildren will be able to see this Mediterranean, alive and well. As we are part of it, and we cannot lose our cultural identity... ■

THE GEF PROJECT IN FIGURES

- **20 existing MPAs and new MPAs currently being created will be supported by 2026, covering 612,600 ha in 6 Mediterranean countries.**
- **85% of non-European Mediterranean MPAs supported**
- **5 years of support**
- **$5 million in financial support from the GEF**
- **$39 million in co-financing (in kind and grants)**

"We all know that the Mediterranean is a region with an eventful history, which is still affected by numerous conflicts. But there are many people working to protect nature beyond borders, who take care of the sea, who want to reach agreements and work together, and who consider the Mediterranean not as what separates them, but what brings them together. Other than its environmental aspect, our project should be an opportunity to bring together all countries around this shared sea, and to build a space for peace."

PURI CANALS, *Chair of MedPAN*

MEDITERRANEAN

The IHO and CIESM renew their agreement

As they both turn 100, the two international organisations have chosen Monaco to renew the terms of their historic partnership for oceanographic research.

In homage to the House of Grimaldi's decision to host two intergovernmental organisations in Monaco, and the Prince's Government's continued hospitality, the International Hydrographic Organisation (IHO) and the Mediterranean Science Commission (CIESM) decided to sign a new agreement during *Monaco Ocean Week*, an event which reflects the ethos of their historic commitments to ocean preservation.

THE SAME GOAL

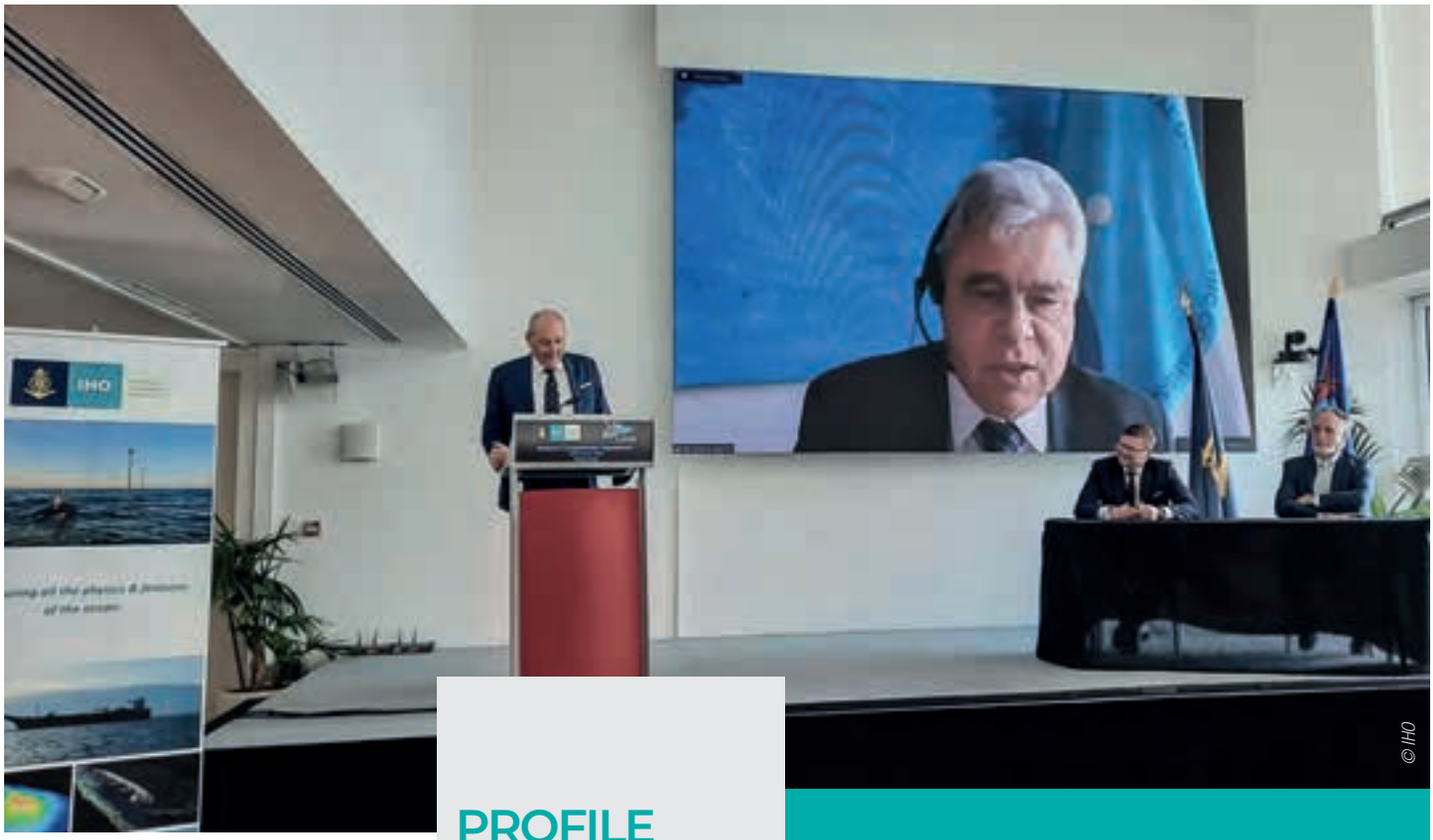
Signed in Monaco on 23 March 2021, the renewed agreement encourages the joint research efforts of CIESM and IHO in the Mediterranean for the next four years:

- monitoring ocean variables directly linked to climate change;
- high-resolution mapping of seabed features in relation to studies on marine geo-hazards;
- helping to obtain international research permits in territorial waters.

Four years after defining the initial framework, a new boost has been given to Mediterranean oceanography. The renewed partnership between CIESM and IHO has reached a convenient point, as it follows on from the United Nations Decade of Ocean Science for Sustainable Development. The work carried out by these bodies *"will offer an invaluable set of data for the Mediterranean region"*,summarises Mathias Jonas, Secretary General of the IHO, whilst Vladimir Ryabinin, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC) and Assistant Director General of UNESCO, promises that *"the three intergovernmental organisations focused on the future of the oceans - IHO, CIESM and IOC - will work together towards the common objective of an improved understanding of the world's oceans and their protection"*.

THE MEDITERRANEAN, A HIGH-RISK REGION

Frédéric Briand, Director General of CIESM, explains how the marine and scientific networks of the two organisations in the Mediterranean could combine forces to collect oceanographic data linked to global warming, and marine geo-hazards in particular. The head of the commission reiterated the unique geography of the Mediterranean region, which has 900 prominent underwater canyons, and is the 3rd most vulnerable sea to tsunamis: *"Updated and precise data can be used to try to predict and mitigate the impact of tsunamis, and thus help populations to better prepare for this natural hazard"*. As part of this active partnership, Mathias Jonas, Secretary General of the IHO, strongly encouraged *"marine research institutes and national hydrographic services in all countries in the Mediterranean and the Black Sea to coordinate their efforts, where possible, to promote these essential objectives"*.



© IHO

PROFILE

Founded in 1921, **the International Hydrographic Organisation (IHO)** endeavours to improve knowledge about the physical characteristics of the world's seas. It coordinates the activities of the national hydrographic services of its 94 member states in order to streamline data and mapping, thus supporting navigation security and marine protection. The IHO also helps to create regional hydrographic commissions, like the Mediterranean and Black Seas Hydrographic Commission (MBSHC).

Founded in 1919, **the Mediterranean Science Commission (CIESM)** promotes and encourages research in the Mediterranean and the Black Sea thanks to a network of several thousand marine researchers who use the latest scientific tools to better understand, monitor and protect the region's marine ecosystems.

SUPPORTED PROGRAMMES

CIESM has been able to gather significant experience over its one-hundred-year history, implementing reliable marine research initiatives in the long-term. The research programmes which will benefit from collaboration with the IHO include the Hydrochanges programme (since 2002) which tracks the alarming acceleration (much higher than the global ocean average) of temperatures of deep waters in the Mediterranean; and the JellyWatch programme (since 2008) which collects data on a weekly basis on the distribution of large jellyfish blooms along the coasts of the Mediterranean.

INTERVIEW

Laura Giuliano
Director of Science at CIESM - The Mediterranean Science Commission


© CIESM

Why did you choose *Monaco Ocean Week* to sign this agreement?

We wanted to show our support for this event's efforts, which reflect the Principality's long-term commitment to marine research and a sustainable approach to the oceans. These values are perfectly aligned with the ethos of our missions.

For over a century, CIESM and the IHO have witnessed major developments in the relationship between society and the ocean. What is the next step?

Global climate change is synonymous with growing ocean threats (hurricanes, flooding, etc.) in the most exposed and yet highly populated coastal areas. The agreement between CIESM and the IHO reflects this context, seeking to consolidate our knowledge and reinforce monitoring capacities. For this new stage, we are planning efforts to integrate bathymetric, hydrological, geoseismic and modelling data to create a map of natural high-risk areas in the Mediterranean region.

What are the specific consequences we can expect for the Mediterranean region?

Oceanography is characterised by a multidisciplinary approach. This agreement will consolidate collaborations on national waters and the high seas, between the community of marine researchers - such as "oceanography experts" (including biologists, chemists, geochemists, geologists, sedimentologists, geophysicians) and "atmosphere experts" - and communities of engineers and hydrography vessel professionals. The sharing of knowledge and services, as well as infrastructure (including oceanography vessels) in the Mediterranean will allow us to make significant progress and optimise the associated costs.

Which marine research areas will be prioritised by CIESM?

All current CIESM programmes should benefit from this agreement. We could enhance our monitoring of biological data (from studying jellyfish blooms to changes in the routes of large marine predators), as well as deep sea hydrology thanks to the availability of Ships of Opportunity.

More specifically, the agreement will allow us to restart programmes to collect geological and hydrological data to map geo-hazards[5] in the Mediterranean region, studies which have significant economic value.

Is there not a risk that seabed mapping might lead to exploitation of land? Which measures can be used to regulate the gathering of knowledge for sustainable use of resources?

Effectively, cutting-edge research often poses the risk of unwanted consequences derived from the misuse of new knowledge. The question of social and ethical responsibility in research is a very topical subject.

In terms of mapping the ocean floor, and in particular following the recent implementation of new mineral resource usage programmes in deep sea areas beyond national jurisdiction (ABNJ), we are helping to develop increased legal protection which involves the International Sea Bed Authority first and foremost, reflecting global efforts like the Montego Bay Convention and, for the Mediterranean region, the Barcelona Convention. ■

5. Natural hazards linked to a site's geological characteristics (e.g. the movement of tectonic plates).

FINANCE

A change of paradigm

When the global challenges of blue and sustainable finance reflect the challenges of the blue and green economy in Africa.

Considered the world's 7th largest economy, the ocean is the focal point of all the current ecological crisis. The financial sector has a crucial role to play in the climate race against time. Without involving civil society and the private sector, it will be difficult to raise new funds to allocate based on targets to save our planet and its ecosystems. Experts have compared their perspectives, with a closer look at the development of the blue and green economy in Africa.

Towards blue and responsible finance?

Following an introduction by Damian Payiatakis, Head of Sustainable & Impact Investing at Barclays Private Bank, the environmental economist Nathalie Hilmi, from the Monaco Scientific Centre, led the first part of the webinar dedicated to blue and sustainable finance.

GIVING NATURE A FINANCIAL VALUE

Ralph Chami, Assistant Director at the International Monetary Fund's Institute for Capacity Development, argued in favour of a new economic paradigm: *"to switch from an extractive view of nature to a regenerative view, we must start to translate the financial value of nature for humanity into more meaningful terms for society as a whole, from consumers to policy-makers"*. We need to value ecosystem services in monetary terms to organise markets around the protection and regeneration of nature. *"By showing that a living and thriving nature is profitable, we will be able to change our behaviour"*, the expert put forward in view of sustainable and inclusive prosperity for all, as well as the protection and regeneration of the natural world.

INNOVATIVE MANAGEMENT

An innovative management lease, tangible income models, mixed funding which makes local communities accountable - these are the pillars of MPA management put in place by the social enterprise Blue Finance. Its director and co-founder, Nicolas Pascal, explained this approach which has been applied in the Dominican Republic and the Philippines, where MPAs cover 16,000 households and protect 800,000 hectares of coral reefs. By 2022, five new MPAs in developing countries could benefit from this support, and around twenty by 2030.

Lacking transparency and with a short-term vision, carbon credits and carbon offsetting markets seem poorly equipped to deal with the challenges of the current ecological crisis. An innovative financing mechanism proposes using *blockchain*[6], artificial intelligence and the internet of things to help key species, like African forest elephants. *"By aligning next generation technologies with key species"*, explained Walid Al Saqqaf, co-founder and CEO of the Rebalance Earth movement, *"we are able to transfer carbon offsetting funds to pay park wardens and make micro-investments in local communities."*

6. Developed in 2008, *blockchain* is an information storage and transmission technology which allows users to transparently share data without an intermediary.

DID YOU KNOW?

Known as **"blue carbon"**, salt marshes, mangrove swamps and seagrasses capture and sequester significant quantities of CO_2, and offer an invaluable natural defence against flooding.

Towards a green and blue Africa

The second panel was arranged by Patricia Cressot, director of Africa Development and founder of Sowl Initiative at Rosemont International.

USE OF PRIVATE FUNDS

"We must review the basic principles of finance, critically analyse financial assessment methods and avoid the damaging focus on short-term profits to establish a new sustainable and resilient global balance founded on human beings. The green and solidarity economy needs financial means to develop", explained Bertrand Badré, former Managing Director of the World Bank and founder of *Blue Like an Orange Sustainable Capital* fund. As underlined in the latest International Monetary Fund and World Bank report, the encouragement of private investment would be crucial to tackle major environmental challenges and achieve the 2030 Sustainable Development Goals set by the United Nations.

A SELF-SUFFICIENT AFRICA?

As noted by Stéphane Brabant, partner at *Herbert Smith Freehills*, the blue economy is developing in the context of building inclusive growth and sustainable development at the scale of a self-sufficient Africa, which will be home to 3 billion people in 2050. The opportunities offered by the development of its blue economy are considerable, as well as the challenges (piracy, insecurity, etc.).

THE *"FREE ZONES OF THE FUTURE"*

A consultant within the World FZO programme, which focuses on sustainable ocean development, Zoe Harries referred to a framework which allows free and special economic zones to achieve their full performance potential, by accelerating value creation and encouraging regional prosperity.

