

Darwin Plus: Final Report

To be completed with reference to the “Project Reporting Information Note”:
(<https://darwinplus.org.uk/resources/information-notes/>).

It is expected that this report will be a **maximum of 20 pages** in length, excluding annexes.

Submission Deadline: no later than 3 months after agreed end date.

Submit to: BCF-Reports@niras.com including your project ref in the subject line.

Darwin Plus Project Information

Project reference	DPLUS152
Project title	Coastal Resource Atlas 2021 & Temporal Analysis for the BVI
Territory(ies)	British Virgin Islands (BVI)
Lead Partner	National Oceanography Centre
Project partner(s)	Joint Nature Conservation Committee
Darwin Plus Grant value	Coastal Management Consulting BVI
Start/end date of project	National Parks Trust of the Virgin Islands
Project Leader name	Ministry of Natural Resources and Labour (BVI Gov)
Project website/Twitter/blog etc.	None
Report author(s) and date	James Strong (7 th September 2023)

1 Project Summary

Marine habitat maps provide vital information on ‘what is where’. Consequently, marine habitat maps are necessary for understanding the distribution of impacts, the planning of sustainable human activities at sea and the placement of protected marine area. This project will combine recent high-value surveys of the physical seabed with additional fieldwork to produce new and more extensive maps for the BVI’ marine environment surround. The fieldwork will also examine the change in marine habitats over time and their current condition.

2 Project Partnerships

National Oceanography Centre

The NOC led and coordinated the collation and collection of data, as well as the production of the Coastal Resource Atlas 2. NOC also supervised the temporal analysis / condition analysis. NOC was the primary point of contact for in-country partners.

The Joint Nature Conservation Committee (JNCC) - JNCC provided a facilitation and coordination role so that the data and outputs from this project can support other initiatives. Specifically, JNCC hoped to use their existing relationship with Vulcan and the Allen Coral Atlas (ACA) to facilitate the exchange of data to allow ACA validation and use of coral polygons in the CRA. The Joint Nature Conservation Committee (JNCC) coordinated the development of an appropriate classification for the main seabed habitats in the BVI. The coordination role ensured that the Coastal Resource Atlas is compatible with the ES-CV tool being developed in DPlus150 and is of most value for local stakeholders.

To refine this process, JNCC ran a workshop in the BVI (week commencing 30th January 2023 - two bouts lasting 4 hour). The workshop examined the following topics of relevance to DPlus152: (i) the habitat classes we’re using in the outputs; and (ii) the habitat descriptions we developed from the literature and emails with input from key stakeholder. Invited attendees at the workshop included Argel Horton, Mervin Hastings, Rozina Norris-Gumbs, Stacey Austin, and Joseph Smith Abbott (Ministry of Natural Resources, Labour, and Immigration - MNRLI);

Shannon Gore (Coastal Management Consulting and the Association of Reef Keepers); Tessa Smith Claxton, Theodore James, Atoya George (Department of Agriculture and Fisheries, Ministry of Education, Culture, Youth Affairs, Fisheries and Agriculture) and Susan Zaluski (H. Lavity Stoutt Community College). JNCC have also kindly provided previously collated seabed observations to the project.

National Parks Trust of the Virgin Islands (NPTVI) and the Ministry of Natural Resources, Labour and Immigration (MNRLI) - NPTVI has assisted in the collation of historical data and the collection of new in situ observations (provision of a survey vessel and crew – vessel 'Missfit'). During the three weeks afloat, Trust staff were always present. Senior Trust staff, Dr Cassander Titley-O'Neal (Director) and Nancy Woodfield Pascoe (Deputy Director), joined the survey on several occasions.

Dr Shannon Gore (Coastal Management Consulting BV) - Dr Gore helped plan and conduct the in-situ observations and data collected on the patch reefs. She was also heavily involved with the annotation of the video ground-truthing as well as the temporal analysis and condition assessment.

Dr Shannon Gore (BVI independent consultant) - Dr Gore has helped plan and conduct the in situ observations (ROV and diver transects), and also help prepare the temporal analysis and condition assessment. She has also be instrumental in guiding the temporal analysis of the results.

3 Project Achievements

3.1 Outputs

Output 1 (collated database of historical bathymetric surveys): this output has been completed. The unified bathymetric survey has been used for the production of the CRA2 maps. The method used to create the unified bathymetry surface (Figure 1) is available in the DPLUS 150/152 evidence pack (attached). Over 500 historical observations were collated from five major surveys.

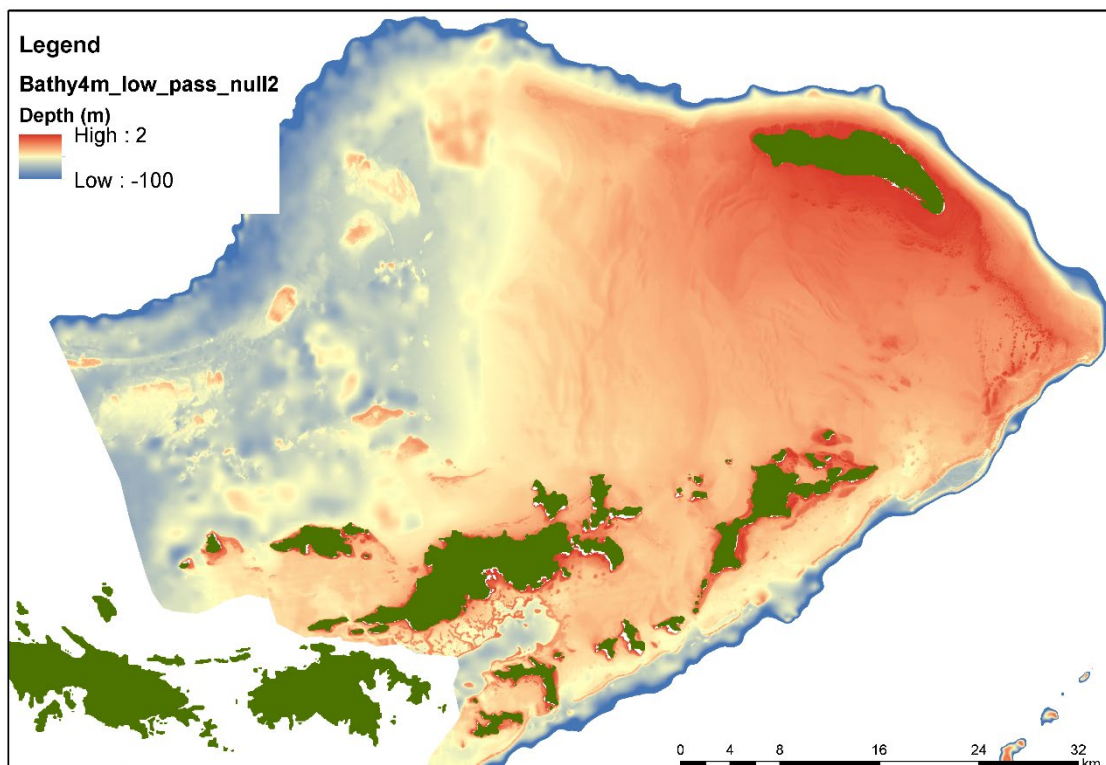


Figure 1. Collated depth surface.

