

CCMI



2021
ANNUAL
REPORT

www.reefresearch.org

WHY SUPPORT CCMI



CCMI is headquartered on Little Cayman; our research field station is surrounded by stunning, unique reefs which are among the most biologically diverse ecosystems in the Caribbean. The reefs on Little Cayman are also unique in that they are showing coral regeneration on a positive trajectory. The island, therefore, offers rich prospects for solutions to the global decline of coral reefs. Our work is rooted in discovering and understanding how some reefs are capable of recovery when coral reefs are in great decline globally. Research topics that are ongoing at CCMI include climate change and ocean acidification, marine protection, threatened and endangered species and coral reef resilience.

Every year, generous donations support our operations by allowing us to offer life-changing scholarships and sustaining our innovative research projects, including:

- Delivering more than 20 different education programmes for local students. Approximately 200 local students participate in programmes at our research field station every year, wherein the boundaries of the classroom are transformed as they participate in hands-on engagement with the mysterious, captivating marine world that surrounds our island nation. We run these programmes at a low cost, to encourage as many students to attend as possible.

- Providing scholarships (typically 100+ each year), robust education, training, and mentorship programmes for qualifying local students from government high schools, helping to create a clear path to new career opportunities.
- Engaging citizen scientists in impactful work throughout the year, including a group of disabled military veterans who are committed to diving to make a difference.
- Supporting students and researchers from around the world, who conduct research at our fully-equipped marine laboratory, with immediate access to vibrant marine ecosystems just outside our doors.
- Publishing more than 100 scientific papers based upon research conducted through CCMI.

At CCMI, dozens of resident and visiting research teams have made great strides in their fields of study, while thousands of students and visitors have learned about the impact they can have on the health of coral reefs and the vitality of our oceans. Annually, Festival of Seas provides vital funding, ensuring these projects continue to run without interruption and to allow us to have the maximum impact possible.

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INTRODUCTION TO CCMI

OUR MISSION TO BE A LEADING RESEARCH FACILITY IN THE CARIBBEAN, FOCUSING ON THE ADAPTATION AND RESILIENCE OF CORAL REEFS, IS AS STRONG AS EVER. OUR TEAM OF SCIENTISTS CONDUCT STATE-OF-THE-ART EXPERIMENTAL RESEARCH, AS WELL AS 20+ YEARS OF MONITORING AND OBSERVATIONAL STUDIES, TO UNDERSTAND HOW CORAL ECOSYSTEMS RESPOND AND EVOLVE IN THE FACE OF CLIMATE CHANGE. WE ARE UNIQUE IN THE REGION IN THIS REGARD.

Using our understanding of coral biology, CCMI is able to progress biodiversity action planning. We also maintain one of the longest running coral restoration research programmes in the region, boosting wild coral populations, and promoting biodiversity on coral reef ecosystems, helping to restore populations of threatened coral species across the Cayman Islands.

CCMI translates scientific knowledge into protection and conservation methods as well as developing education tools for our students. We take current research findings and pair them with immersive and engaging education and outreach initiatives that provide a range of learning and training opportunities. We provide over 100 local scholarships per annum, and host over 350 students from primary to tertiary school, including a robust internship programme for local and international early career scientists. Our flagship "Reefs Go Live" programme is broadcast live to 28 countries and reaches thousands of viewers each year.



EXECUTIVE TEAM MESSAGE



In December 2021, CCMI hit a landmark financial milestone, by breaking the USD \$2 million revenue barrier. In addition to securing several key research grants and progressing the REEL (Reef Ecology and Evolution) Laboratory, CCMI has continued to focus on delivering quality science, and the company is beginning to transition into a more substantive organisation. However, the road to this success has not always been smooth. 2021 presented many barriers to success for CCMI including the continued closure of the international borders in the Cayman Islands, rendering our international programming obsolete for 2021 and a hasty re-arrangement of any planned travel for research. Fundraising has also felt the impact of Covid-19, as group events and international travel hampered fundraising opportunities. Yet as a team, we focused on our strengths, working with an expanding group of partners and funders, to create new and exciting opportunities.

Our short-term goals are: to expand our capabilities and capacity, via developing our accommodation, labs, human resources and facilities to ensure we can conduct research, conservation and education simultaneously; to continue to develop the REEL Lab and our research theme of understanding how corals can adapt to extreme environments (as record global temperatures reiterate that this work is timely and urgently needed); expand our collaborative network and raise the profile of CCMI and the Cayman Islands internationally by working with the best scientists, conservation managers, communicators and educators; and finally, CCMI will continue to develop and broaden our outreach and education, to ensure high quality and current information is available for everyone.

In this report, we highlight how CCMI has continued to make headway with an unrelenting focus on delivering cutting-edge research and sharing our results (and our passion) with peers, citizen scientists and students in the Cayman Islands and across the globe.

**DR GRETCHEN
GOODBODY-GRINGLEY**
Director of Research



**ROB
HEDGES**
Business Manager



**KATE
HOLDEN**
Director of Advancement



**ALEX
CHEQUER**





CHAIRMAN'S MESSAGE



In 2021, I began my current tenure as CCMI's Chairman, a position I previously held from 1998 until 2015. As a resident and businessman of Little Cayman, CCMI's mission to protect the coral reef ecosystem has always been central to what I believe in – without a healthy reef system, not only does our tourism product go away but the ecological systems that we rely upon for our health, food and safety deteriorate in an unfathomable way. Many years ago, I agreed to support this organization because I believed that Little Cayman's reefs are so important that not only must we try and discover why they retain their current health, but we must share our learnings.

In 2021, I stepped forward with renewed vigor to provide the team at CCMI with the oversight and support to take this organization to the next level and to grow our mission. Coming out of the Covid-19 pandemic has meant an increased board focus on CCMI's governance and long-term direction. The Board is extremely proactive and bring a complete set of skills and experience to the institute. We are all aligned in ensuring that CCMI not only comes out of the global pandemic with a more sustainable outlook, but we all believe there is a timely need to progress the organization, as the threats on coral reefs continue to grow.

PETER HILLENBRAND
Chairman



CCMI BOARD

CCMI has adapted our Board in recognition of the rapid loss of global biodiversity and the increasing need to protect the marine environment. In November 2020 the Cayman Islands and US Board evolved to ensure the organization can continue to progress their education programmes, as well as their work of understanding which coral reef species can be resilient for the future. In 2021, we welcomed Dr Steve Gittings on our Board, bringing a wealth of scientific knowledge to CCMI. In 2021, we began in earnest to create a strategic approach to the governance and progression of CCMI as an organisation, bolstered by new and seasoned Board members.

