2017 ANNUAL REPORT

Khaled bin Sultan
Living Oceans
Foundation

MESSAGE FROM THE EXECUTIVE DIRECTOR

Throughout 2017, the Foundation Staff completed the arduous task of cataloguing and quality-controlling the "big-data" we collected during the ***Global Reef Expedition*** field work component (2011-2015). In collaboration with the University of Miami (RSMAS), we have embarked on a scientific path to model "potential resilience" of the coral reefs around the globe surveyed during the ***Global Reef Expedition***. Coral reefs that are "resilient" can absorb stressors such as warming events and tropical storms, recover quickly and continue to be healthy and productive. Measuring ecosystem resilience typically would entail careful long-term monitoring before and after disturbance events. More expediently, scientists believe that we can measure certain variables that serve as good proxies for predicting the potential of a coral reef to be resilient. Our scientific probing of the "big data" has commenced with Fiji as a test case. Once we perfect the scientific methodology in that small region, we will begin to scale it to our entire global dataset. If successful, the result will be a map of "potential resilience" across 15 countries around the globe that will be an invaluable guide to inform conservation efforts.

We are very proud of the success enjoyed from the Foundation's first full year of operating our Education Portal. It is an award-winning, online resource being used around the world to reinforce STEM learning. Teachers can search on a standard they want to teach and be rewarded with turn-key lesson plans, vocabulary, quizzes and so many more engaging materials to stimulate students' desire to learn. We also had great success with our immersive hands-on Caribbean STEM education programs based on mangrove science. The Foundation is enthusiastically supported in the Bahamas and Jamaica through our STEM out-of-classroom education programs. Once a student collects a mangrove propagule (seedpod), grows it, measures it, graphs its growth progress, and plants it back in the mangrove forest, s/he will never forget the science, technology, engineering and math fundamentals learned throughout that hands-on experience. There is no better way to educate youth in our opinion.

Finally, our Communications team enjoyed great acclaim through the success of our film that we co-produced with the Smithsonian Channel. An ***Ocean Mystery: The Missing Catch*** won many awards from national and international film festivals.

By all accounts, 2017 was an extremely successful and productive year for the Khaled bin Sultan Living Oceans Foundation.

