

# 2020

# ANNUAL REPORT



Khaled bin Sultan  
Living Oceans  
Foundation

## MESSAGE FROM THE CHAIRMAN

By all accounts, 2020 was an extremely successful year for the Khaled bin Sultan Living Oceans Foundation (KSLOF). It was certainly a challenging year, but also a productive one, primarily because we were able to adapt to changes imposed by the COVID-19 pandemic. Although we were not able to travel to share our findings at international conferences or complete some of our Mangrove Education and Restoration programs, we published a record number of scientific reports from the **Global Reef Expedition**, and we were here to help teachers and students with the transition to remote learning. This year, students flocked to our award-winning **Education Portal**. When we first launched this online educational platform four years ago, we had no idea how valuable it would become to teachers looking to provide their students with a quality STEM education from home. We are thrilled to see it being used around the world to educate and inspire the next generation of ocean advocates.

The Foundation also adapted this year as an organization, transitioning to a fully **remote work environment**. We had temporarily closed our office for the safety of the employees at the start of the pandemic, but decided to continue working remotely once we realized how efficient our team could be while working from home. This decision turned out to be good for the Foundation, our staff, and the environment. By working remotely, we have significantly reduced our operating costs, provided some welcome flexibility for our team, and cut our carbon footprint.

With travel curtailed, we spent 2020 analyzing the massive amounts of data we collected during the Global Reef Expedition. This year, we released **Global Reef Expedition Final Reports** from our missions to Tonga, the Cook Islands, the Solomon Islands, Palau, and New Caledonia. On these research missions, scientists encountered reefs with incredibly high coral cover and a stunning diversity of fish, but they also observed many signs of the unfolding coral reef crisis. Our reports provide countries with valuable information on the state of their reefs as well as conservation recommendations that could help them protect and preserve these reefs for generations to come.

Data from the Global Reef Expedition also continues to be used to **model coral reef resilience** as part of the Foundation's collaboration with the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS). Together, we are developing a scientific methodology to map the resiliency of coral reefs so we can identify which reefs are more likely to cope with stressors such as warming events or tropical storms.

Twenty years ago, I established the Khaled bin Sultan Living Oceans Foundation to help protect and preserve our living oceans. As we **celebrate the Foundation's 20th anniversary** this year, I could not be prouder of what we have been able to accomplish. Over the years the Foundation has worked with hundreds of scientists to conduct research missions in every tropical ocean basin, educated thousands of students around the world about life beneath the waves, and showcased the wonders of the ocean through our films and community outreach programs. Still, there is more work to be done, and I look forward to seeing what we can accomplish in the coming years as we continue to pursue our mission to **protect and restore ocean health by providing science-based solutions**.

**His Royal Highness Prince Khaled bin Sultan**

Chairman & President

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# SCIENCE

This year was a challenging yet very successful year for KSLOF's Science Department. In 2020, we focused on Global Reef Expedition (GRE) data modeling, the completion of GRE final country reports, applying for grant funding with our collaborators, external research, and, of course, peer-reviewed publications. Initially, 2020 was going to be a blockbuster year for presenting findings and results from the GRE. A total of eight abstracts were accepted by two prestigious international conferences, the IUCN World Conservation Congress in France and the 14th International Coral Reef Symposium in Germany. Unfortunately, due to COVID-19, these conferences were postponed to 2021 and 2022, respectively.

Renée Carlton, Marine Ecologist for the Foundation, continued analysis and writing of the final country reports for the Global Reef Expedition. In 2020, she successfully finished reports for the Solomon Islands and the Republic of Palau and completed the first draft of the final country report for the Chagos Archipelago.

Alex Dempsey, the Director of Science Management, continued her analysis of the GRE data and assisted in the formulation of the final country reports. In conjunction with this effort, Alex also supervised the re-mapping endeavor of the shallow water habitats of the Farasan Banks with King Abdullah University of Science and Technology (KAUST) in Saudi Arabia, focusing on possible shifts in seagrass and algae habitats from the Foundation's maps in 2009.