CCMI Board of Trustees (US) and Directors (Cayman Islands):

Peter Hillenbrand - Chairman

Tim Kary - Vice Chairman

Sydney Coleman

Dr Steve Gittings

Chris Humphries

Our collective intent is to embrace ethical and accountable management and governance, and to support the team at CCMI and their stakeholders. Our aim as a Board, in partnership with our executive team, was to stabilise and focus the organisation. We are pleased to say that the energy, productivity and culture at CCMI has had a paradigm shift and a new phase in our history is beginning. We have invested in our people, adapted our financial management to be able to respond to global crises and created a new way of working at CCMI, throughout the company.

The rapid loss of global biodiversity is accelerating and both understanding and protecting the marine environment is becoming increasingly more vital. This work is extremely challenging, especially because the borders in the Cayman Islands remained closed to international travel and many of the norms, such as scientific conferences, fundraisers and outreach events, remained on hold for the team at CCMI. Despite this, the CCMI team, supported by our engaged and active Board, have managed to progress their research and education deliverables, adapting where needed to keep the momentum forthcoming.



IMPACT HIGHLIGHTS

45m²

Coral outplanted to the wild

100+

Visiting scientists

200,000+

Reefs Go Live reach

50+

PhD, MSc students and internships

1500+ km

Coral grown

\$1,000,000

Invested in field research every year

100+

Published scientific papers

1500+

Local scholarships

RESEARCH AT CCMI

CCMI has a mission to be a leading research facility in the Caribbean, focusing on the adaptation and resilience of coral reefs. Our research team conducts state-of-the-art experimental research, as well as 20+ years of monitoring and observational studies, to understand how coral ecosystems respond and evolve in the face of climate change.

Resilience

CCMI's Reef Ecology and Evolution Laboratory (REEL) is a state-of-the-art research group, that investigates how coral ecosystems function, including adaptation to depth, thermotolerance (heat), and resilience, to maintain biodiversity in the face of climate change. Understanding how marine life, including fish and corals, adapt and connect within extreme environments, is also critical to restoring key ecosystem functions. The team partners with important collaborators all around the globe, ensuring our work is relevant, informed and reaching a broad audience, publishing peer review papers and sharing our findings via interactive webinars, videos, presentations and conferences.



Restoration

Using our understanding of coral biology, CCMI maintains one of the longest running coral restoration research programmes in the region. We develop empirically verified methods to ensure successful, complex restoration can boost wild coral populations and promote biodiversity on coral reef ecosystems, helping to restore populations of threatened coral species across the Cayman Islands.

In 2012, CCMI launched the first ever coral nursery in the Cayman Islands. We don't just grow endangered corals, we have an in-situ, long-term research study that looks at how we can grow more robust and resilient corals, so they can withstand disease, heat and storms, whilst repopulating the wild reef. Our methods have improved our outplanting success rate to 89% (normally <10%). The team also investigate reef complexity and the impacts of restoration on fish communities, creating insight into how we can promote sustainable reef ecosystems. Our 20+ year dataset, indicates that Little Cayman's reefs are 'healthy' and the trends over 20 years show a pattern to reef health and increased coral cover. CCMI's work seeks to support local policy development, especially the biodiversity action plans for key species.



COLLABORATORS

An underwater photograph showing a diver in the upper right, holding a rectangular frame. The scene is dominated by large, brown, porous coral structures in the foreground and middle ground. The water is a deep blue, and some green seaweed is visible in the background.

CAYMAN ISLANDS DEPARTMENT OF ENVIRONMENT

Tim Austin, Ph.D., John Bothwell, Tammi Warrender

UNIVERSITY OF RHODE ISLAND

Hollie Putnam, Ph.D., Kevin Wong, Ph.D. candidate

UNIVERSITY OF HAIFA

Tali Mass, Ph.D., Shai Einbinder, Ph.D., Stephane Martinez, Ph.D.,
Hagai Nativ (masters research), Federica Scucchia, Ph.D. candidate

UNIVERSITY OF NORTH CAROLINA

John Bruno, Ph.D., Katelyn Gould, Ph.D. candidate

CALIFORNIA STATE UNIVERSITY AT NORTHRIDGE

Nyssa Silbiger, Ph.D.

UNIVERSITY OF DELAWARE

Arthur Trembanis, Ph.D.

BERMUDA INSTITUTE OF OCEAN SCIENCES (BIOS)

Samantha de Putron Ph.D., Yvonne Sawall, Ph.D., Timothy
Noyes, Ph.D. candidate

SMITHSONIAN INSTITUTE

Sarah Gignoux-Wolfsohn, Ph.D., Mattieu Leray, Ph.D.

FLORIDA ATLANTIC UNIVERSITY

Josh Voss, Ph.D., Alexis Strumm, Ph.D. candidate

UNIVERSITY OF FLORIDA

Paul Maneval (masters research), Julie Meyer, Ph.D, Holden
Harris, Ph.D., and Anya Brown, Ph.D.

CENTRE SCIENTIFIQUE DE MONACO

Christine Ferrier-Pages, Ph.D.

LOUISIANA STATE UNIVERSITY

Daniel Holstein, Ph.D., Gabrielle Carpenter Ph.D. candidate

WOODS HOLE OCEANOGRAPHIC INSTITUTE

Amy Apprill, Ph.D., Jeanne Bloomberg, Ph.D. candidate



PAPERS & REPORTS

CCMI Authored Publications:

Carpenter, G, Chequer, A, Weber, S, Mass, T, Goodbody-Gringley, G (In Review) Light and photoacclimatization drive distinct coral communities on mesophotic reefs in Little Cayman, Cayman Islands. *Ecosphere*

Donavan, M, Alves, C, Burns, J, Drury, C, Meier, O, Ritson-Williams, R, Cuning, R, Dunn, R, **Goodbody-Gringley, G**, Henderson, L, Knapp I, Levy J, Logan, C, Mudge, L, Sullivan, C, Gates, R, Asner, G (In Review) From polyps to pixels: understanding coral reef resilience to local and global change across scales. *Landscape Ecology*

Goodbody-Gringley, G, Scucchia, F, Ju, R, Chequer, AD, Einbinder, S, Martinez, S, Nativ, H, Mass, T, (2021) Plasticity of *Porites astreoides* early life history stages suggests mesophotic coral ecosystems act as refugia in Bermuda. *Frontiers in Marine Science* 8:702672. doi: 10.3389/fmars.2021.702672

Gould, K, Bruno, JB, Ju, R, **Goodbody-Gringley, G** (2021) Similar thermal performance between shallow and mesophotic corals suggest depth is a refuge from thermal stress. *Coral Reefs* <https://doi.org/10.1007/s00338-021-02095-w>.