Philip G. Renaud
Executive Director

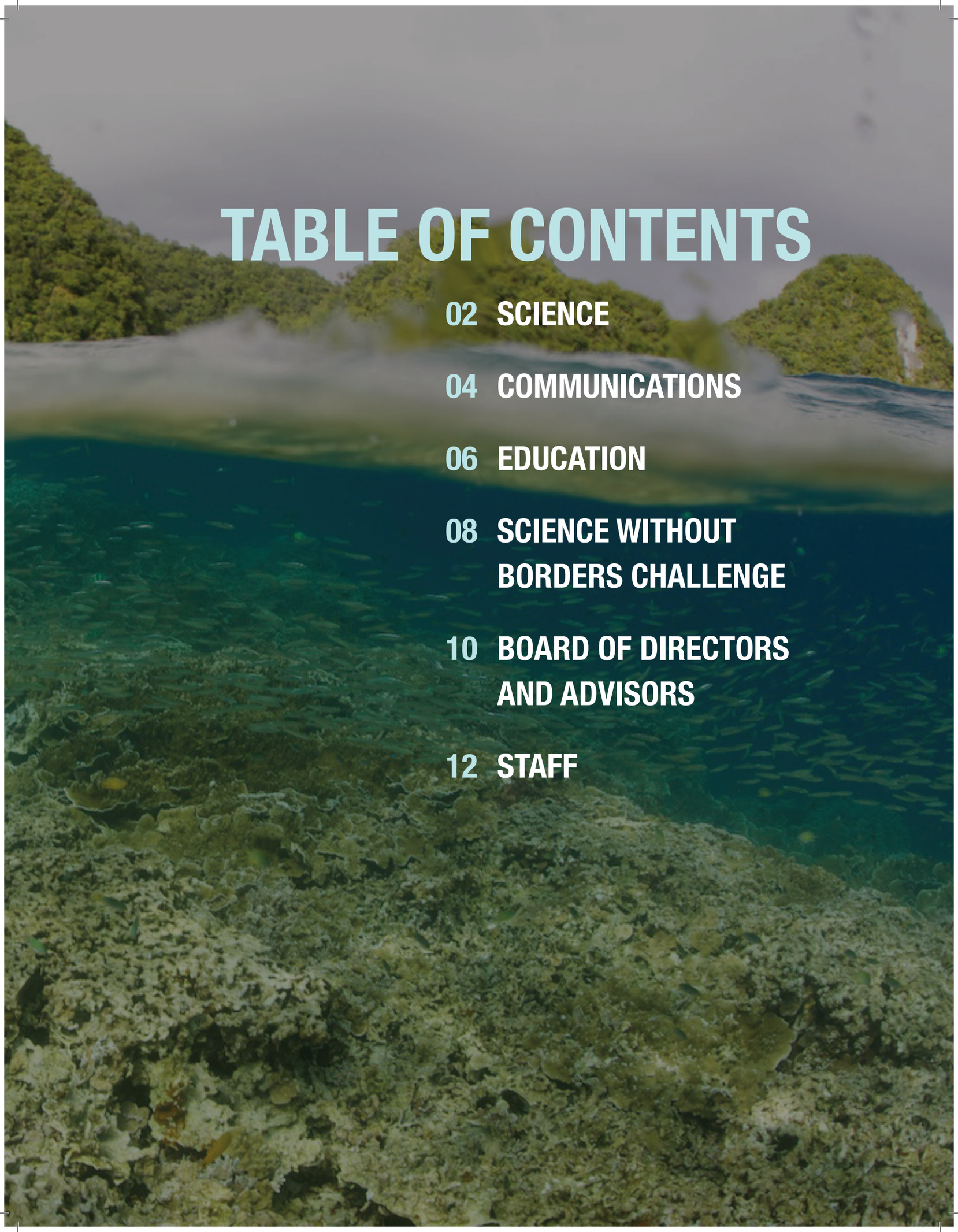


TABLE OF CONTENTS

SCIENCE

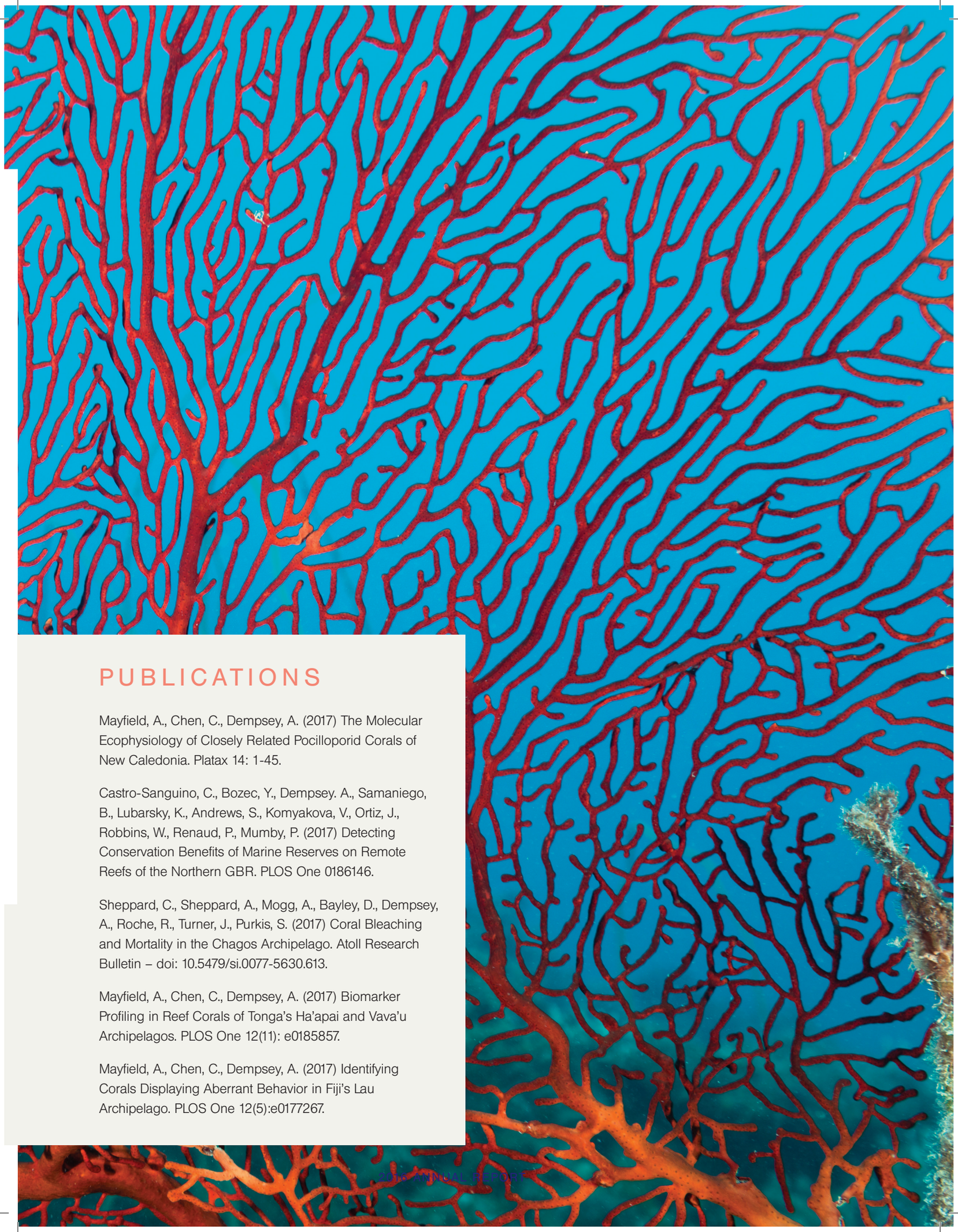
This year was a productive one for the Science Department with a primary focus on the Global Reef Expedition (GRE) data analyses and publication efforts. In 2017, we authored a total of five peer-reviewed scientific journal publications with several other manuscripts currently under review. These publications were written in partnership with former Living Oceans Foundation Fellows and scientific collaborators from all over the world. To develop these publications, we examined GRE data collected in Fiji, Tonga, Cook Islands, the Great Barrier Reef, and the British Indian Ocean Territory. Spearheaded by our Marine Ecologist, Renée Carlton, we successfully published the final country reports for both French Polynesia and Tonga. The Cook Islands report was also drafted and will be the first report published in 2018.

The Foundation's Global Map Portal has been updated to include an additional 38 islands from French Polynesia, Tonga, Fiji, Solomon Islands, and New Caledonia. This update included habitat photographs and documentation, metadata files, bathymetry maps, and close to 1,000 live streaming video clips.

In May, our Director of Science Management, Alexandra Dempsey, traveled to Fiji to represent the Foundation on the Conservation International (CI) research mission in the Lau Province with the goal of revisiting to Foundation legacy sites we established during the GRE. She was able to collect valuable data to enhance our current GRE dataset. This mission was imperative as it provides critical time-series data which will allow us to develop stronger statistical analyses when developing our GRE global synthesis. This time series data will also prove critical in the development of long-term monitoring and management protocols in the area. While there, Alexandra delivered the final country reports and met with government officials, NGO representatives, and traditional leaders who contributed to the implementation of a Marine Protected Area (MPA) encompassing the Navatu Atoll.

In 2017, the Foundation's Interim Chief Scientist, Dr. Sam Purkis, orchestrated a capstone effort for the GRE in collaboration with the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS). The objective of this ongoing effort is to synthesize the GRE dataset by generating products which can be used to address the coral reef crisis. These products take two forms: first, scientific understanding and advancements disseminated through journal publications; second, tools to nourish local management initiatives and partnerships with international conservation entities. Both products are intended to support the designation of MPAs. The effort has followed several themes in parallel, with work generally falling under two broad umbrellas. First, scientists at RSMAS, in close collaboration with the Foundation staff, are analyzing the GRE data to understand spatial patterns of coral reef resilience. Second, researchers at The National Aeronautics and Space Administration Ames Research Center have been using the GRE remote sensing products to train a new generation of image processing routines capable of monitoring global coral reef health.

