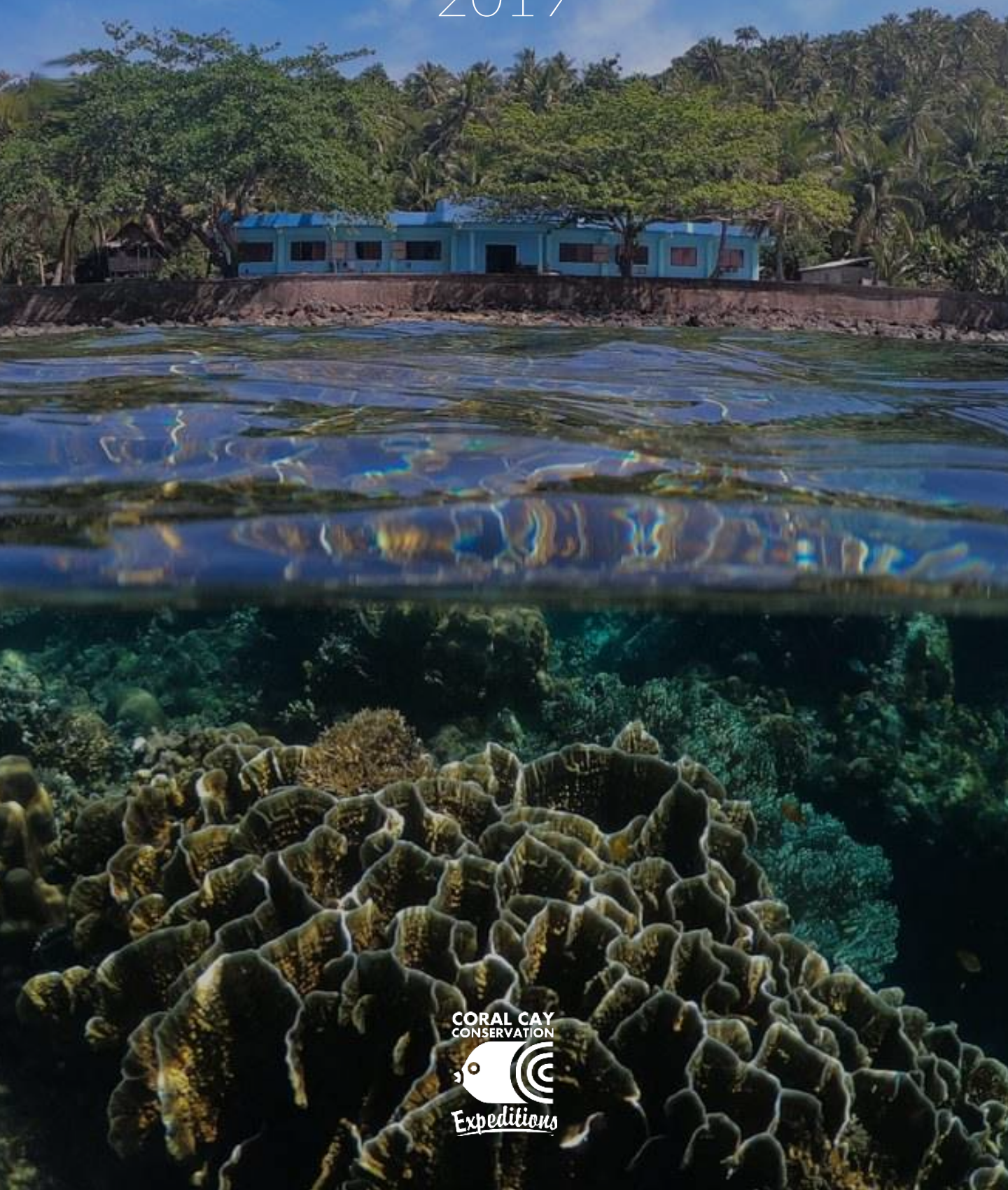


SOUTHERN LEYTE CORAL
REEF CONSERVATION PROJECT

ANNUAL REPORT

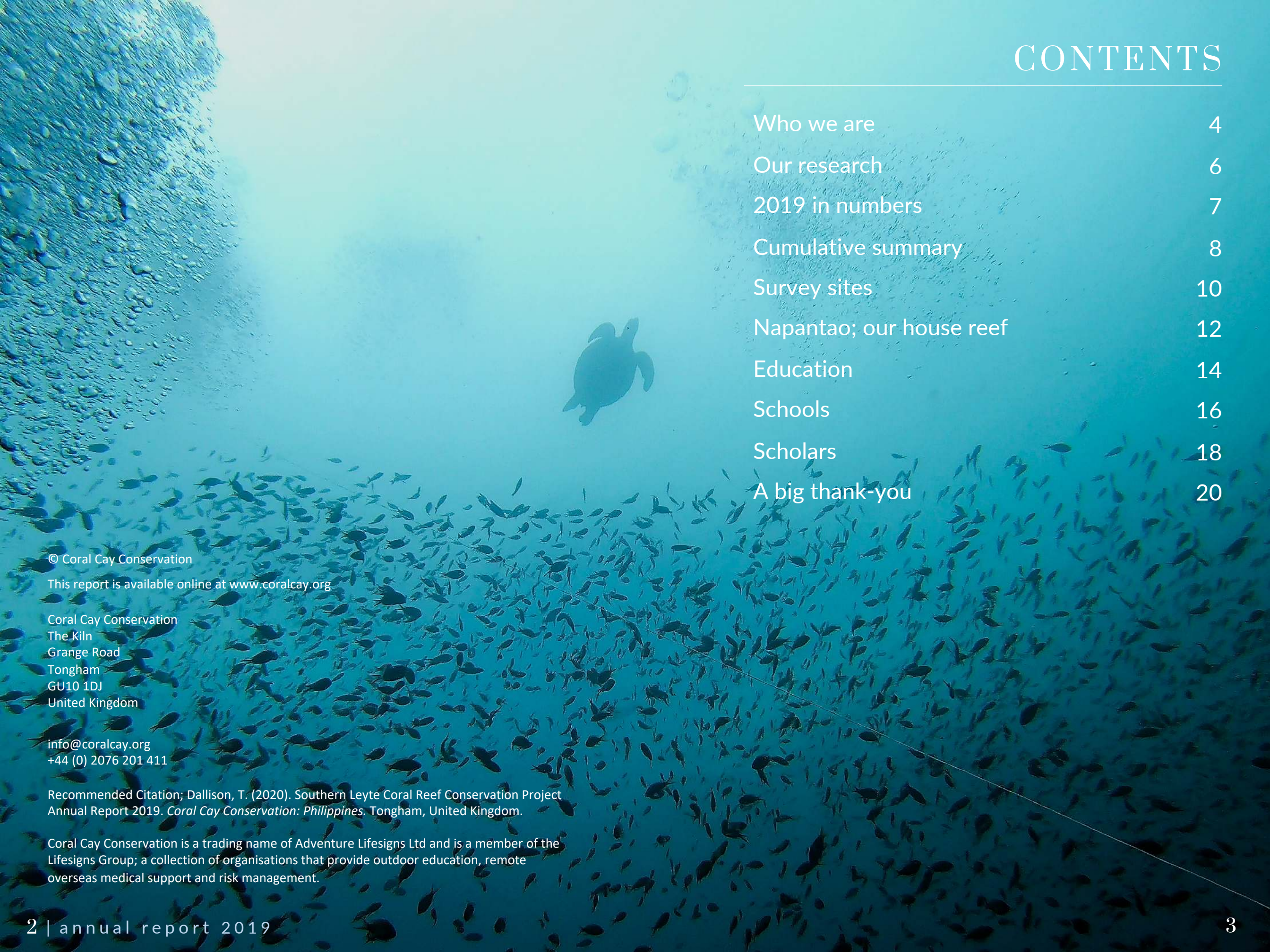
2019



CORAL CAY
CONSERVATION



Expeditions



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Coral Cay Conservation is a trading name of Adventure Lifesigns Ltd and is a member of the Lifesigns Group; a collection of organisations that provide outdoor education, remote overseas medical support and risk management.

WHO WE ARE

Coral Cay Conservation is a renowned conservation specialist and expedition provider dedicated to providing the resources to help protect coral reefs and associated ecosystems throughout the developing world. We are committed to creating real-time solutions to the many plights suffered by our Ocean.

Established 1986, we have over 30 years of experience operating successful marine (and terrestrial) conservation projects. The Ocean, its inhabitants and the local communities that depend on it, are at the center of all our projects acknowledging the necessity to give equal measure to scientific data collection, education and capacity building. Serving these three key themes, we operate under a citizen-science framework, providing opportunities to budding-scientists, conservationists and thalassophytes, collectively protecting biodiversity, increasing resilience and empowering stakeholders. Those that join our projects make a financial contribution that enables our continued work whilst supporting the training of country nationals and stakeholders.

Since establishment, Coral Cay Conservation has operated in over 14 countries through the implementation of 17 mid and long-term projects. For all our projects we advocate best-practice, through replicable and adaptable processes, operating a

bottom-up ecosystem-based approach to conservation. We work directly with local stakeholders, resource managers and governments to promote co-management practices aiming to protect livelihoods and increase well-being.

Alongside working with local stakeholders, we are continually active on both national and international platforms, collaborating with the global community and contributing to international commitments. This combination of local, national and global action ensures the effective management of coral reefs, and their associated ecosystems for the prosperity of future generations.