Capitalizing on the Global Reef Expedition data, the Living Oceans Foundation has forged new collaborations. One such collaboration resulted in a revisit to the Red Sea by KSLOF Chief Scientist Sam Purkis. In the Fall of 2020, Sam participated in a joint six-week expedition mounted between NEOM — a planned cross-border city in the Tabuk Province of NW Saudi Arabia — and OceanX, the ocean-exploration initiative of Dalio Philanthropies. The cruise was conducted aboard OceanXplorer, a research vessel furnished with state-of-the-art tools for seabed mapping. This research mission complemented work Sam conducted with KSLOF nearly 15 years earlier during our first research mission to the Red Sea. Whereas in 2007 KSLOF focused on mapping the shallow-water reefs in the

northern Red Sea and setting a baseline for their health and vitality, the focus of the latest expedition was on the deep-water ecosystems. This new focus shed light on the incredibly high diversity of reef morphology in the waters offshore Saudi Arabia. Much laboratory analysis lies ahead in 2021, with a view to a follow-up cruise in collaboration with NEOM and OceanX, tentatively scheduled for 2022.

Meanwhile onshore, Dr. Art Gleason, a Research Associate Professor also at the University of Miami, has been working with Sam to refine an innovative way of mapping the bathymetry of Earth's coral reefs from orbit. This initiative calls upon NASA's Ice, Cloud, and Land Elevation Satellite-2 (ICESat-2) and the Advanced Topographic Laser Altimeter System (ATLAS) sensor which flies aboard it. This sensor has the potential to penetrate water, and Art and his collaborators want to see if it can be used to assess bathymetry from space, using the high-resolution bathymetry data we collected on the GRE as a reference.

On another front, U. Miami doctoral student Anna Bakker has been preparing ecological models that combine the GRE field assessments with physical and anthropogenic variables captured by remote sensing to predict reef health, globally. To help in this effort, Anna is taking courses on cutting-edge topics in Artificial Intelligence, Machine Learning, and Deep Learning that are relevant to solving Earth System Science problems. Ms. Bakker is close to completion of GRE predictive models and has the necessary background to meld the latest technologies into the Foundation's conservation work.



## PUBLICATIONS

Global Reef Expedition: Solomon Islands. Final Report. Carlton, R., Dempsey, A., Lubarsky, K., Akao, I., Faisal, M., and Purkis, S. (2020). Khaled bin Sultan Living Oceans Foundation, Annapolis, MD. Vol 11.

Smallhorn-West, Patrick F., Sophie E. Gordon, Alexandra C. Dempsey, Sam J. Purkis, Siola'a Malimali, Tu'ikolongahau Halafihi, Paul C. Southgate, Tom C. L. Bridge, Robert L. Pressey, and Geoffrey P. Jones. (2020). Tongan socio-environmental spatial layers for marine ecosystem management. *Pacific Conservation Biology*. 26, 1–7.

Global Reef Expedition: The Republic of Palau Final Report. Final Report. Carlton, R., Dempsey, A., Lubarsky, K., Faisal, M., and Purkis, S. (2020). Khaled bin Sultan Living Oceans Foundation, Annapolis, MD. Vol 12.

# COMMUNICATIONS

In 2020, as the pandemic brought people home and online, the Khaled bin Sultan Living Oceans Foundation stepped up to engage our community through our publications and digital media, focusing on communicating our scientific findings from the Global Reef Expedition and promoting the resources available on our Education Portal.

This year we published more scientific reports than ever before. In 2020, KSLOF published all of our findings from our Global Reef Expedition missions to the Western Pacific, including Tonga, the Cook Islands, New Caledonia, the Solomon Islands, and Palau. The Communications Department worked hand-in-hand with the science team to get these reports into the hands of people that could use them for conservation. The vital information in these reports can help marine managers identify and address threats to their reefs and coastal marine ecosystems, help communities track changes to their reefs and fish communities over time, and provide policymakers with the information they need to sustainably manage their marine resources. We share each Global Reef Expedition country report with government officials, park managers, stakeholders, and conservation organizations so our research could be used to protect and preserve the reefs.

We also invited the media to showcase our research in prominent news outlets around the world. Feature stories about KSLOF and our work appeared in dozens of news outlets this past year, including *Saving Earth Magazine*, *Scuba Diver Magazine*, *ECO Magazine*, *NBC News*, and

KSLOF's **communications** efforts are designed to inspire **conservation action.**