Coral reef resilience is the ability of these ecosystems to resist disturbances and rapidly recover from stress as the ecosystem continues to be healthy and able to produce the goods and services that benefit humans. It is estimated that one billion people worldwide have some dependence on coral reefs for food and income from fishing. Our overarching goal is to map "potential resilience" of all the coral reefs we surveyed throughout the five-year GRE. Achieving this objective will be extremely helpful to coral reef resource managers around the world as they will be able to focus their limited resources on managing and protecting the coral reefs that have the highest potential resilience in the face of climate change stressors.



PUBLICATIONS

Mayfield, A., Chen, C., Dempsey, A. (2017) The Molecular Ecophysiology of Closely Related Pocilloporid Corals of New Caledonia. Platax 14: 1-45.

Castro-Sanguino, C., Bozec, Y., Dempsey. A., Samaniego, B., Lubarsky, K., Andrews, S., Komyakova, V., Ortiz, J., Robbins, W., Renaud, P., Mumby, P. (2017) Detecting Conservation Benefits of Marine Reserves on Remote Reefs of the Northern GBR. PLOS One 0186146.

Sheppard, C., Sheppard, A., Mogg, A., Bayley, D., Dempsey, A., Roche, R., Turner, J., Purkis, S. (2017) Coral Bleaching and Mortality in the Chagos Archipelago. Atoll Research Bulletin – doi: 10.5479/si.0077-5630.613.

Mayfield, A., Chen, C., Dempsey, A. (2017) Biomarker Profiling in Reef Corals of Tonga's Ha'apai and Vava'u Archipelagos. PLOS One 12(11): e0185857.

Mayfield, A., Chen, C., Dempsey, A. (2017) Identifying Corals Displaying Aberrant Behavior in Fiji's Lau Archipelago. PLOS One 12(5):e0177267.

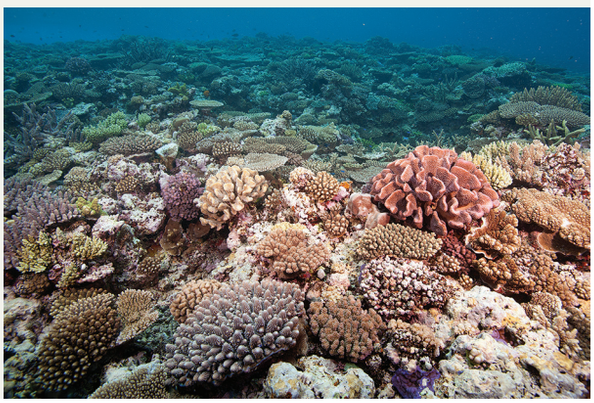
COMMUNICATIONS

This year the Communications Department focused on strengthening our partnerships with other conservation organizations, as well as continuing to promote the work of the Living Oceans Foundation through our website and social media platforms. With our partnerships in mind we held a variety of joint events and produced several joint films.

In April, we celebrated Earth Day with the film premiere of *An Ocean Mystery: The Missing Catch* at the Smithsonian Museum of Natural History in Washington DC. This film features the work of fisheries scientist Dr. Daniel Pauly. It focuses on a big-data research project he led to calculate the amount of fish that have been caught worldwide since the 1950s. The message of the film is about the critical need for accurate data in marine conservation, which is a core value of the Living Oceans Foundation.

The Film and the Foundation were promoted heavily by the Smithsonian Institution and members of Oceana, Pew, Rare, World Wildlife Fund and Conservation International were in the audience. The film was followed by a panel discussion among the Smithsonian, The Living Oceans Foundation, The University of British Colombia, and Rare.

In June, we strengthened our partnership with UNESCO Marine World Heritage creating a joint project for World Oceans Day. Working hand in hand with UNESCO, the Foundation's Communications Department devised a publicity campaign called *My Ocean Pledge.* We created a short film with children who live in UNESCO marine World Heritage sites around the globe. The film encouraged world leaders to demonstrate their own commitment to ocean protection by making their own Ocean Pledge.



Working hand in hand with UNESCO, the Foundation's Communications Department devised a publicity campaign called **My Ocean Pledge.**

The film had its premiere in the General Assembly Hall of the United Nations, in New York, to a collective audience of world dignitaries. The children featured in the film also joined the event to personally deliver their request for commitments to ocean conservation. Ultimately the campaign was able to secure the signatures of leaders from several countries including that of Prince Albert II of Monaco.