Nativ, H, Scucchia, F, Martinez, S, Einbinder, S, Chequer, A, **Goodbody-Gringley, G, Mass, T** (2021) *In situ* estimation of coral recruitment patterns from shallow to mesophotic reefs using an optimized fluorescence imaging system. *Frontiers in Marine Science* 8:709175. doi: 10.3389/fmars.2021.709175

Wong, K, **Goodbody-Gringley, G**, de Putron, S, Becker, D, **Chequer, AD**, Putnam, H (2021) Thermal history influences adult and larval physiological responses to temperature. *Global Change Biology* <https://doi.org/10.1111/gcb.15629>.

Related Work by Collaborators:

Brown AL, Wares JP, Hamman EA, Shima JS, Osenberg CW (2021). Extended phenotypes on coral reefs: cryptic variation & species interactions. *Ecology*

Maneval P, Jacoby CA, Harris HE, Frazer TK (2021). Genotype, Nursery Design, and Depth Influence the Growth of *Acropora cervicornis* Fragments. *Frontiers in Marine Science*. <https://doi.org/10.3389/fmars.2021.670474>.



**RESEARCH
PROJECT
UPDATES**



REEF ECOLOGY AND EVOLUTION LAB - REEL

The REEL group provides cutting edge science reef persistence in the face of climate change. In 2021, the team completed the set-up of the molecular lab at CCMI, to further CCMI's project capabilities, seeking to understand molecular and physiological mechanisms of adaptation by corals to extreme environments. In February 2021, Dr Gretchen Goodbody-Gringley initiated field work for her National Science Foundation funded project. This collaborative study between CCMI and the University of Haifa, Israel, addresses two primary research questions: (1) how does coral morphology and physiology differ across depth and (2) are these differences due to plasticity or evolutionary adaptation? Using a multifaceted approach, including advanced molecular and imaging techniques, we will examine the mechanisms that enable corals to thrive across broad depth gradients in the Caribbean and the Red Sea.

Supported by: Anthony & April Darr, the U.S. National Science Foundation - Israel Binational Science Foundation

ENHANCING ECOSYSTEM COMPLEXITY TO PROMOTE SUSTAINABLE FISH COMMUNITIES

Corals provide shelter and refuge areas for diverse fish assemblages by virtue of their 3-dimensional relief. Corals facilitate both processes of recruitment and biomass production by providing space for settlement, growth and reproduction.

In addition, living coral will continue to deposit calcium carbonate over time, thus ensuring the growth of the physical structure supporting the reef community in the long term. While providing shelter, corals also set the stage for biological interactions such as competition and predation. This project sought to understand if creating enhanced complexity reef (ECR) habitats through transplantation of adult coral colonies to 3-dimensional structures (our restoration sites) would not only impact fish population diversity and abundance on the ECR itself but also on adjacent degraded reef sites. Suggesting that restoration efforts may offer a scalable mitigation strategy to restore fish populations, for both herbivorous and commercially important species from our coral restoration efforts. To examine this possibility, we began our third strategic focus in 2019, looking at whether fish populations benefit from our restoration efforts. At each of the 6 restoration sites, we surveyed fish population on and around the dome structures. Surveys were completed initially after outplanting and repeated after 6 months and again after 18 months. Results of these surveys indicate a significant increase in both the density of fish at outplanted sites as well as the number of species present. These data suggest that outplanting corals onto our dome structures does in fact have a positive impact on the local reef fish population, and thus as our outplanting efforts increase, so will the health of fish populations. The impacts of the coral dome outplanting structures on fish populations was then assessed by conducting surveys initially, and then again after 6 months and 18 months.

Supported by: an Anonymous Donor

CORAL RESTORATION: GROUND-BREAKING UNDERSTANDING OF COMPLEX ECOSYSTEMS

CCMI developed the first coral nursery in the Cayman Islands in 2012. We began conducting research into the resilience and robustness of corals, with the current iteration of the project beginning in earnest in 2019. Long-term coral restoration such as CCMI's is extremely rare; most studies are less than 12 months in duration. In 2021, we have progressed our restoration in an exciting and meaningful way.