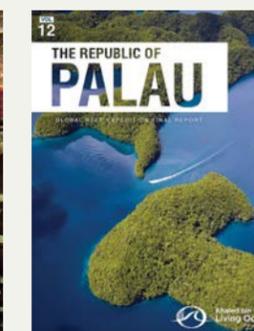
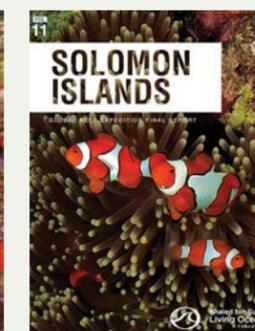
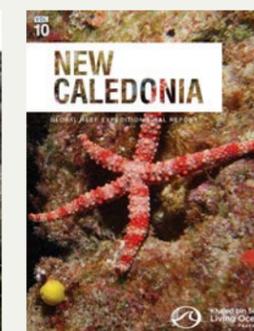
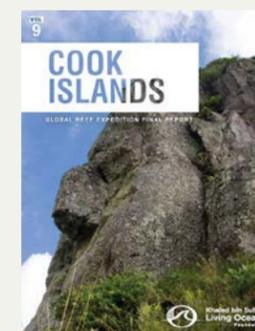
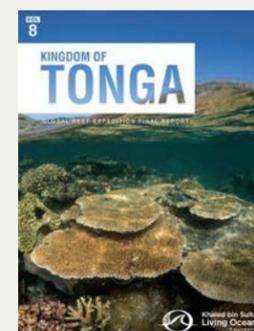
*Dateline Pacific.* These articles covered the Foundation's scientific findings from the Global Reef Expedition, as well as our programs to restore mangrove forests and educate the next generation of ocean advocates.

In addition to working more closely with the media, the Foundation engaged our followers online through numerous blogs, social media posts, and articles about our work. This included several series highlighting specific findings from our Global Reef Expedition Final Reports, a lovely series on our Jamaican Mangrove Education and Restoration program, and another promoting the online resources available on our Education Portal. Our lesson plans and educational resources became such a valuable resource for students transitioning to remote learning that we had to update our website to accommodate the increase in traffic.

And last but not least, in celebration of the Foundation's 20th anniversary, we published *The Khaled bin Sultan Living Oceans Foundation: Two Decades of Aquatic Life Exploration*. This book commemorates all of the incredible work the Foundation has done to preserve, protect, and restore the world's oceans and aquatic resources since His Royal Highness Prince Khaled bin Sultan Al-Saud established the Foundation in 2000. Since then, we have achieved a great deal using our three-pronged approach of science, outreach, and education to conserve vulnerable coral reef ecosystems. Learn more about our successes by downloading the digital book from our website at [LOF.org](http://LOF.org).



## 2020 GLOBAL REEF EXPEDITION FINAL REPORTS



# EDUCATION

## MANGROVE EDUCATION & RESTORATION PROGRAMS

Our Mangrove Education and Restoration Program is a two-year immersive, experiential education program that engages high school students and teachers in the Caribbean to learn about, restore, and monitor mangroves through project-based learning. The program faced many challenges and hardships during the 2019-2020 academic school year. Hurricane Dorian swept over the Abaco Islands, The Bahamas in September 2019 just prior to implementing our Bahamas Awareness of Mangroves (B.A.M.) program. The hurricane demolished the island's infrastructure, forcing most people to evacuate permanently. Needless to say, we postponed the B.A.M. program. Our hearts continue to go out to all of the people of the Abacos, especially our B.A.M. family, as they rebuild and heal from this tragic event.

For the 2019-2020 school year, the Foundation focused our Mangrove Education and Restoration efforts in Jamaica, where we successfully implemented the first two phases of the Jamaica Awareness of Mangroves in Nature (J.A.M.I.N.) program. We partnered with the University of the West Indies Discovery Bay Marine Lab to implement programming at William Knibb High School, and at Port Antonio and Titchfield High Schools, we teamed

up with Alligator Head Foundation. Shortly after the second phase of the program, COVID-19 became a global pandemic. With Jamaican schools closing and everyone's health at risk, we decided to cancel the final phase of the J.A.M.I.N. program.

However, even though in-person instruction was canceled, our work on mangroves continued. With COVID still looming over the 2020-2021 academic year, the Foundation started developing a virtual Mangrove Education and Restoration Program. In addition to providing students with an opportunity to participate in the program while learning from home or in a hybrid learning environment, a virtual program will allow the Foundation to expand our Mangrove Education and Restoration programs in the region.

## EDUCATION PORTAL

As schools shut down due to COVID-19, the Education Portal, which hosts our *Coral Reef Ecology Curriculum*, became an even more valuable resource to teachers and students around the world as they adjusted to e-learning. With grant funding from the Jerome S. & Grace H. Murray Foundation, we were able to update the curriculum and create additional resources. To make life easier for teachers and parents, we compiled our best e-learning videos, activities, and worksheets from our curriculum. We created a new tab under the education section of our website called "[E-Learning](#)" which lists all of the activities that are best for learning at home. We were also able to add video scripts to our "Watch It" video worksheets, which are designed to help students understand concepts in our films. These scripts will be especially useful for students who are hearing impaired or have learning disabilities. Each week a new fact is posted on our Education Portal about coral reefs called "Fact Friday." Funding allowed us to create a year's worth of new facts on the Education Portal and social media channels.



