



**Khaled bin Sultan
Living Oceans**
Foundation



GLOBAL REEF EXPEDITION

2014 Annual Report

Message From the Executive Director

2014 marked the fourth year of our historic Global Reef Expedition. On our journey around the world's coral belt we have been rewarded with scientific discoveries and concerned by the pace and scale of the coral reef crisis. During the first half of 2014 we spent time on land processing some of our coral reef data while our research ship, the *M/Y Golden Shadow*, underwent a 20 year inspection and overhaul.

In September we were back at sea on one of the world's most iconic reefs, the Great Barrier Reef (GBR) in Australia. The GBR is the world's most extensive and richest coral reef ecosystem, earning UNESCO World Heritage Site status in 1981. It is one of the most actively managed coral reef ecosystems on the planet, hopefully serving as a model for the future. We were there to survey reefs on the more remote northern section of the GBR.

We have a standard methodology that we have been using to collect data from reefs in different countries. Ultimately this will allow us to compare reefs from different sides of the planet and draw conclusions about the global state of our reefs. On the Great Barrier Reef, aside from our standard global reef expedition surveys, we surveyed the fish and corals in conservation zones established by the Great Barrier Reef Marine Parks Authority.

The GBR is a multiple-use region. Zones colored pink are 'no-go' areas, green zones are 'no-take', and yellow zones are 'limited-take' areas. We dived and collected data in each of these zones, and while we witnessed that the zoning appears to be having a positive effect we are anxious to complete the data analyses to confirm this.

Our year ended with a successful survey and mapping of the coral reefs of the Solomon Islands. The Solomon Islands are at the eastern edge of the Coral Triangle, the global epicenter of marine biodiversity. While the reefs there are still remarkably alive and diverse, rapid population growth is placing more and more pressure on the fragile reef resources. We hope that our surveys, maps, and recommendations will inform the Solomon Islands in future conservation efforts.

Thanks for your interest in our work to conserve the world's oceans!



CAPT Philip G. Renaud, USN (Ret.)

Table of Contents

Message From the Executive Director

Science Without Borders® _____ 2

Global Reef Expedition Overview _____ 3

GRE by the Numbers _____ 3

Research Missions

Northern Great Barrier Reef _____ 4

Solomon Islands _____ 6

Communications _____ 7

Education Highlights _____ 8

Staff and Fellows _____ 11

Board of Directors and Advisors _____ 12

Scientific Advisory Council _____ 12

Statement of Financial Position _____ 13

Science Without Borders®

The Living Oceans Foundation embraces *Science Without Borders*® in all facets of its operations. *Science Without Borders*® is registered to the Foundation for financial sponsorship of marine conservation programs and scientific research and to promote public awareness of the need to preserve, protect and restore the world's oceans and aquatic resources. The Global Reef Expedition has embodied the purposes of this trademark through both an unprecedented level of collaborative scientific research and an ambitious education and outreach program. Through the Foundation's scientific work, local resource managers and scientists from countries around the globe are receiving critical scientific information and tools to inform the management and conservation of their marine resources. Additionally, local scientists work side-by-side with internationally acclaimed coral reef scientists. The international team of scientists aboard the research vessel, *M/Y Golden Shadow* map and survey coral reefs to close critical gaps in scientific knowledge. The Foundation also trains local scientists and resource managers to continue environmental monitoring long after the *Golden Shadow* departs the region. Upon completion of the field work in each region, the Foundation and its partners compile and analyze comprehensive coral reef data, satellite imagery, photos and video and use the knowledge to guide development of regional and global conservation tools and tactics to counter the most serious threats impacting the health of coral reefs.

