

Rufford Small Grant

Project Update 2

Name: Alexandra Pineda-Muñoz bioalexa@gmail.com

Project Title: Developing a Genetic Diversity Conservation Model for the Threatened Coral *Acropora palmata* in San Andres Island, Colombian Caribbean

Project ID: 46414-1

Date of This Report: January 5, 2026

Executive summary

This project will evaluate the genetic structure of *Acropora palmata* in San Andres Island and compare it with other Caribbean populations. It will identify resilient phenotypes and genotypes for conservation and restoration. A genetic diversity conservation protocol will be developed, alongside management strategies and educational awareness programs to engage stakeholders and promote coral reef conservation.

Project Updates:

1. Indicate the level of achievement of the project's original objectives (Key activities progress included in the comments).

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Improve the understanding of the genetic diversity and structure of <i>Acropora palmata</i> populations in San Andres		X		Key Activities: Collect tissue samples from <i>A. palmata</i> colonies across San Andres Island. (Completed: June) DNA extraction of samples collected. (Completed: July) Perform genetic analysis using SNP genotyping. (Completed: December)

				Compare genetic data with existing Caribbean <i>A. palmata</i> population datasets. (In progress)
Identify resilient <i>Acropora palmata</i> phenotypes and genotypes for targeted restoration		X		Key Activities: Assess colonies' tolerance and resistance to bleaching and disease. (Completed) Select and catalog resilient genotypes for restoration efforts. (In progress)
Develop a conservation protocol for <i>Acropora palmata</i> in San Andres		X		Key Activities: Synthesize genetic data and ecological assessments to create a conservation model. (In progress: January-February) Develop guidelines for integrating genetic diversity into restoration practices. (In progress: January-February)
Increase local awareness and engagement in coral conservation efforts.		X		Key Activities: Partner with the Raizal community to promote stewardship of coral reefs. (In progress: January-February) Develop outreach materials, such as pamphlets and social media content, on coral conservation. (In progress: January-February)

2. Describe the three most important outcomes of your project.

a). Population Status: We quantified the current population status and documented significant changes over time. This yielded estimates of current status of *Acropora palmata* population in San Andres Island and revealed temporal trends throughout the last decades, and allowed to identify resilient unknown and unmonitored reef patches of *Acropora palmata* in San Andres Island.

b). Genetic Sampling and sequencing: In 4 reef patches of *Acropora palmata* in San Andres Island, over 100 colonies were tagged and sampled for genetic analysis. Samples were transported to Bogotá, Colombia and analyzed in the Genetic Institute of the National University of Colombia. DNA was extracted from 96 samples and then transported to AGROSAVIA, ThermoFisher representatives in Colombia, for sequencing. Samples have been sequenced and genetic analysis are being performed.

c) Capacity Building: 3 fishermen and 5 dive instructors were trained for *Acropora palmata* population monitoring, including spawning monitoring at nights. Nets for spawning collection were created and spawning monitoring was then done at two reefs in San Andres during the species' reproductive window, 12 after the full moon, during July, August and September.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

The costs of sequencing the *Acropora palmata* tissue samples resulted to be over twice as much as originally stated with local Thermo Fisher representatives. We could not send samples abroad (USA Thermo Fisher) given that CITES permit to transport samples to another country has taken over 6 months with local environmental authority, and is still pending. We used local collecting permits which were given to the National University of Colombia for sample collecting, and authorization from the local Environmental Authority CORALINA for national transportation of the samples, in order to fulfil project goals with no further delay. As for costs, additional funding was received from the International Coral Reef Society through the Ruth Gates Fellowship to cover additional costs of sequencing.

Sequencing was conducted using the Thermo Fisher Coral–Algae SNP Microarray, designed for SNP identification in acroporid corals and their symbionts. The microarray was purchased through Agrosavia, Thermo Fisher's representative in Colombia, which required importation and nationalization of the chip from the United States. This process, initially expected to take approximately two months, was delayed to four months due to regulatory procedures, as this was the first time this specific microarray was imported into Colombia. As a result, sequencing was completed in the last week of December at Agrosavia facilities, delaying subsequent activities that depended on these results.

To mitigate this delay, community engagement activities were rescheduled for January and February. This adjustment will allow results to be discussed directly with local community and stakeholders so that their knowledge can be incorporated into the development of conservation strategies.

4. Describe the involvement of local communities and how they have benefitted from the project.

To date, three local fishermen and five local dive instructors have been trained and actively involved in the project. Their participation includes hands-on engagement in coral reef monitoring of *Acropora palmata* patches and participation in nocturnal monitoring of coral spawning events. Through this involvement, participants have strengthened their skills in species identification, reef assessment, and the recognition of reproductive and health indicators in threatened coral populations.

These collaborations have increased local capacity for reef monitoring and fostered greater awareness of the ecological importance and conservation status of *A. palmata*. Dive instructors involved in the project are also well positioned to share this knowledge with visitors and the wider community, extending the project's impact beyond direct participants.