“Providing resources to help sustain livelihoods and alleviate poverty through the protection, restoration and management of coral reefs and associated ecosystems”

Our mission

The projects undertaken over our history have ranged from the Americas and Caribbean, through Europe and Africa to East Asia and the Pacific. We are currently active in the Philippines and have been since 1994. In 2002, the Southern Leyte Coral Reef Conservation Project (LRCP) was established in collaboration with the Provincial Government of Southern Leyte with a clear aim to protect the marine resources of Sogod Bay through the establishment of Marine Protected Areas (MPA). Through numerous phases, the LRCP has been highly successful and continues to develop approaches to generate real-time solutions.



OUR RESEARCH

The LRCP's inception in 2002 to secure the long-term benefits and services of coral reefs, and associated ecosystems, saw Coral Cay Conservation protecting food security and supporting livelihoods of the residents in the Southern Leyte Province. The LRCP was established under a clear aim to;

“Enhance marine biodiversity and alleviate community poverty through the evaluation, protection and restoration of coral reefs, and associated ecosystems”

The months throughout 2019 saw the final undertaking of CCC's third phase, a Before-After-Control-Impact (BACI) study whilst continuing to provide ecological assessments and management recommendations for the coral reefs, and associated systems, of Southern Leyte. The BACI phase was designed to increase understanding of the performance of established MPAs within the region by comparing data collected prior to MPA establishment to data collected post-establishment.

In addition to the collection of ecological indicators, such as Scleractinian hard coral cover and biomass of commercially important fishes, CCC utilised the [Marine Protected Area Management Effectiveness Assessment Tool](#) (MEAT) to highlight important threshold indicators focusing on the enforcement, implementation and maintenance of the protected areas. CCC aim to communicate the results of this phase in 2020. In the meantime, summaries of each surveyed site, as well as a collective analysis from all surveyed sites, are provided in the following section; Cumulative Summary.

Our teams of volunteers and scholars collect data to enable the quantification of coral reef health by assessing the abundance of key fishes, invertebrates and substrates whilst noting the presence and absence of impacts such as bleaching, direct coral damage and disease. All CCC surveyors undergo, and must pass, two weeks of training under our specially designed Skills Development Programme (SDP) to ensure that the data collected are done so accurately and efficiently.

Once spatial assessments have been undertaken, our staff team will disseminate results and recommendations to local stakeholders and resource managers, guiding the processes on establishing MPAs in the Philippines.

9



survey sites

5



MPAs surveyed

32



km² of reef surveyed

237



hours underwater

24,061



fish recorded

38,607



invertebrates recorded

26



volunteers

6



scholarships

2019

CUMULATIVE SUMMARY

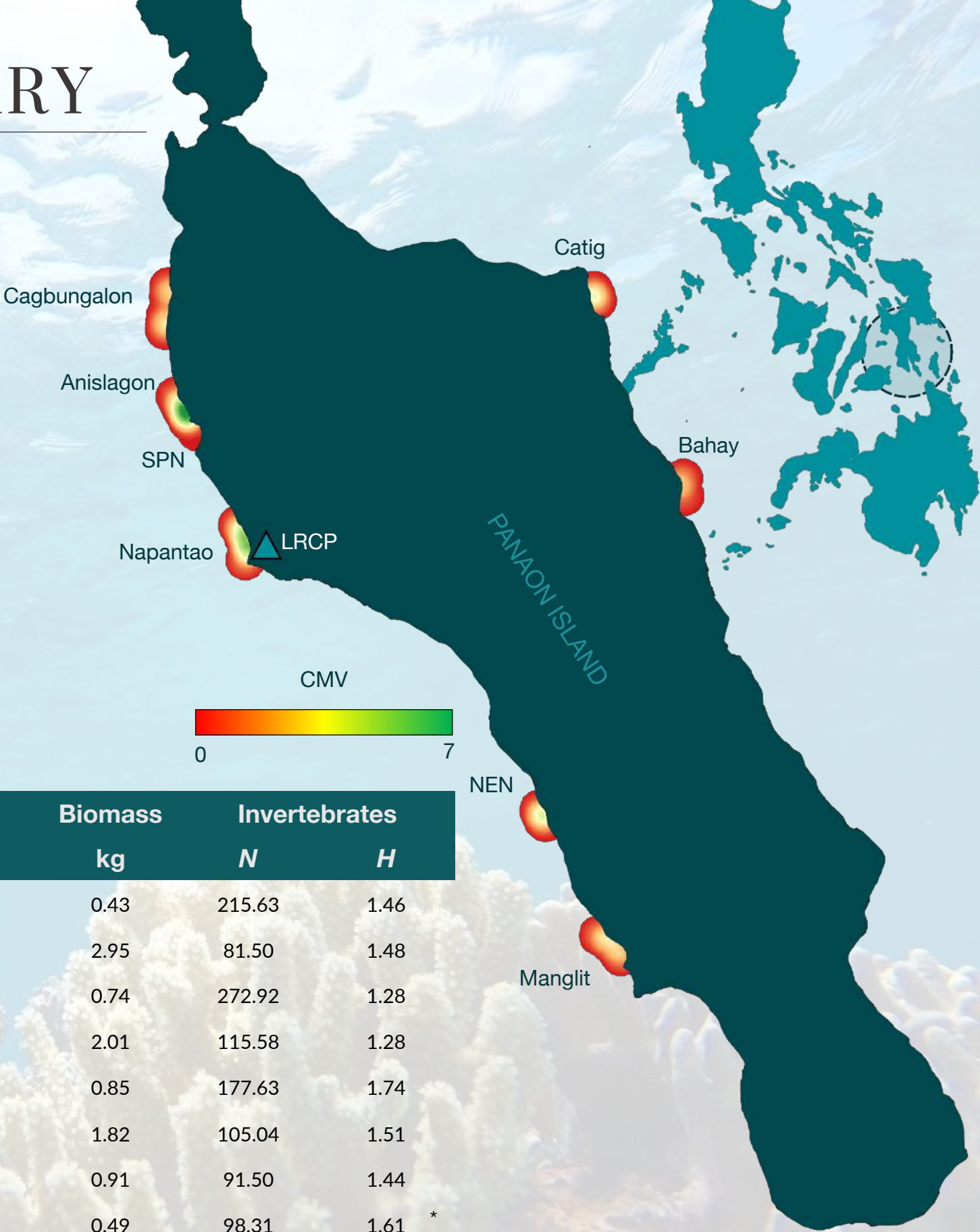
To best demonstrate the results/performance of each site that was surveyed in 2019, they have been compiled and subjected to preliminary descriptive analysis that shows their respective performance against a set of key variables. In addition to this, we have also generated each site's Conservation Management Value (CMV). CMVs are developed from simple indices that compare each site's specific variables against the collective mean and ranks them appropriately.