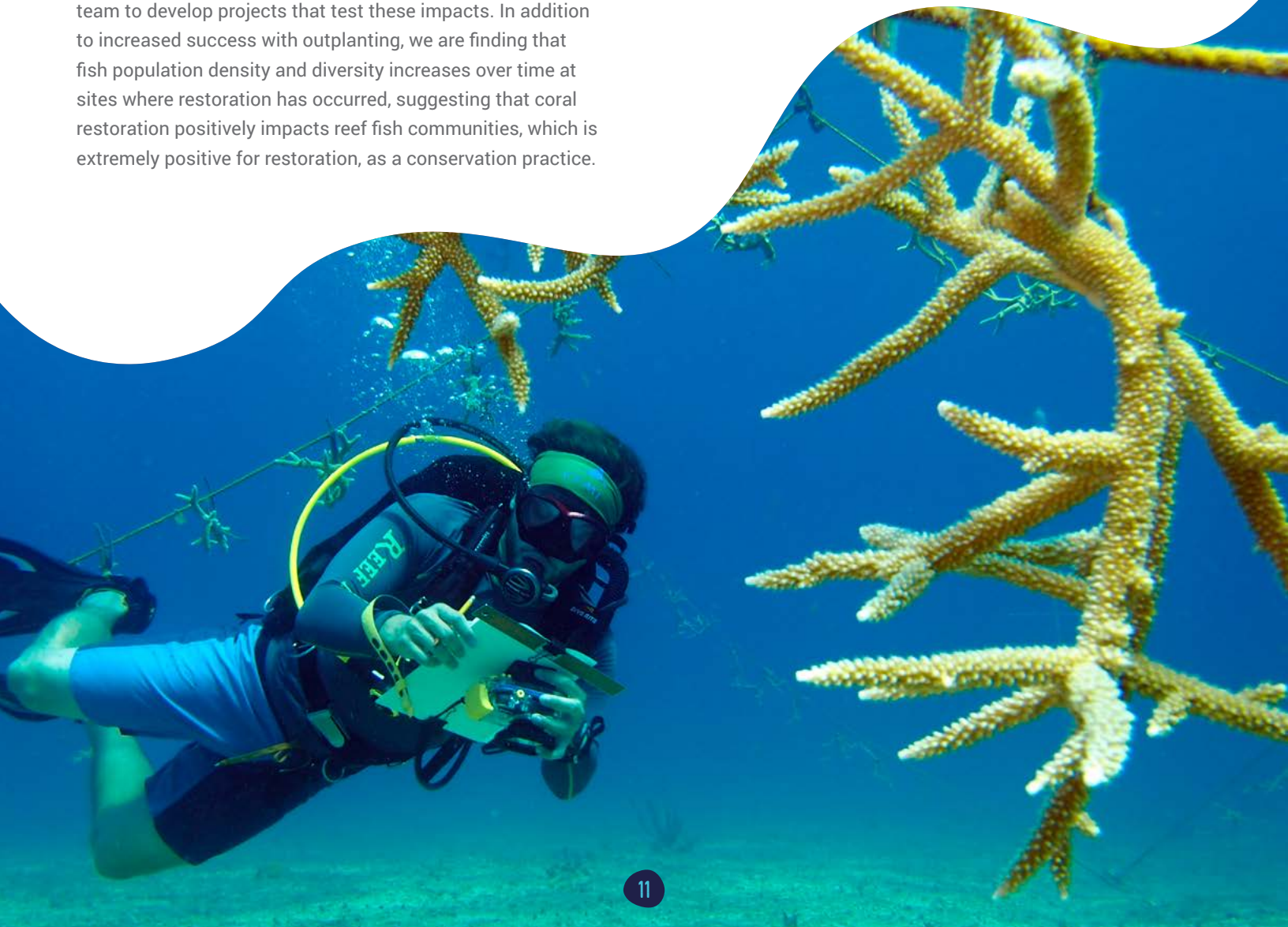
Two key results are:

- 73% of coral outplants on our domes are surviving
- Fish density has improved at the domes from an average of 140 (initial) to 220 (current) fish per 60m².

Ecosystem Approach - Understanding the impact of restoration on the complex ecosystem is incredibly important and our baseline studies, conducted over 20 years, have provided the background knowledge necessary for the CCMI research team to develop projects that test these impacts. In addition to increased success with outplanting, we are finding that fish population density and diversity increases over time at sites where restoration has occurred, suggesting that coral restoration positively impacts reef fish communities, which is extremely positive for restoration, as a conservation practice.

Increasing Coral Cover of Endangered Species - Over the last 5 years we have seen significant success our restoration outplanting methods to place corals on top of a dome-shaped structure greatly improved survival rate (80%+) in comparison to traditional outplanting methods directly to the reef substrate (less than 9%). It is thought that by elevating coral outplants from the substrate we are reducing the impact of competition and predators, creating a more successful outcome for growth and survival. In 2020, we expanded our restoration efforts to a series of 6 sites across 2 different depths. After 18 months, the survival rate across these sites was 73%, which is extremely positive. Importantly, this work led to increased understanding of how site selection can have a dramatic impact on survival as well as outbreaks of disease. Long-term restoration projects are uncommon, so the success rate of these domes gives us a rare opportunity to understand how the entire ecosystem is being from the restoration activity.

Supported by: The AALL Trust, The Cayman Water Company (CWCO), Dart Cayman Islands, The Ernest Kleinwort Foundation, Stuarts Walker Hersant Humphries



QUIET OCEANS

In 2021, CCMI received a Darwin Plus Covid-19 Rapid Response grant to further the Quiet Oceans pilot.

This project seeks to understand how the fish populations of the Cayman Islands responded to the 'Quiet Oceans', due to limited activity and lack of international tourists. Noise pollution has an incredible impact on the ocean and this can: compromise the ability for fish to sense and use sound; cause increased heart rate, blood cortisol, and sheltering offish; and disrupt feeding behaviour, swimming patterns, anti-predator response and parental care. By understanding how local fish populations respond to Quieter Oceans, we gain insight into the 'natural' state of fish behaviour and can then inform conservation policy accordingly.

The project highlights include:

Fish populations can rebound almost immediately when disturbances are removed, yet they are also affected by minimal local activities, suggesting that the sound produced in and around the George Town harbour since local activities have resumed may be enough to elicit a response.

- Increases in parrotfish and grouper are important to our tourism product as they are a draw for divers. Grouper, in particular, are also important for the fishing community as many species are targeted by both commercial fisherman as well as local recreational fishers.
- Overall, our results indicate the reduction in water-based activities related to Covid may result in healthier reefs as algal consumption by herbivores will increase as their abundance increases, enabling our corals to thrive.
- Human water-based activities not only affect the largest fish but also the smallest and thus have impacts across the entire food chain.

Supported by: Darwin Plus Initiative, Walkers

HEALTHY REEFS - LONG-TERM MONITORING

Each year, CCMI undertakes reef monitoring using the AGRRA (Atlantic and Gulf Rapid Reef Assessment) protocol and analyse the data to understand how the reefs in Little Cayman are performing. This monitoring was started in 1998 by Dr Carrie Manfrino and has created an important window into coral reef trends.

The 2020 monitoring results were released in May 2021. The reports indicate that the surveyed reefs on Little Cayman were in a period of recovery, with their health status improving overall compared to 2019. Of the reefs surveyed, 27% were in “very good” health in 2020, versus only 16% in 1999 and 17% in 2010. At the bottom end of the health spectrum, we had no surveyed reefs listed as in “poor” health, and only 18% of the reef classified as “fair”, compared to 36% the year before.

Little Cayman’s coral reefs show positive traits of resiliency, with continued high coral and fish abundances. However, shifts in species contributions and colony size indicate that while coral cover remains high, Little Cayman is not immune to human impacts and global climate change.

For a full report, please click here:
<https://tinyurl.com/HRRC2020>

Supported by: Foster’s, Butterfield, Aureum Re, the Cayman Islands Department of Tourism, Island Heritage and Knighthood.