BUILDING SUSTAINABLE DEVELOPMENT

Fighting against the exploitation of natural resources in Africa, the Senegalese association Oceanium, supported by Monaco, has allowed the restoration of 15,000 hectares of mangrove swamp. 100 million trees have been planted, to help sequester 1 million tonnes of carbon (the equivalent of 1 million flights between Paris and Dakar, or the annual emissions of 2 million Senegalese). The restoration of these ecosystems has created a virtuous cycle: fishing resources have developed, generating €5.68 million; rice production is up, etc. It is about encouraging a reversal of the decline in Africa's natural wealth thanks to investment which allows sustainable development. ■

IN FIGURES

- **$1.5 trillion/year**
  Estimated annual value of the ocean, making it the world's 7th biggest economy.

Ghislain Bardout, *director and co-founder of the Under The Pole expeditions*, sitting inside his invention: the Capsule.
©Rolex/Franck Gazzola

PHILANTHROPY

The perpetual ocean

Rolex reiterates its historic commitment to the ocean, notably through the *Perpetual Planet* initiative.

A major partner of *Monaco Ocean Week,* Rolex firmly supports this international ocean protection event. The Geneva-based watchmaker points to the Perpetual Planet initiative to reiterate the infinite potential of the world's ecosystems, provided that the inner workings are protected. A vulnerable centrepiece, the ocean requires a bold and inventive approach, now more than ever. Time is running out.

INTERVIEW

Arnaud Boetsch
Communication & Image Director, Rolex SA

The oceans and what they represent are a force which has inspired Rolex for around a century. Could you go back to the beginning to explain the ties between the brand and this field?
Our relationship with the ocean goes back to 1926, when Rolex created the Oyster, the world's first waterproof wristwatch. Since this historic event, several models - from the Submariner to the Sea-Dweller, or the Rolex Deepsea - have facilitated and supported the development of deep diving, strongly influencing the watch industry. And in addition to using the world as an open-air laboratory to test its watches, Rolex also seeks to play a pioneering role not only in ocean exploration, but also protecting and preserving them.

2021 marks the start of the United Nations Decade of Ocean Science for Sustainable Development. Does Rolex have a strategy to support this international initiative?
Sustainability is very important for our business, and it is a central aspect of our support for those working to protect the planet. A commitment to the environment might be something relatively new for some companies, but not for Rolex. For more than forty years, we have supported people who work to save the oceans through the Rolex Awards for Enterprise, whether by protecting threatened marine species like the seahorse or whale shark, or by studying coral resistance and sound pollution in marine environments. We have also been working with the famous oceanographer Sylvia Earle since the 1970s. Her Mission Blue programme is a key partner of our Perpetual Planet initiative, through which we support people who offer solutions to tackle environmental challenges, with ocean protection one of the most complex.

Rolex has been a major partner of *Monaco Ocean Week* as well as the *Monaco Blue Initiative*, a key conference dedicated to the oceans, since 2011. What motivates Rolex to help protect the oceans?
We support Monaco Ocean Week, and more specifically the Monaco Blue Initiative, as we are confident that it is necessary to help implement solutions to protect the ocean. All actions to tackle the challenges faced by the oceans, such as climate change or noise pollution, must be based on an exchange between different stakeholders and a thorough understanding of the oceans.

Are you optimistic about the future of the oceans?
We still have a lot to do before marine ecosystems recover, but we look to the future with optimism. Humanity means hope. With the Perpetual Planet initiative, we do everything possible to help those who help to protect the planet, and oceans in particular. Like Sylvia Earle says: "No one can do everything, but we can all do something". And Rolex plays its part. ■

THE PERPETUAL PLANET INITIATIVE

Rolex has supported pioneering explorers for nearly one hundred years. This partnership has evolved since the early 21st century, with the thirst for discovery accompanied by a desire to protect the planet. With the *Perpetual Planet* initiative, Rolex reasserts its long-term commitment to explorers and scientists who use science to understand environmental challenges and find solutions. In addition to supporting the Prince Albert I and II Foundations, this initiative also supports the Rolex Awards for Enterprise and partnerships with the *National Geographic* Society and Sylvia Earle's *Mission Blue* programme. And that's just the beginning.

© Parc national de Port-Cros

61

TRANSITION AND SOLUTIONS

/ 62 An alliance protecting the Mediterranean monk seal

/ 66 The rise of blue diplomacy

/ 68 *Because the Ocean* signatories prepare for COP 26

/ 70 Third meeting of the *Monaco Ocean Science Federation*

/ 72 The energy transition and resource conservation: incompatible goals?

/ 74 Goodbye plastic

/ 80 Make way for upcycling

ENDANGERED SPECIES

An alliance protecting the Mediterranean monk seal

The *Monk Seal Alliance* is honing its action plan to consolidate protection measures for one of the world's most endangered species.

The Mediterranean monk seal's story might have ended around twenty years ago, joining the sad list of extinct species. Decades of hunting and deliberate killing, by-catch in fishing nets, disease and destroyed habitats pushing the animals to leave safe beaches, taking a heavy toll on the population of this marine mammal - which almost became extinct. But regional and national measures have led to the creation of marine protected areas offering safe havens for these animals to settle down. Work has been done with fishing communities to slowly change their view of the marine predator, which was long seen as an enemy. And finally, Mediterranean locals have been made aware of this endangered species, which has been forced to take refuge in inaccessible caves.

A REVIVAL

Considerable efforts made to protect the species and its habitats have started to pay off: some 800 Mediterranean monk seals have established small colonies on the Greek, Turkish and Cypriot coasts, reaching as far as the Atlantic, Madeira or the important site of Ras Nouadhibou in Mauritania. The marine predator is still on the IUCN's red list, but has changed status: formerly "critically endangered", it is now just "endangered". This might be a sign that the species is becoming more resilient.

A BELLWETHER SPECIES

And in the future? Only continued and enhanced conservation action can maintain these population numbers and safeguard the future of a species which is still very rare and vulnerable. Deeply sensitive to the quality of their habitat, mature females only have one pup per year, if conditions are optimal. Protecting this bellwether species means protecting the health of the ocean which it calls home, a place still enlivened by the creature.

IMPROVED PROTECTION

The *Monk Seal Alliance* (MSA) was launched in 2019 by five foundations committed to protecting the Mediterranean monk seal. Its goal is to expand existing actions, consolidate specific conservation actions and establish genuine cooperation between projects. For the 2021-2024 period, more than €2.7 million has been invested to support eight major projects in crucial areas for the species in the Mediterranean and Atlantic.

Keen to reinforce this strategy, members of the *Monk Seal Alliance* met for a lengthy working session during *Monaco Ocean Week*. Whilst the future is not so bleak for this iconic seal living in temperate waters, it is still fragile. ■

PROFILE

FOUNDING ORGANISATIONS OF THE MONK SEAL ALLIANCE

- Prince Albert II of Monaco Foundation
- MAVA Foundation
- Segré Foundation
- Sancta Devota Foundation
- Thalassa Foundation

The Mediterranean monk seal *(Monachus monachus)* owes its name to the folds in the brown fur on its neck, which look like a monk's robes. The marine predator hunts at night and rests during the day, ideally in caves with an underwater entrance, which protects it from any disruption. Reaching adulthood at 4 years old, it grows to 2.5 metres in length and a weight of 240 to 300 kg, and can live to around 20 years old.

PROJECTS SUPPORTED BY THE *MONK SEAL ALLIANCE*

Support for the Mediterranean monk seal

© Cem Orkun Kirac - SAD AFAG

- Alleviating the impact of tourism in the inner Ionian Sea islands, an important habitat for the species. Thanks to science-based management, they could become a key protection area for the monk seal

  The Tethys Research Institute's programme includes the installation of an online surveillance system for the area and a code of conduct for site visitors.

- Identifying and addressing illegal visits to caves inhabited by seals in the Turkish provinces of Muglia and Antalya.

  The participatory project by the Underwater Research Society and the Mediterranean Monk Seal Research Group includes cleaning ten coastal caves, regulations linked to coastal development, tourism and fishing, and establishing a no fishing zone.

- Identifying and protecting the rocky coasts of Ras Nouadhibou in Mauritania, which is home to the world's largest Mediterranean monk seal colony (350 individuals, nearly half of the world's population along 1 km of coastline).

  The CBD-Habitat Foundation's project includes surveillance of the seal marine and land reserve, continuous tracking of the population, advocacy and development of colony translocation methods.

- Protecting the Mediterranean monk seal in the eastern Mediterranean: experts from five countries in the region pool their data to track changes to the population and tackle one of the main identified threats (fishing) with targeted actions.

  The IUCN's international, collaborative project in the Mediterranean also includes operations to clean caves, advocacy actions and consolidating the capacities of stakeholders at regional level, particularly to define population dynamics.

© Cem Orkun Kirac - SAD AFAG


© P. Dendrinos - MOm


© CBD-Habitat


© P. Dendrinos - MOm

© Cem Orkun Kiraç - SAD AFAG

- Improving knowledge and awareness of the species in low density areas, in close collaboration with relevant organisations in regions where the seal is found.

  The project coordinated by the Regional Activity Centre for Specially Protected Areas includes standardising tracking protocols and public awareness activities.

- Replicating the species conservation action plan used at the Alonissos National Marine Park in the neighbouring Greek islands of the Northern Sporades, considered one of the most hospitable areas in the Mediterranean for monk seals.

  The Hellenic Society for the Study and Protection of the Monk Seal is extending its awareness and continuous marine habitat monitoring programme.

- Closely monitoring the small colony in Madeira (around 20 individuals) and studying new potential habitats for the monk seal in the archipelago.

  The Institute for Nature Conservation and Forests also plans to clean caves and carry out awareness activities.

- Preparing eastern Adriatic countries for the return of monk seals, by creating structures and training local stakeholders, with the protection of the last groups of monk seals having encouraged their growth.

  The EuroNatur Foundation is continuing the second phase of this project which aims, amongst others, to finish mapping the seal habitat along this coast, which is ideal for their growth. It also plans to optimise the rescue network by training one vet per country.

"Let's develop shared visions and paths to achieve the future we want for nature and society! "
William Cheung, *expert at IPBES*

IN SIGHT

SUPPORTED BY SCIENCE

The rise of blue diplomacy

Brought together by the Ocean & Climate Platform and the Monaco Scientific Centre, international experts discussed measures to ensure a healthy and resilient ocean.

This meeting, held on 26 March 2021 during *Monaco Ocean Week*, brought together 14 experts in natural, social and political sciences, to defend their vision of ocean governance. The scientists emphasised the central role of the ocean in the planet's ecosystem, whilst pointing out the poor understanding of changes it faces. In terms of governance, the piecemeal nature of ocean-related decision-making bodies make matters more complex and delay action to protect it.

AN "OCEAN IPCC"

Against this backdrop, and as part of the launch of the United Nations Decade of Ocean Science for Sustainable Development, the deputy chair of the Ocean & Climate Platform (OCP) - Françoise Gaill - envisaged the creation of an "ocean IPCC": an *Intergovernmental Panel on Ocean Change* (IPOC). Embodying the interdisciplinary vision of this new entity, the event in Monaco encouraged the OCP to build this vision, bridging the gap between science and politics and giving the ocean the status of a *"global common good"*. The IPOC could also lend weight to conclusions from the *World Ocean Assessment* in the global political arena. Links between ocean regeneration and the hydrosphere were underlined by the experts, who are very positive about synergy between climate sciences, oceans and the Earth. *"We're running out of time to manage the ocean sustainably. We need a social contract for oceanography to achieve this target by the end of the decade"*, concluded Vladimir Ryabinin, Executive Secretary of the Intergovernmental Oceanographic Commission and Assistant Director General of UNESCO.

FROM INSIGHT TO ACTION

The second session of the meeting in Monaco was moderated by Sylvie Goyet, adviser to the deputy chair of the Prince Albert II of Monaco Foundation. It was an opportunity to promote political, economic and scientific initiatives involved in unified and sustainable ocean management, at an international, regional and local level. IDDRI experts deemed it wiser to keep the current ocean governance system and learn to better navigate it, rather than rethink it.


© Guillaume Bounaud

With this in mind, research institutes reiterated their commitments: CNRS endeavours to bridge the gap between science and society; IFREMER, to ensure an interdisciplinary approach to governance issues, particularly the deep sea. IRD showed how science could help to achieve several Sustainable Development Goals. ICRI addressed the original context of coral reef management, whilst MEDECC presented a regional approach to governance, by suggesting policy recommendations specific to the Mediterranean region.

THE RISE OF BLUE DIPLOMACY

Finally, there were three calls for action launched by prominent figures, including the Ambassador for Poles and Maritime Issues, Olivier Poivre d'Arvor, who approved the notion of "global common goods": 1/ promote blue diplomacy beyond the Exclusive Economic Zone; 2/ encourage the accumulation of knowledge; 3/ turn scientific knowledge into political decisions. Despite the fragmented nature of its related bodies, ocean governance can rely on a strong foundation. IPOC's collaboration with UN structures or other international bodies responsible for the ocean could play a pivotal role in the implementation of policies tailored to global ocean change scenarios, in the interest of future generations. ■

A NEW NARRATIVE

Because The Ocean signatories prepare for COP26

An online workshop on 23 March 2021 brought together 52 representatives from countries which have signed an initiative to take a stand for the ocean.

This panel discussion sought to make the ocean central to COP26 objectives. It brought together representatives from 17 of the 39 signatory countries, as well as international senior officials. The meeting started with the promising observation of *"a new ocean narrative"*. The adviser to the deputy chair of the Prince Albert II of Monaco Foundation (Sylvie Goyet) was confident in the ecosystem's increasing importance in international negotiations since the Paris Agreement. However, *"the ocean must make its voice heard during negotiations in 2021"*, commented Stephanie Ockenden, from the British Department for Environment, Food and Rural Affairs, reflecting the future presidency of COP26 and reiterating the United Kingdom's commitment of £500 million through the Blue Planet Fund. The ambassador Waldemar Coutts, Director of Climate and the Environment with the Ministry of Foreign Affairs of Chile (COP25 president), called for a second "blue COP", strengthening the ties between the ocean and climate and encouraging blue finance.

THE VOICE OF MEMBER STATES

The ambassador of Sweden, Helen Agren, coordinated the web meeting. She handed over to various parties from the *Because The Ocean* (BTO) initiative, which was able to build on its momentum and commitments. Since COP21, work by BTO signatories - alongside HSH Prince Albert II of Monaco - has helped to push forward the ocean agenda in discussions on climate within the United Nations Framework Convention on Climate Change.

AN OCEAN AGENDA TO PREPARE FOR COP MEETINGS

Representatives from signatory countries each outlined the priorities of this ocean agenda: dealing with coastal vulnerability, looking deeper into ocean sciences and climate in line with the latest IPCC reports, dedicating a fund to the ocean, reinforcing cooperation and international financial support... The areas for action and research have converged towards a holistic approach likely to have more influence during COP26 (climate) and COP15 (biodiversity).

