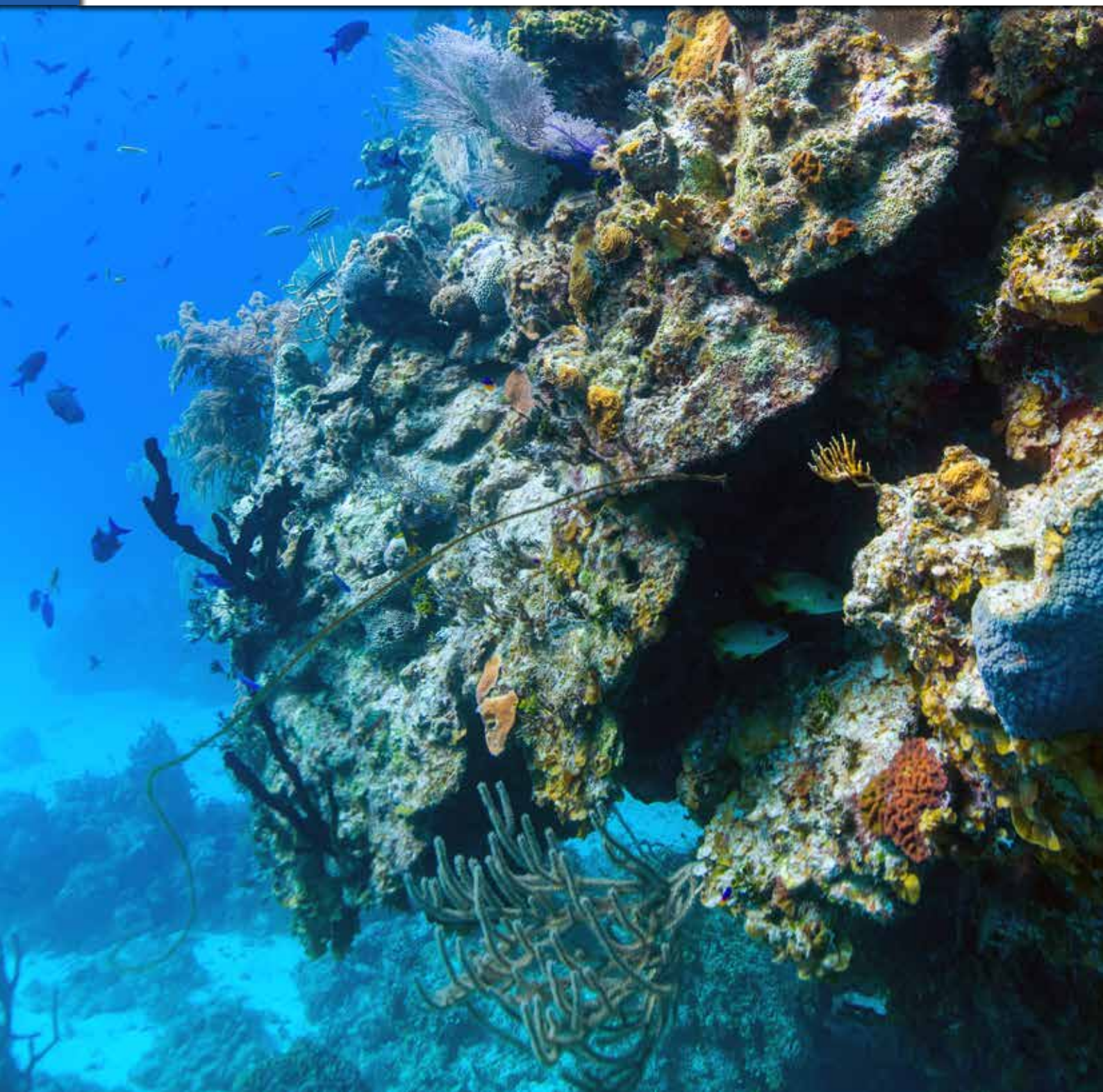
2020 Edition

Perry Institute for Marine Science

ANNUAL REPORT



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2020 IN REVIEW

FUTURE DIRECTIONS

Message from the Director

Dear Friends of PIMS,

A year ago, I was preparing a message for our annual report and reflecting on the challenges we faced in 2019. I was full of hope for the new year, but just a few months into 2020, everything changed. The COVID-19 pandemic has limited our field work, restricted travel, and even affected some of our traditional funding sources. We've been forced to adapt as a result - spending more time analyzing data collected over the past few years; developing cutting-edge photogrammetry tools that are yielding new information on coral reefs; and publishing a new Coral Reef Report card featuring reef health assessments from 11,670 m^2 of seafloor over the past five years. We hosted webinars instead of in-person meetings, expanded our base of support and entered into new partnerships. Due to the hard work of our staff and supporters, we were not only able to adapt to the "new normal", but were able to thrive, ending the year stronger than we projected. In 2020 we grew our revenues by over 15%, launched a new program to engage local communities in conservation, and added four new positions.

But 2020 still had its challenges. In March, our last major field expedition documented the first Bahamian outbreak of Stony Coral Tissue Loss Disease (SCTLD), a recently discovered disease that infects about half the coral species in the region, spreading quickly and killing at an astonishing rate. Within a few weeks it can kill corals that are centuries old. By June we verified the disease off Nassau and by the end of the year, off the north Eleuthera. Responding to this disease will be one our top priorities in 2021.

DR. CRAIG DAHLGREN | EXECUTIVE DIRECTOR

3D MODELLING & PHOTOMOSAICS

This 3D model depicts a **brain coral** suffering from **Stony Coral Tissue Loss Disease** (above).