In the fall, we produced a film about our Education Department's work on mangrove restoration in the Caribbean. We produced this in conjunction with some of our partners from The Bahamas Awareness of Mangroves (B.A.M.) and the Jamaica Awareness of Mangroves in Nature (J.A.M.I.N.) projects. In the Bahamas we worked with Friends of the Environment from Abaco and Forest Heights Academy. In Jamaica, our featured partners were University of the West Indies and William Knibb High School.

We edited the film in our headquarters in Annapolis, and then we returned to the Caribbean to show the film. It was met with tremendous success by the partners involved in the filming and has now additionally been shown to all our B.A.M and J.A.M.I.N partners. We have used the film as part of the recruitment process to encourage even more schools to join in the B.A.M. and J.A.M.I.N project to help ensure the protection for more mangrove areas in these countries.

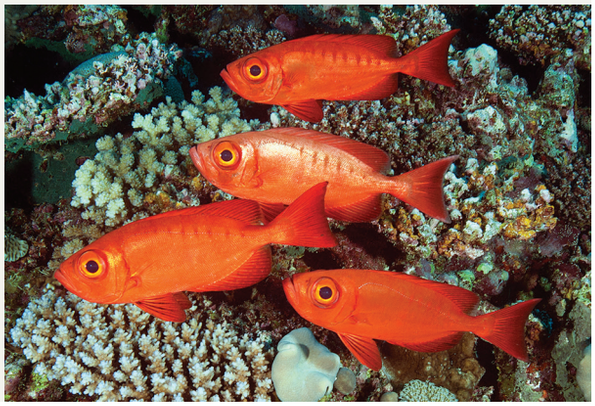
EDUCATION

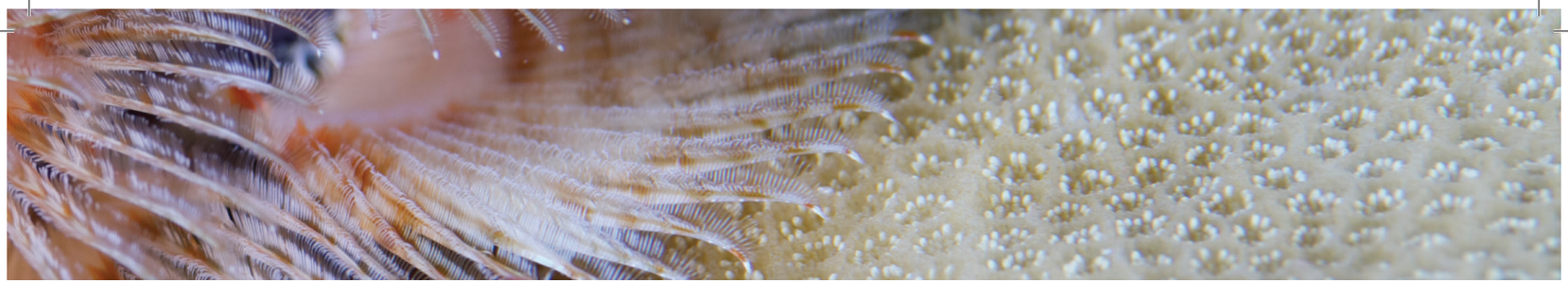
CORALS IN THE CLASSROOM

In 2016, the Foundation launched the Education Portal, a state-of-the-art online learning platform which hosts our *Coral Reef Ecology Curriculum.* This award-winning curriculum is a comprehensive educational resource for teachers and students interested in learning about coral reefs. It includes a wide variety of educational materials including custom-built interactive exercises, lesson plans, educational videos, and quizzes, all aligned to the latest education standards (Next Generation Science Standards, Common Core State Standards, and Ocean Literacy Principles).

In 2017, the Foundation provided Corals in the Classroom professional development workshops to introduce middle and high school teachers to our *Coral Reef Ecology Curriculum.* During these workshops, we delivered a set of classroom ready activities from our curriculum. Teachers learned background information on coral biology and ecology as well as current issues facing coral reefs. These workshops helped build the teachers' understanding of coral habitats and how they can integrate ocean science into their classrooms, while still meeting school standards.

