

Final Evaluation Report

Your Details	
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Project Title	A Blue Economy Approach to Support Community-based Sea Turtle Conservation
Application ID	33326-C
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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
Create stakeholder working group and meet 3 times over 18 months				We successfully identified six members who are committed to what we are now calling the Advisory Committee, committed for 2-year terms. We have been meeting monthly and building the structure and format to recruit more advisory committee members in the field of legal aid, fundraising, accounting, ecotourism logistics and administration, and sustainable seafood. Currently, we have five foreign and one Mexican and aim over the next year to improve our diversity representation.
Draft a bycatch protocol that is expandable and replicable in more fishing communities				Protocol is now formally a part of my PhD, and the scientific criteria and peer-review is under the guidance of my PhD committee to become the first certification in Mexico.
Engage with our three initial fishing communities				Continuous engagement with these communities.
Train fishermen and initiate the bycatch program				Yes, three workshops hosted and participated with the larger scientific community.
Develop the CSF operations and create marketing content.				CSF has been slow because of the PhD and the formalities of developing an official certification and integration of our business in the formal digital Mexican accounting system. We are registered as the first and only CSF in Mexico with Local Catch Network, an NGO from the University of Maine. We have some marketing content and will roll it out once we have the accounting system in place with the Mexican fiscal system. I was able to register myself as a sole proprietor, but with my scholarship there are some grey areas

				in the fiscal system that we cannot override without hiring an accountant. I do not feel this is necessary now as I am able to purchase and sell seafood for our travel groups and with residents. The accounting will come into play when I am ready to sell at a larger scale.
Collect and analyse bycatch data submitted by fishermen on a monthly basis.				Fishers are providing data incidentally, however, not monthly, due to weather, and lack of bycatch - the fisheries are proving to be more sustainable than originally thought, leading to the efficacy of the certification. This information is important to note that we may be proving lower bycatch than originally hypothesised, which is great advancement for conservation.
Interns produce a series of short videos and written articles on our progress				Interns created several video clips for We Travel, social media and submitted/published articles for Earthwatch and Journal del Pacifico. We have our website published but need to revise and update it with links to the articles and videos.
Submit a short documentary to the International Ocean Film Festival				Not completed due to time constraints and permitting in Mexico. There are other permits we did not know about, seemingly new or specific to sea turtles that are not readily published online, relating specifically to filming/photographing sea turtles in marine protected areas. This unfortunately is not uncommon for the Mexican Government authorities to create new permits and rules whenever they want.
Analyse bycatch data				Preliminary analysis of bycatch in combination with sightings of sea turtles during fishing activity which we had not anticipated but happy to have this information as well from fisherman. I have created some preliminary maps using ArcGIS that I have presented to several academic institutions and members of NGO and Mexican Government. (attached). I had wanted to publish already but the PhD programme was stalled due to COVID restrictions and the internal peer-review

				process with committee meetings has created a delay. I aim to submit for scientific publication in Spring 2023 and will reference The Rufford Foundation in the acknowledgements.
Pilot turtle safe seafood with a minimum of 5 ecotourism and wellness companies				The Mexican accounting system is difficult to manoeuvre and there are issues with receiving a Mexican scholarship and having a business simultaneously. We did have students from UCSD create a business plan for the shrimp portion of the CSF, which was an unexpected, unplanned addition to the project. The UCSB graduate students interviewed more than 12 restaurants and ecotourism companies in La Paz who are all interested once we can formally provide Mexican receipts. We were able to pilot to two restaurants and three ecotourism companies, all very successful. We aim to have a larger, wider roll out in 2023-2024 as we continue to grow. In the meantime, we have three ecotourism companies we are partnering with in January - March 2023 with whom we will sell turtle safe seafood for shrimp and fish.
Implement our marketing and outreach content.				We have various marketing and outreach formats in print and digital. We were running strong on social media with the interns present, then they graduated and moved on. My PhD work (directly related to developing the responsible fisherman certification for the seafood) became too heavy for me to keep up with. My team members and I are now on the much larger, million funded research projects to test fishing gear modifications which yielded into one of our conservation strategies (<i>Next objective below</i>). So social media and outreach is shifted timelines until we have more research completed and I can focus first on finishing the PhD and the certification criteria. However, we do have our website that a team member and the advisory committee is

				helping to update and improve with more current information.
Co-create 3 core conservation strategies				We are now part of the large NOAA team to run fishing gear modification trials to reduce sea turtle bycatch, in the process of mapping out conservation zones, and the responsible fisherman certification in Mexico is being developed. I didn't expect our project to gain the attention of larger projects, so I did not anticipate the shift in this timeline, but it is much better than I could have ever imagined.
Evaluate the economy and social success of the CSF				The preliminary data looks very promising, but sales will not sustain our team and research directly. Per the advisory committee, we have decided to run the CSF as a small, local operation with residents until we can grow into the Mexican accounting system. For now, we will use the opportunity to sell seafood at a premium price to recycle funds back to participating certified responsible fisherman and use the opportunity with consumers for outreach and education on what they can do to help support sea turtle conservation. We will continue to market and recruit travel groups to our research sites and serve and discuss responsibly caught seafood.
Implement the conservation strategies with fishers				Gear trials are starting as soon as we have the permits from the Mexican fishing department, fishers are being recruited with our trained fishers to report bycatch fisher to fisher, and fishers are more aware of sea turtles in the temporary trial conservation zones.
Draft the sea turtle expedition protocol				Yes, we have several versions and are currently working on a management plan with the secretary of the environment to officially host travel groups in our research area and to participate in research as volunteers. (Attached some marketing material)