# EDUCATION

## SCIENCE WITHOUT BORDERS® CHALLENGE

The *Science without Borders® Challenge* was developed to get students and teachers around the world more involved and interested in ocean conservation through art. This annual international contest inspires students to learn about important ocean issues while creating artwork that promotes public awareness of the need to preserve, protect, and restore the world's oceans and aquatic resources; thus, contributing to the overarching motto of the Foundation—Science without Borders®.

The theme for the 2020 competition was *Take Action: Conserve Coral Reefs*. Students were asked to use their artistic talents to create a piece of art that illustrates one or more of the different actions that can be taken to preserve coral reefs.

The *Challenge* is judged in two categories: middle school students (ages 11-14) and high school students (ages 15-19). Overall, the Foundation received 689 submissions from 43 different countries, more than we have ever received before.

Stacey Lei won first place in the high school category for her stunning artwork, "The Reef We Read." A 16-year-old student at West Career and Technical Academy in Las Vegas, Nevada, Stacey created a piece of art that illustrates the importance of education and outreach in coral reef conservation. "Coral reefs are dying because of negative human activities," she said. "The lack of awareness surrounding the reefs have contributed to its destruction, but education paves our future."

First place in the middle school category went to 14-year-old Anish Aradhey from Harrisonburg, Virginia. His piece, "Coral Reef Superhero," shows how kids his age can make a difference in marine conservation. Anish said that he "portrayed a young girl picking up beach trash to show the importance of youth regarding coral reef conservation" and that she "demonstrates a small yet heroic action to solve this issue." He says that his painting "aims to thank coral reef 'superheroes' and inspire a new generation of young, active leaders."

**Science Without Borders®** is the motto of the **Khaled bin Sultan Living Oceans Foundation**. It guides all of our work as we pursue our mission to **preserve, protect, and restore** the world's **oceans** and **aquatic resources**.

### High School First Place:



#### THE REEF WE READ

by Stacey Lei  
Age 16, United States

### Middle School First Place:



#### CORAL REEF SUPERHERO

by Anish Aradhey  
Age 14, United States

# FINANCIAL STATEMENT

## KHALED BIN SULTAN LIVING OCEANS FOUNDATION

### STATEMENT OF FINANCIAL POSITION

As of December 31, 2020

	TOTAL
<b>ASSETS</b>	
<b>Current Assets</b>	
Cash and cash equivalents	\$289,565
Prepaid Expenses	\$3,175
<b>Total Current Assets</b>	<b>\$292,740</b>
<b>Furniture and Equipment</b>	
Furniture and equipment, net	\$19,917
<b>TOTAL ASSETS</b>	<b>\$312,657</b>
<b>LIABILITIES AND NET ASSETS</b>	
<b>Current Liabilities</b>	
Accounts payable and accrued expenses	\$24,983
Grants payable	\$74,000
<b>Total Current Liabilities</b>	<b>\$98,983</b>
<b>TOTAL LIABILITIES</b>	<b>\$98,983</b>
<b>Net Assets</b>	
Without donor restrictions	\$213,674
<b>TOTAL NET ASSETS</b>	<b>\$213,674</b>
<b>TOTAL LIABILITIES AND NET ASSETS</b>	<b>\$312,657</b>

## MANY THANKS TO OUR DONORS

PRINCE KHALED BIN SULTAN  
NATIONAL GEOGRAPHIC  
THE JEROME & GRACE MURRAY FOUNDATION



# BOARD & ADVISORS

## BOARD OF DIRECTORS



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PRINCE KHALED BIN SULTAN**  
Chairman and President

**HER ROYAL HIGHNESS  
HALA BINT KHALED**  
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ABUZINADA**  
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- SHAWN MCLAUGHLIN, PH.D.
- SAM PURKIS, PH.D.