In 2017, the Maryland Department of Education designated our Corals in the Classroom workshop as a Continuing Professional Development Experience. As a result, Maryland teachers who attended our two-day workshop were eligible to receive one continuing education credit.





MANGROVE EDUCATION & RESTORATION PROGRAMS

During the 2016-2017 school year, the Foundation successfully implemented our Mangrove Education and Restoration Programs in the Caribbean. The Bahamas Awareness of Mangroves (B.A.M.) and the Jamaica Awareness of Mangroves in Nature (J.A.M.I.N.) programs provide a two-year immersive, experiential education that engages high school students and teachers to learn about, restore, and monitor mangroves through project-based learning.

In order to provide additional learning opportunities for program participants, the Foundation formed two new partnerships — North Carolina State University (NCSU) and Seville Heritage Park.

The Foundation has partnered with NCSU to incorporate citizen science into the Foundation's B.A.M. and J.A.M.I.N. programs. NCSU Ph.D. candidate, Ryann Rossi, studies mangrove disease throughout The Bahamas and Ryann started a citizen science program to aid in data collection. The Foundation and NCSU have co-developed a lesson plan that incorporates her research into the Foundation's existing *Mangrove Ecology Curriculum.* Not only will students contribute to science, but they will also develop new skill sets by conducting scientific methodologies that most people do not encounter until they go to college.

Seville Heritage Park is a 300-acre cultural heritage site in Jamaica. It is also listed as "tentative" on the UNESCO World Heritage List. Through a partnership with Seville Heritage Park, the Foundation brings J.A.M.I.N. participants to this site to learn about and restore mangroves along the coastline.

Not only will students contribute to science, but they will also develop new skill sets by conducting scientific methodologies that **most people do not encounter until they go to college.**

EDUCATION

SCIENCE WITHOUT BORDERS CHALLENGE

The Science without Borders® Challenge contest was developed to get students and teachers around the world more involved and interested in ocean conservation through various forms of art. This annual international contest inspires students to be creative while using different types of media to promote 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 2017 Science without Borders® Challenge was *Reef Superspecies.* The Challenge is open to middle school students (11-14 year-olds) and high school students (14-19 year-olds). Overall, the Foundation received 277 submissions from 28 different countries.

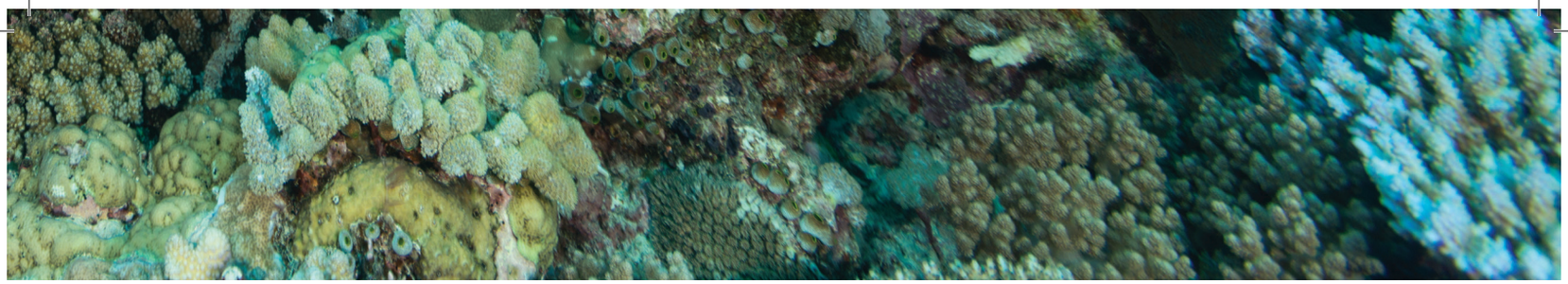
Middle School Winners:

1

2

3

First Place: *A Fish Coral Reef* by Nikita Bagrintsev, Age 11; St. Petersburg, Russia
Second Place: *Hippocampus Oxygenus* by Alicja Dudek, Age 14; Nowy Dwor Mazowiecki, Poland
Third Place: *The Oil Terminator* by Urvi Jain, Age 14; Gwalior, India;