Note: First use of this service mark by the Living Oceans Foundation in the United States was recorded on December 3rd, 2000. The service mark "Science Without Borders®" was officially registered on September 9, 2003, with the United States Patent and Trademark Office under Reg. No. 2,760,882. The registration was renewed for a ten-year period on January 3, 2013. The mark is also registered with the Registrar of Trade Marks in Australia as Trade Mark No. 1092400 and with the European Community as Trade Mark Reg. No. 4756797. Protection of the trademark is also registered in the Kingdom of Saudi Arabia under the registration No. 1236/21. The purpose of the mark is to provide financial sponsorship of marine conservation programs and scientific research and to promote public awareness of the need to preserve, protect and restore the world's oceans and aquatic resources.

Sylvia Earle presenting HRH Prince Khaled bin Sultan his Lifetime Achievement Award from the Wildlife Conservation Film Festival.



Global Reef Expedition Overview

The Khaled bin Sultan Living Oceans Foundation has successfully completed the fourth year of our hallmark Global Reef Expedition. The overarching goals of this ambitious program are to rapidly close gaps in the world's scientific knowledge about coral reefs, create high-resolution maps of these rich ecosystems, educate and inspire, and provide sound recommendations for management.

Comparing the health and resilience of remote coral reefs with reefs that have been affected by chronic over-use and pollution permits the Foundation to identify resource management priorities. As a public benefit organization, we openly share data and results with host countries, non-governmental organizations, and the public to empower people with knowledge. We develop tools and decision aids to influence policy and stimulate actions urgently needed to improve coral reef health. We proudly claim that this Global Reef Expedition is the first coral reef expedition in history to employ standardized scientific protocols across the global landscape.

Conducting scientific research and developing conservation tools is only part of our strategy to protect and preserve coral reef ecosystems. The scale and pace of the coral reef crisis needs to be confronted with adequate resources and a sense of urgency. Our strategy includes creative efforts to educate and inspire people to take action. By utilizing the latest educational technologies, filmmaking, Internet curriculum, and social media, learners around the globe are able to personally take part in the Global Reef Expedition.

Thanks for your interest and support. It's not too late to preserve the amazing diversity of life in our oceans!

GRE By the NUMBERS 2014

3,458,261	depth soundings collected
127,137	minutes of dive time by all divers (88 days underwater)
62,135	corals surveyed, measured, and catalogued
3,402	fish surveys conducted
3,231	km ² of coral reef habitat mapped
3,102	benthic surveys conducted
1,702	coral surveys conducted
760	underwater videos of coral reef habitats collected
612	species of fish recorded
583	km of coral reef habitat tracked
476	tissue samples taken from corals to assess symbionts
392	coral tissue samples collected to assess health
104	separate reefs thoroughly surveyed
62	sediment samples collected for analysis
61	days of research completed in 2014
25	scientists participated in the research missions
10	different islands, atolls, and banks researched
4	years of the Global Reef Expedition completed
1	The most important coral reef expedition in history

Global Reef Expedition Research Missions

During 2014, the Living Oceans Foundation conducted two research missions, one to the Great Barrier Reef, Australia and one to the Solomon Islands. In Australia we examined the effectiveness of the marine zoning implemented on the Great Barrier Reef (GBR). Our research will help determine if protection (no-take Marine Protected Areas or MPAs) of reef systems has a positive effect in restoring depleted shark, grouper, and pelagic fish populations, and if the protection benefits the coral communities. We also examined if there were additional benefits from excluding boats, fishermen, and divers from an area (no-take and no entry MPAs). The GBR mission included nearshore, midshelf and outer reefs across 5 degrees of latitude. In the Solomon Islands we evaluated coral reef systems off high volcanic islands and atolls, comparing large lagoonal reefs and fore reef communities different distances from human populations and between fished (open access) sites and MPAs. Our surveys encompassed five regions and 11 islands. Spending more than 88 days of combined bottom time underwater, we were able to assess and characterize 104 coral reefs. This effort represents a multinational collaboration, in partnership with the Catlan Seaview, OceansWatch, Solomon Islands Ministry of Fisheries and Marine Resources, and the Great Barrier Reef Marine Park Authority. A total of 22 scientists participated in each mission with representatives from 9 universities, 3 government agencies and 3 non-government conservation organizations—Science without Borders!

