DPLR3\1021

Darwin Plus Local - Final Report (1)

Officer: Linzi Ogden

Section 1 - Darwin Plus Local Project Information (Essential)

Project Reference Number

DPL00089

Project Title

No Response

Overseas Territory(ies)

☑ Montserrat

Lead Organisation or Individual

Island Solutions Inc

Partner Organisation(s)

Government of Montserrat and The Ushijima Lab for Coral Health and Restorative Microbiology - University of North Carolina - Wilmington

Value of Darwin Plus Local Grant Award

£48,258.00

Project Start Date

01 June 2024

Project End Date

31 July 2025

Project Leader Name

Andrew Myers

Project Website/Twitter/Blog etc.

www.islandsolutions.org

Report Author(s)

Andrew Myers

Report Date

30 July 2025

Project Summary

No Response

Project Outcomes

Checked	**Biodiversity: improving and conserving biodiversity, and slowing or reversing biodiversity loss and degradation;**
Checked	**Climate Change: responding to, mitigating and adapting to climate change and its effects on the natural environment and local communities;**
Checked	**Environmental quality: improving the condition and protection of the natural environment;**
Checked	**Capability and capacity building: enhancing the capacity within OTs, including through community engagement and awareness, to support the environment in the short- and long-term.**

Section 2 - Project Outcomes (Essential)

On a scale of 1 (high – outcome substantially exceeded) to 5 (low – outcome substantially did not meet expectation), how successful do you think your project has been?

⦿ 4 - Outcome moderately did not meet expectation

Project outcomes and justification for rating above

Despite significant environmental challenges—including extreme seawater temperatures linked to climate change—this project successfully delivered the majority of its intended outcomes and has had a measurable impact on coral disease response capacity in Montserrat and the wider Caribbean region.

Key outcomes include:

Development and Testing of Probiotic Treatments:
1) Three controlled treatment trials were completed at the Montserrat Coral Research Facility. Each trial tested three probiotic candidate strains against a control on four unique diseased coral colonies over 28–30 days. Daily documentation included coral health photography and water quality monitoring. These trials produced valuable data, which have been submitted to the Ushijima Lab for detailed analysis on probiotic effectiveness. The findings are contributing to multiple peer-reviewed publications.

2) Transition to In Situ Coral Treatment:
Building on lab-based success, a 7-day field workshop led to the training of six divers (two from Island Solutions and four from the Government of Montserrat Marine Science team) in in-situ treatment application using protocols developed in partnership with the Smithsonian Marine Station and Ushijima Lab. This represents a significant advancement in Montserrat's ability to directly respond to SCTLD on reefs.

3) Sustained Treatment and Monitoring Programme:
The in situ trial is scheduled for mid-September 2025 and will treat multiple colonies using two probiotic strains, with a follow-up monitoring period of three months. This reflects a sustainable model of treatment and evaluation beyond the project timeline.

4) Public and Regional Engagement:
A public outreach event held on July 24th engaged Montserrat's community and raised awareness of local coral conservation efforts. Additionally, project findings will be disseminated regionally through the Coral Conservation in the Overseas Territories (CCOT) network to share best practices and inform similar programmes.

5) Contributions to Long-Term Research Infrastructure:
Two resilient coral species have been identified for future microbiome sampling, strengthening the Ushijima Lab's probiotic bank and supporting ongoing regional research. This outcome lays the foundation for future collaboration and scientific contribution from Montserrat.

Overall, the project has met its primary objectives, including the development and local deployment of nature-based coral disease treatments, enhanced local technical capacity, and regional knowledge-sharing. The training of six divers in in situ methods, the establishment of a functioning coral research facility, and contributions to international publications demonstrate impact well beyond activity-based outputs.

Most notably, this project now represents the most active coral disease treatment programme outside of the United States. It has positioned Montserrat as a regional leader in sustainable coral disease response, with the tools and expertise to continue treatment, research, and training into the future.