HSH Prince Albert II of Monaco in Marrakesh during COP22, November 2016.
© Gaétan Luci

BIGGER AMBITIONS

The panellists agreed on the need to strengthen ties between science and politics, to ensure ocean action is supported at all levels. The fact remains that ocean ambitions must grow further within COP26, with each country needing to review its contributions defined by the Paris Agreement. Commitments in favour of reducing emissions determine the global balance of the future, involving the health of marine ecosystems which are particularly threatened.

A THIRD OCEAN DECLARATION

Offering significant political influence, the two previous *Because The Ocean* Declarations have played an essential role since the Paris Agreement to improve awareness of the link between the ocean and climate in international agreements. The *Monaco Ocean Week* meeting was an opportunity for Chile to present its proposal to develop a third Declaration, in view of COP26 which will be held in Glasgow in November. Other countries offered their thoughts and agreed, in collaboration with the BTO secretariat, to promptly submit a proposal to all signatory members. ■

PROFILE

The *Because The Ocean* initiative has been supported by the Prince Albert II of Monaco Foundation since its launch in 2015. It now includes 39 signatory countries which made a commitment by signing the first and second *'Because The Ocean'* declarations. These declarations had a significant influence in the conclusions made by the Madrid COP, known as the "blue COP".

SCIENCE AT THE CORE

A new ocean narrative

The *Monaco Ocean Science Federation* defends the importance of science in building a positive view of the ocean: between modelling and reconnecting, a new narrative is emerging.

The members of the *Monaco Ocean Science Federation* met for the third time on 23 March 2021 via video call during *Monaco Ocean Week*. Alongside HSH Prince Albert II, 26 participants examined ways to increase interest in the ocean amongst the public and policy-makers. By raising awareness of the importance of the ocean in terms of the services it offers humans, and its potential contribution to the environmental transition, the common goal is to encourage greater awareness of marine ecosystems, greater uptake of measures to protect them, and on the part of policy-makers, greater attention and increased funding for marine sciences.

FORGOTTEN BENEFITS

At the dawn of the Decade of Ocean Science for Sustainable Development, there is a general consensus that interest in the oceans is poor. Compared to space exploration, ocean exploration garners little enthusiasm, whilst this global ecosystem contributes to food, health, employment and life for a large portion of the population, not to mention its role in climate regulation. In recent years, problems have been promoted (overfishing and low stocks, pollution and dead zones, extensive plastic pollution, warming, etc.), hiding the ocean's formidable potential. It was important to raise awareness of environmental issues, but citizens now need hope, or they will lose interest and move away from science towards alternative realities.

A NEW NARRATIVE

The ocean has increased its appeal thanks to a highly effective narrative orchestrated by major agencies, promoting major challenges and successes, pushing forward human expertise without environmental blame. Members of the *Monaco Ocean Science Federation* agreed on the need to develop ocean-related communication. It is no longer about understanding marine ecosystems to protect them, but also to restore them and re-establish their full potential (designing marine protected areas, integrated multi-trophic aquaculture, new pharmaceutical uses, etc.).

SCIENCE AND SOCIETY

During the meeting, it emerged that science must address citizens' expectations and offer solutions: addressing fundamental needs, offering an escape, giving the option to make choices and take action. Different members are working on the link between science and society to develop joint research and to ensure that knowledge contributes to democracy. The scientific process must become accessible to more people, notably young people, both in developed countries and in developing countries.

LOOKING FORWARD TO THE FUTURE OF THE OCEAN

The ocean must be more accessible, more understandable, including in its development, the experts noted. Increasingly developed modelling should help present scenarios - including positive scenarios - to look forward to the future. Science should help identify development paths to address global challenges, both social and environmental.
Science fiction techniques can be used to include numerous aspects (economic, political, social, etc.) as well as breakthroughs. Simulation tools, including an ocean digital twin, offer the option of testing impacts and actions by including local and global scales.

ALIGNING TWO VISIONS

It is not impossible to use and protect the ocean at the same time, but a new mindset is needed to align the two, from resource mining to ecosystem management. This change in perspective requires us to review indicators and the way we assess activities, beyond short-term economic performance.
The European Commission ordered different studies on the relationship between citizens and the ocean, identifying a global disconnect. Social sciences, behavioural psychology and the arts could be used to bridge this emotional gap, like the Mission *Starfish 2030* by the European Commission.
To make the ocean more visible and more attractive, major challenges must be addressed, which could underpin the United Nations Decade of Ocean Science for Sustainable Development. To mark this change in approach, meeting participants considered publishing an article with a positive vision of the ocean. ■

"Although it is more important than ever for our era to rely on science, science itself is often in danger.

Superstitions, ignorance and fake news are alive and well. They flourish on social media, of course, but also in comments made by certain senior officials - and sometimes even scientists.

That is why we need you. And that is why we must work with you to develop a clear scientific strategy, particularly for matters relating to the ocean, its future and a better understanding of ocean issues.

We must tailor our strategy in terms of narrative. As there is no point shining light on the truth if, at the same time, its enemies are using tools to spread information, and if we are not able to convince our contemporaries. "

Opening speech by ***HSH Prince Albert II of Monaco***

© Michaël Alesi

ACCELERATING THE TRANSITION

The energy transition and resource conservation: incompatible goals?

The Prince's Government's Mission for Energy Transition discusses underlying problems and suggests overall solutions.

The conference was held at the Monaco Yacht Club on 24 March 2021, led by the Director of the Prince's Government's Mission for Energy Transition, Annabelle Jaeger-Seydoux, along with five experts and the journalist Guillaume Pitron, a specialist in raw material geopolitics.

AGE 2.0 OF THE ENERGY TRANSITION

The director of the documentary *La Face cachée des énergies vertes* (The hidden side of green energies) spoke about his research into renewable energy solutions, highlighting the growing need for mining resources for their production. *"Mining and refining these materials leads to invisible pollution, as it is outsourced. But this does not stop us from having a clear analysis of the overall life cycle of green technologies",* the journalist explained, pointing out the subsequent geopolitical problems. However, *"we are entering age 2.0 of the energy transition: we must not ask ourselves whether the transition is required, but how we do it, and avoid new demands created by mining or refining becoming problems of the future"*.

THE LIFE CYCLE

In order to discuss solutions to help turn our backs on the carbon economy, the five other speakers shared their expert views. *"Whatever the means of transition, there will be an environmental impact"*, underlined Nicolas Meunier, consultant from the advisory firm Carbone 4, encouraging others to rely on *"technology and simplicity"* to minimise the scale. The consultant looked back at the electric vehicle life cycle analysis to work out its real carbon footprint. In France, where electricity production relies on nuclear energy,*"the carbon footprint of a vehicle like this is reduced by two-thirds"*, which is far from the case throughout Europe, like in Germany, which is dependent on coal, or in China. Also, *"the challenge is to relocate the battery production chain in Europe to countries with low-carbon electricity"*.

Pierfranck Pelacchi, sales director of the Monaco Electricity and Gas Company, emphasised personal accountability, with users adopting a *"low energy approach"* to optimise their electricity consumption. Speakers discussed the problems of the digital transition (digital payslips, digital internal exchanges, etc.), which require a comprehensive analysis and education to have a genuine positive environmental impact.

After the panel discussion, Annabelle Jaeger-Seydoux concluded that *"this early phase of the circular economy requires expertise, an array of innovations and universal accountability"*. France and Monaco are targeting carbon neutrality by 2050, an objective which should be part of an informed transition. ■

IN FIGURES

Over 1,800 signatories of the Monaco National Energy Transition Pact:
keen to tackle the challenge of climate change, they are willing to review their behaviour.

DO YOU WANT TO GET INVOLVED IN CLIMATE ACTION?

Over to you! Join the National Energy Transition Pact by visiting **pacte-coachcarbone.mc**

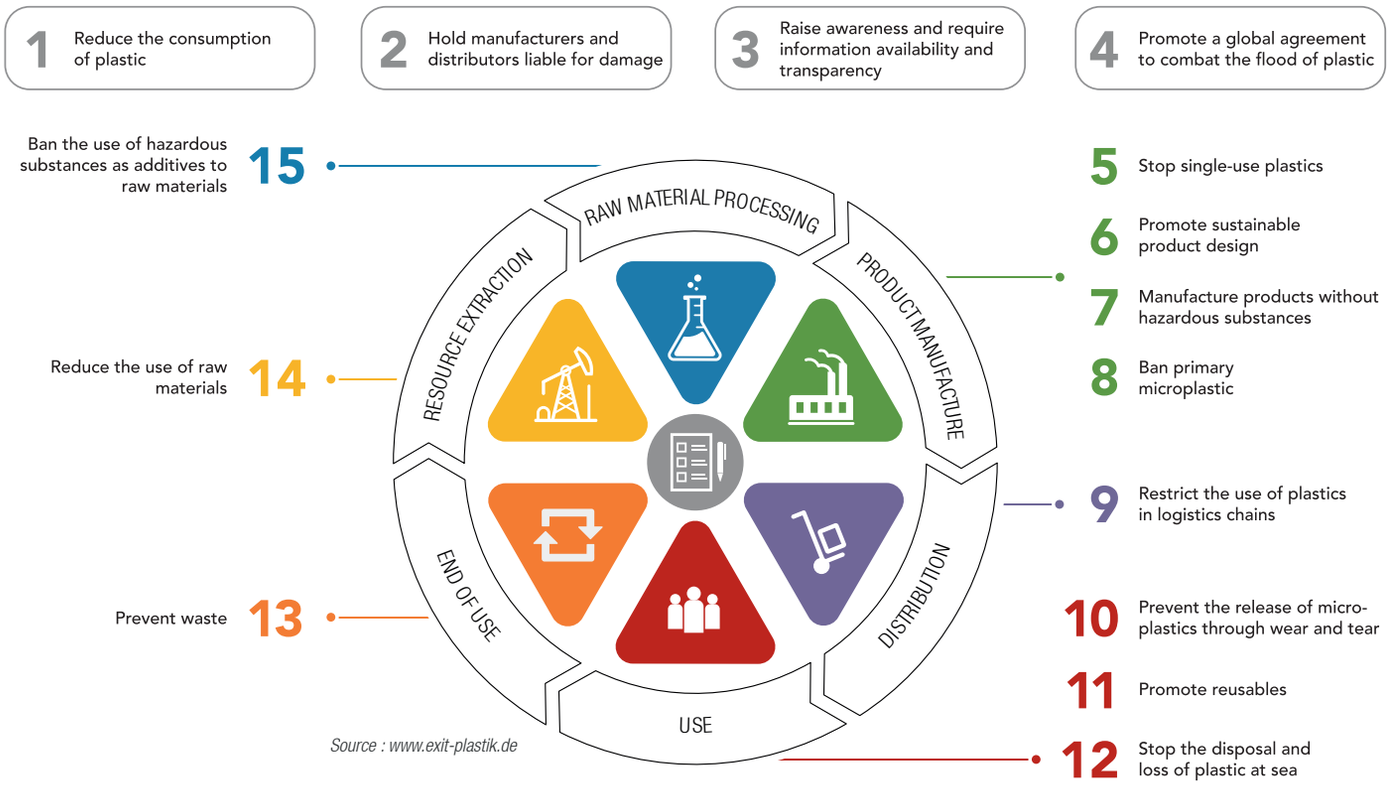
ACTION PLAN

Ending the plastic crisis?

The 15 key proposals of the campaign against plastic pollution by the *German Marine Foundation*, which unites a movement of European NGOs.

"We must consider the entire plastic cycle", explained Frank Schweikert, founder and director of the *German Marine Foundation*, during the digital presentation on 24 March at *Monaco Ocean Week*. The German foundation's team has been working on solutions since June 2018, with the support of around fifteen associations and foundations, in order to trigger real change. *"We will only end the plastic crisis if solutions emerge in civil society"*, explained the leader of the initiative, who has continued on the European adventure of marine research and awareness on board the laboratory vessel Aldebaran for the last 30 years, leading to the nickname "the German Cousteau".

From mining raw materials to waste management, from production to use, all stages of the plastic chain can incorporate new recommendations. Fifteen would be enough to end the plastic crisis:



Source : www.exit-plastik.de

Formulated by a group of German and international NGOs, these 15 principles are the guidelines of an action plan which the German Marine Foundation has agreed to present to members of the German federal government and to international political bodies, playing a role as an interdisciplinary moderator. *"We received a very positive response from the German government, but we must also involve other ministries, such as research or industry, as the plastic lobby is very powerful and involves a lot of people!"* concluded Frank Schweikert with confidence inspired by one of the founding figures of the Club of Rome, Elisabeth Mann-Borgese, an expert in maritime policy and law, and daughter of the famous German writer. ■

MICRO-INITIATIVES

12 BeMed 2021 winners
working towards a plastic-free Mediterranean

Single-use plastic has made a comeback in a big way due to the pandemic, increasing pollution which threatens the planet's health. To continue to tackle the scope of this environmental scourge in a badly hit region, the BeMed association has repeated its call for micro-initiatives. Five years after it was founded, its Mediterranean network - which works to implement sustainable solutions and share best practices - has expanded to new stakeholders.

During the press conference held on 24 March 2021 at the Monaco Yacht Club, BeMed revealed **12 winning projects in 9 countries in the Mediterranean region**. H.E. Mr Bernard Fautrier, chair of BeMed, opened the meeting, focusing on the vulnerability of the Mediterranean and *"the need to encourage positive action models to take care of our shared sea"*. The winners presented the outline of their project. Ultimately, thanks to the support of the deputy of Alpes-Maritimes Alexandra Valetta-Ardisson, Métropole Nice Côte d'Azur, Communauté d'agglomérations de la Riviera française and other public inter-communal cooperation bodies will work alongside BeMed to combat plastic pollution. There were plans to sign a partnership agreement at the end of the conference, but this had to be delayed for health reasons. But the support of these municipalities is already in place. ■

KEY
- *organisations supported since 2015*
- *actions selected in 2021*

PROFILE

Hosted by the Prince Albert II of Monaco Foundation, the **BeMed association** enjoys the generous support of the Primat Foundation and the Aether Fund for Future Generations for its call for micro-initiatives.

DID YOU KNOW?

Plastic accumulated in the Mediterranean is estimated at around 1.2 million tonnes over the last 10 years. The concentration of microplastics in its waters makes it one of the most polluted seas in the world.
(source: UICN, « The Mediterranean: Mare plasticum », 2020)

The BeMed network is growing

INNOVATE

"No plastic for our bread"
Association for the Protection and Safeguarding of the Bizerte Coastline - Tunisia

A network of bakeries in the city of Bizerte is working to find alternatives to plastic bags and to encourage responsible behaviour thanks to daily bread.

Farming: a focus on the alternatives
Doctor Vet in Community - Albania

Awareness, research and implementation of plastic alternatives in collaboration with farmers and the Albanian Ministry of Agriculture.

"Plastic Free" Certification
Menorca Preservation Fund – Spain

Reviews of single-use plastic consumption habits in Menorca and implementation of the "Plastic Free Balearics Certification" in Balearic Island shops.