The northern Great Barrier Reef

In September, we embarked on what is perhaps the most complex research project completed during the Global Reef Expedition, the Great Barrier Reef, Australia. This work involved a continuation of our global assessment of reef health and resilience, but unlike past efforts we were seeking answers to specific questions regarding the effectiveness of coral reef management. Unlike past efforts, habitat mapping was not a component of this mission, mainly because these reefs have been mapped and extensively researched, and the reef systems are managed under one of the most comprehensive systems of zoning in existence, which includes 30% designated as no-take MPAs. The main objective of our research was to evaluate the effects of different management regimes on reef fish, coral, and benthic communities, and how these help mitigate impacts from human activities such as fishing pressure as well as global scale threats from temperature stress, storms, crown of thorns starfish and other stressors associated with climate change. Our surveys focused on 30 reefs in the northern Great Barrier Reef, extending from 11° to 15° south latitude. The sites were selected in triplicate, spanning inner, mid-shelf and outer shelf locations, with representative locations within the Preservation (Pink) Zone, Marine National Park (Green) Zone and Habitat Protection (Blue) Zone. What was unique about the zoning, is that we were able to evaluate differences between areas open to fishing (blue zone) with areas closed to fishing (green zone) and areas that are completely closed to all activities (no boats were allowed to enter these areas). Furthermore, there was a gradient of human pressure,

with some of the central reefs located close to populated areas (near Lizard Island) and the northern reefs located off unpopulated coastlines.

The amount of data collected during this mission exceeded all previous GRE missions. Surveys were completed at 166 sites on 29 reefs with scientists conducting 145 shark and pelagic fish surveys, 565 reef fish surveys, 864 benthic surveys, 432 coral surveys, 381 rugosity assessments, and 1,932 photo-transects. We discovered some promising benefits of the zoning scheme, with abundances of sharks, other top predators and pelagic species elevated over historic surveys, and an increase in the numbers of juvenile and small sharks, all suggesting the protection is working. We also observed prominent differences between locations on the shelf with both fish and coral communities differing among nearshore, midshelf and offshore reefs and also between northern and central sites. The healthiest and most diverse reef systems were those in the north, while some of the central reefs, especially near Lizard Island and to the south had been badly impacted by crown of thorns outbreaks and recent cyclone damage. However, the high numbers of newly settling corals, low amounts of seaweed and healthy populations of herbivorous fish were all indicative of healthy, resilient reef systems that could rebound quickly from these impacts. This mission provided good evidence of the importance of no-take marine protected areas, both as a refuge for critical species and as seed stock to replenish open access reef systems. It also provided an opportunity to witness the amazing diversity and beauty of an intact coral reef ecosystem.



Solomon Islands

During October and November, we surveyed coral reefs off Solomon Islands, a group of densely vegetated, volcanic islands and low-lying atolls located northeast of Australia, at the eastern edge of the coral triangle. During the research mission, we mapped and characterized shallow marine habitats and surveyed coral reefs off the western islands surrounding Munda, Arnavon, Gizo, and Marovo Lagoon and around the more remote Santa Cruz Islands of Vanikoro, Utupua, Reef Islands and Tinakula. Our surveys involved an assessment of the health of corals, algae, fish and commercially valuable invertebrates with additional research on the effects of temperature and changing ocean chemistry on coral health and growth. We also partnered within the Catlin Seaview Survey to create interactive three-dimensional images of reefs using a unique propeller-driven, high definition, 360 degree panoramic camera system. For the second half, we worked with OceansWatch to remove crown of thorns starfish from an affected reef and to evaluate the benefits of a locally managed MPA.