*The **same infected coral is displayed in a higher resolution** 3D model (right bubble).*

OUR 2020 IMPACT

184,857
PHOTOS STICHED TOGETHER INTO PHOTOMOSAICS

8.3 TRILLION
PIXELS FROM 2013-2015

1.6 HECTARES
OF REEF ANALYZED

INSPIRING REEF EDUCATION

In addition to its incredible power as a research tool, photogrammetry can be used to **visualize the underwater world in 3D** – helping us educate and inspire people who may never get the chance to SCUBA dive themselves. We can combine our models with tools like virtual reality to provide **immersive reef experiences never before possible.**

At PIMS, we're using **photogrammetry** to create incredibly **detailed photomosaic maps and 3D models of sections of coral reef.** These maps and models are basically virtual versions of the coral reefs themselves, allowing us to collect and analyze data from the reefs after the fact. By conducting repeated surveys of reef sites, **we can detect changes in reef health, species abundance, and even coral growth, down to a fraction of a millimeter** (our average resolution is 0.25 millimetres)**.** In 2020, PIMS capitalized on the additional time out of the water due to the global pendemic by undertaking a project to **organize, process, and catalog the many thousands of photos** taken as part of our over the past several years.

MODELLING HURRICANE DORIAN'S IMPACT

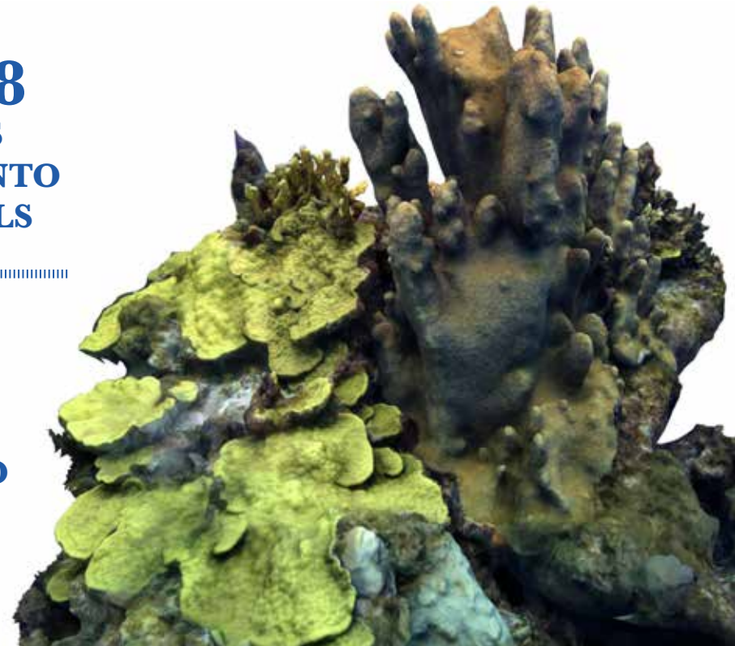
A big chunk or our work involves analyzing our 2019 data collected off Grand Bahama and Abaco immediately following **Hurricane Dorian.** Specifically, we're using our maps and photomosaics to collect **benthic cover data, structural complexity measurements, and change analysis at sites with pre-existing photogrammetry data.**

We also use this technology to track **outplant growth and survival of Critically Endangered corals,** as well as their contribution to **reef structure at restoration sites.** Lastly, we're meauring the prevalence and spread of **Stony Coral Tissue Loss (SCTLD)** on reefs in Grand Bahama.