Output 2 ('dataset of in situ seabed (camera imagery) data for historical and new ground-truthing stations in the BVI'): the new survey data has been processed and combined with the historical data. The combined dataset has been used to train the models used to create the new CRA2 maps. The methods used to create the models are detailed in the final CRA2 report (attached). An additional 340 ground truthing observations (Figure 2) were collected during the three weeks of fieldwork. These observations have been combined with the 500 historical observations to produce a significant model training data set.

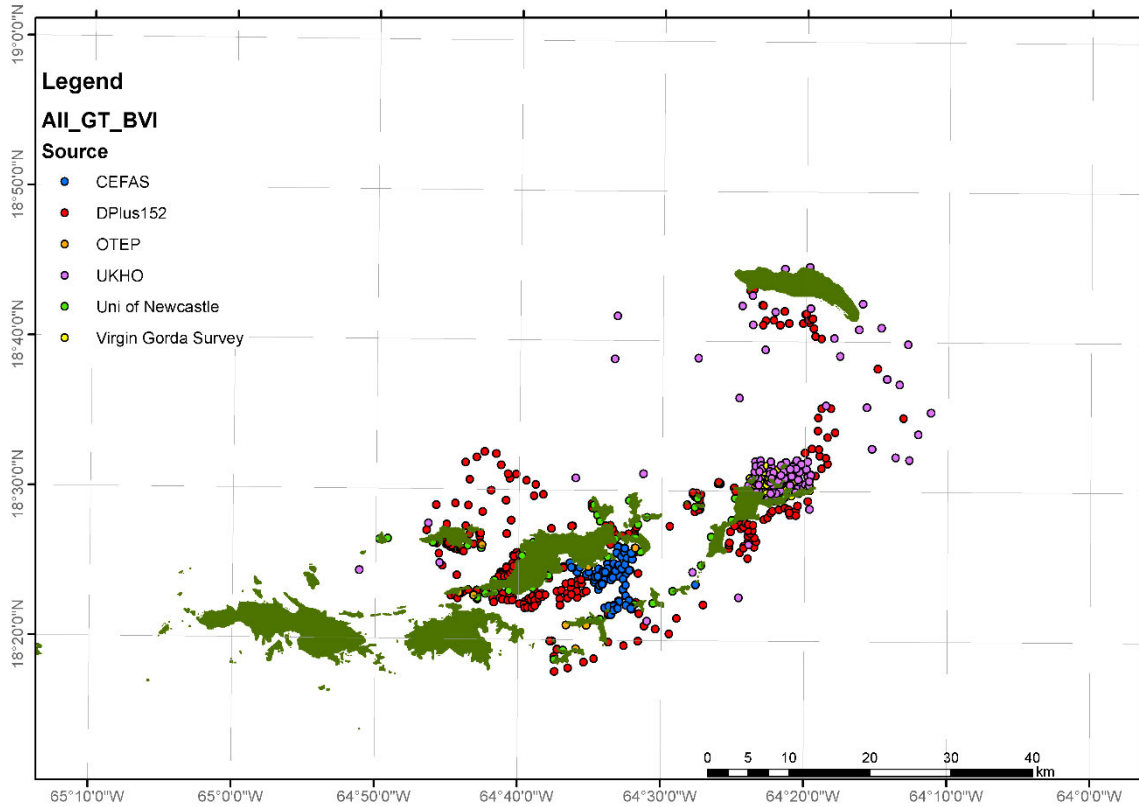


Figure 2. Seabed video stations. Red points present the additional 344 stations undertaken in 2022 by NOC and NPTVI.

Output 3 ('updated CRA covering the major habitats out to both the 12 nm area (predictive habitat maps) and EFZ (geomorphology maps/seascape). The Darwin Plus project 152 produced a new, full-coverage, marine habitat map for the BVI (Coastal Resource Atlas 2) and provides detailing information on the distribution of dominant substrates, geomorphology, habitat classes (EUNIS habitat classification) and the suitable habitat for 11 common species groupings/biotopes (e.g. branched coral, massive coral, seafans, soft corals, native seagrass, and calcareous macroalgae) (example maps provided in Figures 3-5). All of the CRA2 maps have been completed and delivered to the Ministry as well as being shared with DPLUS150 for inclusion in the Marine Spatial Planning (MSP) system. The presence is evidenced in the final CRA2 report (attached).