Both coral and fish communities in the Solomon Islands were the most diverse we had witnessed to date, with over 450 species of corals and 600 species of fish. Each reef had unique assemblages of corals with different dominant species and variations in species and growth forms found at different depths and habitat type, between lagoonal and fore reef environments, and between exposed and protected locations. Many reefs had single species assemblages that

formed unusually large stands, with one species coalescing into a coral thicket of a different species. While many reefs had flourishing coral communities that extended well below our 30 m survey depth, it was more typical to find high amounts of living coral in shallow water and unusually thick mats of cyanobacteria, calcareous green coralline algae and fleshy seaweed in deeper water with little coral. Many of the shallow reefs had stunning assemblages of branching, digitate and tabular acroporids and large stands of foliaceous and plating corals in deeper water. We also found sites where most of the corals had died, and surviving colonies showed signs of recent partial mortality from disease, snail predation, overgrowth by sponges and algae, evidence of past storm damage and extensive bioerosion. Fortunately, outbreaks of voracious crown of thorns starfish were only found on four reefs.

Although reef fish communities were diverse, many areas were overfished. There were far fewer sightings of top predators such as sharks and groupers, and those that were seen were often small in size. The dominant predators were snappers, and with few exceptions, they occurred in low abundances. Even herbivores were smaller in size and less abundant compared to other sites examined during the GRE. Most locations were dominated by small-bodied fish such as damselfish, butterflyfish and wrasses, and many of the other reef fish populations were made up mostly of juveniles. There were exceptions, however. Marine protected areas had large populations of schooling herbivores and a high fish biomass of snappers, brems and herbivorous surgeonfish and parrotfishes and in general most of the reefs in the more remote Santa Cruz Islands had larger populations of pelagic predators such as jacks and barracudas, as well as snappers, groupers and sharks, and large bumphead parrotfish, Napoleon wrasse and schooling herbivores.

These surveys illustrated the unusual diversity of species of plants and animals found in this region, as well as the impacts of human activities and the importance of marine protected areas for their conservation.