High School Winners:

1

2

3

First Place: *Liberty Turtle (Libertatum testudo graeca)* by Rebecca Kneale, Age 15; Tauranga, New Zealand
Second Place: *Dragon Fruit Sea Turtle* by Hyunseo Ju, Age 18; Fort Worth, Texas, United States
Third Place: *Zì_ur* by Farah Sara Kurnik, Age 17; Ljubljana, Slovenia

BOARD & ADVISORS

BOARD OF DIRECTORS

HIS ROYAL HIGHNESS
PRINCE KHALED BIN SULTAN
Chairman and President

HER ROYAL HIGHNESS
HALA BINT KHALED
Director

GENERAL CHARLES HORNER,
USAF (RET.)
Vice Chairman

CAPTAIN PHILIP RENAUD,
USN (RET.)
Executive Director

IAN FAIR
Chief Financial Officer

MOHAMED FAISAL,
D.V.M.,PH.D.
Lead Scientist

SHAWN MCLAUGHLIN, PH.D.
Secretary

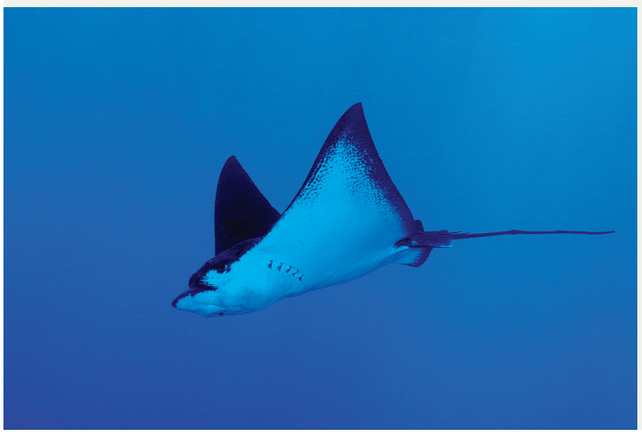
PROFESSOR ABDULAZIZ
ABUZINADA
Director

SCIENTIFIC ADVISORY COUNCIL

SYLVIA EARLE, PH.D.
JOHN MCMANUS, PH.D.
PETER MUMBY, PH.D.
BERNHARD RIEGL, PH.D.
MOHAMED FAISAL, D.V.M., PH.D.
SHAWN MCLAUGHLIN, PH.D.
SAM PURKIS, PH.D.

ADVISORS

STEPHEN BOND
JOHN IND, MD



IN MEMORY OF

WILLIAM EDGAR ‘BILL’ BEAMER

JULY 19, 1940 – SEPTEMBER 18, 2017

Bill Beamer was a beloved legal advisor to the Khaled bin Sultan Living Oceans Foundation Board of Directors since the inception of the organization. Bill was proud of his Navy roots, having served four years on ships engaged in the Vietnam War. Once Bill became an attorney, he always made time to serve in various philanthropic organizations, particularly focused on human and environmental wellness. Bill was instrumental in establishing the legal framework of the Living Oceans Foundation and subsequently provided HRH Prince Khaled bin Sultan with years of impeccable legal advice which has greatly contributed to the success of the Foundation. Bill was always a gentleman and a true family-man. Bill is survived by his wife of 50 years (Sharon), three sons (William, Jonathan, and Michael), 11 grandchildren, and his extended ‘family’ at the Living Oceans Foundation. We all miss him dearly.

STAFF

STAFF

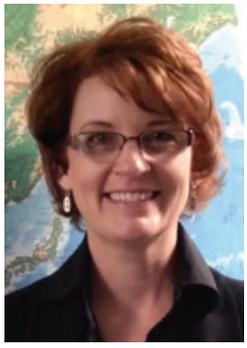
CAPTAIN PHILIP RENAUD, USN (RET.)
Executive Director

ALEXANDRA DEMPSEY
Director of Science Management

SAM PURKIS, PH.D.
Interim Chief Scientist

RENÉE CARLTON
Marine Ecologist

ALISON BARRAT
Director of Communications



PATTY ALLEN
Office Manager

AMY HEEMSOTH
Director of Education

Khaled bin Sultan
Living Oceans
Foundation