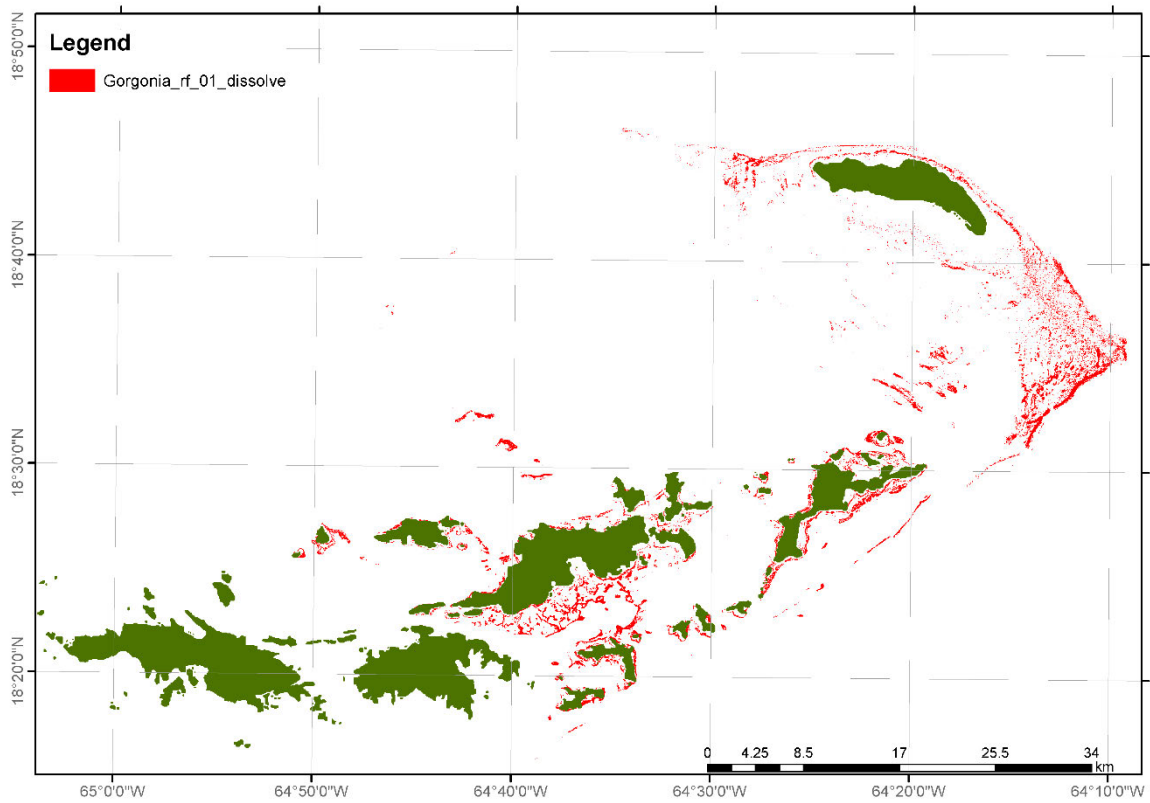


Figure 3. Suitable habitat for Seafans (*Gorgonia* spp.)

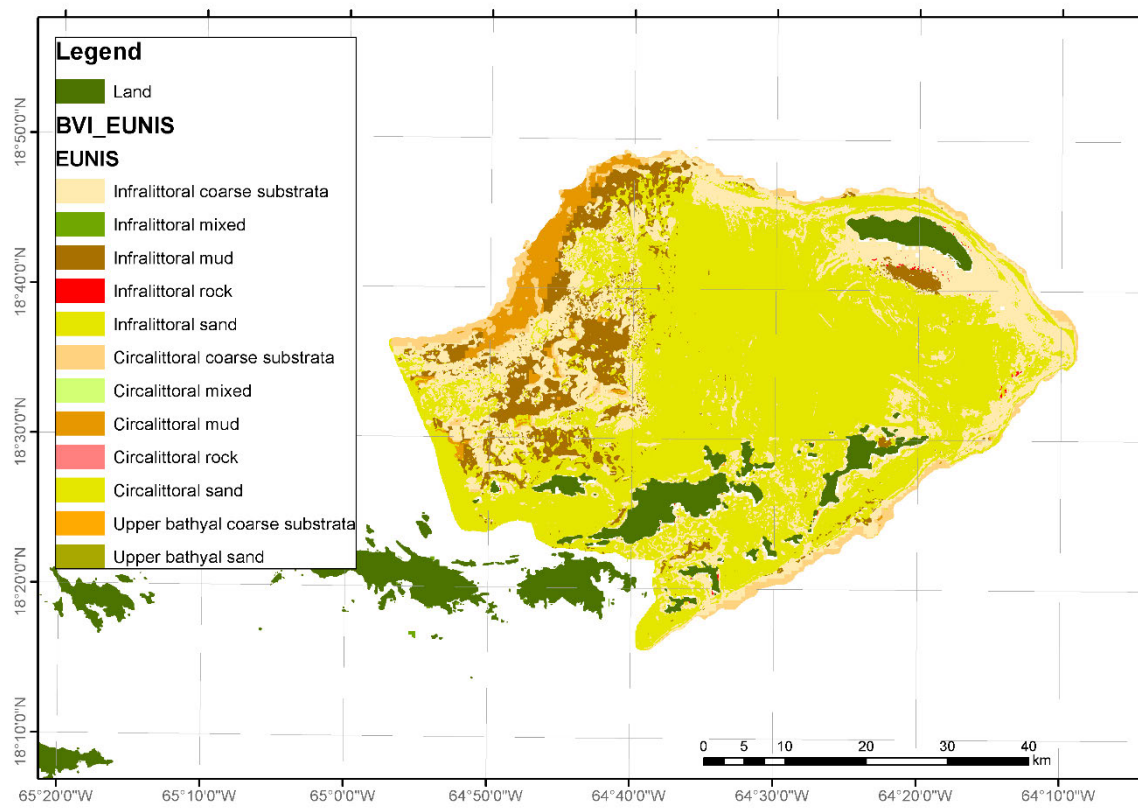


Figure 4. EUNIS habitat map for the BVI.