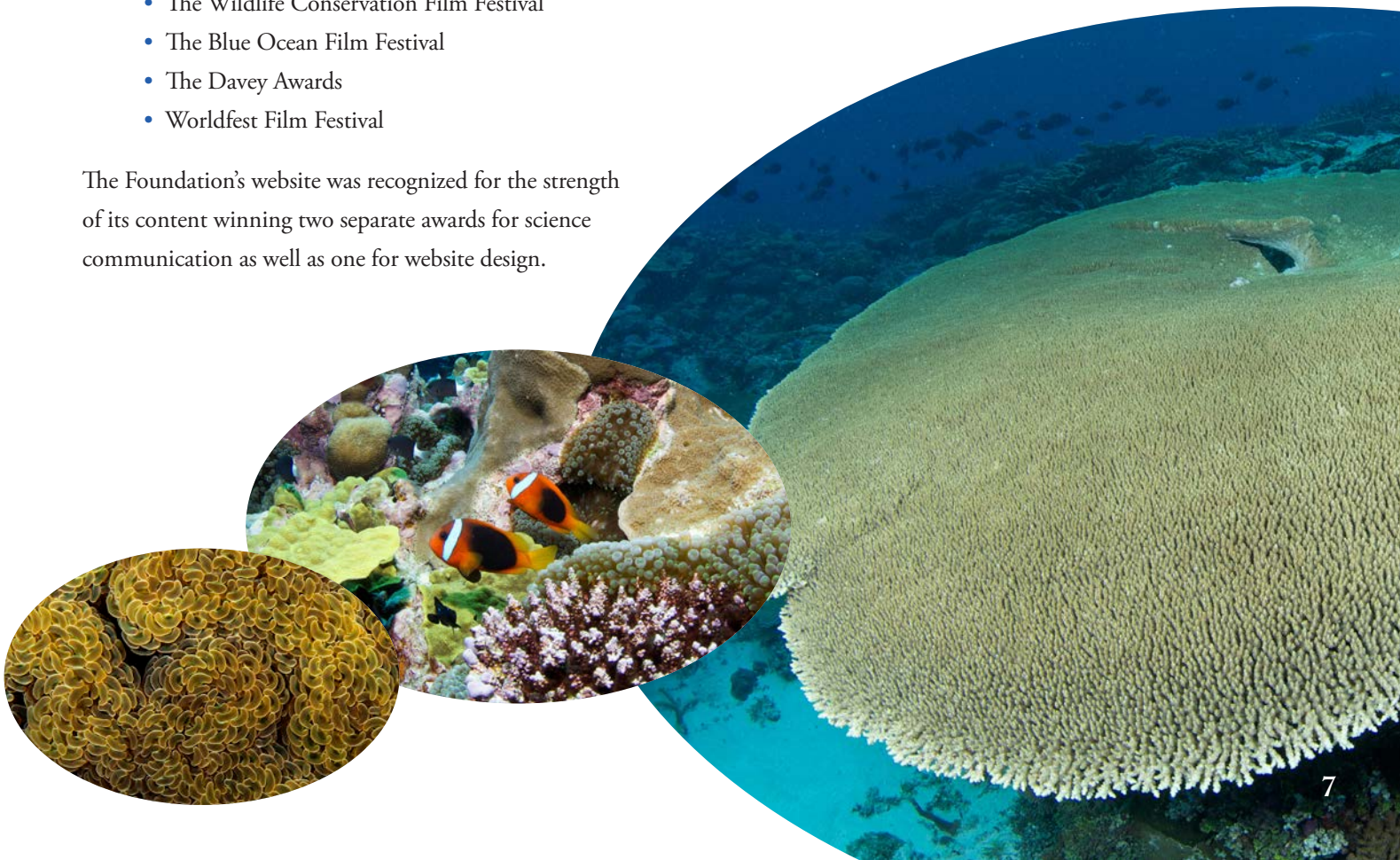


Communications

The Khaled bin Sultan Living Oceans Foundation is committed to communicating coral reef science and the value of coral reef conservation to communities around the world. We believe that helping people to connect with marine life in an emotional way, as well as boosting their understanding of it, is vital for lasting ocean conservation. Notable accomplishments in 2014 include:

- A quarterly newsletter to deliver updates from our research sites, some of the spectacular photographs taken on location, as well as articles covering the results of our scientific research. Visit www.lof.org to subscribe.
- A photography exhibit of underwater images taken by award winning photographer Michele Westmorland during one of our research expeditions. Michele's visit was part of our ongoing partnership with the International League of Conservation Photographers (iLCP). Another iLCP photographer, Jurgen Freund, was hosted on our mission to the Great Barrier Reef.
- Our first annual film screening and live science event to celebrate World Oceans Day was held in June. In partnership with the Annapolis Maritime Museum, a premier film screening of our award winning documentary 'Sharks of the Coral Canyon' was held, followed by a science question and answer with shark expert Dr. Will Robbins live from Australia.
- High quality films produced by the Foundation continued to achieve recognition for their cinematography and science and conservation messages, winning 7 different awards from:
 - The American Conservation Film Festival
 - The Wildlife Conservation Film Festival
 - The Blue Ocean Film Festival
 - The Davey Awards
 - Worldfest Film Festival

The Foundation's website was recognized for the strength of its content winning two separate awards for science communication as well as one for website design.



2014 Education Highlights

Science without Borders® Challenge

The theme for this year's conservation art contest was "Protect Our Coral Reefs." In all, the Foundation received 39 digital and hand made artworks from eight different countries. Winning submissions included students from Morocco, the Philippines, South Korea, and the United States.

Education Workshops and Presentations

The Foundation continues to support the Global Reef Expedition through education. During the Solomon Islands mission, the Foundation conducted land-based seminars to primary and secondary schools, as well as to communities. Overall, the Foundation conducted four school seminars, 25 community seminars, and four ship tours reaching a total of 2,638 people.