In order to determine each site's CMV, we analysed 7 key indicator variables; Scleractinian coral cover (HC) (%), Nutrient Indicator Algae (NIA) (%), fish abundance (N), fish community sample diversity (H), invertebrate abundance (N), invertebrate

community sample diversity (H), and commercially important fish biomass (kg).

By comparing the site's variable mean to the overall mean, it allows us to rank each site. If a site ranks higher than the overall mean for that variable, it is scored '1' and if it is ranked below, a score of '0' is awarded. As there are 7 variables, the maximum CMV score is '7', and the lowest is '0'. These indices are representative of the surveyed sites and not necessarily the entire area of Sogod Bay and Panaon Island. These have been spatially plotted for visual analysis.

To provide further context, we have also presented the mean of each site's key variable to accompany the visualization.



	Substrates		Fishes		Biomass	Invertebrates	
	HC	NIA	N	H	kg	N	H
Anislagon	31.02	2.34	67.41	2.02	0.43	215.63	1.46
Bahay	14.38	0.42	65.04	2.00	2.95	81.50	1.48
Cagbungalon	30.73	5.73	113.17	2.02	0.74	272.92	1.28
Catig	43.54	1.25	100.00	1.92	2.01	115.58	1.28
Gudan	19.38	6.09	123.75	2.01	0.85	177.63	1.74
Napantao	46.88	1.88	99.79	2.18	1.82	105.04	1.51
NEN *	64.90	1.77	74.00	2.13	0.91	91.50	1.44
Manglit	44.22	0.78	77.22	1.94	0.49	98.31	1.61
SPN *	27.34	2.66	63.13	1.76	0.58	163.19	1.47

* Nueva Estrella Norte (NEN)
Santa Paz Norte (SPN)

ANISLAGON

During Amihan, Barangay Anislagon (Municipality of San Francisco) experiences shelter from prevailing trade winds however, during the monsoon season the barangay is subject to high wave action from Southwest trade winds. Following surveys in 2016, an MPA was proposed to the north of the barangay's coastal waters, however, following further deliberation, stakeholders and resource managers requested for the MPA to be positioned in front of the barangay, enabling easier enforcement. Whilst this highlights clear intent by stakeholders to effectively protect their respective resources, the initial recommendation aimed to protect the area's more diverse area of reef and found the reefs in front of the barangay to be in poor quality. This ongoing discussion has resulted in no MPA being established and therefore, CCC surveyed Anislagon as a 'Control' site under the BACI protocol.

BAHAY

Bahay is the southern-most barangay in the Municipality of Liloan, located on the eastern coastline of Panaon Island. The MPA located in Bahay was established in 2016 and covers an area of 77 ha, comprising of a No-Take Area (NTA) (27ha) and Marine Reserve (50ha). At the point of establishment, it was agreed by the barangay to accept ordinance combining the MPA with the already established protected area of President Quezon (north of Bahay). Despite the MPA being awarded an "excellent" [MEAT](#) score of 71/84, due to the MPA's age, it could only be awarded a level 2 status. Barangay Bahay was surveyed in 2012, 2018 and 2019, as an 'Impact' site under CCC's BACI protocol, with most recent findings suggesting low levels of poaching within the MPA and relatively low overall anthropogenic impacts.