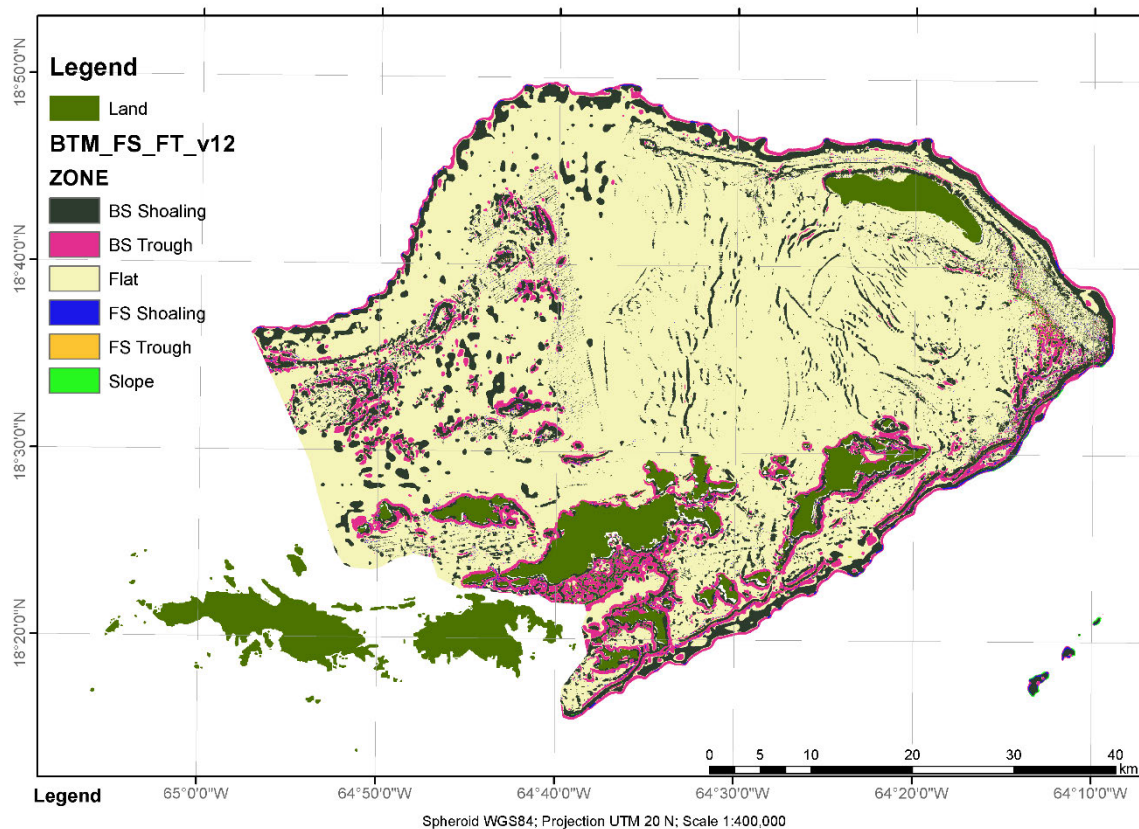


Figure 5. Shallow water geomorphology

Output 4 ('better understand of the temporal change and overall trajectories of the major marine habitats in the BVI. Updated condition assessment for coral habitat in the BVI'): this output has been completed and a report provided to the Ministry. The temporal analysis found that between the years 1977-1985, the reefs demonstrated a minor change in heterogeneity and the coral community remained broadly similar. The data collected in 2022, however, shows that there has been a complete shift in the benthic community around Anegada. Communities have transformed since the time of the original surveys, with comparisons showing how all the reefs are now dominated by seawhips alongside a greater presence of stress tolerant corals. This is most likely due to Acroporid mass mortality and erosion, which has meant that seawhips and sponges have outcompeted slow growing corals such as *Orbicella annularis* for space to colonise on the seabed. The report detailing the temporal analysis is included in the evidence package (attached). Overall, DPLUS152 achieved all of its intended outputs.

3.2 Outcome

Outcome: 'High-quality habitat maps made available for marine management, research, resource/inventory assessments, natural capital validations and the placement of protected sites etc. Improved management for a larger sea area (deeper waters)'. This outcome (Figure 6) has been met and the outputs of the project (i.e. all maps and spatial predictions have been provided to both the Ministry and the Trust.

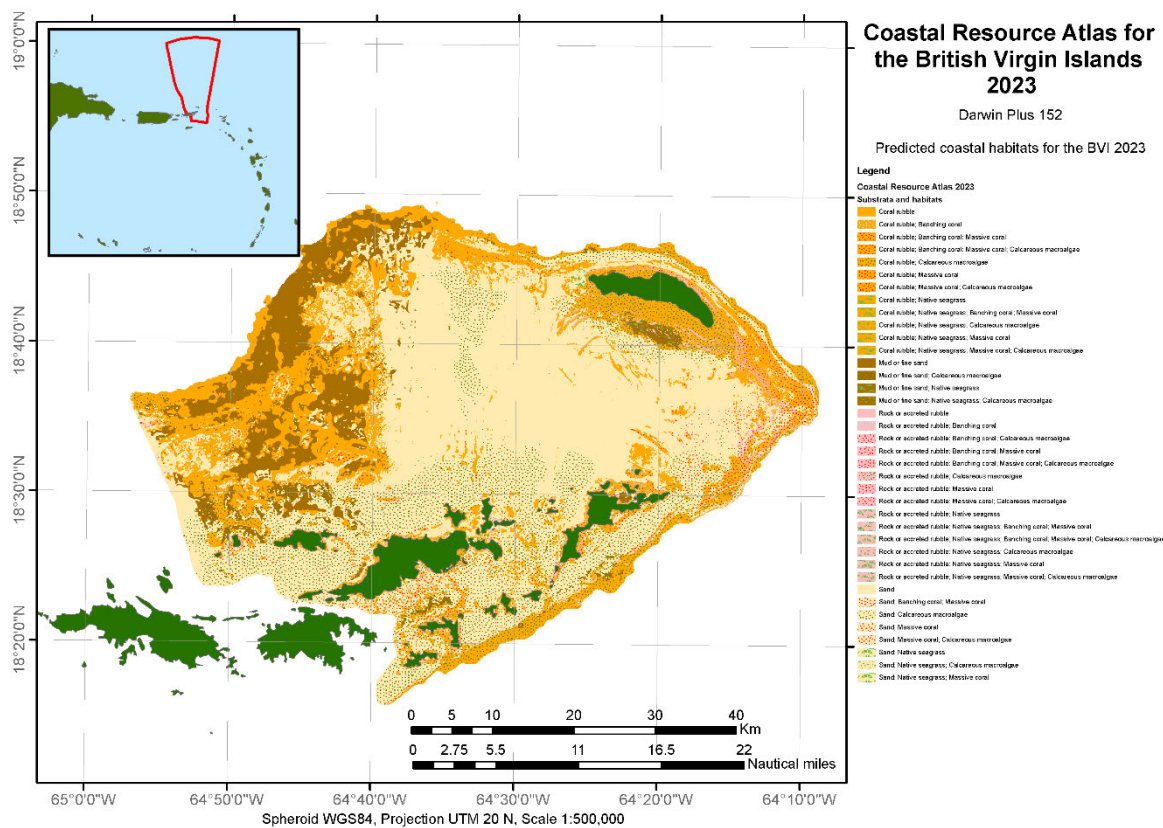


Figure 6. Coastal Resource Atlas 2 produced by DPLUS152.

Indicator 1 - Delivery of the CRA to the MNR&L by January 2023: the CRA is complete and all of the output GIS files have been shared with both the MNR&L and NPTVI.

Indicator 2 - Hosting of the new CRA on the National GIS system by March 2023: we have clearly missed this deadline. All of the files are lodged with the Ministry and the Trust; this was done during the official handover event in the BVI (see evidence pack for information).

Indicator 3 - Report describing the temporal analysis and current coral condition by Jan 2023: this analysis is now complete. The draft report is included with the final CRA2 report. The final version of the analysis has been produced and included in the evidence pack (attached).

Indicator 4 - Maps integrate the best available information from other sources: this has been completed. The collation exercise has merged all of the available data into one source, ensuring the outputs produced here were created using the best evidence base possible.

Indicator 5 - In situ data used to support the validation of the Allen Coral Atlas by Oct 2022: JNCC confirmed that the time-frame for supplying data to the Allen Coral Atlas did not align with the timeline for this project. Regardless, the data are available for Vulcan to use as validation for their coral products.

Overall progress towards the overall outcome has been met. Successful completion of the handover event in the BVI signalled the fulfilment of the project. We have partially missed some of our data delivery deadlines due to us planned an official data hand-over event later than planned (June 2023) and that the data products are too large to transfer online (current size is 800 Gb).

3.3 Monitoring of assumptions

With regard to the monitoring assumptions, number 1 'Other data sources, such as the distribution and intensity of human activities are sufficiently resolved for effective marine management'; this did indeed pose a problem as it became apparent that the spatial data for the distribution and intensity of human activities (useful for the mapping) was not available. Thankfully, within DPlus150, there was sufficient resource to fashion a new output and fill this data gap. As such, this assumption did not hold but corrective measures were implemented immediately to fill that gap.

Assumption 2 'Any datasets may require reformatting and permissions to be sort'; we did indeed have to apply for various data sharing agreements to assess both bathymetry and ground-truthing data sets. Thankfully, assistance from JNCC and the MNR&L had this process quick and easy. All of the collated data was in different formats and a significant amount of time was spent reformatting and merging information.

