Rufford Small Grant

Project Update 3

Name: Alexandra Pineda-Muñoz bioalexa@gmail.com

Project Tittle: 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: April 1, 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 *Acropora palmata* populations in San Andres		X		**Key Activities:** **Collect tissue samples from *A. palmata* 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 *A. palmata* population datasets. (In progress)
Identify resilient *Acropora palmata* 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. (Completed)**
Develop a conservation protocol for *Acropora palmata* in San Andres		**X**		**Key Activities:** **Synthesize genetic data and ecological assessments to create a conservation model. (In progress: April)** **Develop guidelines for integrating genetic diversity into restoration practices. (In progress: April)**
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: Completed)** **Develop outreach materials, such as pamphlets and social media content, on coral conservation. (In progress: Completed)**

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, Thermo Fisher 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 widow, 12 after the full moon, during July, August and September.

d) Community Outreach: The following workshops were given in San Andres:

- 3 local schools – Bolivariano, Flowers Hill and Tecnico Industrial
- 2 dive shops – Hans Dive Shop and Felo Divers
- Local university – National Univesity of Colombia – Caribbean Campus
- Local Fishermen Workshop – Dominando el Arrecife – workshop with local fishermen to establish conservation measures while developing a domino contest.

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

Apart from the previously reported delays associated with the import and nationalization of the microarray chip required for coral DNA sequencing, an additional challenge arose during the implementation of the genetic analysis workflow. Local personnel at AGROSAVIA required specialized training to run the Best Practices Workflow for SNP genotyping, which was conducted in coordination with the Thermo Fisher central office in the United States.

This capacity-building process, although highly valuable for strengthening national technical expertise, extended over several weeks and resulted in delays in generating and retrieving key output files from the sequencing facility. Consequently, downstream analyses, particularly comparisons with Caribbean-wide genetic datasets, had to be postponed.

To address this, the project timeline was adjusted. Genetic analyses are now being finalized, and comparative Caribbean analyses have been rescheduled for April. The integration of these results into the genetic conservation protocol is expected to be completed by May.

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 actively involved and trained through this project. Their participation has included hands-on engagement in coral reef monitoring of *Acropora palmata* patches, as well as participation in nocturnal monitoring of coral spawning events.

Through this involvement, participants have strengthened their technical skills in species identification, reef assessment methodologies, and the recognition of reproductive and health indicators in threatened coral populations. This has contributed to building local capacity for reef monitoring and has fostered a stronger sense of stewardship toward coral reef conservation.

In addition to direct training, the project implemented a series of outreach and education activities targeting different sectors of the local community. Workshops were conducted in three local schools (Bolivariano, Flowers Hill, and Tecnico Industrial), two dive shops, and at the National University of

Colombia – Caribbean Campus. These activities increased awareness about the ecological importance and critical conservation status of *A. palmata*, particularly among youth and ocean users.

A key community engagement activity was the "Dominando el Arrecife" initiative, which combined a fishermen workshop with a conservation-themed domino tournament. This event created a culturally relevant space for dialogue, allowing fishermen to engage with reef conservation concepts while sharing their local ecological knowledge.

5. Are there any plans to continue this work?

Yes. The project will continue until May 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 in their final stages, the immediate next step is to complete the integration of genetic and ecological data to finalize the conservation protocol for *Acropora palmata* in San Andrés Island. This protocol will provide practical guidelines for incorporating genetic diversity into ongoing reef management and restoration efforts.

Building on the progress achieved since the previous reporting period, the project is now transitioning from data generation to application. This includes translating genetic results into concrete recommendations for management, particularly regarding the identification of priority reef patches, the protection of remnant populations, and the selection of colonies with potential resilience to bleaching and disease.

In the short term, results will be shared with the local environmental authority (CORALINA) and partner organizations to support decision-making processes related to reef conservation. This will contribute to strengthening existing management strategies within the Seaflower Biosphere Reserve.

Another key next step is the continuation of community-based monitoring efforts. The trained local fishermen and dive professionals will remain actively involved in coral health and reproductive monitoring, ensuring continuity and reinforcing local capacity built throughout the project.

Finally, the results of this project will be disseminated through scientific publications and outreach activities, with the aim of contributing to broader discussions on coral conservation and providing a reference for similar efforts in the Caribbean region.

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:

1) 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.
2) Banner and t-shirts for the "Dominando el Arrecife" fishermen workshop. These materials were given out to local fishermen and used during the workshop, ensuring visibility of Rufford Foundation Logo.
3) Local workshops: all presentations for schools, dive shops, university and scientific conferences included Rufford Foundation logo and acknowledged financial support.
4) Social media pieces and local newspaper articles included the Rufford Foundation logon and acknowledged financial support.

In addition, the use of these materials during field activities and community-based worshops, we have 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 2 news paper articles:

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=IwdGRjcANHjyNleHRuA2FlbQIxMQABHhqYFprvDOeI5bXlNKGfHMMAjjGXoku-lqhfvjXcsiMHBNG14xWCvJ_Yy92-_aem_7_F_1yPyvCLaIoQoDIfSDA

https://www.facebook.com/photo/?fbid=1324745206340413&set=a.446598460821763

https://www.facebook.com/photo/?fbid=1321854863296114&set=a.446598460821763

https://www.facebook.com/share/p/1GVwNK1EJS/

https://www.facebook.com/share/p/1Bzw3jV8hr/

https://www.instagram.com/p/DUyuzwdFcj1/

https://www.facebook.com/share/p/18Kk7EGVjN/

https://www.facebook.com/photo.php?fbid=1211795641066518&set=a.432173892362034&type=3

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

[Intentionally removed]

10. Any other comments?

100% of the project funds have been spent to date, on fieldwork logistics, DNA extraction materials, genetic sequencing, community activities and outreach materials.

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. Healthy *Acropora palmata* in EL Cove Reef San Andres Island

3. Dominando el Arrecife domino tournament and fisherman workshop

4. Dominando el Arrecife domino tournament and fisherman workshop

5. Dominando el Arrecife domino tournament and fisherman workshop

6. Dominando el Arrecife domino tournament and fisherman workshop

7. Dominando el Arrecife domino tournament and fisherman workshop

8. Dominando el Arrecife domino tournament and fisherman workshop

9. Community outreach: local dive shop

10. Community outreach: local dive shop

11. Alexandra Pineda Monitoring the reef

12. Alexandra Pineda Monitoring the reef

13. Alexandra Pineda and Randy Blanco (fisherman) monitoring the reef

14. Alexandra Pineda Monitoring the reef

15. Alexandra Pineda and Randy Blanco (fisherman) monitoring the reef

16. Community outreach: school workshop

17. Community outreach: school workshop