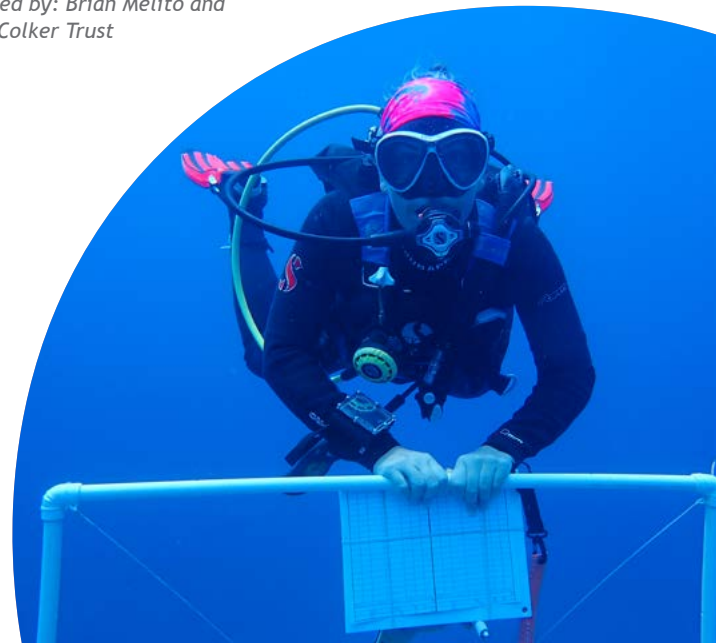


WOMEN IN OCEAN SCIENCE AWARD (WIOSA)

In 2019, the Brian Melito and Jessica Colker Trust helped CCMI launch WIOSA. This programme has a goal to facilitate the advancement of women in ocean sciences so they become world-leading professionals. In 2020, we announced our first scholar and interns but had to hold the programme due to the impacts of Covid-19. By the end of 2021, with border openings in sight, we booked Dr Sarah Gignoux-Wolfson to join us in July 2022 and opened the call for the second round of WIOSA scholars and interns.

The WIOSA Advisory is: Dr Sylvia Earle (Mission Blue), Dr Gretchen Goodbody-Gringley (CCMI), Dr Christine Ferrier-Pages (Centre de Scientifique Monaco), Dr Carrie Manfrino (CCMI) and Dr Hollie Putnam (University of Rhode Island)

Supported by: Brian Melito and Jessica Colker Trust



A close-up photograph of coral polyps, showing their intricate, yellowish-orange structures against a reddish-brown background. The polyps are arranged in clusters, with some showing their characteristic tentacles.

EDUCATION OUTREACH

IN ADDITION TO HOSTING OVER 200+ LOCAL STUDENTS AND 200+ INTERNATIONAL STUDENTS EACH YEAR (NORMALLY!), CCMI HAS AN EXTENSIVE, DIVERSE SCHOLARSHIP AND INTERNSHIP PROGRAMME THAT SUPPORTS UNDER-REPRESENTED EARLY CAREER SCIENTISTS AND STUDENTS TO ENSURE OUR FUTURE GENERATIONS ARE ENGAGED WITH MARINE SUSTAINABILITY.

To our knowledge, outside of formal education, CCMI operates the biggest scholarship programme (100+ participants) in the Cayman Islands. Our Ocean Science Scholar intern programme supports up to 8 interns per year. CCMI also provides ocean literacy digital resources for students and teachers, including the Reefs Go Live programme, which reaches 40-60k participants a year.

In 2021, Covid-19 had a significant impact on CCMI's ability to run education programmes. Whilst local education courses continued to flourish, our international programmes remained unavailable due to international border closures and quarantine restrictions.

SCHOLARSHIPS

The education team have had a busy 2021 education season, supporting an increased number of local scholarships (100+). CCMI's scholarship programme included supporting 4 interns in 3-to-6-month residential placements.

Supported by the Edmund F. and Virginia B. Ball Foundation Ocean Science Scholars programme and the R3 Foundation



CCMI also expanded our Caribbean Marine Ecology Camps in 2021 support to host over 5 students during a week-long programme in Little Cayman, supported by the Edmund F. and Virginia B. Ball Foundation Ocean Science Scholars programme and the R3 Foundation. We also supported 50 students and their chaperones on 3-day residential Marine Ecology Courses for primary and secondary students.

Supported by the BODA Charitable Star Trust

2021 also resulted in another successful Young Environmentalist Leadership Course, with 9 students completing this 4-month course.

Supported by Foster's and Cayman National Bank

SCHOOL PROGRAMMES

In addition, the team ran robust primary and secondary Marine Ecology Courses for local schools, taking advantage of reduced college programming and filling up all available space with local education provision. We have had students aged 10-18 immerse themselves in life at the field station, learning about marine sustainability and understanding how/why local marine ecology is so important to them. 2021 included visits from Cayman Prep, the Cayman International School, Montessori by the Sea, Hope Academy, the Cayman Islands Home School Group and Protect our Future. It cannot be understated the importance of these continued education opportunities for Cayman's K – 12 students.





REEFS GO LIVE

In 2021, Reefs Go Live completed a three-year grant from project sponsors, the Edmund F. and Virginia B. Ball Foundation. This grant enabled CCMI to take the RGL programme from a pilot and develop it with the sustainability of a multi-year grant. The 2018-2021 Reefs Go Live project had an aim of improving helping to improve ocean literacy by removing barriers to ocean science learning. The programme had a goal of completing a 12-part series of broadcasts, expanding teacher networks, resources and training, whilst also exploring opportunities for scaling up the programme to include exhibits and a network of ocean-literate teachers locally, regionally and internationally.

The impact to date has included:

- The delivery of 12 live broadcasts, plus refining the original 6 pilot broadcasts.
- The delivery of 3 additional outreach specific live broadcasts (general public), including World Ocean Day 2019 and 2021, plus a special Royal broadcast in March 2019.
- The delivery of 2 additional research project specific live broadcasts, including the Covid-19 rapid response project “Quiet Oceans” (2021) and the Darwin Initiative herbivorous fish research project (2019).
- To support the broadcasts, the CCMI team created 3 teacher training videos, 6 interactive ‘how to’ videos, 6 ‘response’ Q&A videos and delivered 2 teacher workshops, as well as fact sheets and activity sheets for every live broadcast, which are mapped to the curriculum.