A low-tech machine
Skopelos Dive Center P.C - Greece

Use of a low-tech machine to transform plastics collected from the sea into everyday items recycled as part of a local and collaborative dynamic.

STUDY

Oysters and microplastics
UMR MARBEC – France

Scientific study to assess microplastic pollution caused by oyster fishing in the lake of Thau (south of France), which has 650 farms. Raising awareness of pollution from plastic material subject to significant environmental constraints.

Diving clubs getting involved
iSea, Environmental Organisation for the Preservation of the Aquatic Ecosystems – Greece & Cyprus

Quantification of marine pollution with Cypriot diving clubs and use of data to raise public and tourist awareness.

PROCESS WASTE

Sifting through waste
Zibel – Malta

Classification of macro and microplastic waste collected on land and at sea on the west coast of Malta to inform and involve stakeholders, and create an educational kit.

Fishing for waste
NGO Green Life – Montenegro

Cleaning and classification of waste found on the seabed in the Ulcinj region to raise awareness and involve the general public and local authorities.

Collecting waste
Regional Development Agency - Ulcinj Business Association – Montenegro

Improving the waste collection system in the Ulcinj region, supporting businesses in their search for plastic alternatives and involving local environmental organisations.

Improved management of plastic waste
Association TATAVAKA – Croatia

Raising awareness and supporting stakeholders and local authorities to design and implement a waste management plan on two islands in the Croatian archipelago.

RAISE AWARENESS AND EDUCATE

Introducing children to zero plastic
Nabeul environment eco-tourism association – Tunisia

Creating environmental clubs at primary schools in Nabeul to raise awareness amongst children and to establish recycling at these establishments in collaboration with the local authorities.

Recycling machines
MareVivu – France

The association is starting another tour of Corsica with artisan recycling machines in order to raise awareness of the problem of plastic waste recycling rates amongst the public and policy-makers and to encourage us to reduce our plastic consumption.

WORKSHOP WITH BEMED 2020 WINNERS

Monaco Ocean Week 2021 was an opportunity for the 15 project leaders who received support from BeMed in 2020 to share their experience within the network. Beyond the success of initiatives, the discussions established that the pandemic has made it more difficult to work in the field, considering the increased use of plastic and fragility of the private sector, which is less receptive to environmental issues. To address these difficulties, the associations must reinforce advocacy work, rely on local authorities which have a major role to play and encourage synergies between projects in the Mediterranean.

© SMILO

1

THE ISLANDS JOIN THE INITIATIVE

Launch of the CapiMed-Island project

With the support of BeMed, the small Mediterranean islands are joining forces against plastic pollution.

The string of Croatian and Albanian islands, Malta, Djerba, Tavolara, Corsica or the Balearic Islands... the small Mediterranean islands are refuges for biodiversity and mini-paradises overrun by visitors. They all suffer the same problem: plastic pollution. The CapiMed-Island project - launched on 25 March during *Monaco Ocean Week* - aims to bring them together to tackle this threat. Led by SCP/RAC and SMILO, the webinar got the main stakeholders involved with the five winners of the call for projects in the Mediterranean islands, supported by BeMed in 2020.

A review of different island initiatives was presented in line with the consortium dear to CapiMed-Island, establishing synergies with other similar regional initiatives. Efforts against plastic pollution risk having a limited impact if they remain isolated and sporadic, or if there is a lack of human resources and knowledge from local stakeholders. As a result, this network aims to address the fragmented nature of regions by pooling and streamlining initiatives. It is about standing together against plastic, and giving islands more influence in regional programmes and policies. Two lines of action which shape the initiative.

During this kick-off meeting, each project was fully aligned with the process to capitalise on knowledge, and consolidated by synergies between initiatives in a region with significant ecological issues. In this regard, the Med IUCN, the Interreg Med biodiversity protection community and the *Clean Blue Alliance* shared their insight on how to obtain an effective impact through projects to prevent plastic pollution in the islands.

The small Mediterranean islands could become symbols of collective awareness of the need to protect these fragile places, small mini-continents which are a focal point of all the issues and expectations of Mediterranean protection. ■

IN FIGURES

- **200 small islands in the Mediterranean, with around 10,000 islets**
- **4% of the Mediterranean's surface area** *(Source: Conservatoire du littoral)*

THE FIVE WINNING PROJECTS INVOLVED IN CAPIMED-ISLAND

1. The *Small Islands Organisation (SMILO)* implements **a micro-sector to produce alternatives to single-use** plastic in the Îles d'Or (France) and plans to replicate the approach on the islands of Tavolara (Italy) and Kerkennah (Tunisia).

2. The Croatian association *Nature, Environment and Sustainable Development (SUNCE)* supports local stakeholders with their waste reduction initiative on two Croatian islands and develops a **zero-plastic plan**.

3. The *Royal Albania Foundation* supports the local authorities on ten Albanian islands which seek to define **a sustainable waste management strategy**, and develop regulations to limit the use of plastic on the islands.

4. In Spain, the *Save the Med and Ibiza Preservation* foundations establish a common **"plastic-free" certification** in the tourism sector in the Balearic Islands and offer a guide with best practices.

5. With Plastistop, the *Jlij Association for the Marine Environment (AJEM)* **improves the collection and recycling of plastic** from a neighbourhood on the Tunisian island of Djerba.

THE CONTEXT

Even more than the Mediterranean coastline, the islands are suffering from growing plastic pollution which is reflected by micro-particles in the sea. Limited in space, the destinations of drifting plastic waste, lacking the infrastructure to implement sorting and recycling industries, the small islands still remain resilient regions, which strive to suggest solutions: reducing the use of plastic, designing sustainable alternatives, local recycling, creating labels... Their small scale could play in their favour and push them to become change leaders.

ECO-CITIZENSHIP

Make way for *upcycling*

The Animal Fund shines the spotlight on an ecological practice to give a new lease of life to used items to enhance them and reduce our impact.

Turning old jeans into a handbag, a pullover into a cushion cover, a tired skateboard into a coffee table, a damaged guitar into a wine bar, a surfboard into a coat rack, an old piano into a bookcase, corks into mats, plastic bottles into bird feeders. The only limit to upcycling seems to be our imagination. *"This new eco-citizen trend might even inspire people to create their own company"* suggests the chair of the Monegasque association, Berit Legrand, during *Monaco Ocean Week*.

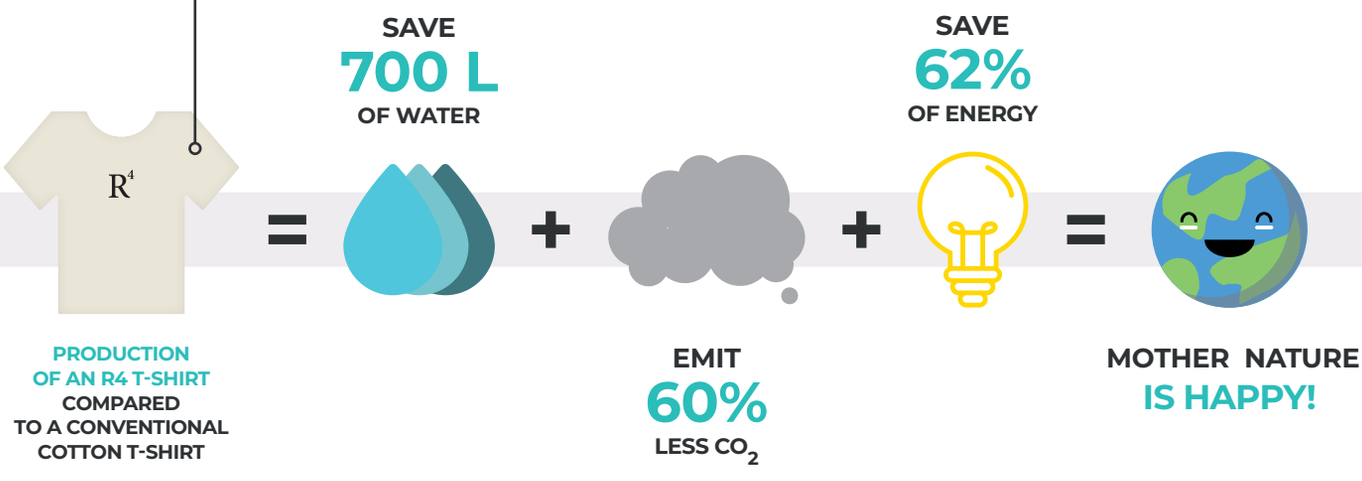
"By choosing water-saving raw materials or fully soluble packaging, we show them that it is possible to say "no" to plastic",

***Angelo Legrand**, co-creator of R4 Clothing*

CREATING A MOVEMENT

In the introduction to her conference on the topic, the activist talked about the context of worsening plastic pollution, which is shown to be *"worse than ever with the pandemic, due to the exponential use of disposable masks and the boom in takeaway sales"*.

Angelo Legrand, graduate with a master's degree in renewable energies and co-creator of a responsible clothing brand, *R4 Clothing*, reviewed the global problem of recycling, which is still very marginal (just 9% of global plastic is recycled). *"We need a global regulation approach and this approach can be adopted by each person"*, added the young Belgian-Danish entrepreneur, who criticised the flood of plastic waste from Western countries to Malaysia, now that China has closed its doors. Once used, the clothing from his brand, made with organic hemp or cotton fibres, is turned into a new item, or "upcycled". *"We are trying to create a movement with consumers. By choosing water-saving raw materials or fully soluble packaging, we show them that it is possible to say "no" to plastic"*, the young activist concluded, presenting other brands which follow the same trend, like *4Ocean* and *Ocean Mimic*, whose products and clothing are designed using plastic waste.



TACKLING THE PROBLEM AT AN EARLY STAGE

Several speakers, including the US fashion designer Pamela Peterson, presented collections of "upcycled" objects in order to inspire any person keen to improve their environmental footprint. *"By reusing, we avoid creating a new product and we save energy and raw materials which would have been required to make a new object"*, explained Berit Legrand, promoting the fun aspect of the process. *"We want to show that upcycling is not very difficult, it's even fun, particularly when you have kids or during lockdown!"* Making the most of broken, outdated or forgotten objects, giving them a new chance by reinventing them, improving them and giving them new features, often far from those for which they were originally designed... The philosophy of *upcycling* deeply changes our behaviour as consumers. *The Animal Fund* continues its commitments to marine mammals through an approach based on individual accountability, far from the *fast fashion industry* which impacts the ocean in so many ways. ■


© Pamela Peterson


© Daria Shevtsova - pexels.com


© TAF

"By reusing, we avoid creating a new product and we save energy and raw materials which would have been required to make a new object",

Berit Legrand,
founder and chair of The Animal Fund

© Pauline Cottaz - Sphyrna Odyssey

83

BLUE INNOVATIONS

/ **84** 3D printed artificial reefs teeming with life

/ **86** Bioacoustics in the Mediterranean

/ **88** Seaweed

/ **94** Zero plastic: Solutum / Nanocaptis

/ **95** When a legendary race plays its part in ocean science

/ **98** Yachting has an energy revolution

The Larvotto Marine Protected Area (33 hectares) protects a Posidonia meadow, an iconic Mediterranean habitat. KEYFACT

BIOTECH

3D printed artificial reefs teeming with life

An initial assessment reviews the scope of the Larvotto Marine Protected Area pilot project, created in 2015 by the Prince Albert II of Monaco Foundation and the Monegasque Association for the Protection of Nature.

After more than three years sitting on the sandy floor of Larvotto cove in Monaco, have the 3D printed artificial reefs become true underwater habitats? How have these structures - submerged at a depth of thirty metres - been colonised? The survey was carried out by a multidisciplinary team of experts in marine ecology, engineers from the private sector and managers of Marine Protected Areas in Monaco. Two marine ecology researchers presented their conclusions during *Monaco Ocean Week*.

EFFECTIVE NATURAL LABORATORIES

These six clever islets filled with nooks and crannies have proven to be *"genuine natural laboratories for scientific research"*, summarised Elisabeth Riera, from the ECOSEAS laboratory at the University of Nice Côte d'Azur, emphasising their effectiveness in restoring coastal habitats. *"This new generation of reefs offers immense structural complexity designed to attract specific species"*, continued the biologist, who demonstrated the ecological performance of the material used. Unlike conventional concrete, the communities fixed to these dolomite sand-based reefs do not trap heavy metals from the ocean.

TRUE HABITATS FOR SPECIES

To understand the gradual colonisation of the submerged reefs, the classic method of visually counting fish populations in a 3 metre radius around the reefs is combined with biennial automated photography tracking to identify more timid species, at a rate of one photo every 30 seconds. Since 2018, 23 fish species and 3 species of cephalopod and crustacean have been seen within or near to the reefs. Swimming amongst shoals of pomfrets and wrasse, divers were able to identify conger eels, brown comber, sea bream, moray eels and scorpionfish, but also lobsters, apogons and even a young dusky grouper. Clutches of squid and octopus eggs were regularly seen. The marine ecology researcher Alexis Pey concluded that *"these observations demonstrate the effectiveness of the reefs designed by Professor Patrice Francour"*. The results collected at the Larvotto site confirm the hypotheses suggested by their designer: species which have a major ecological and economic interest colonise the reefs, with some even adopting the new habitats in the long-term. These reviews will continue in the years ahead. ■


© Alexis Pey

PROFILE

The six Larvotto artificial reefs

- dimensions:
  1.2 m (height) x 2 m (diameter)
- 3D printed by Boskalis and D-Shape
- an innovative dolomite sand-based, pH neutral material for the marine environment, using a non-polluting binder.

INNOVATION

In order to better understand these colonisation processes, the **HYPER3D project** uses a hyperspectral camera developed by the start-up PlanBlue, as well as artificial intelligence. This innovative technology helps to identify the diversity of communities as well as their physiological status, without disturbing them.


© Stéphane Jamme

TUNED IN

Bioacoustics in the Mediterranean

Following nine months of acoustic recordings at sea, the oceanography team from the Sphyrna Odyssey mission presented highly innovative scientific results.

This long-term adventure is characterised by two world firsts, mixing marine bioacoustics, technological innovation and artificial intelligence. Launched in September 2019, the *Sphyrna Odyssey* mission involves acoustic exploration of the western Mediterranean using autonomous, silent nautical drones. Researchers fitted them with mini sensors and cutting-edge sound recording systems which send data to laboratories in real-time. This new type of exploration was devised by Hervé Glotin from the CNRS LIS laboratory at the University of Toulon in response to a call for projects by the company Sea Proven. It is broadly supported by the Prince Albert II of Monaco Foundation, Monaco Explorations and ACCOBAMS, and continued under the mission name *"Quiet Sea"* during lockdown, until May 2020. *"The use of these ecological scientific research vessels and bioacoustics, an increasingly popular science to determine the health of an ecosystem without impacting it, is perfectly aligned with our values"*, explained Philippe Mondielli in his introduction, Scientific Director at the Prince Albert II of Monaco Foundation.