Supporting Evidence - file(s) upload

Probiotic Help for Corals!
30/07/2025
12:39:23
jpg 367.3 KB

DPL Probi-In situ training-JUL schedule
17/07/2025
21:56:53
pdf 121.57 KB

Supporting Evidence - links to published document/online materials

Probiotic trial photos - https://drive.google.com/drive/folders/1FZaYNShtgoiVIVg9wHjKfpJPi9hK_yAk?usp=sharing

Strain effectiveness timeline - https://drive.google.com/drive/folders/1h1S_BUKTuGkkShsmNNihNBU_lDxpBnex?usp=share_link

Research papers - https://drive.google.com/drive/folders/1dp9CSXwn3hFw1KeDJsVPeJmgzhL12xwE?usp=sharing

Educational and Outreach materials - https://drive.google.com/drive/folders/1K3ZEBb-zTIrLI9AAV52IgBQjL4iUD3Zb?usp=sharing

Workshop support documents - https://drive.google.com/drive/folders/1k0-YzpWZbkkN-R8QhfkGoqxmxePvG4ij?

usp=sharing

Photos/Videos
In situ training program photos - https://photos.app.goo.gl/Tuq5X7wBZt8mztqw5
Outreach day photos - https://photos.app.goo.gl/stUGzqy7KuS8Fsp47
Coral lab - https://photos.app.goo.gl/XZxkEggpXBpkiydR6
General - https://photos.app.goo.gl/zZGwnUk7s4x486cQ8
Project outreach video - https://youtu.be/K0DiNAarXVM

Media
Government of Montserrat coverage - Outreach day - https://www.facebook.com/100064363764482/posts/1152840013538113/?rdid=xUJpjU01xlluSsz7

Project Challenges

The project encountered several challenges, both environmental and logistical, which required adaptive management and timeline adjustments.

An extreme bleaching event between October 2024 and May 2025 significantly reduced the visible presence of Stony Coral Tissue Loss Disease (SCTLD) on Montserrat's reefs. Bleaching, which results in the loss of symbiotic zooxanthellae from coral tissue, appeared to temporarily suppress disease expression. This observation further supports the hypothesis that SCTLD is closely linked to the presence or condition of zooxanthellae. However, while the disease was less visible during this period, its underlying presence remained, requiring the team to shift focus to monitoring and preparation for post-bleaching interventions.

Another challenge was the declining number of visibly infected corals, partly because many susceptible colonies had already died before treatment capacity was developed. This limited the number of active treatment opportunities in some locations, but it also highlighted the urgency and importance of ongoing intervention.

Logistically, the availability of the lead trainer from the Ushijima Lab was impacted by an illness, which caused short-term delays in delivering planned training sessions. The project team adjusted schedules accordingly and continued capacity-building activities with local experts, ensuring progress was maintained.

Despite these challenges, the project successfully adapted by revising fieldwork plans and targeting remaining disease sites for treatment trials. The training of six local divers ensured readiness for rapid response to future outbreaks, and data collected during the bleaching period contributed valuable insights into SCTLD behavior under environmental stress.

Lessons Learned

The partnership with the Ushijima Lab of Marine Microbiology has been one of the strongest aspects of the project, providing critical technical expertise, training support, and continuity in probiotic research. Equally important was the strong collaboration with the Government of Montserrat, which enabled the Marine Science divers to participate in training and fieldwork during their regular work schedules—greatly enhancing the project's capacity and impact.

A key lesson was the need to remain flexible and responsive to unexpected environmental and logistical challenges. The extreme bleaching event and the limited availability of visibly infected corals significantly affected field plans. Despite this, the team successfully adapted timelines and activities, maintaining project momentum.

One limitation was the short project duration. Given the complexity of marine disease research and in situ

treatment implementation, a 2–3 year timeline would have allowed for greater resilience to unforeseen delays and more robust outcomes.

If repeated, we would build in more contingency time and secure multiple local trainers to avoid delays from individual availability.

For others undertaking similar projects, we recommend investing early in partnerships, training local personnel from the outset, and planning timelines with flexibility to accommodate environmental variability.

Section 3 - Project Finance (Essential)

Project Expenditure

Project Spend (indicative)	Total Grant (£)	Total actual Darwin Plus Costs (£)	Variance %	Comments (please explain significant variances)
Staff Costs	[redacted]			
Consultancy Costs				
Overhead Costs				
Travel and Subsistence				
Operating Costs				
Capital Items				
Others				
Total	48,258.00	46,171.00	-4.5%	

Please provide a short narrative summary on project finances.

The project remained closely aligned with the original budget, with only minor deviations due to adjustments in field activities. One notable change was a partial reallocation of operational costs originally designated for a second full in situ treatment program. Due to a reduction in available diseased coral colonies—largely resulting from prior mortality and an extreme bleaching event—these funds were redirected to support expanded monitoring of bleaching and disease presence across key reef sites. This strategic reallocation ensured continued data collection and project impact, despite environmental constraints. As a result, the overall project expenditure came in approximately 4.5% under budget.