- We created a global following, across 12 countries, including the Caribbean region, US, UK, Latin America, Asia and Europe.
- Reefs Go Live has garnered international media coverage, including featuring in articles on prominent news sites (including Forbes, Today, and MSN), parenting sites, and travel pages (including National Geographic!). Key partnerships with Scubaverse and the Cayman Islands Tourism Department have helped drive awareness globally.
- Reefs Go Live to date has had over 12,000 direct views (taken from classes that register with us and declare student numbers on the day of live broadcasting) and we expect to finish the 2020/21 season with circa 18,000 direct student views and a social media reach in excess of 65,000 engagements.
- Over the 3-year period, our direct student views per live broadcast have risen from circa 350 students (2018) to 2,000 students (2021).
- We have also utilised Reefs Go Live to leverage campaigns such as the Hope Spot launch, Healthy Reefs and a new campaign for 2021, Stand Up for Reefs.

Thanks to the Edmund F. and Virginia B. Ball Foundation for supporting Reefs Go Live.

Global Reach - Visiting College Programmes

2021 was another year of no visiting international college and university programmes. However 2022 saw borders open in the Cayman Islands.

HEALTHY REEFS OUTREACH

Thanks to the support of Healthy Reef sponsors, we continued annual coral reef monitoring efforts for a 23rd year, and our team released the second version of the Little Cayman Healthy Reef Report Card as part of a robust month of activity in June around World Ocean Day.

Protecting coral reefs for the future is key to maintaining marine biodiversity. CCMI's Healthy Reef campaign has grown our reach, seeing over 40,000 hits on social media and YouTube alone. We know that our audience engages with us, evidenced by the high numbers of views as well as the interaction through livestream Q&A on both YouTube and Facebook where available. In addition to 3 Reef Lectures, CCMI released a six-part podcast on 8 June to bring listeners closer to coral reefs and to help instill a sense of care for the precious coral reef ecosystem. This series included a range of special guests, brought in to discuss some of the big issues facing reefs, as well as how anyone, anywhere, can help protect reefs for the future.

<https://anchor.fm/ccmi7>

Healthy Reefs webpage

<https://reefresearch.org/get-involved/healthy-reef/>
Stand Up for Reefs webpage

<https://reefresearch.org/standup4reefs/>

Every year, CCMI partners with the Cayman Islands Further Education Centre (CIFEC), with the wonderful Sarah McDougall and her art class. Each year, the class present a portfolio of work, representing the Healthy Reefs theme - and every year, we are so honoured to be represented by these amazing students.

https://reefresearch.org/standup4reefs/cifec_2021/

Supported by: Foster's, Butterfield, Aureum Re, the Cayman Islands Department of Tourism, Island Heritage, National Gallery of the Cayman Islands, Dart Cayman Islands and Knighthead





ADVANCEMENT

FOLLOWING THE IMPACT OF COVID-19 ON OUR ABILITY TO HOLD EVENTS AND FUNDRAISE, WE FURTHER ADAPTED OUR STRATEGY IN 2021 TO KEEP ADAPTING THE REVENUE-BUILDING OPPORTUNITIES.

CCMI raises funds through 3 core revenue-generating activities:

- Earned revenue – fees from education courses and visiting scientists at the Little Cayman Research Centre.
- Unrestricted fundraising events – this includes the annual Festival of Seas Gala, the Navigator’s Council and private donations from trusts, companies and individuals.
- Restricted funding – project-specific revenue raised via donations and grants.

With earned revenue remaining limited, we looked to secure unrestricted funds, as well as increasing our grant revenue, via both securing new funders and renewing grants with funders we already have a relationship with.

Fundraising in 2021 presented many barriers, as the Cayman Islands had strict border controls, and towards the end of 2021, the prevalence of Covid-19 in the local community meant group events were limited in numbers and there were significant restrictions in place. International events were also unfeasible. However, a local swim group launched the Bogue Swim (a 10K swim between Cayman Brac and Little Cayman), which resulted in circa \$50K in fundraising to support local education, as a new and well-received fundraising event. Our annual Festival of Seas raised circa \$150K, and additional unrestricted funding came in via our VIP Programme, thanks to local investors Maples

(Navigator) and Rawlinson and Hunter (Ambassador). Donations were also incredibly important to us in 2021, with several large donors contributing to the \$60K unrestricted donations.

New grant opportunities were forthcoming via the European Union’s RESEMBID programme, which were confirmed at the end of 2021, supporting coral restoration and our operational adaptation to Covid-19, providing critical funds at a time when investing in operational technical support was hugely necessary but underfunded by the lack of earned revenue.

The Edmund F. and Virginia B. Ball Foundation renewed two large grants, supporting our Ocean Science Scholars and the Reefs Go Live programme. This renewal not only created important investment in the programmes which deliver local and international education scholarships and the provision of free education materials but the grant also underpinned our entire education programming, at a time when Covid-19 was still impacting our earnings potential.

In November 2021, CCMI held a VIP lunch at Luca in Grand Cayman. This was an important opportunity for local stakeholders to meet with the Board and management team, to discuss how CCMI has emerged from the global pandemic and to outline the future plans for the organisation, whilst inviting feedback and commentary from some of our most valued supporters.

What has been key to CCMI’s revenue success is the focus on communications for a range of different stakeholders. Via effective PR, social media, relationship management and VIP events, CCMI continues to bring added value to projects, as well as promoting the organisation locally and internationally.





FINANCIAL SUMMARY

ANNUAL FINANCIAL REPORT

CCMI surpassed the \$2 million revenue mark for the first time in its history in 2021, mainly due to new and renewed grants in research (\$500K), education (\$547K) and operations (\$229K):

- Our earned income remained low for 2021 due to the closed borders with revenue of \$185K, roughly \$260K less than a typical year. Earned revenue continues to play an essential role for CCMI, ensuring a stable income, which results in unrestricted funds that can support operational overhead and management of assets.
- Key grants and sponsorship increased in 2021, existing grants and sponsorships were renewed or replaced, and new grants were received, ensuring our research and local funded programmes could continue to expand. Total revenue for key grants and sponsorship was \$1.276M vs a \$750K budget, with \$229K granted from the EU RESEMBID programme to specifically to support and develop operations.
- Core funding via unrestricted fundraising and contributions revenue, which supports the core business, increased to USD\$586K (2020: USD\$403K).
- Controlling cash flow and continuing our expense controls through 2021 was essential to maintaining our financial stability. While the projects and programmes were well supported, spending of unrestricted funds had to be limited. Our total expenses of \$1.46M for the year were \$140K (9%) below budget.
- CCMI finished 2021 with good cash reserves and a net income of \$178K, which will be used to support operations in 2022.

2021 FINANCIAL SUMMARY

CCMI made a net profit of \$178K in 2021 (2020: \$57K). The increase in year-on-year net profit was due to our revenue increasing to \$2.05M (2020: \$1.53M) while our expenses, taking on our efficiencies from Covid-19, remained low in comparison at \$1.46M (2020: \$1.37M).