Assumption 3 'As with a survey at sea, weather downtime may reduce the duration or timing of the survey work'; as with any survey at sea, weather downtime may reduce the duration or timing of the survey work. However, we only experience 2 weather down-days and NOC managed to complete a very successful bout of fieldwork (extended from 2 to 3 weeks to ensure adequate collection). The number of stations visited greatly exceeded the expectations of the lead. Equally, the quality of the temporal data sets collected round Anegada were more superior that had been anticipated. We must also highlight the valuable contribution made by the NPTVI in helping NOC gather the ground-truthing.

Assumption 4 'Timelines may change depending on when access to existing data is made available e.g. the UKHO LiDAR'; the project timeline did not change as the UKHO were able to promptly provide access to the BVI LiDAR dataset.

Assumption 5 'Much of the historical data may have been lost during the extreme hurricanes of 2017. We hope that our in-country partners can help source this information. The project has the resources to help regenerate and collate some of the information lost'; the collated data is now a complete and unified repository of new and historical data for the BVI. Habitat observations collected in 1991, 2015 and 2018 have now been collated into a single GIS project. To achieve this, NOC formally entered into several data sharing agreements with the respective data sources (CEFAS, JNCC and University of Newcastle). A similar collation has also been completed for the historical data, with the raw data collected by Dunne and Brown (1975 and 1977) and Anderson et al. (1985) has also been centralised into one GIS project. All raw notes have been either hyperlinked to spatial objects or carefully georeferenced. These products will be provided to both the Ministry and NPTVI during the official data hand-over event in June 2023.

4 Contribution to Darwin Plus Programme Objectives

4.1 Project support to environmental and/or climate outcomes in the UKOTs

The overarching objective of Darwin Plus is to provide support to the UKOTs to achieve strategic long-term outcomes for the natural environment.

- The collated data provides an excellent baseline for most of the important marine habitats to be found in the BVI's waters.
- The newly acquired ground-truthing (340 observations of the seabed round all of the island in the BVI provides an excellent data set for providing a much-needed condition assessment of the marine habitats.
- However, it is only the end products from this project that will make tangible impacts on local long-term goals. The updated Coastal Resource Atlas will provide critical information on the 'what, where and how much' for the seabed habitats of the BVI. Equally, deliver of the CRA to the Marine Spatial Planning project will provide the meaningful contributions to the: (i) Convention on Biological Diversity (CBD), which requires parties to undertake a comprehensive list of actions to protect species and ecosystems; (ii) MSP requirements outlined in the Blue Charter, Blue Belt and Virgin Islands Strategic Blue Economy Roadmap initiatives.

4.2 Gender equality and social inclusion

All projects are required to promote equality between persons of different gender and social characteristics. Describe how your project has proactively contributed to ensuring individuals achieve equitable outcomes and how you have engaged participants in a meaningful way.

If there have been any notable achievements of the project please include these within your response.

Please support all comments with evidence and reference any relevant indicators from your logframe.

Please quantify the proportion of women on the Project Board ¹ .	11 females compared with 4 male board staff
Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women ² .	The project's primary points of senior contact at the NPTVI, JNCC, MNR&L and Coastal Management Consulting BVI (Dr Shannon Gore) are all female.

5 Monitoring and evaluation

Specific project partners are responsible for individual outputs, and these partners have been tasked with monitoring and evaluating the delivery of these outputs. To-date, this process has been successful. The project lead (NOC) has also maintained oversight over the entire project and links to the other associated DPlus150 project. The communication of overall progress within the project is typically promogulated to other partners via update emails. In hindsight, this method has not been sufficient to keep all stakeholders updated during the project. The shortcomings of the system were pointed by a partner and additional meetings were quickly scheduled to increase the flow of information both within and between projects.

There have been no major changes in the project design or logframe during the lifetime of the project. The M&E system was moderately helpful over the project. There are no planned internal or external evaluation event for the work delivered. However, if these opportunities arose in the future, we would welcome their feedback.

6 Actions taken in response to Annual Report reviews

As our project proceeded to plan, the feedback on the annual reports was positive and provided few, if any, major recommendations for implementation.

7 Lessons learnt

It must be acknowledged that NOC has not sustained a sufficient level of dialogue between partners across the two DPlus projects enough. The National Parks Trust right indicated to NOC that communication had been lacking and they were concerned about alignment of products between the two DPlus projects. The lead for both projects (J. Strong) acknowledges this shortfall and has scheduled meetings to improve the flow of information and progress reports between the two project and be inclusive of all project partners. In the future, it would be valuable to schedule regular online meetings (rather than scheduled ad-hoc) at the beginning of the project and commit to regular contact so that all partners can communicate effectively. With regard to events that went well, NOC were delighted with the assistance provided by the National Parks Trust Virgin Islands in delivering the fieldwork section of this project, none of which would have been possible without the hard work, help and patience of Finfun, Cecil, Nancy, Cassander and Sean (all National Parks staff).

8 Risk Management

No new risks have emerged in the last 12 months. If anything, risks, typically associated with COVID restrictions, have eased significantly.

¹ A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

² Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

9 Sustainability and Legacy

The new Coastal Resource Atlas is a fundamental data set that provides critical information on the 'what, where and how much' of marine habitats. The values of a marine habitat map is its ability to be used for multiple purposes from designed designated areas, marine spatial planning, natural capital assessments, carbon inventories and resources assessments. However, the CRA2 is likely to have its greatest legacy through its immediate integration with the marine spatial planning tools in DPLUS150.

10 Darwin Plus Identity

The most important event for highlighting the profile of both Darwin Plus projects was the presentation of the outputs for both projects to the Hon Dr. Natalio Wheatley, Prime Minister of the British Virgin Islands (BVI), during a visit to the NOC in February 2023. The press release for this event is included below:

"Last week the NOC was delighted to meet with the Hon Dr. Natalio Wheatley, Prime Minister of the British Virgin Islands (BVI), who was accompanied by colleagues from the BVI London Office. During the meeting, the NOC presented a historic account of our long-standing relationship and details of two ongoing marine scientific research projects funded via Darwin Plus, DPLU150 and DPLUS152. Both projects not only support capacity development of local stakeholders but provide data that will be vitally important in support of the BVI's efforts to manage their marine estate. In parallel these data will be critical in the BVI's efforts to promote their carbon reduction credentials, providing access to carbon markets and enabling the development of partnerships that support carbon removal initiatives. NOC lead scientist Dr. James Strong presented recently produced outputs from the Darwin Plus projects, which included a harmonised bathymetric surface (merged from both LiDAR and multibeam echosounder surveys), a seabed imagery data set consisting of over 500 historical observations and 340 additional stations visiting during fieldwork in 2022, and some of the recently modelled maps that'll represent the new Coastal Resource Atlas for the BVI (i.e. full coverage maps for various geomorphological features, habitat and species – DPLU152). Finally, Dr. Strong outlined the structure of a toolbox of Marine Spatial Planning tools (produced in conjunction with the Ministry of Natural Resources and Labour (BVI), the Joint Nature Conservation Committee (UK) and WSP Global Inc. - DPLU150), that has been calibrated for marine habitats and human activities in the BVI. These tools will allow local policymakers to exploit fully the new Coastal Resource Atlas, quickly draft marine spatial plans and bring about a step-change in marine management capabilities es locally.