CAGBUNGALON

Located in the Municipality of Liloan, Barangay Cagbungalón is on the western coastline of Panaon Island. Currently, there is no MPA established with recommendations by CCC in 2014 not materialising. As such, CCC re-surveyed the near shore reefs in 2019, highlighting Cagbungalón as a 'Control' site. Combined with other 'Control' sites, the temporal changes in coral reef condition in Cagbungalón will aim to contextualise the general shifts seen in Sogod Bay without the influence of MPAs. The surveyed area was considered as highly impacted due to the absence of commercially important fishes and invertebrates whilst further experiencing high levels of sedimentation from outfalls from adjacent rivers. In 2014, CCC recommended an MPA that would protect an area of 5 hectares.

CATIG

Barangay Catig, Municipality of Liloan, is situated on the eastern coastline of Panaon Island. The barangay's position results in the near shore reefs experiencing high-energy conditions due to the influence from the Northeast trade winds during the season of Amihan. Following a major landslide in 2004, the barangay was re-located 3km north, during which time it was presumed that Catig's reefs would have been significantly affected. The reefs of Catig were surveyed as an 'Impact' due to the establishment of an MPA. Following initial surveys in 2015, Barangay Catig established an MPA totalling 98.22ha, comprising of a Marine Reserve (72.21ha) and core NTA (26.01). In 2019, CCC discovered a shift in Demarcation Buoys that highlighted that the NTA had reduced by 42%. Catig obtained a "fair" [MEAT](#) score with 32/84 cumulative points and was awarded a level 2 status.

GUDAN

Barangay Gudan, Municipality of Liloan, is positioned on the eastern coastline of Panaon Island, located to the north of the Island. Due to its position, the barangay receives shelter during Amihan from the Northeast trade winds but is influenced by high-energy wave action during the monsoon season. Dive tourism is common in this barangay due to the local dive site known as "Olly's Wall". Despite a recommendation to establish an MPA in 2015, protecting 15.6ha of reef (including the popular dive site), no protection has been implemented with the Barangay's coastal waters and as such, it was surveyed as a 'Control' site during CCC's BACI protocol.

NUEVA ESTRELLA NORTE

Barangay Nueva Estrella Norte is located in the Municipality of Pintyuan, on the western coastline of Panaon Island, and was surveyed as an 'Impact' site during CCC's BACI protocol. Following original surveys in 2015, an area of 14.6ha was accepted in 2016 to protect the near shore reefs and resources of the barangay. To accompany bio-physical surveys in 2019, CCC further assessed the MPA using the [MEAT](#) format which categorised the MPA as "Established", and Level 1, with a cumulative score of 12/84. This provides further clarity on the MPA's ability to perform, highlighting that additional support is required to facilitate the Barangay in successfully managing marine resources.

MANGLIT

Barangay Manglit is located on the western coastline of Panaon Island and resides in the Municipality of Pintyuan within Sogod Bay. The coastal waters of Manglit were surveyed in 2019 as part of CCC's MPA spatial assessments. Manglit's MPA protects a total area of 15.44ha and following assessment, CCC recommended that the MPA be extended by 5ha to result in a protected area of 19.5ha. Further recommendations were provided that included the importance of establishing a Bantay Dagat presence to enforce the accepted ordinance, maximising its chance of success. Further recommendations focused on resource utilisation and waste management due to high levels of discarded fishing gear found within and around the MPA indicating potential poaching.

SANTA PAZ NORTE

Barangay Santa Paz Norte (Municipality of San Francisco) was surveyed in April and May of 2019, following wishes from the Barangay Council to establish an MPA. CCC made original recommendations in 2014 for MPA establishment however, these did not materialise. Following 2019 surveys, CCC provided two sets of recommendations with the first protecting 9.98ha of reef to the north of the barangay and the second protecting 5.32ha. Both recommendations included a central core NTA surrounded by Marine Reserves. The intention of the marine reserve is to act as a buffer to the NTA where there is a limitation of usual practices such as only permitting the use of hook and line fishing gear.



NAPANTAO

In Barangay Napantao, San Francisco, where the LRCP is based, you will find the Barangay Napantao Fish Sanctuary, as known amongst the Coral Cay Conservation team, House Reef. The Fish Sanctuary was established in 1996 and protects an area of 5ha.

Each year, we conduct bi-annual studies that are a component of a larger temporal study that has been conducted annually since 2013. We positioned transects inside and outside of the Fish Sanctuary (or MPA) that not only enable us to take a snap-shot of the current ecological status of the reef but also to understand the performance of the protected area over time. Key changes over time to indicate ecological status include; fish community assemblages, presence (and biomass) of commercially important fishes and the health of the benthic communities as well as substrate compositions such as reef-building (or Scleractinian) corals. Whilst communication of reef-building coral composition is key, we also communicate the varying lifeforms and growth structures of colonies enabling us to quantify changes in composition. This is of importance as although reef building coral composition could appear stable, the community composition could be changing, possibly shifting to a less complex structure which, in turn, will influence the fauna and flora present within the reef system.