Programs

Two new education programs were successfully piloted in 2014. These programs were initiated in countries where the Foundation previously conducted research for the Global Reef Expedition. The aim of our education programs is to increase environmental awareness and ocean literacy. Formal evaluations and needs assessments were implemented to evaluate the effectiveness of the project and to assess the educational needs of each country.

- **Tonga Coral Reef Education Pilot Project** was initiated in the Vava'u Island Group in June 2014. The Foundation provided coral reef seminars to 1,668 students, teachers, and principals. Research was collected in upper elementary and secondary schools and it will be used to determine information such as prior knowledge and attitude, knowledge retention, and whether there was a change in action regarding coral reefs. This information will be used to develop coral reef educational resources and programs in targeted countries.
- In October 2014, the **Mangrove Education and Restoration Project** was implemented in two high schools near Falmouth, Jamaica. This project is called the Jamaica Awareness of Mangroves in Nature (J.A.M.I.N.). The Foundation has partnered with the University of the West Indies Discovery Bay Marine Laboratory to carry out this project. The Foundation has developed a mangrove curriculum that includes hands-on, collaborative activities for students and teachers to help them learn about, and restore, the mangrove ecosystem.





Khaled bin Sultan Living Oceans Foundation Staff

Executive Director

Captain Philip Renaud, USN (Ret.)

Chief Scientist

Andrew Bruckner, Ph.D.

Director of Communications

Alison Barrat

Director of Education

Amy Heemsoth

Communications Manager

Elizabeth Rauer

Coral Reef Ecologist

Alexandra Dempsey

Office Manager

Patricia Allen

Fellows

Badi Samaniego

João Monteiro, Ph.D

Anderson Mayfield, Ph.D

Steve Saul, Ph.D



Board of Directors

Chairman and President

His Royal Highness,
Prince Khaled bin Sultan

Vice Chairman

General Charles Horner, USAF (Ret.)

Executive Director

Captain Philip Renaud, USN (Ret.)

Chief Financial Officer

Ian Fair

Lead Scientist

Mohamed Faisal, D.V.M., Ph.D.

Secretary

Shawn McLaughlin, Ph.D.

Director

Professor/Dr. Abdulaziz Abuzinada

Advisors

Douglas Baldwin

Stephen Bond

John Ind, MD

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.

Andrew Bruckner, Ph.D.

Abdulaziz Abuzinada, Ph.D.

Shawn McLaughlin, Ph.D.

Sam Purkis, Ph.D.



Statement of Financial Position

December 31, 2014

ASSETS 2014

Current Assets

Cash and cash equivalents	\$ 911,698
Investments	300,000
Prepaid expenses	46,595
Contributions receivable	50,000
Total Current Assets	1,308,293

Furniture, equipment and improvements net	125,495
---	---------

Other Assets:

Investment restricted for endowment fund	1,729,436
Deposits	4,589
Total Current Assets	1,734,025

Total Assets	\$3,167,813
---------------------	--------------------

LIABILITIES AND NET ASSETS

Current Liabilities

Accounts payable and accrued expenses	\$ 77,561
Grants payable	140,000
Total Current Liabilities	217,561

Total Liabilities	217,561
--------------------------	----------------

Net Assets:

Unrestricted	
Undesignated	97,080
Board designated—endowment	300,000
Board designated—operational contingency reserves	673,736
	1,070,816

Temporarily restricted	150,000
Permanently restricted	1,729,436

Total Net Assets	2,950,252
-------------------------	------------------

Total Liabilities and Net Assets	\$3,167,813
---	--------------------

Khaled bin Sultan Living Oceans Foundation

8181 Professional Place, Suite 215, Landover, MD 20785

(301) 577-1288 Toll-free (877) 484-3623

www.livingoceansfoundation.org

info@lof.org

Executive Director: CAPT Philip G. Renaud, USN (Ret.)



Printed on 60% post-consumer paper. Please recycle.

An American Non-profit Public Benefit Corporation. ©2014 Khaled bin Sultan Living Oceans Foundation. All rights reserved.