The NOC would like to thank Dr Wassim Dbouk of the University of Southampton who organised the visit."

Furthermore, the visit was also covered by press within the BVI (see the link below). Of particular note is the quote:

"Premier Wheatley also counted a meeting held with the UK's National Oceanographic Centre as a triumph, describing it as "amazing".

"We will soon be presented with the data from the environmental mapping. And that has huge implications for us," he stated.

"I'm not sure how familiar persons in the Virgin Islands are with carbon markets, but carbon markets basically essentially, we have carbon emissions in the world and there are companies who want to be able to offset their carbon emissions," Dr Wheatley explained.

Premier Wheatley further explained that these endeavours have an economic value. "And so they're willing to fund projects that will help to preserve [the] environment and do other types of environmental projects."

<https://bvinews.com/southampton-mou-a-major-achievement-premier/>

Additional press releases were prepared by the Governors' House (BVI) "A full day of training, followed by an official hand-over event, marked the successful delivery of both Darwin Plus projects DPLUS152 and DPLU150. The objective for the Darwin Plus project 152 was produce a new, full-coverage, marine habitat map for the BVI (Coastal Resource Atlas 2) and provides

detailing information on the distribution of dominant substrates, geomorphology, habitat classes (EUNIS habitat classification) and the suitable habitat for 11 common species groupings/biotopes (e.g. branched coral, massive coral, seafans, soft corals, native seagrass, and calcareous macroalgae).

Project 150 developed a set of interpretative tools that, when used with the new habitat map, estimating the sensitivity of local marine habitats, predicts the footprint of human activities in marine environment, and how these two aspects can be managed and promoted together in a sustainable manner i.e., the basis for a marine spatial planning system. These tools have been merged into a single system that facilitates the rapid querying of spatial data to provide detailed information on the uses and priorities of an area.

Contributions for the presentations and training provided included input for all of the partners involved from the two projects, namely, National Oceanography Centre (Lead on both projects), Ministry of Natural Resources, Climate Change and Labour, the Joint Nature Conservation Committee, National Parks Trust of the Virgin Islands, Dr Shannon Gore (Association of Reef Keepers) and WSP Global Inc. The training and hand-over event was well attended by representatives of:

- The Ministry Natural Resources
- Survey Department
- Department of Agriculture and Fisheries
- Town and Country Planning
- VI Shipping Registry
- Project partners present included NOC, WSP, National Parks Trust VI and JNCC

11 Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?	No
Have any concerns been investigated in the past 12 months	No
Does your project have a Safeguarding focal point?	Yes, James Strong (PI)
Has the focal point attended any formal training in the last 12 months?	No. James Strong has attended Active Bystander training.
What proportion (and number) of project staff have received formal training on Safeguarding?	Past: 0% [0] Planned: 0% [0]
Has there been any lessons learnt or challenges on Safeguarding in the past 12 months?	
Need for staff to attend for safeguarding training.	

12 Finance and administration

12.1 Project expenditure

Project spend (indicative) since last Annual Report	2023/24 Grant (£)	2023/24 Total actual Darwin Plus Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				Late time allocation
Overhead Costs				Late time allocation
Travel and subsistence				Adjustment
Others				Reverse IT charge/Audit
TOTAL	£12,003	£24,013.17		

Staff employed	Cost
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(Name and position)	(£)
NOC – James Strong - PI	
NOC – Lynda Haller - PM	
NOC – Charlotte Francoz - Researcher	
NOC – Tim Le Bas	
NOC – Catherine Wardell	
JNCC/CMC – Internal Reverse Charge VAT (from 22/23)	
TOTAL	

Other items – description	Other items – cost (£)
Audit Software charge correction Adjustment from 22/23	
TOTAL	

12.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
TOTAL	0

Source of funding for additional work after project lifetime	Total (£)
TOTAL	0

12.3 Value for Money

This project provided significant value for money by harnessing existing, high-value dataset. The reuse of the existing LiDAR dataset, which covers a vast area of seabed, is the most striking example. The LiDAR dataset, estimated to have cost approximately [REDACTED], was a massive driver in making a high quality marine habitat map and a much reduced cost. Equally, a lot of effort was put into sourcing existing historical data, with the final ground-truthing data set being containing ~ 500 observations. A ground-truthing data set of this size is very rare in marine habitat mapping and again contributed to the production of a high-quality habitat map at a fraction of the normal budget. This project sourced, digitised and reused field observations of BVI patch reefs made in the 1970s and 1980s. These historical observations are extremely rare and valuable. Reusing this information for the temporal analysis is an extremely cost-effective approach to understanding historical change in coral condition over time. Finally, the map was imported into the marine spatial planning system delivered by DPLUS150, which has provided an immediate route to exploit the habitat map for marine management.

13 OPTIONAL: Outstanding achievements of your project (300-400 words maximum). This section may be used for publicity purposes.

Annex 1: Report of progress and achievements against logframe for Financial Year 2022-2023 – if applicable

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
<p>Impact</p> <p>Effective marine management based on accurate and up-to-date information on the distribution of marine habitats. Effective targeting and prioritisation of management activities. Provision of information for spatial assessments and research.</p>		<p>(Report on any contribution towards positive impact on biodiversity or positive changes in the conditions of human communities associated with biodiversity e.g. steps towards sustainable use or equitable sharing of costs or benefits)</p>	
<p>Outcome High-quality habitat maps made available for marine management, research, resource/inventory assessments, natural capital validations and the placement of protected sites etc. Improved management for a larger sea area (deeper waters).</p>	<p>0.1 Delivery of the CRA to the MNRL&I by January 2023 0.2 Hosting of the new CRA on the National GIS system by March 2023 0.3 Report describing the temporal analysis and current coral condition by Jan 2023 0.4 Maps integrate the best available information from other sources, e.g. Allen Coral Atlas by Nov 2022 0.5 In situ data used to support the validation of</p> <p>0.1 Summary maps to be provided in the project report 0.2 Results of the temporal analysis, and the creation of the new map classes, will be provided in the project report 0.3 Testimonial from the MNRLI that the updated CRU has been integrated into their marine management workflow 0.4 Use project data within the validation exercise for the Allen Coral</p>	<p>Indicator 1 - Delivery of the CRA to the MNR&L by January 2023: the CRA is now complete and all of the output GIS files have been shared with both the MNR&L and NPTVI. draft and Ongoing and on schedule.</p> <p>Indicator 2 - Hosting of the new CRA on the National GIS system by March 2023: we have clearly missed this deadline. The files are lodged with the Ministry but we will provide complete data hand-over in June. The March deadlines are a hang-over from when our original programme was to end in March but was extended, at the proposal phase, to June. The deadlines in the log frame were not updated.</p> <p>Indicator 3 - Report describing the temporal analysis and current coral condition by Jan 2023: this analysis is now complete. The draft report is included with the final CRA2 report. The</p>	<p>(Highlight key actions planned for next period)</p>