We utilise these observed changes, or responses, to highlight potential detrimental events or activities and provide recommendations to the Barangay's council and stakeholders to improve performance and limit such activities.

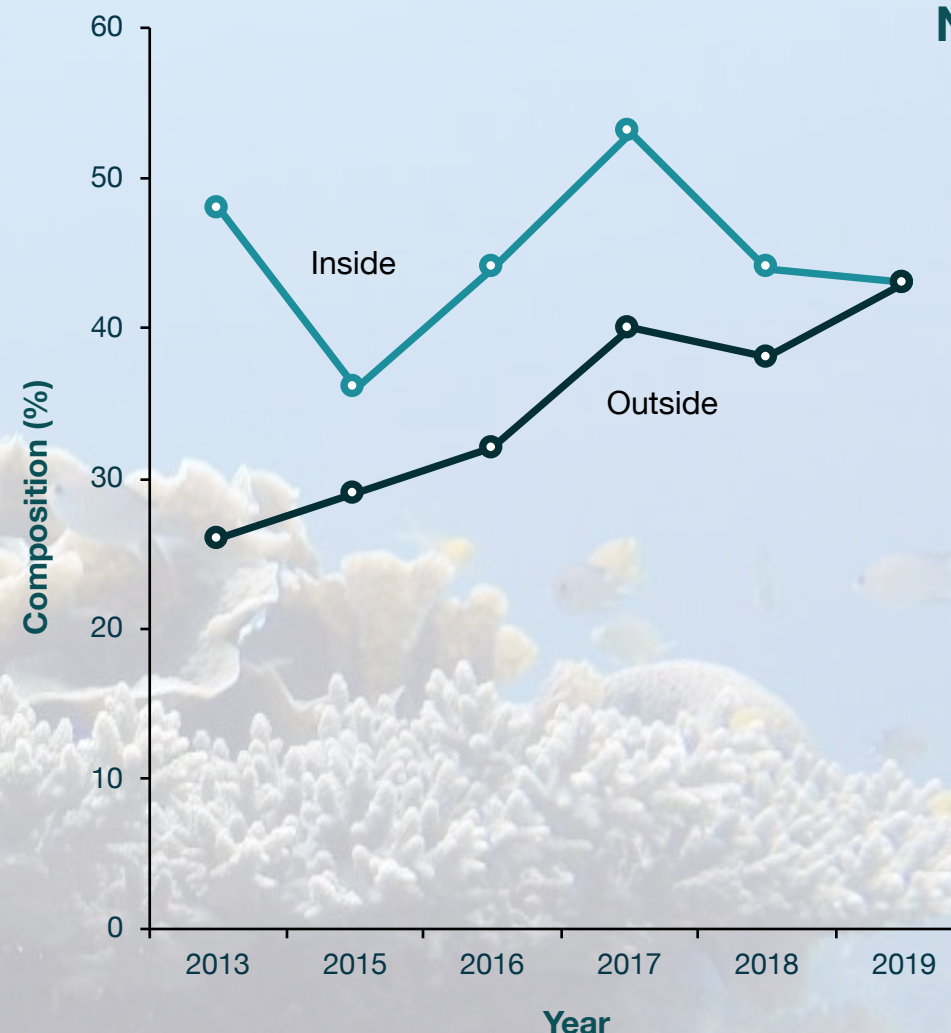
In 2019, bi-annual studies were conducted as usual in March/April and October. During the analysis phase, we deployed Generalized Linear Mixed Models (GLMM) to accommodate the bi-annual sampling framework. The MPA demonstrated positive influence on the diversity of recorded fishes, the abundance of Parrotfish and Snapper, the biomass of Parrotfish and Grouper and the abundance of invertebrates.

The dominant substrate was reef building coral which ranged from 36% - 47% over the year inside the protected area and remained stable outside (41% - 46%). The similarity of reef building coral composition both inside and outside of the protected area is an excellent demonstration of performance considering that cover outside the protected area was below 30% in 2013. Furthermore, the community composition of reef building corals was fairly even across the entire site, presenting a fairly diverse (and resilient) community.

A potential area for concern, however, were the numbers of Crown-of-Thorns Seastars (COTs) recorded across the entire reef. There have been reports elsewhere in the bay of outbreaks of these natural corallivore invertebrates and as a result there has been pro-active population monitoring by our staff team on Napantao. When, and if, COTs abundances reach 'outbreak' levels, they will be removed from the reef to reduce coral predation.

Napantao continues to be an incredible reef for our staff and volunteers to study with coral coverage almost double the 26% national average. We will be compiling and presenting the 2019 spatial assessment for Napantao in 2020 whilst also compiling results and producing a 2013-2019 temporal study.