DIVING INTO THE ABYSS

From listening to fauna in the depths of the ocean to the impacts of lockdown in the Mediterranean, this zero-carbon mission shines light on the enigmatic world of a sea criss-crossed by deep underwater canyons, currents and places of refuge and shelter. During the 9-month mission, hydrophones fitted to Sphyrna twin drones sent 20 terabytes of 3D acoustic data, which was processed by algorithms and then interpreted at the Toulon laboratory.

© Rémi Demarthon

During the digital press conference at Monaco Ocean Week, the mission's scientific director, Hervé Glotin, presented one of the major results, from a recording on 14 January 2020 off the coast of Monaco, within the Pelagos sanctuary: *"This listening system does not disturb the animals, so we were able to recreate 3D journeys of a pod of sperm whales in the depths of the ocean. We discovered that these large sounders have developed a group hunting strategy using their acoustic expertise, which I call super-sonar"*. Keeping a distance of 500 metres between them, the pod members dive in a coordinated fashion to a depth of 1,700 metres in the vortex formed by the ocean currents around the underwater mountain Méjan.

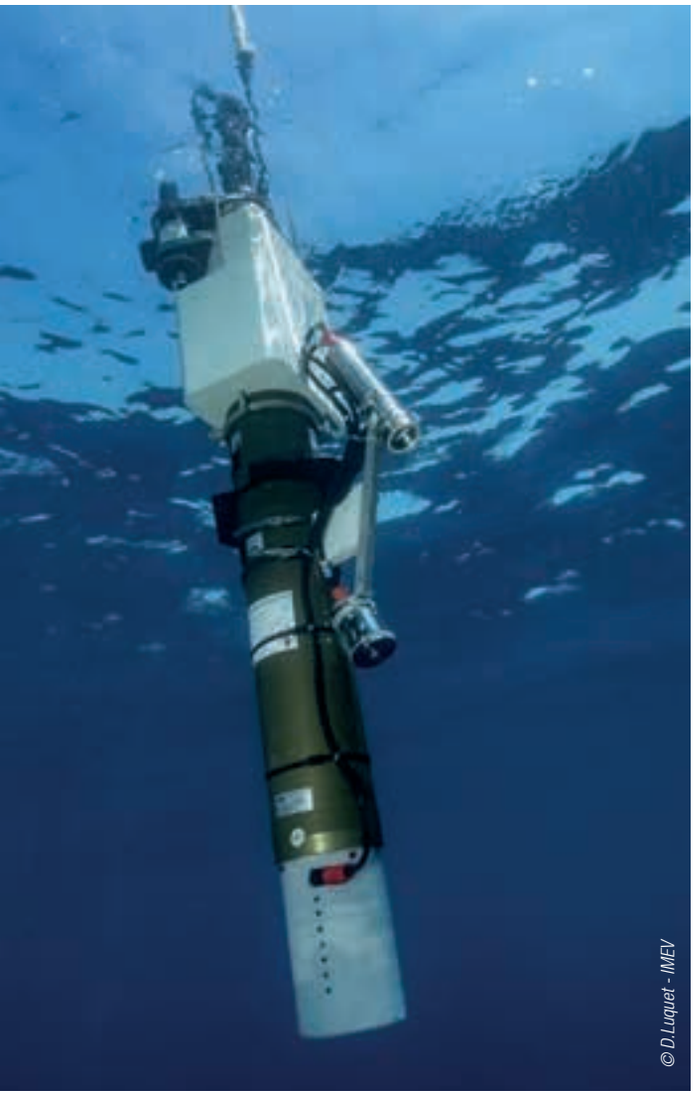
IN FIGURES

The two Sphyrna laboratories designed by Sea Proven

- **Length:** 17 and 22 metres
- 3 types of renewable energy**: solar, wind, tidal**
- 100 times cheaper **than a traditional vessel**
- 50 scientific protocols **and up to** 1 tonne of equipment **on board**
- Fitted with 5 hydrophones **under their hull, they are able to listen to large cetaceans to a** depth of 2,000 metres **and a** radius of 6 kilometres

A NEW ERA

A world first, this work marks the start of *"a new era of ocean observation"*, the researcher explained, supporting the prevention of noise pollution and risks of collision. *"These vortexes attract cetaceans as they are very rich in nutrients and therefore prey. They are even partially visible from space"*, noted Hervé Glotin, whose team works with the European Space Agency in order to predict them, and to better understand the needs of super-predators through bioacoustic analysis using nautical drones and Bombyx smart acoustic buoys. These predators play a fundamental role in the food chain, but there are no more than one thousand in the north-west Mediterranean. Protecting them requires convergence between experts and challenges, as this mission shows.



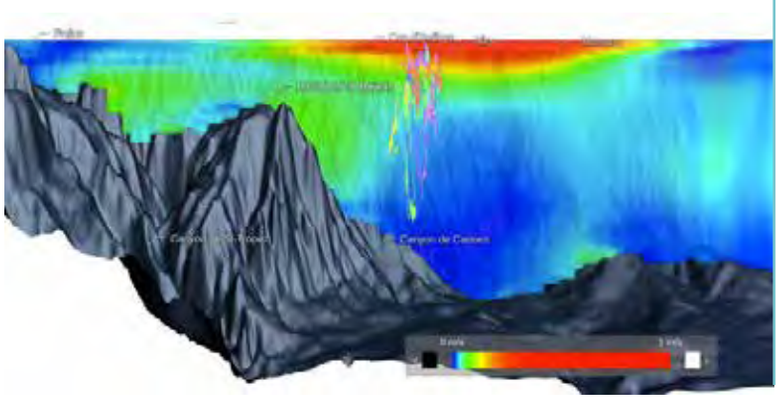
© D.Luquet - IMEV

AN ACOUSTIC POSTCARD OF THE LAST CENTURY

In spring 2020, the "Quiet Sea" mission also offered very valuable results. *"The mission was able to seize this extraordinary scientific opportunity to study marine mammal populations without the disruption of noise pollution"* Philippe Mondielli added enthusiastically, who had offered his support. From Toulon to Monaco, 400 kilometres of coastline - amongst the busiest in the world - returned to the calm of pre-industrial times. Ideal conditions for cetaceans to visit the coast. Differences of 6 decibels RMS[7] were recorded along the coast and at sea, where coastal traffic continued, which is a value corresponding to a "very deep silence", explained Hervé Glotin, *"which allowed us to record sounds made by cetaceans in very high definition, even at sites usually deeply affected by noise pollution"*. Other indicators demonstrated the benefits of a significant decline in human activities in the area, such as a sharp drop in hydrocarbons dissolved in the water.

Many questions on the *Monaco Ocean Week* chat allowed the mission's representatives to offer details on these promising results, which reveal a hidden Mediterranean. ■

"The mission was able to seize this extraordinary scientific opportunity to study marine mammal populations without the disruption of noise pollution"



7. RMS *(Root Mean Square)* is an average noise volume heard overall, thus depending on a certain recording time.

RESULTS

The "Quiet Sea" mission

During lockdown in spring 2020, drones fitted with instruments patrolled from the Calanques to Monaco, along 400 kilometres of coastline, revealing a sea:

- half as polluted with hydrocarbons
- ambient noise energy fell significantly on the coast, sometimes by more than 6 dB RMS (four-fold reduction in noise level).
- cetacean communications during lockdown estimated to be 4 times longer at low frequencies (which could mean an improved group dynamic and greater opportunities for hunting and reproduction)
- 10 times quieter: a 10 decibel reduction in low frequencies was recorded, with the presence of "silent spots"
- cetacean communications up to 6 times longer (which means an improved group dynamic and greater opportunities for hunting and reproduction)

IN SIGHT

"Let's listen to the world's song before the music stops".

***Philippe Mondielli,** Scientific Director at the Prince Albert II of Monaco Foundation*

A SEAWEED REVOLUTION

Hidden champion of the ocean

Europe is banking on the seaweed bioindustry, a sustainable and highly promising solution, to get the most out of the ocean whilst contributing to its regeneration.

In the early 20th century, the visionary Prince Albert I of Monaco had already shone the spotlight on the significant potential of seaweed, an abundant and regenerative resource. Following this historic introduction to the meeting's opening address, the director of the Oceanographic Museum of Monaco, Robert Calcagno, encouraged faster development of a sustainable seaweed industry in a resilient *Green Deal* Europe. Although still far behind Asia, which accounts for almost all of a booming market, Europe is mapping out a promising path encouraging sustainable seaweed-based practices, as explained by Maris Stulgis, Policy Officer at the Directorate General for Maritime Affairs and Fisheries.

APPETISER

The chef at the Menton restaurant Mirazur (3 Michelin stars), Mauro Colagreco, explained his culinary approach to seaweed, as demonstrated by the menu at this prestigious French restaurant. Customer interest in these flavours has even led to a new restaurant project dedicated to sea products, which will be linked to its own seaweed farm.

© Adrien Vincent

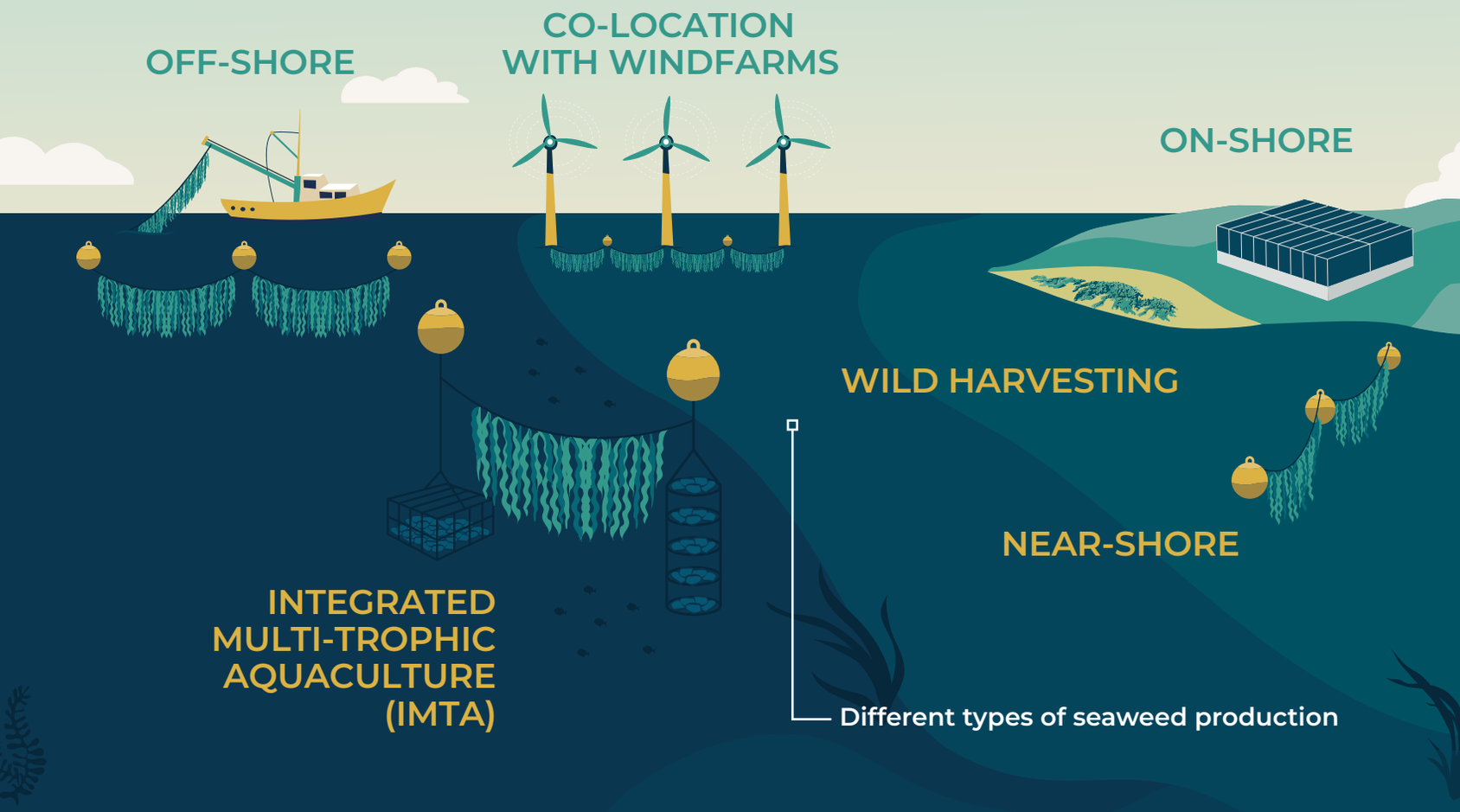
EUROPE COUNTS ON SEAWEED

An increasingly popular ingredient in gourmet cooking, seaweed has attracted many enthusiasts in a wide array of fields. After a presentation on its ability to regenerate, the director of the *Seaweed for Europe* programme, Adrien Vincent, referred to the report "Hidden Champion of the Ocean" (October 2020) to explain the myriad applications and social, environmental and economic benefits linked to seaweed farming, which can be developed offshore, combined with wind or aquaculture farms, or even on coastal farms. Vincent Doumeizel, from the United Nations Global Compact, shared his perspective on the use of seaweed in human history, before presenting the Safe Seaweed Coalition, a global initiative seeking to promote safety standards for the seaweed industry.

The director of the Nobel Foundation, a former special envoy for oceans in Norway, Vidar Helgesen, mentioned commitments to seaweed by 14 heads of state from the top-level panel for a sustainable ocean economy. The director personally committed to ensuring that seaweed would be on the menu at the next official Nobel dinner!

PROFILE

Seaweed for Europe unites stakeholders from industrial associations, investors, growers, processors, technology suppliers, universities and opinion leaders. Over 80 organisations from 15 European countries are involved in the European seaweed industry.



THE OCEAN: THE FIRST TO BENEFIT

The lungs of the ocean, food-producing forests, underwater habitats... Seaweed has crucial properties for the ocean ecosystem. Cultivated in large amounts, it could actively contribute to ocean restoration, and thus mitigate the impact of climate change, as underlined by the founder of the Oceans 2050 initiative, Alexandra Cousteau. The grandchild of the famous explorer is leading the programme to restore lost coastal habitats by replanting and managing marine forests at 25 seaweed farms. Their potential to sequester carbon will be assessed.