# STAFF

## STAFF



**SAM PURKIS, PH.D.**  
Chief Scientist



**ALEXANDRA DEMPSEY**  
Director of Science Management



**AMY HEEMSATH**  
Director of Education



**RENÉE CARLTON**  
Marine Ecologist



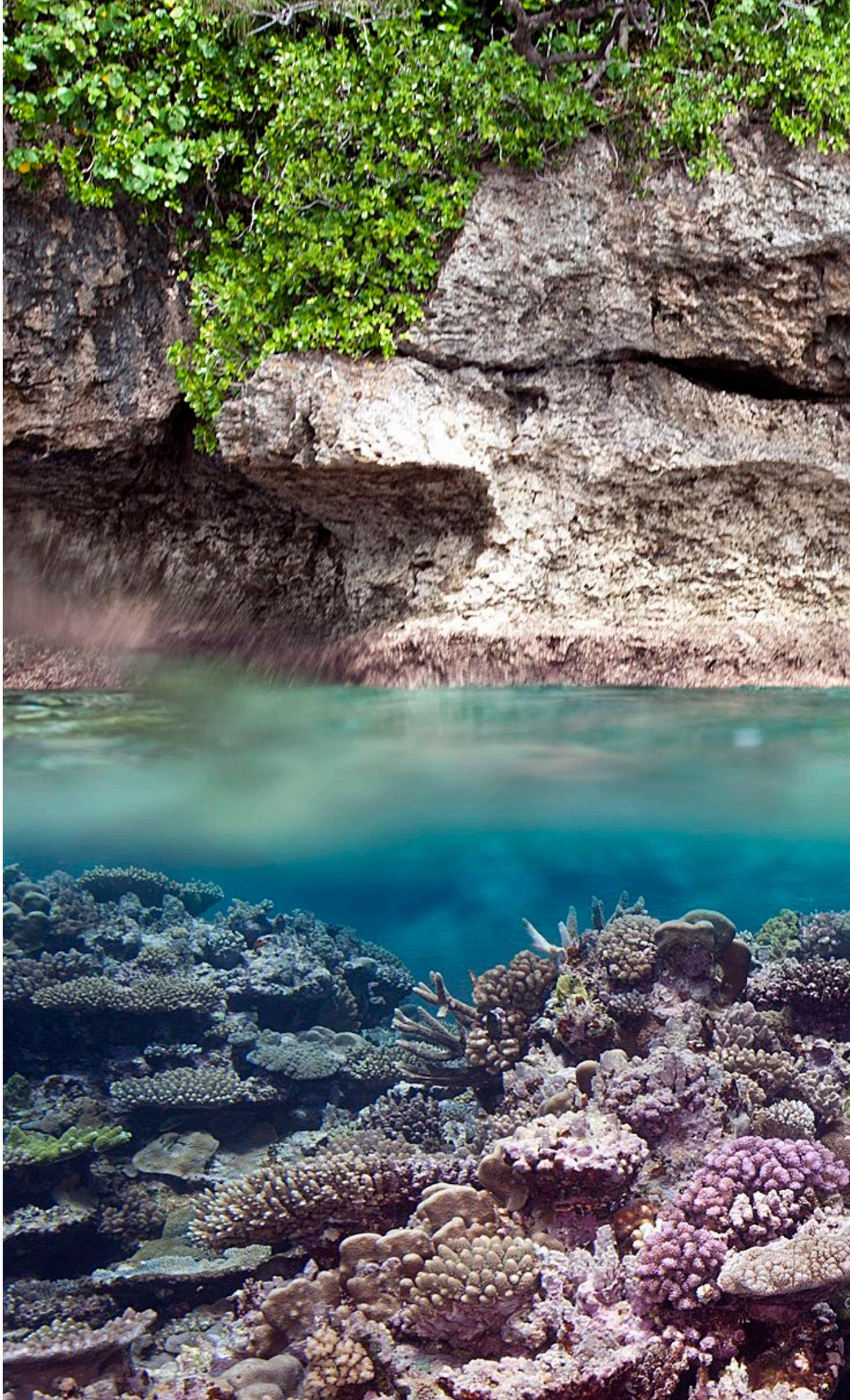
**LIZ THOMPSON**  
Director of Communications



## 2020 BY THE NUMBERS

- 166,900 WEBSITE VISITORS
- 159,615 SOCIAL MEDIA REACH
- 27,000 EDUCATION PORTAL USERS  
FROM **145** COUNTRIES
- 20,000 KM<sup>2</sup> OF REEFS MAPPED
- 13,289 REEF TRANSECTS ANALYZED
- 2,420 WORLD REEF MAP USERS
- 1,500 SUPERCOMPUTER HOURS
- 689 SWB CHALLENGE STUDENTS  
FROM **43** COUNTRIES
- 300 SUBMERSIBLE DIVE HOURS
- 209 J.A.M.I.N. PARTICIPANTS
- 76 MEDIA APPEARANCES
- 6 SCIENTIFIC REPORTS
- 1 RESEARCH MISSION





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