Additional activities with local fishermen are scheduled and will focus on strengthening their engagement in coral reef conservation, particularly for *Acropora palmata*. These activities will include one-on-one interviews to document local ecological knowledge and a community-based domino tournament centered on coral reef conservation themes. These events are designed to encourage dialogue, knowledge

exchange, and local stewardship. Due to sequencing delays, these activities were rescheduled and will take place in January–February.

5. Are there any plans to continue this work?

Yes. The project will continue until February this year, when the current objectives are expected to be completed. Beyond this period, we plan to continue long-term monitoring of coral spawning events and coral health in *Acropora palmata* populations at the study sites. These activities are intended to contribute to sustained monitoring efforts and inform future conservation and restoration actions.

Building on the outcomes of this project, we also aim to expand this work to include the closely related threatened species *Acropora cervicornis*, as well as to additional reef sites across other islands within the Seaflower Biosphere Reserve. This expansion will depend on the availability of funding and permits but will build directly on the methodologies, partnerships, and local capacity developed through this project.

6. How do you plan to share the results of your work with others?

Local newspaper, scientific papers and social media.

7. Looking ahead, what do you feel are the important next steps?

With genetic analyses now completed, the immediate next step is the integration of these results into ongoing conservation and restoration planning for *Acropora palmata* in San Andrés. The data generated through this project provide a scientific basis for identifying and prioritizing genotypes for future restoration efforts and for guiding management decisions aimed at preserving remaining genetic diversity.

In the short term, results will be shared with the local environmental authority (CORALINA) and partner organizations to support the incorporation of genetic considerations into active restoration initiatives already underway within the Seaflower Biosphere Reserve. This includes informing site selection, donor colony management, and future propagation strategies.

A further next step is the consolidation of local monitoring capacity developed during the project. Continued coral health and reproductive monitoring will be maintained with the participation of trained local fishermen and dive professionals, ensuring continuity beyond the project's funding period.

Finally, project findings will be disseminated through scientific outputs and local outreach activities, including engagement with schools and community groups, to strengthen awareness and long-term stewardship of coral reef ecosystems.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes. The Rufford Foundation logo was included on rash guards and microfiber towels produced as fieldwork uniforms for all project trainees, including local fishermen and dive instructors. These materials were used during coral monitoring activities, spawning surveys, and other field-based work, ensuring visible acknowledgment of The Rufford Foundation's support throughout the project.

In addition, the use of these materials during field activities and community-based monitoring has provided local visibility for the Foundation among project participants, partner organizations, and the broader diving and fishing community involved in coral conservation efforts.

Publicity was done through social media and 1 news paper article:

https://www.instagram.com/p/DL6BhRwsyZh/?img_index=4&igsh=MWxncGk0bmhmaHFzbA==

https://www.instagram.com/p/DNOJw2YAoXF/?img_index=3&igsh=MTk4cnRtZTNhaXFueQ==

https://www.elisleño.com/index.php?option=com_content&view=article&id=31967%3A2025-08-19-18-05-49&catid=41%3Aambiental&Itemid=83&fbclid=IwdGRjcANHjyNleHRuA2FibQIxMQABHhqYFprvDOeI5bXlNKGfHMMAjjGXoku-lqhfvjXcsiMHBNG14xWCvJ_Yy92-aem_7_F_1yPyvCLaloQoDifSDA

9. Provide a full list of all the members of your team and their role in the project.

Alexandra Pineda – Principal Investigator

Miguel Hinestroza – Diver – Field Work Assistant

Luis Pamenio Suescun – Genetic Expert – DNA extractions

Natalia Chavez – Laboratory assistant – DNA extractions

Sammy Martinez – Photographer – Multimedia coverage and video production

David Pineda Correa – Graphic Designer and Publicist – Local community and social media campaign

Randy Blanco – Local Fishermen and Diver – Coral Reef Monitoring

Peter Freiler - Local Fishermen and Diver – *Acropora palmata* Spawning Monitoring

Kaliensky Batista - Local Fishermen and Diver – *Acropora palmata* Spawning Monitoring

Sebastian Charria – Diver – *Acropora palmata* Spawning

Samir Orellano – Diver – *Acropora palmata* Spawning

David Leonardo Zapata – Diver – *Acropora palmata* Spawning

Andres Talero – Diver – *Acropora palmata* Spawning

10. Any other comments?

Approximately 85% of the project funds have been spent to date, primarily on fieldwork logistics, DNA extraction materials, genetic sequencing, and community training activities. The remaining funds will be used to support pending outreach and dissemination activities planned for the final phase of the project.

We are grateful to The Rufford Foundation for its support, which has been essential for advancing conservation-focused genetic research on *Acropora palmata* and for strengthening local capacity for coral reef monitoring and stewardship in the Seaflower Biosphere Reserve.

11) Supporting photographs

These are the captions for the pictures that are attached:

1. Healthy *Acropora palmata* in Nirvana Reef San Andres Island
2. Bleached *Acropora palmata* in EL Cove Reef San Andres Island
3. *Acropora palmata* recruit in Nirvana Reef San Andres Island
4. Local fishermen monitoring the reef
5. Local dive instructor monitoring coral spawning
6. Alexandra Pineda - team leader in site