Every speaker at the conference underlined the reasons for developing a dynamic bioindustry from seaweed in Europe, which could *"influence the climate"*, according to the inspiring conclusions by the scientific explorer Tim Flannery. Launched in 2020, the *Seaweed for Europe* coalition seeks to drive change in this area, which is rooted in a change of logic - a blue, sustainable and responsible economy. ■

IN FIGURES

In 2030

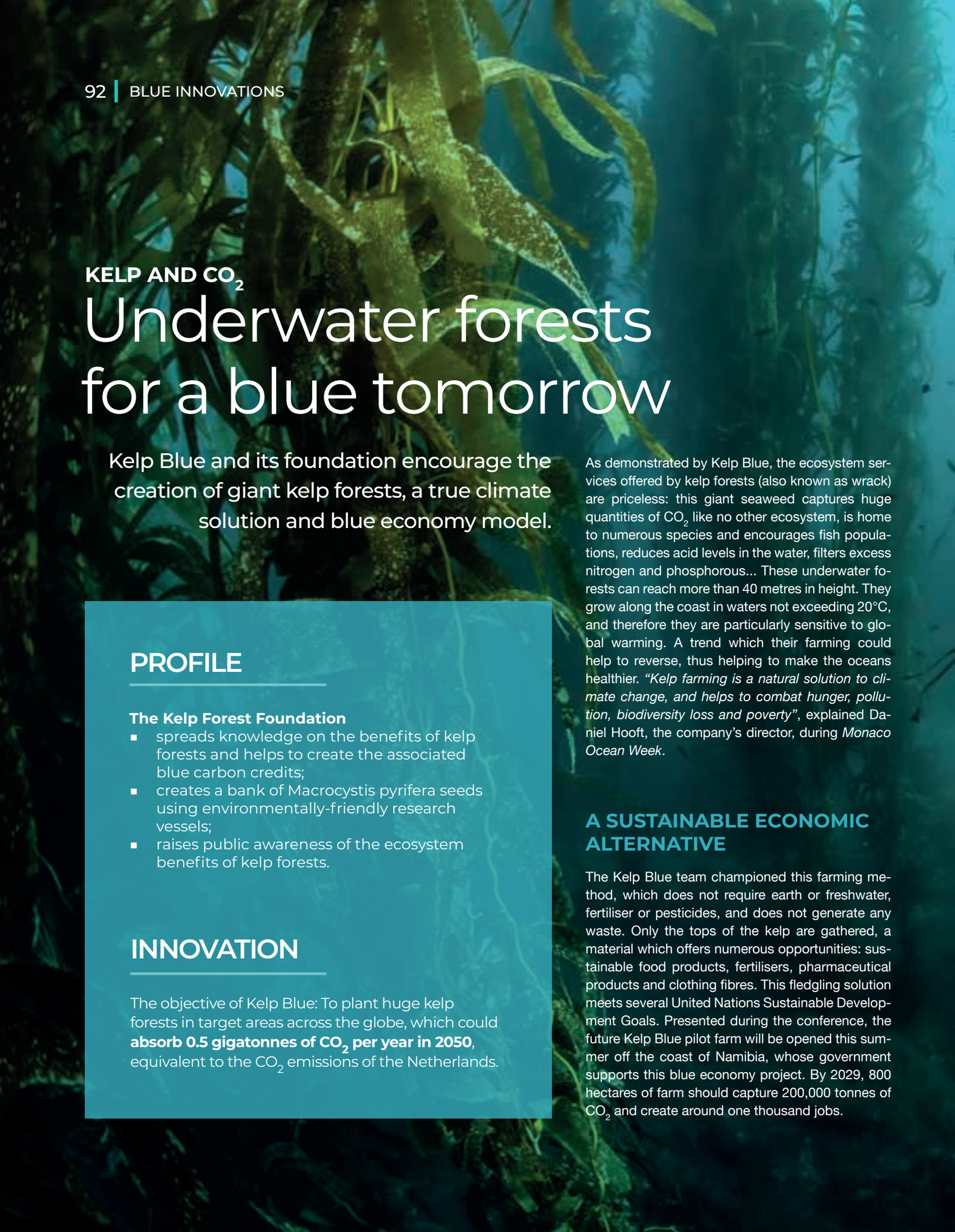
A booming bioindustry...

- **€9.3 billion - 115,000 new jobs: the potential seaweed market**
- **30% target: the European market share potentially addressed by seaweed grown in Europe**

...with multiple environmental benefits

- **5 million tonnes of CO_2 captured from the atmosphere each year thanks to photosynthesis**
- **Absorption of inputs in the ocean: 20,000 tonnes of nitrogen and 2,000 tonnes of phosphorus/year**
- **Development of rich habitats for marine biodiversity**

(source: Seaweed for Europe)



KELP AND CO_2

Underwater forests for a blue tomorrow

Kelp Blue and its foundation encourage the creation of giant kelp forests, a true climate solution and blue economy model.

PROFILE

The Kelp Forest Foundation

- spreads knowledge on the benefits of kelp forests and helps to create the associated blue carbon credits;
- creates a bank of Macrocystis pyrifera seeds using environmentally-friendly research vessels;
- raises public awareness of the ecosystem benefits of kelp forests.

INNOVATION

The objective of Kelp Blue: To plant huge kelp forests in target areas across the globe, which could **absorb 0.5 gigatonnes of CO_2 per year in 2050**, equivalent to the CO_2 emissions of the Netherlands.

As demonstrated by Kelp Blue, the ecosystem services offered by kelp forests (also known as wrack) are priceless: this giant seaweed captures huge quantities of CO_2 like no other ecosystem, is home to numerous species and encourages fish populations, reduces acid levels in the water, filters excess nitrogen and phosphorous... These underwater forests can reach more than 40 metres in height. They grow along the coast in waters not exceeding 20°C, and therefore they are particularly sensitive to global warming. A trend which their farming could help to reverse, thus helping to make the oceans healthier. *"Kelp farming is a natural solution to climate change, and helps to combat hunger, pollution, biodiversity loss and poverty"*, explained Daniel Hooft, the company's director, during *Monaco Ocean Week*.

A SUSTAINABLE ECONOMIC ALTERNATIVE

The Kelp Blue team championed this farming method, which does not require earth or freshwater, fertiliser or pesticides, and does not generate any waste. Only the tops of the kelp are gathered, a material which offers numerous opportunities: sustainable food products, fertilisers, pharmaceutical products and clothing fibres. This fledgling solution meets several United Nations Sustainable Development Goals. Presented during the conference, the future Kelp Blue pilot farm will be opened this summer off the coast of Namibia, whose government supports this blue economy project. By 2029, 800 hectares of farm should capture 200,000 tonnes of CO_2 and create around one thousand jobs.

A BIO-INNOVATION SECTOR

The Kelp Blue web conference also shone the spotlight on an array of entrepreneurs linked to the seaweed sector, all sharing the same philosophy. The tulip grower John Huiberts confirmed that kelp is an effective biostimulant. The founder of Algiknit, a company which makes clothing fibres from kelp, demonstrated the more sustainable options for the textile industry. Finally, innovative kelp-based packaging was presented by the creator of NotPla. The conference emphasised the sustainability of kelp farming, whose products create a circular economy by limiting emissions throughout the production chain. On a major scale, this natural carbon trap could play an important role in the fight against climate change. ■

DID YOU KNOW?

Giant kelp *(Macrocystis pyrifera)* is one of the fastest growing organisms in the world. It can grow 60 cm in one day, and reach more than 40 metres in height. An achievement made possible by photosynthesis, which converts and stores large amounts of carbon dioxide in various parts of the seaweed.

IN SIGHT

"The promise of kelp and its ecosystem services must be better quantified to accelerate the growth of its farming. By developing it on a major scale, the goal is to help mitigate climate change and create sustainable products which are less harmful for the environment. The Kelp Forest foundation was created to carry out this research and share it",

Daniel Hooft,
director and co-founder of Kelp Blue.

NEXT STEPS

Zero plastic

© Chen Wagshall

SOLUTUM

AN ISRAELI START-UP DESIGNS A 100% SOLUBLE “PLASTIC”

By exploring various materials to produce biodegradable plastic, the Israeli chemical engineer Sharon Barak developed a unique material which can dissolve in water. *“This plastic can biodegrade in the ocean in 90 days, as the materials are naturally broken down by bacteria”*, the designer explained during *Monaco Ocean Week*. Made from ecological materials, without toxic residues or microplastics, this innovative plastic - named Solutum by the eponymous start-up - offers an alternative to traditional single-use plastics.
A solution to reduce plastic pollution in the ocean presented live from the Capsule Building at Tel Aviv University, a sustainable energy laboratory building with a green roof.

NANO CAPTIS

FILTERING NANOPLASTICS

Each time we wash synthetic clothing (polyester, nylon, acrylic, etc.), we release microparticles which flood into the ocean. This invisible pollution has a significant effect on the ocean and the species living in it. How can we tackle nano-contamination by these plastics, which are currently undetectable by water processing plants? Mindful of these issues, the companies Phoenix H2O and Nano Captis, in partnership with a US research centre, have designed plastic nano-particle filters for washing machines. During *Monaco Ocean Week*, the designers presented the story of this innovation, as well as promising results after an initial test phase. 90% of plastic fibres are captured by this filter, which will start production soon.

VENDÉE GLOBE 2020

When a legendary race plays its part in ocean science

Aboard his laboratory vessel, skipper Boris Herrmann took samples from the Southern seas looking for signs of climate change.

During his lone 80-day odyssey, the German sailor Boris Herrmann collected precious oceanographic data from the perilous Southern seas. This unique set of information should help explain the impacts of climate change in the most distant corners of the globe. For this top sailor who came in 5th place, the finish line did not end at Les Sables-d'Olonne: the race continues in the European laboratories processing the data sent by the laboratory on board the monohull yacht Malizia II.

Fitted with the latest generation of sensor, OceanLAB focuses on CO_2 levels, changes in pressure, temperature and salinity of the water. The sporting challenge of Vendée Globe was coupled with a high-precision scientific adventure in partnership with the Max Planck Institute for Meteorology (Hamburg), the Geomar research centre (Kiel, Germany) and Ifremer (Brest), which use the results for long-term programmes. A hectic and dedicated ocean journey, recognised by HSH Prince Albert II of Monaco during a press conference at the end of *Monaco Ocean Week* on 26 March 2021, in honour of the sailor who raced on behalf of the Principality.

Boris receiving a lifetime member's certificate for Monaco Yacht Club from Prince Albert II of Monaco. © MESI

IN SIGHT

*"The biggest change is what we cannot see, like rising temperatures or CO_2 levels in the ocean. That is why we installed a laboratory on board. And when you see this data and understand the implications, you realise that there is absolutely no time to waste to take action", **Boris Herrmann.***

INTERVIEW

© Andreas Lindlahr

Boris Herrmann
Vendée Globe 2020 skipper
(SeaExplorer – Monaco Yacht Club)

What was the main objective of this mission?
The main objective was to collect data on CO_2 levels on the ocean surface to help scientists understand the impact of climate change on our ocean.

Was this scientific mission a first for you?
We tested this installation, which was designed by SubCtech engineers, with Pierre Casiraghi, my team mate and founder of Team Malizia, during our previous sailing trips. So the Ocean Lab has already been tried and tested over 60,000 kilometres in recent years. We tweaked it, but it was up and running for Vendée Globe.

What did you need to do on board? Did it slow you down during the race?
The automated system was designed to require minimal input from the sailor. I was able to concentrate 100% on the race! The data is sent in real-time to partner laboratories, on land, to be analysed. Every 24 hours, the device self-calibrates using a pressurised gas bottle, which maintains the level of precision. And everything kept working until the end! The only thing I had to do was take a water sample to calibrate the data collected. On the 10th day of the race, I released an Argos type beacon which will drift about for many years, directly sending data to scientists on temperature, salinity and pressure.

How can this data make a difference in ocean science?
The Ocean Lab measures three main parameters: surface CO_2 levels, temperature and salinity of the water. The data revealed increases in CO_2 off the coast of Brazil, but also New Zealand. With Team Malizia, and particularly during this round-the-world race, we visited distant ocean areas which are rarely visited. This type of data cannot be collected by satellite or autonomous buoys. And with Vendée Globe, this is the first tracking project of this type, over 80 days. The data we have collected allows scientists to supplement their data on the ocean, which covers 70% of the planet. This will give them a better understanding of CO_2 absorption mechanisms and the impact of climate change on all ocean regions.

Which scientific programmes are involved?
The data is sent to the Max Planck Institute meteorology laboratory, as well as the labs at Geomar and Ifremer. After processing, it is submitted to the SOCAT global database, where it is checked again. A flag is

assigned to each piece of data depending on its precision. Our data has been classified as the highest quality, with this type of measurement and vessel. So it is available to the global scientific community. Our 2019 data was used in the global carbon assessment report, and is already referenced by scientists in numerous papers.

What was your main motivation to add a scientific side to this race, often called the "Everest of the seas"?

Malizia II is considered a ship of opportunity, in the sense that it collects data during the race thanks to its onboard ocean laboratory. It is ideal for scientists, as it is not as expensive and does not take as much time as launching a research vessel! Also, few vessels can travel non-stop to these distant ocean areas, far from conventional sailing routes. Being able to contribute to ocean science is a huge incentive for me! Protecting the ocean has to be very dear to the heart of any sailor... In any event, after several years, we have taken samples from numerous regions which had never been observed before, which allows scientists to bridge gaps in their models and see if the amount of CO_2 in the ocean has increased proportionally in line with the atmosphere. In the atmosphere, the air circulates and mixes in a few months. In the ocean, the changes are much slower: there is around one thousand years of inertia! Being able to play our part in this research is crucial. ■

© Andreas Lindahl

THE BLUE TRANSITION

Yachting has an energy revolution

The energy transition was a central topic during conferences and discussions at this annual event, which is highly anticipated by yachting stakeholders keen on securing a sustainable future.

The Monaco Yacht Club devised a new format for the 10th environmental symposium "La Belle Classe Superyachts" which took place on 25 March 2021 on the theme of "New energies and carbon emissions: yachting focused on the future". Six speakers shared their expertise during this day of lively conferences and debates at the Yacht Club, broadcast live to a large audience of users online.

ENERGY OBSERVER, A LABORATORY BOAT

The symposium started with a presentation of a renewable energy laboratory catamaran, *Energy Observer*, which has sailed the seas since 2017. It is energy self-sufficient due to a mix of hydrogen, solar, wind and hydroelectric power.

"We test all these technologies in extreme conditions so they can be applied on a large scale and by everyone", explained the captain **Victorien Erussard**. There are some 200 m² of solar panels on this first zero-emissions vessel. Some take the shape of hulls, others, with non-slip surfaces, are used as coverings, others are vertical or placed upside down, transforming the sun's reflections off the deck into energy. *"We also tested vertical wind turbines and a traction kite, but the wings inspired by the technology used by boats in the America's Cup combined with mini-turbines convinced us: we save between 18 and 32% energy!"* the vessel's captain revealed enthusiastically, having travelled more than 10,000 nautical miles in 2020.