As outlined in the original application, Island Solutions provided co-financing to support the project. This co-financing was used to contribute to management expenses, operational field costs, and essential overheads such as equipment maintenance, transportation, and administrative support. The in-kind contribution helped maintain project continuity during periods of unforeseen delay or activity adjustment.

In addition, the Ushijima Lab provided financial and in-kind support, covering the cost of producing probiotic

treatments and contributing to the shipment of research materials and equipment between Montserrat and the United States. This collaboration significantly enhanced the project's scientific capacity without requiring additional grant expenditure.

These combined financial contributions ensured that the project delivered high-impact results within budget while maintaining flexibility to adapt to changing field conditions.

Section 4 - Contribution of Project to Darwin Plus Programme Objectives

Please select up to **one** indicator that applies within **each group/indicator list (A, B, C, D)** and report your results for that indicator in the text box underneath. If you do not have relevant results to report for any of the indicators in a particular group, you can leave them blank.

Please also submit some form of evidence (above) to demonstrate any results you list below, where possible.

Group A: Capability and Capacity - Core Darwin Plus Standard Indicators (select one)

Checked	**DPLUS-A01: Number of people from key national and local stakeholder groups completing structured and relevant training.**
Unchecked	**DPLUS-A02: Number of secondments or placements completed by individuals of key local and national stakeholders.**
Unchecked	**DPLUS-A03: Number of local/national organisations with improved capability and capacity as a result of project.**
Unchecked	**DPLUS-A04: Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.**
Unchecked	**DPLUS-A05: Number of trainers trained reporting to have delivered further training by the end of the project.**

Group A Indicator Results

2 persons from local NGO Island Solutions received trainer-level training and 4 persons from the Montserrat Marine Science divers received practical training through the workshop.

Group B: Policies, Practices and Management- Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-B01: Number of new/improved habitat management plans available and endorsed.**
Unchecked	**DPLUS-B02: Number of new/improved species management plans available and endorsed.**
Unchecked	**DPLUS-B03: Number of new/improved community management plans available and endorsed.**
Unchecked	**DPLUS-B04: Number of new/improved sustainable enterprises/ community benefits management plans available and endorsed.**
Unchecked	**DPLUS-B05: Number of people with increased participation in local communities / local management organisations (i.e., participation in Governance/citizen engagement).**
Unchecked	**DPLUS-B06: Number of Local Stakeholders and Local Communities (people) with strengthened (recognised/clarified) tenure and/or rights.**

Group B Indicator Results

N/A

Group C: Evidence and Best Practices - Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-C01: Number of best practice guides and knowledge products published and endorsed.**
Unchecked	**DPLUS-C02: Number of new conservation or species stock assessments published.**
Unchecked	**DPLUS-C03: New assessments of habitat conservation action needs published.**
Unchecked	**DPLUS-C04: New assessments of community use of biodiversity resources published.**
Unchecked	**DPLUS-C05: Number of projects contributing data, insights, and case studies to national Multilateral Environmental Agreements (MEAs) related reporting processes and calls for evidence.**

Group C Indicator Results

N/A

Group D: Sustainable Benefits to People, Biodiversity and Climate - Core Darwin Plus Standard Indicators (select one)

Unchecked	**DPLUS-D01 Hectares of habitat under sustainable management practices.**

Checked	**DPLUS-D02: Number of people whose disaster/climate resilience has been improved.**
Unchecked	**DPLUS-D03: Number of policies with biodiversity provisions that have been enacted or amended.**

Group D Indicator Results

This project offers the potential to reduce coral reef habitat loss which provided climate and disaster resilience - population of Montserrat.

Section 5 - Project Partnerships, Wider Impacts and Contributions

Project Partnerships

Island Solutions served as the lead partner for the majority of planned activities; however, collaboration with formal project partners was essential for achieving our objectives.

Government of Montserrat:
The Ministry of Agriculture, Housing, Land and Environment played a key role by providing access to three members of the Montserrat Marine Science (MMS) Team to participate in training and support field implementation. Additionally, the Royal Montserrat Police Service enabled one of their officers, also a member of the MMS, to participate in the in situ treatment training. The Department of Environment provided oversight and guidance, particularly on permitting requirements and alignment with national environmental priorities.

