Final Evaluation Report

Your Details	
Full Name	Michelle Marie Carpenter
Project Title	Manta Ray Habitat Use in KwaZulu-Natal, South Africa
Application ID	32649-2
Date of this Report	30 May 2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Published scientific article providing first-time knowledge on manta ray hotspots in South Africa			X	Published in January 2025; the manta ray aggregation in the iSimangaliso Wetland Park was a key finding in the study. The Rufford Foundation was credited as a primary supporter.
Marine education presentations and guided snorkels on Aliwal Shoal (n=12)			X	By redirecting surplus fieldwork funds, we completed 15 guided educational snorkels, despite unexpected snorkel equipment rental costs. Unpredictable weather, including high winds, river flooding, and poor visibility, made scheduling challenging and required more time than initially planned.
Piloting fieldwork in the Port Ngqura harbour in Port Elizabeth	X			In December 2023, this site was added to the project following manta ray sightings in 2023; however, no sightings have been reported by our local researcher during the 2024 and 2025 summer seasons. Therefore, funds were redirected.

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

a) **Education and Awareness:** Reached over 120 children through guided snorkel trips, school talks, workshops, and book donations—developing ocean literacy and inspiring the next generation in the local community.

b) Scientific Contribution: Published a peer-reviewed paper on manta rays in KwaZulu-Natal, with findings contributing to conservation planning, including the designation of Important Shark and Ray Areas (ISRAs).

c) Public Perception Shift: Helped reduce fear and misconceptions about the ocean through hands-on experiences and increased media attention on manta rays, promoting a more positive and informed public outlook.

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

Working in Africa's marine environment demands a high degree of adaptability. Unpredictable weather, limited infrastructure, and economic challenges frequently impact project logistics. As a self-funded, independent foreign researcher, financial constraints are continuously substantial. Due to work restrictions on foreigners in South Africa, I had to undertake overseas work to support myself financially, which delayed project activities. Additionally, the sale of my personal vehicle in 2024 meant more of the project budget in 2025 to cover essential transport costs, in order to reach field and education sites in KwaZulu-Natal (Annex I).

Environmental unpredictability also required flexibility in research planning (Annex I). A revised budget was submitted and approved by the Rufford Foundation Trustees in December 2023, allowing for a strategic reallocation of funds. As a result, the project focus shifted from the more transient oceanic manta ray (*Mobula birostris*) to the more consistently encountered reef manta (*Mobula alfredi*), providing valuable conservation data. Fieldwork in the iSimangaliso Wetland Park (IWP) proved highly successful, with abundant data on *Mobula alfredi* (Annex II). This southern African population of this Vulnerable species is considered among the most threatened in the world.

Manta ray sightings in Port Elizabeth (PE) in 2023 led to this site being included in the revised budget in December 2023. However, no sightings were reported by the local researcher in 2024 or 2025 which led to the cancellation of fieldwork in PE in March 2025. This enabled additional snorkel trips for local children despite unforeseen costs such as hiring snorkel equipment. Hiring snorkel equipment was an oversight previously referenced in the First Quarter Report. In 2024 each rental cost R150 per child, which originally reduced the number of affordable snorkel trips from 12 to 10. In 2025, standard prices increase resulted in boat hire to increase to from R3600 to R3900, and snorkel equipment to increase from R150 to R170 per unit. Nevertheless, surplus funds from cancelling work in PE and collaboration with other projects (e.g., acoustic tagging with the Oceanographic Research Institute) maximized efficiency and outcomes, allowing for a total of 15 snorkel trips, including all gear rental, to be completed by May 2025 (summary presented in Annex III).

Organizing snorkel trips at Aliwal Shoal was particularly challenging due to highly dynamic and unpredictable marine and weather conditions. The area is known for strong currents, local eddies, large swells, variable visibility influenced by major river outflows, upwelling events, and frequent low-pressure systems. These factors make Aliwal Shoal one of the most difficult dive locations in the world. Additionally, launching boats through surf and sandbanks requires very specific safe conditions. Climate change has intensified these challenges, with increasing annual rainfall leading to more severe flooding and flash floods (Annex IV). As a result, snorkel trips required extensive time and were often scheduled at short notice to align with safe and favorable conditions. Further, limited funding and logistical challenges for schools in informal settlements required postponing the snorkel trips with Mbulula. These trips could only proceed once additional resources can be secured to cover transport,

snorkel training, a Zulu-speaking guide, and other essential support needed to ensure the children's safety and meaningful participation.