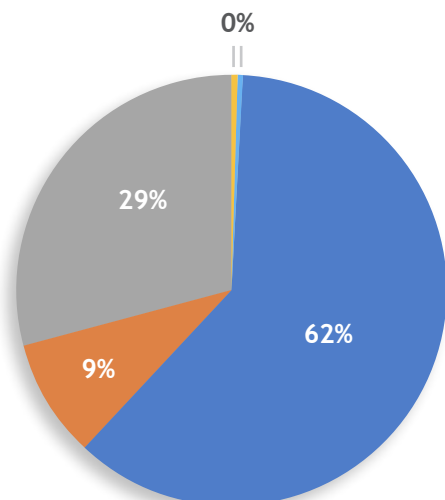
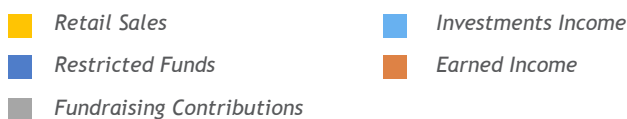
Our earned income \$185K in 2021 increased from \$150K in 2020, although this is still below pre-pandemic levels by roughly \$200K. This is due to a lack of international groups throughout 2021.

An increase in temporarily restricted donations by \$420K and a net profit of \$178K contributed to an increase in equity for 2021 of \$598K (2021: \$3.44M; 2020: \$2.84M).

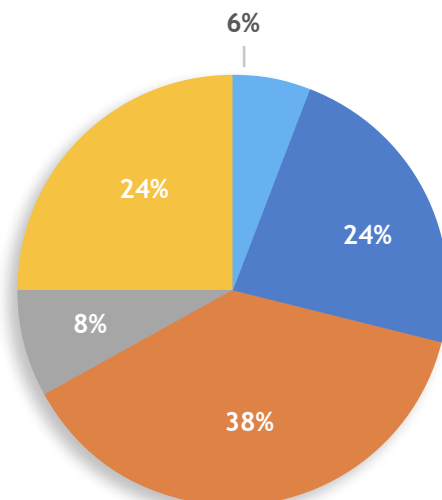
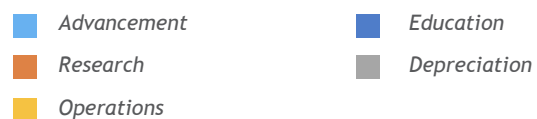
Contributions receivable increased to \$1.33M (2020: \$840K) mainly due to the large multi-year grants received towards the end of 2021 for research, education and operations for which funds are not due until 2022 or beyond.

The shift in both expenses and revenue was due to the pandemic and the changes CCMI made in response. In 2021, 11% (2020: 10.8%) of total costs were for support services and 6% (2020: 2%) towards fundraising activities with the remaining 83% spent on the delivery of programmes (2020: 87.8%).

2021 CCMI REVENUE SOURCES



2021 CCMI EXPENSES



IN-KIND SUPPORT

In-kind support remains a bedrock of CCMI's operation. We would like to thank the many professional firms who have supported us in 2021, including: BDO for the annual audit, Stuarts Walker Hersant Humphries for legal services, Berman Fisher for accounting support services, Copper Blue Communications Ltd for PR, Communications and Brand Development support, Douglas Ziegler LLC for US accounting support, SALT Technology Group for IT support, as well as the Board of Directors and Officers who give their personal time in support of CCMI's mission. CCMI would also like to thank the project technical advisors who donated many in-kind hours in expertise, specifically Pauline Simpson and Greg Locher.

2021 OPERATIONAL RESERVES

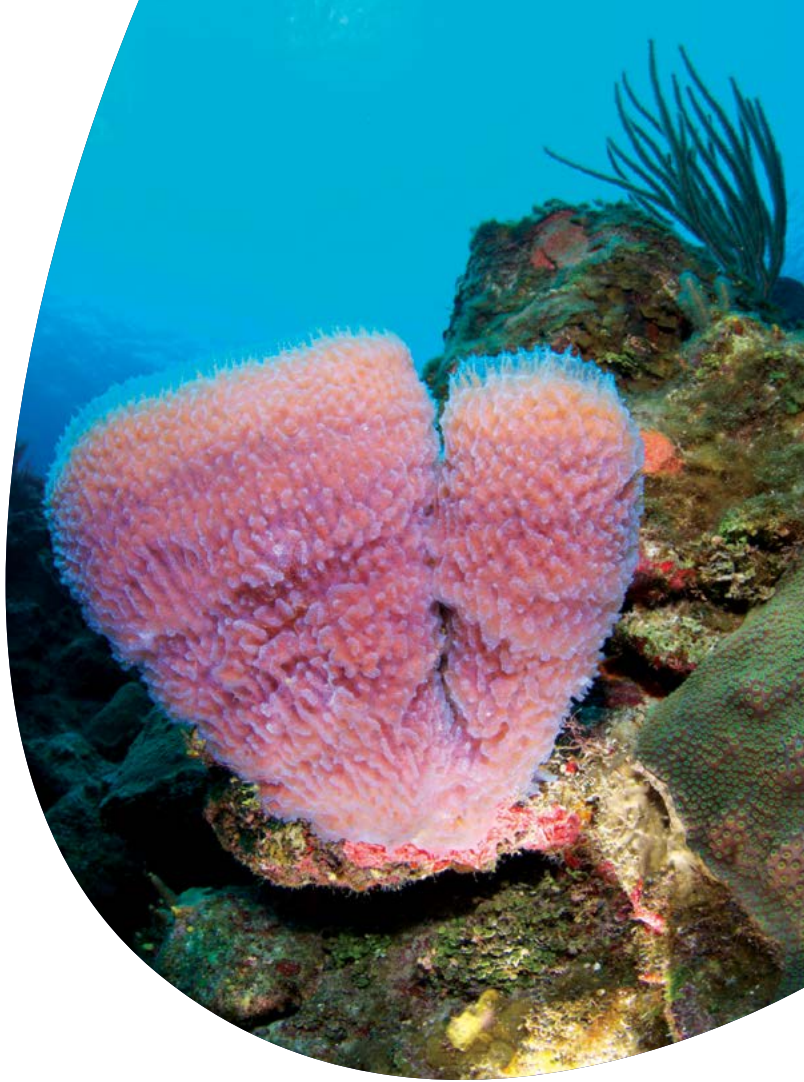
CCMI aims to maintain an operational reserve to meet basic operational costs (salary, insurance, mortgage, etc) for a period of six months at any one time.