Ushijima Lab for Marine Microbiology (UNC Wilmington):
Island Solutions worked closely with the Ushijima Lab through regular consultations to coordinate trial designs, address environmental challenges, and refine project deliverables. The Lab also supported the project by producing probiotic strains, supplying equipment, and covering some shipping costs.

Partnership Achievements and Challenges:
Despite illness temporarily affecting the availability of a lead trainer from the Ushijima Lab, the project adapted timelines to ensure successful delivery. Another challenge was scheduling Government-employed divers with existing responsibilities, which limited their availability. These were addressed through flexible planning and maximizing the contributions of available personnel.

Additional Engagement:
Beyond formal partners, the project engaged local stakeholders through public outreach, involving community members and youth. Technical specialists from the region were also kept informed through the Coral Conservation in the Overseas Territories (CCOT) network, enabling knowledge sharing and future collaboration.

Wider Impacts and Decision Making

While the project has not yet directly influenced formal policy or decision-making frameworks, it has made important contributions toward establishing the foundation for future regional action on coral disease management—particularly within the Caribbean UK Overseas Territories (UKOTs).

Through its pioneering work on probiotic-based treatment for Stony Coral Tissue Loss Disease (SCTLD), this project has generated critical baseline data, built local technical capacity, and demonstrated a viable, non-antibiotic response model. These achievements are being shared through regional networks such as the Coral Conservation in the Overseas Territories (CCOT), where findings from Montserrat are contributing to the

collective knowledge base and informing discussions around coordinated coral disease response strategies.

Importantly, the project has helped raise awareness of the environmental threats posed by emerging coral diseases among local stakeholders, including government departments, marine science personnel, and the wider public. This increased awareness supports a more environmentally informed perspective in local marine management and planning processes.

As the first project in the region to move probiotic SCTLD treatment from the lab to in situ application, Montserrat is now well-positioned to inform the development of regional response protocols and action plans. The groundwork laid by this initiative will help integrate disease management into long-term reef resilience strategies and future marine policy decisions.

Sustainability and Legacy

Although the Darwin Plus Local-funded phase of the project has concluded, several important benefits and activities will continue, ensuring a lasting legacy for coral conservation in Montserrat and the wider region.

Island Solutions remains committed to supporting the Government of Montserrat's diver programme. The trained divers from the Marine Science Team will continue to play a key role in reef monitoring and coral disease response, with Island Solutions providing coordination, field support, and training as needed.

Our collaboration with the Ushijima Lab for Marine Microbiology is ongoing, with plans to expand joint research efforts, share additional microbiome samples, and support regional data analysis for future publications. These continued partnerships ensure that the scientific knowledge developed during the project will keep growing and informing regional coral health initiatives.

Island Solutions also remains an active member of the Coral Conservation in the Overseas Territories (CCOT) working group, where project findings and techniques are being shared with other UKOTs. This engagement supports long-term knowledge exchange and strengthens Montserrat's role as a contributor to regional marine conservation strategies.

All equipment procured through the project will be retained and used for future coral monitoring, research, and treatment initiatives. Island Solutions will also retain its core project staff, ensuring that the capacity built during the project remains in place and available for future work on coral resilience and reef health.

In this way, the project's impact will continue beyond its initial scope, helping to shape long-term conservation outcomes in Montserrat and beyond.

Section 6 - Communications & Publicity

Exceptional Outcomes and Achievements

Montserrat has emerged as a regional leader in the fight against the devastating Stony Coral Tissue Loss Disease (SCTLD), thanks to innovative, nature-based approaches developed through the Darwin Plus Local-funded project led by Island Solutions. SCTLD continues to impact over 20 coral species across the wider Caribbean, threatening biodiversity and reef resilience. This project has produced exceptional results by advancing locally adapted, antibiotic-free treatments that harness the natural resistance of Montserrat's own coral species.

In partnership with the Ushijima Lab of Marine Microbiology at UNC Wilmington and the Government of Montserrat's Marine Science team, we successfully isolated probiotic strains from healthy, SCTLD-resistant corals. These probiotics were developed into treatments to prevent and reverse disease symptoms in infected

corals. What began as lab-based research has now evolved into real-world reef intervention.

Using in situ treatment methods developed by the Smithsonian Marine Station and the Ushijima Lab, Island Solutions has trained four local divers from Government Marine Science (GMMS) Dive Team to apply the probiotics directly to corals on the reef. The underwater procedure requires teams of two to deploy a custom "probiotic tent" that isolates the diseased coral, allowing targeted application. The probiotic is absorbed into the coral's microbiome, enhancing its natural defenses against SCTLD. What would be a simple process on land becomes quite a challenge underwater moving the "tent" into position over the diseased corals, delivering the treatment, all the while not impacting other corals around you with your fins! We are proud of our GMMS team for taking on the challenge!