Reef-Building Coral Composition; Napantao



OUR HOUSE REEF

EDUCATION

We understand that successful conservation hinges on a holistic approach where equal measure is given to the collection of scientific data, education, and capacity building. It is therefore Coral Cay Conservation's belief that marine conservation goes hand in hand with education and economic development. Throughout the LRCP, great emphasis has been placed into education and outreach efforts, inspiring children, students and communities to challenge detrimental activities and adopt sustainable practices.

Since the project's inception in 2002, thousands of children, students and adults have been provided with a better understanding of the marine environment, knowledge about resource management and sustainable practices through the implementation of educational programmes. Although providing educational resources to all demographics of communities is undoubtedly important, Our focus revolves around children and students; the next generation. Coral Cay Conservation aims to alter perceptions by raising awareness and inspiring future generations and as a result, hopes to overcome the often encountered social and traditional barriers to conservation success, incorporating sustainability and a sense of ownership for the marine environment.

In 2019, we continued with our efforts of increasing accessibility

to conservation-focused education through our Seastars Environmental Award Scheme (SEAS) and Reef Rangers as well as other ad-hoc events such as community days and workshops. Each lesson or activity is tailored to the age of the children and students and address the same core principles of coral reef ecology, species identification, coral reef and coastal conservation, marine resource management, sustainability, marine pollution, and plastics.

SEAS

An educational programme designed to develop sustainable partnerships with schools whilst establishing an environmental ethos. Delivered through a three-tiered process (bronze, silver and gold), it pushes schools to establish environmental committees, driven by students, who are then responsible for organizing and running environmental events from beach cleans to awareness-raising parades in local communities.



All smiles on World Oceans Day

REEF RANGERS

An immersive activity allowing children from schools within Southern Leyte to visit CCC's base within Napantao. The activity is run throughout a single day and provides children with opportunities to learn about coral reef conservation and coral ecology. The day is concluded by a group snorkel where students can put their newly acquired knowledge into practice on the Napantao house reef.

Reef Rangers is focused on conservation education, and is designed to be fun, practical and immersive, whilst aiming to inspire students to protect and care for the marine world.



Students show off their fish drawings during SEAS lessons

In addition to the developed initiatives, we also organise large scale *ad-hoc* events such as beach cleans. These activities often generate large turn outs and are clear examples of the local communities' understanding of the importance of reducing environmental stressors. For World Oceans Day, a large event was hosted in the Municipality of Liloan that saw over **270** attendees that collected **546kg** of plastics and waste!

In 2019, we conducted and hosted a total of 14 educational events, lessons and activities throughout Sogod Bay.



Reef Rangers gets the 'OK'



Ecobricking during a community day



Testing the new Ecobrick furniture

SCHOOLS

Coral Cay Conservation's drive to inspire the next generation of environmental stewards also spills onto the international platform as we work with schools from the United Kingdom. In 2019 we welcomed two schools; George Abbot and The Holt.

International school expeditions are coordinated with our sister company, [Adventure Lifesigns](#), who specialise in providing bespoke UK-based outdoor programmes and overseas expeditions. These expeditions focus on personal development whilst immersing participants into the culture of destination countries.

The Holt School joined us in Summer 2019 and worked alongside our staff and community members to build much-needed infrastructure for our local Barangay, Napantao. In an attempt to reduce the amount of plastic entering the Ocean, the team collected plastics from local beaches and spent many hours building Ecobricks (a recycled plastic bottle stuffed with plastic to create a solid building block). These Ecobricks were then utilised as the key building material for a communal toilet in the Barangay's hurricane shelter; an essential addition to ensure accessible sanitation for community members. Throughout its construction, The Holt School students engaged with local students and schools, assisting in lessons focused on

the marine world and the mesmerizing fauna that habituate it.

George Abbot school also joined us in the Summer of 2019 and instantly immersed themselves in the incredible coral reefs of the Philippines. Whilst also assisting and engaging with local children and the community, students from George Abbot learnt how to SCUBA dive and had a crash course in marine ecology. George Abbot's expedition was centered around SCUBA diving and experiencing the natural world, putting our staff's teaching to the test ensuring that students could not only identify marine fauna but also develop an understanding of the intricate and complex systems of coral reefs.

"Teaching the children about sea life was one of the best moments... This was truly an amazing experience and I'm so glad I could be a part of such a strong community like this!"

Holt School



"I recently spent some time with you through Adventure Lifesigns... I have just arrived back from my holiday as a PADI Open Water diver and I wanted to thank you for giving me that push to complete the course and inspiring me to pursue a career in Marine Biology"

Holt School

SCHOLARS

The Scholarship Programme is a unique initiative practiced by Coral Cay Conservation. It aims to increase capacity within the Philippines through immersive, practical training; providing stakeholders with the tools and skills to successfully manage their marine resources sustainably.