POST-DORIAN MODELS

46,158
PHOTOS STICHED INTO 3D MODELS

5,471
M^2 OF REEF ANALYZED



Coral Restoration

© Shane Gross

Did you know? PIMS created the **Reef Rescue Network (RRN)** to establish coral nurseries across the Caribbean. The RRN rehabilitates coral reefs alongside a network of communities, divers, organizations, dive shops and volunteers. So far, we've built **30 coral nurseries,** and coordinated their maintenance, management, outplanting and monitoring with partners in **The Bahamas, St. Lucia, and Aruba**. Spanning **14 Caribbean islands** in total, we've already outplanted **more than 3,000 Critically Endangered corals** onto struggling reefs, with thousands more growing!

30
NURSERY SITES
7,736
CORALS

5
SPECIES
3,400
OUTPLANTED CORALS

29
PARTNERS
14
ISLANDS

Fisheries Research & Conservation

OUR 2020 IMPACT

9
VIRTUAL PRESENTATIONS & WORKSHOPS ON FISHERIES

50
WEBSITE & SOCIAL MEDIA POSTS ON BAHAMIAN FISHERIES

5
PEER-REVIEWED PUBLICATIONS & TECHNICAL REPORTS

NEW GROUPER GRANT!

In 2020, we received grant funding from the **Moore Bahamas Foundation** to establish a new **grouper telemetry project off San Salvador.** In collaboration with Florida International University, this project will help us better **understand the migration routes of this Critically Endangered** species.

The **Fisheries Research & Conservation Program** successfully launched a new passive acoustic monitoring project in Abaco with **HJR Reefscaping** and the **Bahamas Marine Mammal Research Organisation** to monitor sounds produced by Nassau grouper and identify the presence of other aggregating grouper species at active and reported spawning sites. We've also had an extremely active and productive year - even though it was virtual! Notably, we've: 1) developed a **marine biophysical monitoring plan** for The Bahamas National Protected Area System, 2) led multiple **virtual training workshops,** 3) delivered **invited presentations** at regional and international conferences, and 4) **published a new paper** on the genetic population structure of Nassau grouper.

"The reality is, **the disease is spreading and it's spreading very fast.** If we lose those species which build up coral reefs, we might lose coral reefs in the long term with profound ecological impacts."

– Dr. Valeria Pizarro
PIMS Senior Scientist

Stony Coral Tissue Loss Disease

Stony Coral Tissue Loss Disease (SCTLD) is a rapidly spreading disease affecting over **20 Caribbean coral species.** It was first observed in Florida in 2014, and has since pread to The Bahamas, where it was first reported in 2019. The advance rate of this disease in a coral colony is approximately 3 cm a day; in other words, it can easily **kill big corals in just a few weeks.** What causes SCTLD has not been discovered; all we only know is that it's waterborne.

In March 2020, PIMS and our partnres conducted an **assessment around Grand Bahama of 25 reefs, covering about 40 miles of the coast.** We found **SCTLD in 18 species,** from which we identified 9 sentinel species or species that are more severally affected by this disease. In many of the surveyed sites **mortality – caused by SCTLD – was up to 80 - 90%.** So far, SCTLD has been confirmed off Grand Bahama, North Eleuthera and New Providence. Next year, we'll assess the spread of this disease in other islands and work on treatment methods, as well as train and educate our partners and stakeholders.