This marks the first application of probiotic treatments in Montserrat's waters and positions the island as a Caribbean leader in sustainable coral disease management. It also builds critical in-island capacity for ongoing reef monitoring and response.

Public engagement has been integral. Our recent outreach day brought together a diverse cross-section of the Montserrat community—including local youth—to share findings, raise awareness of the threats facing the reef, and inspire local stewardship of marine resources.

Check out the project video at our YouTube Channel - https://youtu.be/K0DiNAarXVM.

Photo, video or graphic to be used for publicity and communications.

Please upload at least one relevant and engaging image, video or graphic that you consent to be used alongside the above text in Defra, JNCC or NIRAS communications material.

78a1d3c3-21d2-44b7-b4b0-e0bf18b91b2f
30/07/2025
15:48:06
jpg 255 KB

IMG_7270
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jpg 4.05 MB

Example of disease progression monitoring
30/07/2025
15:47:08
png 2.29 MB

P8201505
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20250724_172452
30/07/2025
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20250724_150922
30/07/2025
12:14:24
jpg 3.4 MB

Probiotic Help for Corals!
30/07/2025
12:05:03
jpg 367.3 KB

Photo, video, and/or graphic captions and credits.

78a1d3c3-21d2-44b7-b4b0-e0bf18b91b2f.jpg - DPLR3_1021 - MONTSERRAT - Island Solutions's Emmy Aston explains aspects of the coral lab to members of Montserrat Marine Science Dive Team who participated in the In Situ Probiotic Treatment training program - Island Solutions

IMG_7270.jpeg - DPLR3_1021 - MONTSERRAT - Time for in water treatment practice with Montserrat Marine Science (MMS) divers (from right to left) Mike Celestine, Chase Buffonge, Rondell Meade, Dary Breton, Erin Papke from the Ushijima Lab and Andrew Myers and, in the foreground, Emmy Aston of Island Solutions! - Island Solutions

Example of disease progression monitoring.png - DPLR3_1021 - MONTSERRAT - Monitoring photos following the progression of SCTLD on an OFAV - Island Solutions

P8201505.jpg - DPLR3_1021 - MONTSERRAT - MMS divers Chase Buffonge and Dari Breton practicing in situ treatment probiotic SCTLD treatment - Island Solutions

20250724_172452.jpg - DPLR3_1021 - MONTSERRAT - Outreach day had fun for all ages. Kids got some fun times making play doh corals, making their of coral themed reusable bags, and sidewalk chalk art. Emmy Aston of Island Solutions watches the young Picasso! - Island Solutions

20250724_150922.jpg-DPLR3_1021-MONTSERRAT- Public outreach day on SCTLD and probiotic treatment at Scuba Montserrat Dive Shop - Island Solutions

Probiotic Help for Corals!.JPG - DPLR3_1021 - MONTSERRAT - This is one of the infographics produced for public outreach day by the Ushijima Lab and Island Solutions - Island Solutions

I agree for the Biodiversity Challenge Funds Secretariat, Administrator, and/or JNCC to publish the content of this section.

⦿ Yes, I agree for the BCFs Secretariat and/or JNCC to publish the content of this section.

Please list any accounts that you would like tagged in online posts here. This can include project pages, partners' pages or individuals' accounts for any of the following platforms: LinkedIn, Facebook, Twitter, or Instagram.

Island Solutions:
Facebook - Island Solutions Montserrat
Instagram - @islandsolutions_org

The Ushijima Lab of Marine Microbiology:
Instagram - ushijimalab

Ministry of Agriculture, Lands, Housing & the Environment:
Facebook - Ministry of Agriculture, Lands, Housing & the Environment

Section 7 - Darwin Plus Contacts

Please tick here to confirm that you have read and acknowledge the BCF's Privacy Notice on how contact details will be used and stored and that you have sought agreement from anyone that you are sharing personal details with us on their behalf.

⦿ I confirm I have read the Privacy Notice and have consent to share the following contact details

Project Contact Details

Project Contact Name	Andrew Myers
Role within Darwin Plus Project	Project leader
Email	[redacted]
Phone	
Do you need further sections to provide additional contact details?	⦿ No