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
	<p>Atlas Other data sources, such as the distribution and intensity of human activities are sufficiently resolved for effective marine management Defra – July 2020 2 the Allen Coral Atlas by Oct 2022</p>	<p>final version of the analysis is expected by the end of April.</p> <p>Indicator 4 - Maps integrate the best available information from other sources: this is complete. The collation exercise has merged all of the available data into one source, ensuring the outputs produced here were created using the best evidence base possible.</p> <p>Indicator 5 - In situ data used to support the validation of the Allen Coral Atlas by Oct 2022: JNCC confirmed that the time-frame for supplying data to the Allen Coral Atlas did not align with the timeline for this project. Regardless, the data are available for Vulcan to use as validation for their coral products.</p>	
<p>Output 1. Collated database of historical biological and physical seabed observations</p>	<p><i>See Activities</i></p>	<p>Output 1 (collated database of historical bathymetric surveys): this output is now complete. The unified bathymetric survey has been used for the production of the CRA2 maps. The method used to create the unified bathymetry surface is available in the final CRA2 report (attached)</p>	
<p>Activity 1.1 Database populated with historical seabed observations (ground-truthing observations of species and habitat) into one database. The number of items within the database will be a suitable indicator of progress</p>		<p>Collation of the remotely sensed data for the BVI is now complete (see annual report 2022)</p>	<p>(Outline what will be carried out in the next period)</p>
<p>Activity 1.2 Geo-spatial database populated with existing bathymetric data from various sources and methods. The footprint of collated bathymetric data within 200 nm of the BVI would be an appropriate indicator of progress and success.</p>		<p>Habitat observations collected in 1991, 2015 and 2018 have now been collated into a single GIS project (see annual report 2022).</p>	

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
Output 2. Dataset of in situ seabed (camera imagery) and water column (profiler) data for historical and new ground-truthing stations in the BVI.	(Insert agreed Output level indicators)	Output 2 ('dataset of in situ seabed (camera imagery) data for historical and new ground-truthing stations in the BVI'): the new survey data has been processed and combined with the historical data. The combined dataset has been used to train the models used to create the new CRA2 maps. The methods used to create the models are detailed in the final CRA2 report (attached).	
Activity 2.1. 2.1 Delivery of the seabed imagery, profile data and GT interpretations to the MNRLI by September 2022		Activity 2.1: the ground-truthing survey, scheduled for 2022, has now been successfully completed (see annual report 2022).	
Activity 2.2. Project report detailing the number of observations collected during the fieldwork and the survey methods used by September 2022.		Activity 2.2: this report was delivered to both the MNR&L as well as the Nation Parks Trust of the Virgin Islands (much of the material was reproduced in the 2022 annual report).	
Output 3. Updated CRA covering the major habitats out to both the 12 nm area (predictive habitat maps) and EFZ (geomorphology maps/seascape). Attribution of mapped classes with the results of the temporal analysis (i.e. identity and trajectory over time).		Output 3 ('updated CRA covering the major habitats out to both the 12 nm area (predictive habitat maps) and EFZ (geomorphology maps/seascape). All of the CRA2 maps are now complete. The presence is evidenced in the final CRA2 report (attached).	
Activity 3.1 Presence of the updated CRA with a confidence layer (detailing the data sources used) uploaded the BVI National GIS database by March 2023		Activity 3.1: all of the collated bathymetry datasets have been merged into a single bathymetric surface for the BVI. As such, this activity is now complete (see annual report 2022).	

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
Activity 3.2 Full coverage bathymetric surface for the BVI with terrain variables by Oct 2021		Activity 3.2: The bout of fieldwork (17th April to the 9th May, 2022) resulted in NOC completing three weeks of fieldwork the NPTVI. The fieldwork exceeded the number of survey stations examined.	
Activity 3.3 Delivery of a geomorphology maps to the BVI National GIS database by Dec 2021		Activity 3.3: the new maps for the Coastal Resource Atlas (as a ArcMap map package and Word document report) have just been completed and delivered to both the MNR&L and the NPTVI.	
Activity 3.4 Project report summarise the methods used in the project by March 2023		Activity 3.4: the new maps for the Coastal Resource Atlas (as a ArcMap map package and Word document report) have just been completed and delivered to both the MNR&L and the NPTVI. This delivery is in advance of the 'official' hand-over, scheduled for June 2023, to allow stakeholders to comment on the maps.	
Output 4. Better understand of the temporal change and overall trajectories of the major marine habitats in the BVI. Updated condition assessment for coral habitat in the BVI.		Output 4 ('better understand of the temporal change and overall trajectories of the major marine habitats in the BVI. Updated condition assessment for coral habitat in the BVI'): this output is also now complete. The report is currently being drafted so that I can be combined with the final report (a draft version of the temporal and condition report has been included with the current final report to evidence the completion of output 4).	
Activity 4.1 Delivery of the seabed observations data base storing all of the information sourced during the project (same as 1.1		Activity 4.1: All of the seabed imagery and GT interpretations have been	

Project summary	SMART Indicators	Progress and Achievements April 2022 - March 2023	Actions required/planned for next period
		provided to both the MNR&L and the NPTVI.	
Activity 4.2 Report detailing the finding of the temporal analysis and current condition of coral habitats delivered to the MNRL&I by Jan 2023		Activity 4.2: the examination of the new temporal data has just been completed. The temporal analysis, undertaken by Greg Anderson at the University of Southampton, has been summarised with a report (available on request but included in the DPlus main report (currently being draft for the close of the project)).	
Activity 4.3 Delivery of the condition report to other key stakeholders and interested parties both within the BVI and elsewhere by Jan 2023		Activity 4.3: The same report (see 4.2) details the current condition of coral near Anegada.	