These adaptations ensured that both research and education goals were not only met, despite the challenges. This flexible, responsive approach has laid a strong foundation for future initiatives and demonstrates the value of resilience and resourcefulness in conservation work.

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

This project meaningfully engaged local communities through a combination of marine education, ocean experiences, and access to the Aliwal Shoal Marine Protected Area (MPA) - many for the first time. A total of 120 local children participated in 15 snorkel trips, with 58% having never seen Aliwal Shoal before (Annex III). Prior to each trip, educational briefings were delivered using WildOceans' session plans, including lessons on the Introduction to Oceans and the Importance of Marine Protected Areas. Marine species identification activities were conducted during each snorkel trip, helping children connect their classroom learning with real-life ocean encounters. After returning to shore, children used ID books to recall the species they had seen—such as sea turtles, whip rays, and reef fish. Children became enthusiastic, and 51% expressed interest in completing a dive course, while around 15% stated they would like to pursue a career in marine biology; many realizing for the first time that these opportunities exist right on their doorstep. Further, the donation of 150 Harry the Hammerhead Shark education books further reinforced marine literacy at home and in the classroom.

These experiences shifted local people's perceptions of the ocean. They overcame fears of waves, sharks, and the unknown. Many shared their snorkeling stories with peers and families, creating a ripple effect of awareness in the community. Several families have fishing backgrounds and may not fully understand the value of MPAs. By emphasizing how MPAs function as "food banks" during educational talks, the project encouraged a shift in attitudes. After just six snorkel trips, community interest grew significantly. With strong local support from Olivia Symcox - longtime resident and marine conservationist - the initiative gained momentum.

The project has sparked a deeper appreciation for the local marine environment, replacing fear with curiosity, confidence, and a sense of stewardship - thanks to the generous support of the Rufford Foundation and community partners like the Clansthal Conservancy.

5. Are there any plans to continue this work?

Yes. The research and educational outreach efforts initiated during this project will continue and expand in scope.

On the research side, monitoring of reef manta rays within the IWP is ongoing. At the beginning of the Rufford-funded project, the database included 175 identified individuals; this has now increased to 204 (Annex II). New manta rays continue to be

documented with each field visit, indicating the aggregation is dynamic and not yet fully accounted for. Several more years of data are needed to complete a robust population abundance estimate for South Africa's reef manta ray population.

On the education side, there are plans to deepen and broaden engagement with local communities; particularly underserved Zulu communities, orphanages, and informal settlements. This includes building a structured program to bring ocean experiences and conservation education to rural schools such as Mbulula, Naidooville, Danganya, Nganiwakhe, and others in areas like Ifafa and Umgababa. These plans will require greater financial and logistical support, including funding for transportation, hiring and training a Zulu-speaking guide, and providing basic swimming and snorkel instruction.

To improve the sustainability of these activities, future initiatives will aim to purchase snorkel equipment, which could significantly reduce operational costs. In addition, focusing snorkel activities within optimal weather windows (e.g., May–July) will help minimize cancellations due to adverse ocean conditions.

Building on the positive response from students, there is also interest in developing more advanced opportunities such as a freediving and ocean literacy program, possibly in partnership with local experts and organizations like Russel Symcox and Mission Blue. This could include training local youth as freedivers or marine ambassadors, as well as creating a specialized course on Aliwal Shoal ecology. Collaboration and potential pooled funding with partners such as Mission Blue and existing school programs in Durban and the Clansthal area could help establish a more strategic, inclusive, and impactful long-term program which would ensure the growth of this important work.

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

The final report will be shared with the Clansthal Conservancy and can be made available to the broader community. A peer-reviewed scientific paper presenting the research findings has been published (Annex V), which gained significant media attention. The study was featured in BBC Wildlife, local newspapers, and across 16 online media platforms.

Research updates and educational outreach were consistently shared via social media platforms including Instagram (@mobulidmich, @african_shark_diaries, @naturenakk, @marinemegafauna, @adventurerandy) and Facebook (Michelle Carpenter, Marine Megafauna Foundation). These channels collectively reached an audience of approximately 50,000 followers.

Educational activities and snorkel trips were also promoted through social media accounts such as @mobulidmich, @wilded, @kulaacademy, and @oliviasymcox. Community involvement included student volunteers like 13-year-old Eden Westerdale, and intern Summer Lambrecht, who under my supervision created the

Aliwal TV educational video series. This now includes 8 videos and contributes to the Living Blue YouTube channel, which has grown to 376 subscribers.