Named the first French ambassador of Sustainable Development Goals by the Ministry of the Energy and Solidarity Transition, Energy Observer is continuing its energy odyssey towards the Pacific, where a second experimental vessel is being prepared.

© mesi

HYDROGEN, ENERGY OF THE FUTURE

An endless raw material offering rapid, clean, silent and lightweight refuelling, hydrogen has emerged as renewable energies' best friend. The current challenge of this alternative to fossil fuels, a solution for the yachting of the future, is in optimising its storage. The increased demand for hydrogen will lead to falling costs, and thus economic viability. *"More than 50 nautical projects, including large boats and ferries, have already invested on hydrogen"*, explains **Jérémie Lagarrigue**, CEO of the company EODev, which develops these solutions. *"In 2017, this market was worth 2 billion dollars; by 2050, when hydrogen production is mature, the national hydrogen plan is looking at 2.5 trillion dollars and 30 million new jobs"*.

WITNESSING CHANGE

On his part, the South African explorer **Mike Horn** is working on a hydrogen technology equipment project for his yacht *Pangaea*. Having traversed the wildest terrains, sailing 27 times around the world and witnessing melting glaciers and desertification, he is working to create completely carbon-free transport. A driver of change, the adventurer is testing a next-generation fuel battery which he helped to develop with CEA-Liten, before facing extreme conditions with his 35-metre yacht: *"It wasn't possible to go to the North Pole at night. I did it at -50°C. It will be the same with hydrogen. I want to show that it is a change within reach, that a yacht can break the ice without emitting CO_2, that a greener life is possible"*. The Monaco Yacht Club member insisted on the need to *"take the leap of major investment to allow the deployment of hydrogen infrastructure"*, reiterating that yachting has a role to play in transforming the use of fossil fuels.


© mesi

IN SIGHT

*"We need a new source of energy to deal with fossil fuels. We do not have the time to think about how much it will cost, there will be no more tomorrows", **Mike Horn.***

INNOVATION FINDS ITS HOME PORT

On land, the new La Ciotat shipyard, intended for refitting superyachts, meets ambitious environmental requirements. The port site stands out for supporting innovation in yachting. During his speech, the shipyard's director, **Jean-Yves Saussol**, announced the arrival of *Hynova Yachts*, the first yachting brand to use electrical and hydrogen propulsion: *"The nearby Calanques National Park reminds us of the protection efforts required to restore this industrial site. These innovations are part of the solution to reduce the industry's impact."*

masi

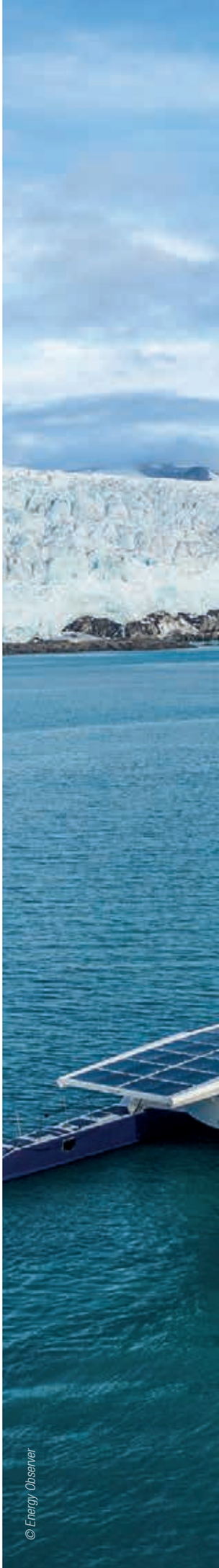
THE ENVIRONMENTAL IMPACT OF SUPERYACHTS UNDER THE MICROSCOPE

As part of the project "Monaco, Capital of Yachting", which aims to make the Principality a centre of excellence and innovation in superyachts, the Monaco Yacht Club created the "SEA Index" in collaboration with Credit Suisse. This benchmark will help assess CO_2 emissions and improve the environmental performance of vessels longer than 40 metres. Already up and running and available online, this tailor-made tool assigns a score depending on environmental standards, with the aim to extend it to other areas of yachting and become a sustainability benchmark, covering propulsion systems, energy recovery, chemicals, waste and water.

HSH Prince Albert II of Monaco, President of the Monaco Yacht Club, recognised efforts made by the owners of the two vessels (the *Ragnar* and the *Maltese Falcon*) which have just joined the initiative, supervised by the historic rating agency Lloyd's Register. The ambition to improve the environmental impact of superyachts is shared by *Water Revolution* which, using the *YETI tool*, can examine the life cycle of a yacht.

IN FIGURES

The yachting industry represents 1% of maritime sector emissions


© Energy Observer

YACHTING AT THE HEART OF THE DEBATE

The specialist in raw material geopolitics, **Guillaume Pitron**, offered a critical view of the energy transition, which *"must be supported by recommendations: an understanding of the environmental truth of technologies, ethical sourcing of minerals, mineral diplomacy, the circular economy..."* An economic sector which has been relatively protected until now by green regulations (unlike cargo), the yachting industry is *"increasingly invited to make its energy transition, particularly by observing the international regulations aiming to make the transport sector zero carbon by 2050"*, added the investigative journalist, before listing solutions under development: combustion engines using new fuels (biofuels, natural gas, algofuels, bioethanol), 100% electric engines, hydrogen batteries... *"Whilst all these options have drawbacks, their combined benefits are undeniable"*, with yachting able to become a sector of innovation and a driver of change. ■

© mesi

103

THE BLUE GENERATION

/ **104** Children listening to the sounds of the ocean

/ **106** The climate generation

BIOACOUSTICS WORKSHOP

Children listening to the sounds of the ocean

Children aged 8 and 9 listened carefully to the fascinating orchestra of marine animals during a video workshop dedicated to bioacoustics.

What if the sea was anything but a world of silence, like we have long believed? If it was full of very diverse and mysterious sounds? And if marine animals played their part in a large orchestra? Dedicated to the up-and-coming science of underwater acoustics, the school event offered by Culture Océan, the science education unit of the Villefranche Sea Institute (IMEV), got students inspired during *Monaco Ocean Week*. The Year 4 class from École Saint-Charles in Monaco took part in a video workshop led by Manon Audax, science education leader at IMEV.

A SOUND QUIZ

During the session, which was structured around a sound quiz, the students just needed to prick up their ears and listen carefully to rediscover the ocean: the classic whistling of dolphins, the noise of boats, the underwater murmuring of storms, but also percussion by certain fish or the roar of ice in the sea... Designed to get young people to discover the wide range of sounds in the ocean, the workshop invited them to follow in the footsteps of researchers at IMEV and the Chorus research institute.

POLLUTING NOISES

The students also learned about noise pollution, which affects every corner of the ocean. Noise from boat engines reaches the bottom of the Mariana trench, 11 kilometres under the surface, and more powerful sounds, like sonar from surveying boats, can cause fatal injuries, particularly amongst cetaceans. The host showed how underwater acoustics was increasingly used for surveillance, conservation and protection of the oceans. The students were very interested in this issue. What a success! ■

PROFILE

For 10 years, the **Culture Océan** team, the science education unit at the Villefranche Sea Institute, has worked with young people to introduce them to marine science and understanding how the ocean works, a pre-requisite to defend and protect it.

TUNING IN TO THE SOUNDS OF THE OCEAN

Each marine species has its own way of making sound: cetaceans click, whistle or roar, fish vibrate their muscles, hit their swim bladder, rub their fins or grind their teeth, sea urchins crack their skeleton and rub their spikes, crustaceans clack their pincers and shake their antenna and shells... In a marine environment, sounds are not a luxury, but a means of communication. Essential for mating, sounds are also used by certain species to find their bearings and locate prey in the depths, like sperm whales.

@ADOPTAFLOAT

The workshop students were invited to take part in the educational programme *"adopt a float"*. This programme allows classes to adopt an underwater robot, to track it throughout its scientific journey and understand the measurements it takes. Students and teachers benefit from a scientific, cultural and citizen approach to the ocean and marine sciences.

THE CALME NETWORK

Since 2015, the Chorus research institute has listened to Posidonia meadows and coralligenous reefs on the western Mediterranean coastline. This acoustics-based environmental surveillance network has allowed unique sampling in Europe. It is used to establish an initial review of marine life and noise pollution in the area.

ONE YOUTH, ONE OCEAN

“The climate generation” campaigns for the ocean

They are aged 20 to 35 and live across the globe. They share the same dream: an ocean that offers life. *Monaco Ocean Week* champions the voice of young people lobbying as part of the Ocean Decade.

SUSTAINABLE OCEAN ALLIANCE

THE OCEAN FOR THE FUTURE

Everything started in a neighbourhood in Washington, at Georgetown University, one night in 2014. A group of students shared the same dorm and the same dream: *“restoring the ocean in our lifetime”*. Now, the dream is shared by a whole generation of young leaders, entrepreneurs, defenders, students and pioneers from 165 countries. *Sustainable Ocean Alliance* (SOA) is the largest community of young people committed to the ocean in order to accelerate solutions, cultivate leaders and create a network able to address the threats which are damaging the world’s biggest ecosystem.

“As young people, we must proactively defend the UN’s Sustainable Development Goals. But we must also ask the global community to be accountable for the commitments it has made, notably to our generation, as we are the lead stakeholders of the ocean’s health in the future”, explained Marina Porto, Brazilian student of sustainable environment and co-director of the SOA’s Youth Policy Advisory Council. Its chair, the US student Mark Haver, presented its guidelines during *Monaco Ocean Week*.

YOUNG PEOPLE AT THE HELM OF A GLOBAL BLUE NEW DEAL

A strategic unit of the SOA, the Youth Policy Advisory Council was founded to create a platform to allow young ocean leaders to sit at the table of policy-makers to defend their position. It asks global ocean stakeholders to adopt a *“Blue New Deal”*, a framework which encompasses young people’s priorities regarding the ocean. According to a recent SOA study, they are focused on four major concerns: 1) creating and maintaining healthy protected areas to protect biodiversity; 2) reinforcing the sustainable fishing value chain; 3) making changes to high carbon emitting industries; 4) consolidating the commitment to managing natural ocean resources. A commitment for future generations, the *Blue New Deal* only asks to be considered by policy-makers.

A MORATORIUM ON DEEP SEA MINING

On the brink of the era of deep sea mining and as the pressure mounts to deliver International Seabed Authority operating licences, the SOA and its Advisory Council have proposed a moratorium for the next ten years. *"We are concerned that deep sea mining could be the final straw for an already vulnerable ocean. We must protect the climate benefits of the deep seas"* explained Alanna Smith during the web meeting, from the Cook Islands. *"The Pacific islands (Fiji, Papua New Guinea, Vanuatu) made declarations against this problem in 2019. We must support them! "*

In contrast to the drive for profits, the SOA champions knowledge which prioritises deep sea biodiversity research, their role in carbon storage and the climate system. The young leaders from the international community have organised their appeal for the deep sea and are carrying out an awareness campaign on the impacts of the deep sea mining industry. They are calling on young people and certain government representatives, particularly from the small island states. In the short term, they are counting on the support of Indonesia, Portugal, the Philippines and Peru, in order to increase their influence.

IN SIGHT

"The opportunity to give a presentation during Monaco Ocean Week was exciting and allowed us to interact with political leaders and opinion leaders. These key figures could help us to extend and escalate our campaigns for the ocean to turn our concept into a solution",

Mark Haver, *chair of the SOA Youth Policy Advisory Council.*

EDINBURGH *OCEAN LEADERS*

A NEW WAVE OF LEADERSHIP FOR THE OCEAN

From the Pacific islands, the Indian Ocean or the seas bordering Indonesia, South America or the United Kingdom, *Ocean Leaders* - involved in the *Edinburgh Ocean Leaders* (EOL) programme - shared their experiences during a digital panel discussion at *Monaco Ocean Week*. With a clear vision and tireless enthusiasm, these activists lead major actions to protect the ocean. These internationally recognised *Ocean Leaders* invited inspiring speakers, growing the wave of leadership on the most diverse coastlines.

As reiterated during the introduction by Olivier Wenden, deputy chair of the Prince Albert II of Monaco Foundation, which supports this global initiative, *"we are at a turning point, we need to build new leadership for the ocean in which young people must play a part"*. A pledge that resonated with the words of Meriwether Wilson, co-founder and co-director of the *Edinburgh Ocean Leaders* programme and associate professor of marine policy and science at Edinburgh University: *"The goal of this programme is to give more people the option to become ocean leaders, particularly by helping working professionals to develop the skills and creative solutions"*, explains the professor, who has worked on the creation of marine protected areas in over 30 countries and managed many sustainable ocean development projects in collaboration with the United Nations, the World Bank and NGOs. Her drive is reflected in this programme, which brings together even more leaders. ■

Edinburgh OCEAN LEADERS

PROFILE

Launched and coordinated by Edinburgh University and supported by the Prince Albert II of Monaco Foundation as well as other organisations, ***Edinburgh Ocean Leaders*** seeks to accelerate leadership, creativity and influence amongst exceptional young professionals to have a significant positive impact on the health of the world's oceans.

Thoughts from *Ocean Leaders*
leaders at *Monaco Ocean Week*




© Richie Graham, Davies Formal

Hugo Tagholm
United Kingdom

A surfer with an honorary doctorate in ecology, he manages the national marine conservation charity Surfers Against Sewage. Highly committed to the fight against plastic pollution, he also works in water quality, climate and highly protected marine areas.

"We need greater protection for life and ocean ecosystems, by focusing on total protection of 30% of the ocean during this decade. Ocean life can recover if we give it the necessary space. "

Charlie Gough
United Kingdom

A PhD student and technical adviser at Blue Ventures, she pursues a community approach to management and conservation of local fisheries with ocean conservation in mind, mainly in Madagascar.

"We need more effective collaboration and less competition if we want to achieve our collective goals!"

Yolanda Sánchez
Spain - Latin America

Through marine education programmes, she builds bridges between oceanography and people to promote marine conservation in Latin America.

"Everyone is responsible for the future of the ocean. The most important thing is to identify links with the ocean, to understand how it influences our lives and how we influence it, in order to make more responsible decisions. Education is essential to identify these connections which have stayed invisible for many years."

Harriet Harden-Davies
Australia - USA

A researcher at the University of Wollongong, she is working with the United Nations to develop a new treaty for the high seas as well as sustainable and fair ocean governance, plus she is the deputy chief editor of the journal Marine Policy.

"The United Nations Ocean Decade began this year. We need strong leadership to allow everyone dependent on the oceans to make their voice heard in policy."