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)

Project Summary	Measurable Indicators	Means of Verification	Important Assumptions
Impact:			
Effective marine management based on accurate and up-to-date information on the distribution of marine habitats. Effective targeting and prioritisation of management activities. Provision of information for spatial assessments and research			
Outcome: High-quality habitat maps made available for marine management, research, resource/inventory assessments, natural capital validations and the placement of protected sites etc. Improved	0.1 Delivery of the CRA to the MNRL&I by January 2023 0.2 Hosting of the new CRA on the National GIS system by March 2023	0.1 Summary maps to be provided in the project report 0.2 Results of the temporal analysis, and the creation of the new map classes, will be provided in the project report	Other data sources, such as the distribution and intensity of human activities are sufficiently resolved for effective marine management

<p>management for a larger sea area (deeper waters).</p>	<p>0.3 Report describing the temporal analysis and current coral condition by Jan 2023</p> <p>0.4 Maps integrate the best available information from other sources, e.g. Allen Coral Atlas by Nov 2022</p> <p>0.5 In situ data, collected during the BVI fieldwork, are to be provided to researchers working on the Allen Coral Atlas so that the newest iteration of coral maps can be validated (cross validation) – data to be lodged with Vulcan by October 2022</p>	<p>0.3 Testimonial from the MNRLI that the updated CRU has been integrated into their marine management workflow</p> <p>0.4 Use project data within the validation exercise for the Allen Coral Atlas</p> <p>0.5 Confirmation email that the BVI dataset has been lodged with Vulcan/Allen Coral Atlas</p>	
<p>Outputs:</p> <p>1.0 Collated database of historical biological and physical seabed observations</p>	<p>1.1 Database populated with historical seabed observations (ground-truthing observations of species and habitat) into one database to support the temporal analysis). Observations from the previous two coastal mapping surveys are to be collated by December 2021</p> <p>1.2 Geo-spatial database populated with existing bathymetric data (i.e. ship-based sonar data, plane-base LiDAR and satellite derived bathymetry) and methods. The footprint of collated bathymetric data within 200 nm of the BVI would be an appropriate indicator of progress and success. Collation of all historical data to be completed by December 2021.</p>	<p>1.1 Testimonial from the MNRLI that the finished databases of seabed observations have been received</p> <p>1.2 Updates on the quantity of information collected for both databases will be reported, and minuted, within the Project Management Group meetings</p>	<p>Many datasets may require reformatting and permissions to be sort. This may mean that these work packages may continue to be updated throughout the project</p>

<p>2.0 Dataset of <i>in situ</i> seabed (camera imagery) data for historical and new ground-truthing stations in the BVI.</p>	<p>2.1 Process all newly acquired seabed footage to for use in the geo-statistical models by September 2022</p> <p>2.2 Project report detailing the number of observations collected during the fieldwork and the survey methods used by May 2022</p>	<p>2.1 Presence of a seabed ground-truthing database at NOC with a report sub-section detailing in-house QC and the processing method used by NOC</p> <p>2.2 Presence of a report detailing the fieldwork campaign. This will be provided as an attachment to a scheduled progress report to the Darwin Initiative</p>	<p>As with a survey at sea, weather downtime may reduce the duration or timing of the survey work</p>
<p>3.0 Updated CRA covering the major habitats out to both the 12 nm area (predictive habitat maps) and EFZ (geomorphology maps/seascape). Attribution of mapped classes with the results of the temporal analysis (i.e. identity and trajectory over time)</p>	<p>3.1 Presence of the updated CRA with a confidence layer (detailing the data sources used) uploaded the BVI National GIS database by March 2023</p> <p>3.2 Full coverage bathymetric surface for the BVI with terrain variables by Oct 2021</p> <p>3.3 Delivery of a geomorphology maps to the BVI National GIS database by Dec 2021</p> <p>3.4 Project report summarise the methods (geo-statistical modelling and temporal analysis) in the project by March 2023</p>	<p>3.1 Deliverables will be summarised in the project report, Project Management Group minutes and a project press release</p> <p>3.2 Testimonial from Town and Country Planning (curator of the National GIS database that the bathymetry, terrain variables and geomorphological surfaces have been received</p> <p>3.3 Placement of the maps onto an online portal for public access (e.g. OBIS)</p> <p>3.4 The updated project report will be provided as a supporting document attached to a scheduled progress report to the Darwin Initiative</p>	<p>Timelines may change depending on when access to existing data is make available e.g. the UKHO LiDAR</p>

<p>4.0 Better understand of the temporal change and overall trajectories of the major marine habitats in the BVI. Updated condition assessment for coral habitat in the BVI.</p>	<p>4.1 Delivery of all of the fieldwork data sourced during the project by December 2022</p> <p>4.2 Report detailing the finding of the temporal analysis and current condition of coral habitats delivered to the MNRL&I by Jan 2023</p> <p>4.3 Delivery of the condition report to other key stakeholders and interested parties both within the BVI and elsewhere by Jan 2023</p>	<p>4.1 Testimonial from Town and Country Planning (curator of the National GIS database that the bathymetry, terrain variables and geomorphological surfaces have been received</p> <p>4.2 Presentation to be provided by project partners on the outcomes of the temporal analysis and condition assessment</p> <p>4.3 Press release highlighting the delivery of products and key findings</p>	<p>Much of the historical data may have been lost during the extreme hurricanes of 2017. We hope that our in-country partners can help source this information. The project has the resources to help regenerate and collate some of the information lost</p>
<p>Activities:</p> <p>1.1 Collate historical surveys of the BVI seabed. Observations to collect include multibeam echosounder and LiDAR-based bathymetric datasets.</p> <p>1.2 Habitat observations collected in 1991, 2005 and 2018 also need to be collated into a similar database to facilitate the temporal analysis.</p> <p>2.1 Conduct a ground-truthing survey in 2022 to collect new drop-down video footage of the seabed habitats.</p> <p>2.2 Delivery of the seabed imagery, profile data and GT interpretations to the MNRLI with report.</p> <p>3.1 Merge bathymetric datasets to produce a new unified bathymetric surface for the BVI. Using this surface, additional terrain variables will be derived and geomorphological surfaces made. Use the terrain variables to model the distribution of observed seabed habitats throughout the waters of the BVI.</p> <p>3.2 All activities will include a work-shadowing/capacity building component for MNRLI staff.</p> <p>4.1 Examine temporal patterns and trajectories between historical observations to infer change over time for the major seabed habitats in the BVI.</p> <p>4.2 Report temporal trends – potential scientific publication.</p> <p>4.3 Use the most recent seabed observations (2022 survey) to assess the current condition of coral habitats within BVI waters.</p>			

Table 1 Project Standard Indicators

DPLUS Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with DPLUS Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)

Annex 5 Supplementary material (optional but encouraged as evidence of project achievement)

Please see DPLUS150/152 evidence pack.

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to BCF-Reports@niras.com putting the project number in the Subject line.	
Is your report more than 10MB? If so, please discuss with BCF-Reports@niras.com about the best way to deliver the report, putting the project number in the Subject line.	
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 10)?	
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
Do you have hard copies of material you need to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 13)?	
Have you involved your partners in preparation of the report and named the main contributors	
Have you completed the Project Expenditure table fully?	
Do not include claim forms or other communications with this report.	