It provides opportunities to national Filipino students and community members that can demonstrate a clear intent and passion for conservation, and a wish to pursue this passion further. The opportunity to attend is available to one Filipino national every month following a rigorous application process. Over a four-week period scholars undergo dive and scientific training including gaining their PADI Open and Advanced Open Water certifications, ecological training through our Skills Development Programme and first aid training with the [Expedition Care Programme](#) (ECP). Whilst undertaking the programme, scholars form an integral part of our scientific survey teams, implementing proposed MPA assessments.

Upon completion of the Scholarship Programme, scholars will hold certifications, knowledge and skills in coral reef ecology, marine resource management, species identification, data collection methods and data assimilation techniques; all relevant tools to enable proactiveness within their

resident community. During 2019, CCC welcomed 7 scholars. The programme has shown great success over the years with scholars often continuing to take up roles within government agencies, conservation NGOs and even establishing their own NGOs. Furthermore, it is not uncommon for scholars to return to CCC's site to further their experience and assist with current initiatives on site.

We would like to extend our congratulations to all those that successfully graduated from the scholarship programme in 2019;

- **Karla Ceguerra**
- **Cherissa Garcia**
- **Dianne Villaflor**
- **Maria Villegas**
- **Claudine Caminian**
- **Carmelo Urbanes**
- **Jill Banta**

In 2019, we also welcomed Angus McReynolds, a Minerva Scholar, who joined us for an incredible 9 months! During this period, Angus became a solid member of team as he shadowed staff, guided other volunteers and engaged with the local community.



"I came with courage now going home humble and proud. I may take wrong ways towards my destinations, I may arrive late to my specific point. The important thing is long and hard ways always gives you the best experience and lesson in life. Thank you so much CCC for the opportunity, you're each and every email gives me hopes for my dreams. From my first day up to the very last day I can't imagine how I've gone through. I promise to use these skills and learnings to help my country back doing little steps. Thank you to each and every staff you are all great with your jobs. To future scholars, enjoy each and every moment of learnings all is going to be worth it. Be a CCC scholars and lets help our coastal communities help our reef. Help our fisherman help our ocean."

Claudine



INSPIRE

A BIG THANK YOU

Coral Cay Conservation can only continue to be successful in protecting the natural world and providing support to local communities through our devoted volunteer, scholar and staff network. It is only through this network of conservation advocates and multi-faceted collaborations with a local, national and international capacity that current, and future, stressors can be challenged, mitigated and remediated, taking actions to ensure sustainability for current and future generations.

We would like to express our heart felt gratitude to all those that have made the Southern Leyte Coral Reef Conservation Project a success in 2019, to our Project Partners, Advisors and supporters;

Adventure Lifesigns
All Barangay Captains and Councils
Ana Gaisiner
Andres Cala Campo
Angus McReynolds
Anne Brouwer
Ben Young
Beth Harvey
Camerlo Urbanes
Chantel Elston
Charlotte Heney
Charlotte Henriksen
Cherissa Garcia
Claudine Caminian
Dana Yaptangco
David Spencer
Dianne Mae Villaflor
Dr Alistair Harborne
Dr Carl Cater
Dr Doug Fenner
Dr Greta Aeby

Dr Simon Harding
Edmund Keall
Edna Lorthois
Eliza Leake
Emelita Sebugon Jubay (Pedang)
Emmanuel Dumoulin
Frank Baldivino
Gareth Turner
George Abbot School
Honorable Christopher M. Yap
Honorable Damian G. Mercardo
Jill Banta
Jordan Williams
Jose Ydel (Dodong)
Karla Ceguerra
Katie Dyson
Kyle Stemmett
Lea Bijaoui
Leonie Messmer
Lifesigns Group
Ma'am Eva Abad
Manon Broadribb
Maria Villegas
Matthew (Scoob) Bigland
Naomi St John
Pallavi Shanbhag
Peter Jones
Pheobe Zhou Huixin
Prof. Morgan Pratchett
Prof. Peter Mumby
Provincial Government of Southern Leyte Board Members
Provincial Environmental and Natural Resource Management Officer (PENRMO)
Provincial Tourism Office
Rachel Knowles
Richard Bongot (Bok)
Richard Sajol (Ricky)
Roslyn King
Sally Richards
Satoko Koshida
Servando Jr. Tio (Bandy)

Sian Humphryes
Simron Browne
Sir Armando Gaviola
Stephanie Carter
Steven Hix
Stuart Ross
The Holt School
Viki Simon
Wai Leong Chow

“CCC gave me a taste of my childhood dream of becoming a marine biologist. I loved learning about all the amazing creatures being protected right in our house reef”

Stacey

2019 saw tremendous efforts by our team to communicate our work through various mediums, providing recommendations to local communities, collaborating on scientific articles and providing support to charities and organisations. We are grateful to all those that contributed and are excited for future collaborations. You can read all 2019 published material as well as historic reports on our [website](#);

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PUBLICATIONS

SOUTHERN LEYTE CORAL
REEF CONSERVATION PROJECT