<i>Restricted Contractual Reserves for program delivery following year</i>	\$388,995
<i>Operational reserve</i>	\$250,000
<i>Deferred Revenue</i>	\$18,524
<i>Unrestricted free cash</i>	\$27,740
<i>Total End of Year cash on hand</i>	\$685,259





GOVERNANCE



HOW WE ARE GOVERNED

The organisation is governed by a Board of Directors/Trustees in the Cayman Islands and USA, and by the Trustees of the UK Charity (outlined below).

The Board of Directors/Trustees is also supported by a group of special advisors, who specialise in areas of need, such as research, human resources (HR), technological development (specifically education related) and company governance.

STATUS

The Central Caribbean Marine Institute/CCMI has charity status in the Cayman Islands (CCMI Cayman – NP#3), is a UK registered charitable organisation (#1104009) and a US 501(c)(3) non-profit (#22-3609293).

GOVERNANCE CODE

As a company operating within multi-jurisdictions, CCMI has a strict code of governance that complies with the UK, US and Cayman Islands requirements. CCMI has an engaged board of trustees and management team all aligned and engaged with the company's very clear mandate, to protect coral reefs for the future. The shared mission and culture within CCMI therefore aligns with the Charity Commission's Governance Code (2017), the 501 (C) 3 governance checks (IRS) and the Cayman Islands Non-Profit Organisations Law 2016.

COMPANY REGISTRATION DETAILS

United States

Central Caribbean Marine Institute, Inc
501(c)(3) Registration: 22-3609293
Mailing Address: 1 Airport Place, Suite 3, Princeton NJ 08540

Cayman Islands

CCMI
Non-profit registration: NP- 3
Mailing Address: PO Box 37, Little Cayman,
Cayman Islands, KY3 2501

United Kingdom

CCMI UK
Charity Registration: 1104009
Mailing Address: Farrer & Co, 66 Lincolns Inn Fields
London, WC2A 3LH

CCMI BOARD

2021 Board of Trustees (US) and Directors (Cayman)

Chris Humphries
Sydney Coleman
Dr Steve Gittings
Peter Hillenbrand - Chairman
Tim Kary - Vice Chairman

JS de Jager - Treasurer
Pauline Simpson - Secretary

2021 UK Board

Chris Humphries
Tim Ecott
Andrew Hersant
Kate Holden
Dominic McCahill

Principal Professional Advisors

Accounting - Berman Fisher
Audit - BDO (2019, 2020 audit)
Solicitors - Stuarts Walker Hersant Humphries/Broadhurst LLC
Bankers - Bank of America, Fidelity, UBS, Cayman National Bank,
Bank of Butterfield, HSBC UK.



POLICIES

PUBLIC BENEFIT

CCMI was established in 1998 to protect the future of coral reefs through research, conservation, and education. We opened the Little Cayman Research Centre in 2005 and the facility has become a preeminent Caribbean marine institution, working on one of the most pressing issues facing the region: the protection and conservation of coral reef biodiversity. Our work benefits the scientific community regionally and around the globe, as well as children who we engage in ocean literacy programmes and international students who we empower to reduce their impact on and improve the vitality of our oceans. We have a research agenda that includes actionable projects that are essential to advance the science and deliver solutions needed to inform coral restoration efforts around the globe. What makes CCMI different, however, is our commitment to transforming knowledge into impactful educational outreach.

RESERVES POLICY

CCMI's reserves policy outlines three areas of reserve:

- Contractual reserves – where CCMI has a contract that specifies how funds must be utilised (a grant, for example). These funds are treated as restricted funding and reported on accordingly.
- Board and Management Initiatives – in accordance with the goals and objectives of the organisation, the board and management periodically set up reserves (restricted funds) for particular initiatives that they feel are key to the organisation.
- Operational reserves – the organisation aims to maintain an operational reserve to meet basic operational costs (mortgage, salary, insurance, utilities etc) for a period of six months.

RISK MANAGEMENT

CCMI continues to assess and develop our approach to risk. The impacts of Covid-19 in 2020 and 2021 have ensured CCMI has a proactive and pragmatic approach to risk management, as operating from a remote tropical island during a global pandemic brings a new paradigm to risk management. In addition to strengthening the CCMI Board, increasing our on-hand cash reserves and developing new revenue opportunities, CCMI was awarded a Covid-19 Rapid Response Grant in 2021 by RESEMBID, which will support the CCMI team in taking stock of the impacts of the pandemic, developing strong after-action reports (AAR) and developing improvements to our overall risk management, especially in the face of health and weather hazards.



A close-up photograph of coral, showing vibrant red and orange polyps with yellow centers. A dark blue circle is overlaid in the center, containing the text 'CORPORATE SPONSORS' in a light blue, sans-serif font.

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Ernest Kleinwort Charitable Trust



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THE HUMPHRIES FAMILY | SUSAN OLDE OBE | OLIVER S. AND JENNIE R. DONALDSON TRUST | SUREFINE FUND LTD.



**VOLUNTEERS
SUPPORTERS**

VOLUNTEERS AND SUPPORTERS

AMANDA GOODWIN
ANNE-MARIE LEADBETTER
ASH MCKNIGHT
BRIGITA NEMET
BRIAN MELITO AND THE JESSICA COLKER TRUST
CATHERINE CHILDS
CATHY CHURCH
CHRIS & JOANNA HUMPHRIES
DAVE BELL
DEBBI TRUCHAN
DIANA SCHMITT
DOMINIC MCCAHILL
ERIN QUIGLEY
FIONA, BOB AND JEN MOSELEY
FRANS DE BACKER
GREG LOCHER
JOE & SUSAN PLOPLYS
JS DE JAGER

LAUREN CHRISTIE
MAGGIE JACKSON
MELISSA WOLFE
MIKE & MEREDITH GUDERIAN
MIKE & WENDY MANNISTO
MYRA & JAMES COWAN
NATALIE URQUHART
NICOLA MARTYN
NICOELA MCCOY
PAULINE SIMPSON
PETER HILLENBRAND
SARAH MCDUGALL
SIMON & CANDY WHICKER
STEVE & MARTY GITTINGS
SYDNEY & CLAIRE COLEMAN
TIM & JUDY KARY
WILLIAM WAGGOTT





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