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

The next critical steps involve building deeper capacity for ocean education and creating more structured, long-term pathways for youth engagement. Many children expressed a strong desire to continue their learning and involvement in marine conservation, yet lacked access, resources, and guidance on how to do so. Developing a program that integrates in-water experiences with formal ocean education will be key. This would ideally be in collaboration with partners like Mission Blue and local schools. A potential addition could include offering freediving certification to selected students, providing both motivation and a tangible skill set that supports future careers in marine biology, conservation, or ocean tourism.

A top priority moving forward is ensuring equitable inclusion of Zulu communities in these ocean experiences. While many Zulu children participated in this project, we were not yet able to bring an entire school group from an informal settlement. We initiated a relationship with Mbulula School through classroom visits and by donating educational books, and we received positive feedback from parents and teachers. However, severe flooding and logistical challenges prevented snorkel trips from taking place during this phase. These initial engagements should be viewed as foundational pilot efforts to build trust and understanding in communities with historically limited access to the ocean. Cultural sensitivity, respect, and patience are essential in these contexts, especially where fear of the ocean is deeply rooted due to historical exclusion and a lack of swimming opportunities. Long-term relationship-building, inclusive planning, and community consultation will be crucial for success. Another important future goal is to involve the local orphanage in Umkomaas, a process that will similarly require thoughtful planning, coordination, and support. With sufficient funding and local partnerships, these next steps can create meaningful, lasting impact. All of which will empower the next generation of ocean stewards from all backgrounds in KwaZulu-Natal.

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?

The Rufford Foundation logo was used in presentations and educational materials. During each snorkel trip, it was communicated to students and accompanying adults that the activity was made possible through Rufford's support. The Foundation received recognition across multiple platforms, including social media posts, talks, and a peer-reviewed publication on manta ray habitat use. Additionally, the Rufford Foundation was credited in every Aliwal TV educational video hosted on the Living Blue YouTube channel. The Rufford Foundation was acknowledged in media coverage that featured the project including local news articles, online platforms, and conservation-focused outlets.

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

Mandi Dyall, Rod Crookes, and June Holtzhausen served as the administrative team for the Clansthal Conservancy. They provided essential logistical and organizational support.

Olivia "OJ" Symcox played a pivotal role in the education and outreach component of the project. As a long-standing conservation advocate in the Aliwal Shoal area, she was instrumental in organizing and communicating with school groups, coordinating snorkel trips, and supporting the delivery of marine education sessions. Olivia also coordinated media outreach for the project, securing local coverage that significantly amplified public awareness and engagement. She also photographed many activities and provided these to be used for the project.

Dr. Ryan Daly was the project's primary scientific collaborator, contributing expert guidance and oversight to the manta ray research conducted within the iSimangaliso Wetland Park (IWP). His involvement was key in supporting long-term research goals and fieldwork in the IWP. Ryan also photographed many activities and provided these to be used for the project.

ScubaXcursion Dive Centre provided critical in-water support and resources for the snorkel and research trips. Their local expertise, boat operations, and safety support made much of the fieldwork and education sessions possible.

Dr. Tessa Hempson and Grant Brokensha (Mission Blue) assisted with fieldwork and outreach in the IWP. Their collaboration helped strengthen the project and opened opportunities for future strategic partnerships.

Together, these individuals and organizations played crucial roles in the success of both the scientific and community engagement goals of the project.

10. Any other comments?

We are deeply grateful to The Rufford Foundation for the support that made this project possible, as well as the Clansthal Conservancy's administrative support particularly Mandi Dyall. This project advanced critical manta ray research in South Africa and created transformative ocean experiences for local youth. The positive community response has laid the foundation for lasting conservation impact, and we are excited to build on this momentum through continued research, education, and collaboration.

ANNEX I – Financial Report [Intentionally deleted]

ANNEX II – Overall summary of fieldwork trips in the iSimangaliso Wetland Park and data collected

iSimangaliso Wetland Park fieldwork dates	Number of full fieldwork days (approximately 8 hours at sea)	Budget (ZAR)	Budget spent (£)
March 2024	3	R3,401.38	142.62
May 2024	4	R6,351.10	266.29
January 2025	2	R15,630.39	655.36
May 2025	3	R11,548.84	484.23
TOTAL	**12**	**R36,931.71**	**1,548.50**