INSTITUTIONS

© M. Dagnino

The Sancta Devota Foundation joins the *Monk Seal Alliance*

On Monday 22 March 2021, the first day of *Monaco Ocean Week*, Olivier Wenden, deputy chair of the Prince Albert II of Monaco Foundation and Colonel Luc Fringant, deputy chair of the Sancta Devota Foundation, officially entered into a partnership agreement to consolidate actions carried out as part of the *Monk Seal Alliance* initiative, which aims to support and coordinate efforts to protect one of the world's most endangered species: the Mediterranean monk seal. In 2020, the *Monk Seal Alliance* confirmed its support for eight conservation projects for this Mediterranean marine mammal, on the eastern Atlantic coasts. The Sancta Devota Foundation joins the Prince Albert II of Monaco Foundation, MAVA Foundation, Thalassa Foundation and Segré Foundation. This new partnership seeks to increase collaboration between fundraisers and stakeholders in the field at a local level, national level and wherever the species is found.

The BeMed calendar

The Board of Directors meeting of Beyond Plastic Med (BeMed), following the General Meeting, took place on Monday 22 March 2021. In the presence of directors, the 2020 activity summary was presented and the provisional 2021 activity calendar was approved. Regarding the BeMed network business group, which brings together businesses working to implement tangible solutions to prevent plastic pollution in the Mediterranean, a workshop and pilot project kick-off was planned for 9 and 10 June in Marseille. Q4 will be dedicated to a business recruitment phase, then a second group workshop at the end of the year. An announcement was also made about the sixth call for microinitiatives by the BeMed network, which selects around ten projects each year in the Mediterranean to reduce plastic pollution at sea.

The MedFund holds a board meeting

The Board of Directors of MedFund, co-chaired by H.E. Mr Bernard Fautrier, special adviser to HSH Prince Albert II of Monaco and H.E. Yann Wehrling, French ambassador for the environment, met by video call on 25 March 2021. Amongst the many points discussed, Romain Renoux, executive director of the Fund, presented a review of the activities carried out in the marine protected areas supported by the fund in Tunisia, Albania, Morocco and Turkey. The Board of Directors also deliberated on the potential for development of new programmes seeking to amplify and sustain actions in the Mediterranean. New communication visuals were also presented and approved by directors.

CULTURE

FASHION FOR THE OCEANS

The fashion ecologist **Runa Ray** invited *Monaco Ocean Week* participants to visit her virtual museum with ethereal decor surrounded by the ocean. The visitor can discover her dresses made from cyanobacteria fibres, archaic micro-organisms which become "ocean fabrics" in the skilful hands of the Indian designer, but also her biodegradable dresses made from chlorophyll printed seaweed... A way to remind people that the oxygen we breathe is like a second skin and that it is possible to reduce microplastics produced by fabrics. In room 2, we discover patterned satin dresses using floating ink art (an alternative to industrial dyes) or inspired by marine life. Through interactive digital stands on her website, the designer advocates for a circular economy, recycling, zero waste initiatives, and solutions based on nature and ancient and indigenous techniques. The user can visit the activist's exhibitions, who raises awareness of the environmental impact of the fashion industry and advocates for a change in paradigm.

THE ARCTIC, A DISAPPEARING WORLD

In the winter solitude of the Canadian Arctic, north of Churchill, the French director **Cristiana Bontemps** goes in search of a polar bear. For five years, she ventures into the tundra of the Wapusk National Park at -40°C, braves storms, meets an Inuit camp near to the mythical Northwest Passage, where the coastal waters attract seals and polar bears in spring, before setting off for Spitsbergen to observe the ice pack.

"Encounters in the Arctic", her documentary film (24') made from her expeditions, was made available throughout *Monaco Ocean Week* at the site of the Monaco embassy in Washington, looking at the ecology of a species in view of major climate upheaval. On the list of IUCN vulnerable species, *"the bear has to adapt to a home whose walls are constantly moving"*, the director notes. For how long will the species which the Inuit call "the great traveller" deal with the fragile ice pack? Christian Kempf, explorer and geographer specialising in the Arctic, explains that we are losing 90,000 km^2 of ice every year. A warning film which shines a light on one of the ocean regions most affected by the ecological crisis.

113

PARTNERS OF MONACO OCEAN WEEK

PRINCE ALBERT II OF MONACO FOUNDATION

THE PRINCE ALBERT II OF MONACO FOUNDATION

HSH Prince Albert II of Monaco decided to create his Foundation in June 2006 as a response to the concerning challenges facing our planet's environment. For 15 years, the Prince Albert II of Monaco Foundation has carried out actions in three main geographic areas: the Mediterranean, the Polar Regions, and the Least Developed Countries (according to the United Nations list) in order to limit the effects of climate change and encourage renewable energies, protect biodiversity, manage water resources and combat desertification. Active at an international level, the Foundation involves citizens, political officials, scientists and economic stakeholders to defend nature, a common good of humanity.

www.fpa2.org

Gouvernement Princier
PRINCIPAUTÉ DE MONACO

THE MONACO GOVERNMENT

HSH the Sovereign Prince has made sustainable management of the seas, oceans and their resources a priority area of Monaco's national and international policy. The Monaco government works tirelessly to this end, and particularly within the framework of the 2030 Agenda for Sustainable Development adopted by the United Nations.

That is why the Government is now involved in events for *Monaco Ocean Week* supported by the Prince Albert II of Monaco Foundation, in which all Principality stakeholders are involved.

www.gouv.mc/Action-Gouvernementale/L-Environnement

Institut océanographique
Fondation Albert Ier, Prince de Monaco

OCEANOGRAPHIC INSTITUTE, PRINCE ALBERT I OF MONACO FOUNDATION

The Oceanographic Institute aims to raise awareness of the wealth and fragility of the oceans, and to promote sustainable management and thoughtful and effective protection. To do this, it mediates between scientific and socio-economic stakeholders, the general public and policy-makers. It carries out this mission by promoting the exceptional heritage of Prince Albert I and the exemplary commitment by HSH Prince Albert II of Monaco to: "Raise awareness, love and protect the oceans".

www.institut-ocean.org

THE SCIENTIFIC CENTRE OF MONACO

The Monaco Scientific Centre (C.S.M.) is an autonomous public Monegasque institution created in 1960 by Prince Rainier III. Its aim: to give Monaco the means to carry out scientific research and support the action of government and international organisations responsible for protecting and conserving marine life. The Centre attracts candidates from all over the world: since its move to new headquarters at Quai Antoine Ier in 2013, more than 50 specialists have arrived from 15 countries (Europe, the USA, Japan, Australia, New Zealand, Palau, Brazil, the Caribbean, Canada, Oman, Saudi Arabia...).

www.centrescientifique.mc

THE YACHT CLUB OF MONACO

Founded in 1953 by Prince Rainier and chaired since 1984 by HSH Prince Albert II of Monaco, the Monaco Yacht Club has 1,200 members from 60 nationalities. Home to some of the most prestigious private yachts in the world, the YCM now enjoys a unique position in the world of international yachting and sailing.

www.yacht-club-monaco.mc

MONACO TOWN HALL

The Town Hall is the oldest institution in Monaco, with over 650 people working in 19 municipal departments, in areas of expertise like the Environment and Sustainable Development. Deeply mindful of the environment, based on guidelines given by HSH Prince Albert II, the Monaco Town Hall has been committed to protecting the environment for many years; a commitment which is reflected in tangible and sustainable actions in the Principality.

www.mairie.mc

THE PELAGOS AGREEMENT

The Pelagos Sanctuary is a 87,500 km^2 marine area subject to an agreement between Italy, Monaco and France to protect its marine mammals. What makes the Pelagos Sanctuary unique is the fact that it is managed by three different authorities, and it includes coastal areas and international waters which form a huge ecosystem of major scientific, socio-economic, cultural and educational interest.

www.sanctuaire-pelagos.org

ACCOBAMS

ACCOBAMS *(Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area)* is a cooperative body working to conserve marine biodiversity in the Mediterranean and Black Sea. Its primary objective is to reduce the threats to cetaceans in this geographic area, and improve our knowledge about these animals. ACCOBAMS is the first agreement binding countries from two sub-regions and allowing them to collaborate on a general interest topic.

www.accobams.org

THE RAMOGE AGREEMENT

The RAMOGE area includes the maritime areas of the Provence-Alpes-Côte d'Azur region, the Principality of Monaco and the Italian region of Liguria, forming a pilot area to prevent and combat marine pollution. The RAMOGE agreement is an instrument of scientific, technical, legal and administrative cooperation allowing French, Monegasque and Italian governments to carry out actions for integrated coastal management.

www.ramoge.org

MEDITERRANEAN SCIENCE COMMISSION (CIESM)

CIESM has supported multilateral research in the Mediterranean and the Black Sea since 1910, the date it was founded. It is a unique forum for scientific discussion and dialogue, bringing together thousands of researchers who, together, use the newest technologies and approaches to understand, monitor and protect a very exposed sea. The Commission is able to define the Mediterranean's priorities in terms of marine and environmental research with greater impartiality, consolidated by the political support of its 23 Member States.

www.ciesm.org

THE INTERNATIONAL HYDROGRAPHIC ORGANISATION (IHO)

The International Hydrographic Organisation (IHO) is the intergovernmental body responsible for ensuring that all seas, oceans and navigable waters are hydrographically surveyed and mapped through the coordinated efforts of national hydrography services. The IHO has been hosted by the government of Monaco since its creation in 1921 and currently has 93 member states worldwide.

www.iho.int

INDEMER: THE INSTITUTE OF THE ECONOMIC LAW OF THE SEA

The Institute of the Economic Law of the Sea, founded in 1985 as an approved Monegasque association, whose patron is HSH the Sovereign Prince of Monaco. Its primary goal: to carry out studies and research concerning legal, economic, social and environmental issues raised by the use of the ocean and the marine environment.

www.indemer.org

INTERNATIONAL ATOMIC ENERGY AGENCY

The IAEA Environmental Laboratories, located in Monaco and Seibersdorf, Austria, work with Member States to develop strategies for sustainable management of their land, marine and atmospheric resources. Together, they apply nuclear and isotope science to understand and mitigate the environmental impact of radionuclides, trace metals, organic contaminants (PCBs, hydrocarbons), as well as to study the impacts of climate change, habitat destruction and the loss of biodiversity. This includes inspecting and monitoring contaminants in the oceans, such as mercury or plastics, as well as biotoxins linked to microalgae, and studying how they are transferred to marine animals.

www.iaea.org

MONEGASQUE ASSOCIATION FOR THE PROTECTION OF NATURE (AMPN)

The Monegasque Association for the Protection of Nature (AMPN) manages two Marine Protected Areas (MPA) in Monaco, which it created in 1976 and 1986.

It regularly develops monitoring and research programmes. This includes work carried out on 3D printed artificial reefs submerged in the Larvotto MPA. These lead to the development of innovative tools to protect or reinforce biodiversity. AMPN also created the Monaco Educational Marine Area for which it plays a central role. Its expertise contributes to its success, and guarantees that children can play their part in environmental protection.

www.ampn-nature-monaco.com

BEYOND PLASTIC MED - BEMED

With over 3 trillion microplastic particles, the Mediterranean is the most polluted sea in the world. Faced with this finding, the Prince Albert II of Monaco Foundation asked the Tara Océan Foundation, Surfrider Foundation Europe, and the MAVA Foundation to join forces and launch the Beyond Plastic Med (BeMed) initiative during the international conference “Plastic in the Mediterranean: what next?” which was held in Monaco in March 2015.

In January 2019, the Beyond Plastic Med (BeMed) association was founded and is now led by a large group, as the IUCN wanted to get involved alongside the founding members. As BeMed’s goal is to act at the source of the problem, the association aims to support and network stakeholders committed against plastic pollution in the Mediterranean, implement sustainable solutions, encourage the research of new alternatives and rally stakeholders and the general public through knowledge and sharing best practices.

www.beyondplasticmed.org

THE MEDFUND
ENVIRONMENTAL FUND FOR MEDITERRANEAN MARINE PROTECTED AREAS (MPAS)

The MedFund is an environmental trust fund based in Monaco, specifically dedicated to funding marine protected areas (MPA) in the Mediterranean. Founded in 2015 by Monaco, France and Tunisia with the support of the Prince Albert II of Monaco Foundation, MedPAN network and SPA/RAC, the MedFund realises the commitment by several Mediterranean countries and international environmental organisations who believe that immediate action is required to protect the future of the Mediterranean and its populations.

The environmental fund partially relies on an innovative funding mechanism which aims to capitalise a solid financial amount whose regular profits are reinvested sustainably in MPA support. Transparent and secure, The MedFund observes a responsible investment policy which helps address the issues of a new, more sustainable Mediterranean economy.

www.themedfund.org

OCEAN ACIDIFICATION AND OTHER OCEAN CHANGES – IMPACTS AND SOLUTIONS – OACIS

Ocean Acidification and other ocean Changes – Impacts and Solutions (formerly the Monegasque Association for Ocean Acidification - AMAO) is a Monegasque association founded in 2013 on the initiative of the Prince Albert II of Monaco Foundation to study the impact of climate change on the ocean, such as acidification, as well as potential solutions to mitigate its impacts. It is hosted by the Prince Albert II of Monaco Foundation.

OACIS involves several stakeholders: the Prince Albert II of Monaco Foundation, the Monaco Government, the IAEA environment laboratories, the Monaco Scientific Centre and Oceanographic Institute, as well as representatives from the International Union for Conservation of Nature (IUCN) and the French Scientific Research Centre (CNRS).

STARS'N'BARS

A Premier Sports Bar and family restaurant in Monaco since 1993, STARS'N'BARS (founded by Kate and Didier) decided to make environmental awareness, well-being and personal development a priority, whilst continuing to offer a diverse menu based on home-made, organic dishes.

STARS'N'BARS is a vital player in the sustainable development of the Principality, and plays an active role in events such as *Monaco Ocean Week*, Le Salon Ever, L'Eco Race …

www.starsnbars.com

The organisers would like to thank
Rolex and Barclays Private Bank
for their invaluable support for the *Monaco Blue Initiative*
and *Monaco Ocean Week*, as well as all partners who took part
in this 2021 edition.

Printing | Graphic Service - Imprim'vert Cetified (www.gsmonaco.com)
This book is printed on FSC Certified paper.

Photo credits | Shutterstock.com : Craig Lambert Photography, Antonio Martin, Wirestock Creators, Damsea **/** pixabay.com : Marcelo Kato **/** pexels.com : Francesco Ungaro, Artem Beliaikin, Eric Chen, Daniel Torobekov, Irlando Calzada

Coordination | The *Monaco Ocean Week* team of the Prince Albert II of Monaco Foundation: Philippe Mondielli, Nadège Massé
Graphic design and creation | Grégory Cheyroux - greg.cheyroux@gmail.com
Editing | Caroline Audibert **/** Prince Albert II of Monaco Foundation

PRINCE ALBERT II
OF MONACO
FOUNDATION

Villa Girasole 16, Boulevard de Suisse
98 000 MONACO
Tel: +377 98 98 44 44
Fax: +377 98 98 44 45
www.fpa2.org

monacooceanweek.org