In March 2020, 80% of the symmetrical brain corals (Pseudodiploria strigosa) we surveyed off Grand Bahama were infected with SCTLD. To report sightings of SCTLD, visit our website at ***perryinstitute.org/reportsctld***

Community Conservation, Education & Action Program

This year, our **Community Conservation, Education, and Action Program** - which launched in 2019 - developed a **Social and Behavior Change Communications plan** to inform local conservation actions in The Bahamas. We also hosted a PADI's Women's Dive Day (alongside the Reef Rescue Network) to **introduce local women to SCUBA diving** and marine conservation. Lastly, we initiated a **pilot study** to understand how boater and diver behavioural change could **slow the spread of SCTLD.**

"Thinking about this opportunity provides me with **an overwhelming amount of excitement.** I have yet to try SCUBA diving due to it being an expensive activity..."

– **Ke'Nah Demeritte,** PADI Women's Dive Day Participant

Bahamas Coral Innovation Hub

OUR 2020 IMPACT

56
K-12 STUDENTS IN CORAL RESTORATION

3
NEW MID-WATER CORAL NURSERIES

13
REEF RESCUE DIVERS CERTIFIED

19
STAGHORN CORAL GENOTYPES TRACKED FOR GROWTH

Despite the challenges posed by COVID-19, Research Associates Natalia Hurtado (bottom left) and Casey Harris (bottom right) taught a **virtual coral research class** in 2020. What' more, they created **coral spawning predictions** and protocols for The Bahamas to improve coral restoration techniques, as well as **educational materials to raise awareness of SCTLD.**

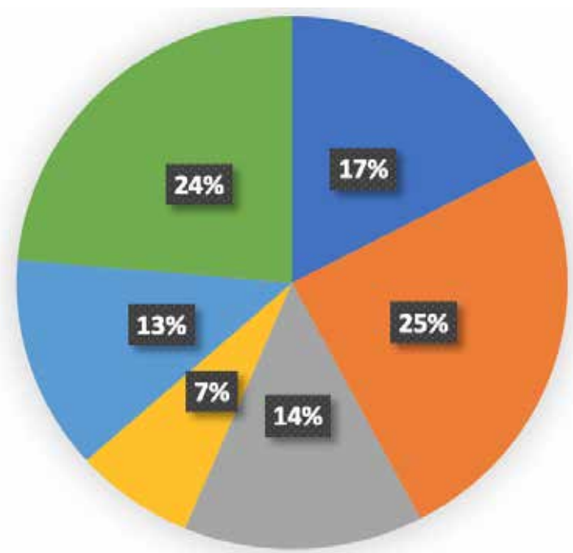
ANNUAL BUDGET

	2017	2018	2019	2020
Revenues				
Grants	$ 495,100	$ 454,560	$ 807,509	$ 738,147
Donations	$ 500	$ 1,721	$ 21,083	$ 100,734
Other		$ 14,536	$ 9,750	$ 161,382
TOTAL	$ 495,600	$ 470,817	$ 838,342	$ 1,000,263
Expenses				
Programs	$ 379,156	$ 531,261	$ 537,345	$ 727,101
Admin	$ 10,498	$ 25,785	$ 59,552	$ 124,239
Operations		$ 3,582	$ 1,805	
Fundraising		$ 5,000	$ 2,500	$ 6,652
TOTAL	$ 389,643	$ 562,046	$ 601,203	$ 857,992

VISIT OUR REEF RESCUE NETWORK INTERACTIVE MAP!

We're excited to announce we've created a **coral nursery interactive map** that showcases where you can take our **PADI Reef Rescue Diver Specialty Course**, as well as other coral nursery experiences in the Caribbean!

Program Expenses



- ASSESSING CORAL REEF HEALTH
- CORAL RESTORATION
- FISHERIES CONSERVATION & MANAGEMENT
- STONY CORAL TISSUE LOSS DISEASE
- COMMUNITY ENGAGEMENT
- OTHER

Our Plans for 2021

- RESEARCH, MONITOR & TREAT SCTLD IN THE BAHAMAS
- HELP PARTNERS MAKE CORAL RESTORATION PROFITABLE
- EXPAND THE RRN TO INCREASE NUMBER OF OUTPLANTED CORALS
- NASSAU GROUPER SPAWNING SITE ASSESMENTS
- CONSERVE & RESTORE MANGROVE ECOSYSTEMS
- NEW INTERNSHIP PROGRAM THAT TARGETS BAHAMIAN YOUTH

"The sea, once it casts its spell, holds one in its net of wonder forever.

–Jacques Cousteau