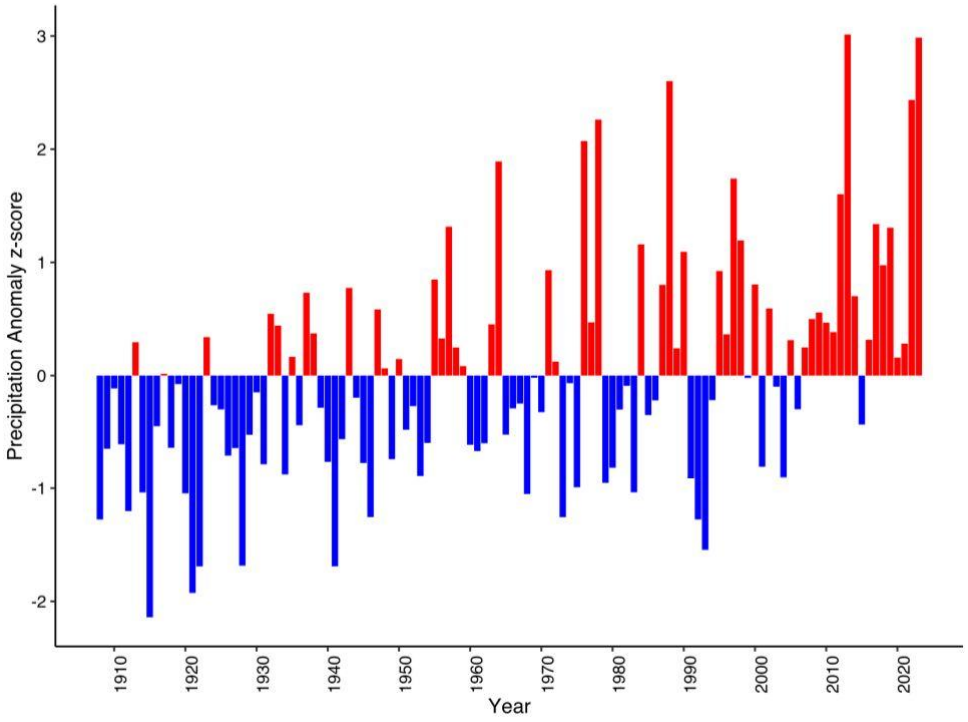
Month / year	Total number of sightings	Total number of identifications	Number of new individual mantas	Number of resightings	Number of individuals in South Africa's manta ray database by end of trip (also including citizen science)
March 2024	18	13	8	5	175
May 2024	25	16	6	10	182
January 2025	6	5	2	3	187

May 2025	52	33	17	16	204

ANNEX III – Overall summary of educational snorkel trips

Month	Number of boat trips	Number of students	Number first time snorkelling Aliwal Shoal	Budget (ZAR)	Budget (£)
February 2024	2	13	10	R12,068.41	506.01
March 2024	0	N/A	N/A	N/A	N/A
April 2024	1	6	3	R5,250	220.13
May 2024	2	13	9	R11,000	461.21
January 2025	3	24	12	R20,458.80	857.81
February 2025	3	24	13	R20,969.00	879.20
March 2025	0	N/A	N/A	N/A	N/A
April 2025	2	16	12	R17,819.00	747.13
May 2025	2	16	10	R11,436.16	479.50
TOTAL	**15**	**120**	**69**	**R99,001.37**	**4,151.00**

ANNEX IV – Increasing Rainfall in KwaZulu-Natal



ANNEX V – Coverage

Link to publication

Environ Biol Fish
https://doi.org/10.1007/s10641-024-01639-7

Preliminary insights into manta ray (*Mobula alfredi* and *M. birostris*) population demographics and distribution in South Africa

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Abstract Both the reef manta ray, *Mobula alfredi* and oceanic manta ray *M. birostris*, are repeatedly observed in South Africa, yet little is known about the distributions of either species. In this study, we collated citizen science observations since 2003 to reveal six areas in the KwaZulu-Natal (KZN) and Eastern Cape provinces, where manta rays have been sighted across multiple years. Using their unique ventral spot patterning, 184 individuals were photo-identified, comprising 139 *M. alfredi* and 45 *M. birostris*. Most of the photo-identified *M. alfredi* individuals were encountered in the iSimangaliso Wetland Park (IWP) in KZN (89%; $n=119$) and for *M. birostris*, Aliwal Shoal (48%; $n=22$). We identified 32 new transboundary records of 28 *M. alfredi* also photographed in the Inhambane Province, Mozambique, demonstrating connectivity, specifically to Závora ($n=27$). One *M. alfredi* individual traveled multiple times between the IWP and Závora, Mozambique, totaling 1305 km, and another individual traveled from the Pondoland MPA to the IWP in South Africa, a distance of over 600 km. Further, we extend the southern range for *M. alfredi* in Africa by over 500 km from

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General media

[BBC Wildlife Magazine]
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