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

a). The formal invitation of the Mexican fishermen's union and support of federal academic institutions, non-profit organisations, and the institute of fisheries to create the first Mexican certification that recognises individual fishermen for their responsible actions directed at sea turtle conservation is the most important outcome. As mentioned above, the scientific criteria that will be used to formally monitor the efficacy and compliance is now officially evolving from my PhD research. The certification lends to an eco-label that will identify seafood products with traceability to the fishermen, the type of fishing gear used, the region where the seafood originated, and when it was wild caught. For a product to be eligible for the eco-label, the fishermen who captured the product must be certified, however all products from that fisherman may not be eligible for the eco-label. For example, a fisherman can be certified as responsible for reporting bycatch and working to reduce bycatch and improvise fishing through cooperative community management, but fish for sharks and rays. We are not promoting the sale of elasmobranchs or parrot fish or other species that are endangered, illegal, or data deficient. The idea in this case is that we will in the future adapt our travel programmes to "PescaTourism", meaning bring academic groups and eco travellers out with the fishermen who catch sharks and rays to catch, tag and release-creating a scientific tourism programme that rivals the economic gain from catch and market.

b). MARES Comunidad is an ambitious project aimed at reducing bycatch with fishing communities in northwest Mexico. The same communities we work with and many of the same fishermen and team members. My PhD advisor and a team member on this project I was invited to be a major team member of MARES. He shared my PhD project about the certification and later I was invited to present at two meetings with the scientific research team and a meeting mixed with scientists, government and fishers. Currently, my PhD project is part of the second phase that will commence at the end of 2023 ideally with funding to match my scholarship and the funding we generate from travel groups through Blue Turtle. One of the MARES founders said that my project is a "paradigm shift in the way we consider bycatch mitigation." He was referring to the idea that we are recognising and certifying the fisherman not the fishery. Within the MARES project, there are several universities, governmental agencies, and non-profits involved. Arizona State University, Dr. Jesse Senko has invited me personally to help support his research on experimental fishing gear modifications to reduce bycatch of sea turtles and elasmobranchs. This opportunity not only supports my PhD research financially, and it also supports our growing collaboration. While my research is focused on spatial ecology of potential bycatch interactions and designing economic incentives and alternatives for mitigating bycatch at the community level, his gear modification experiments allow me to expand the "Pescador Responsable" programme into new communities, learn about more fisheries, and gain more academic support for our team research in northwest Mexico from a major US university.

c). Advisory Board - I originally proposed the idea that we would host three stakeholder workshops for feedback on the seafood and travel portions of Blue Turtle. However, to my delighted surprise, one of the stakeholders, Mary Heeney,

proposed and offered to create an advisory board that would meet monthly. Mary is a sailor who has participated in citizen science reporting of sea turtles while sailing in the Gulf of California and has purchased our seafood and supported my research for the past several years

The response to the responsible fisherman certification "Pescador Responsable". Working in small-scale fisheries to reduce sea turtle bycatch is an extremely complex issue. The social-economic factors, the assumptions from scientists and fishermen, the long process of trust that must be gained, the corruption of a developing country government, and the culture and tradition of rural fishing communities consuming sea turtles constantly play a role in how we navigate a project of this magnitude. So, when so many fishermen showed their interest by participating in the training workshops to report bycatch, then the unexpected data from other fishermen whom we had not met, then the extraordinary efforts of women fishermen to stop poaching in their own communities, was amazing. I know we did not reach all our objectives and so many changes during the course of the project as we learn more and more each time we set foot into the fishing communities, but the response, the dedication, the honest voluntary participation from the fishermen, especially the indigenous women, feels like the most significant achievement. Without the trust and participation of the fishermen, I have no business, no matter how many tourists sign up or how many ecotourism or wellness centres want to buy responsible seafood. Without the fishermen, without their eagerness to stand beside me as team members, as friends, nothing else matters. We have so far to go still, but the response is my inspiration and motivation when I feel like I want to quit, when it all feels overwhelming and daunting and I feel like I am falling behind, a call from a fisherman just to chat and say hi, or when they send a video of a turtle being rescued it makes it all worth it.

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

At first, I made these elaborate data books/ logbooks for each fisherman to fill out when we started the bycatch reporting programme. The idea was that we could assess fishermen by their responsibility as fishermen to reduce sea turtle bycatch by how often they reported bycatch of sea turtles in their own fishing gear or of other fishermen who trusted them as leaders in their community. It didn't go so well, only one fisherman used the logbooks to report bycatch.

I later learned that at least one of the fishermen is illiterate. He can read but cannot write. Which now makes sense why he always sends voice messages in response to my text messages. During the workshop, another fisherman we learned is also illiterate in reading and writing. Both are amazing in their efforts and intentions to participate in scientific research as citizen scientists. They are also leaders in their community by recruiting and rallying other fishermen to report bycatch and work with my team to find ways to reduce entanglement. We of course always want to be inclusive and welcoming of any fisherman who wants to work towards our unified conservation goal, so we had to find another way. They could voice message their reports. Fishermen who are illiterate shared their honest opinion with us that the logbooks were too much. It was hard for them to remember to bring them on the

boat, to remember to bring pencils do not pen since we printed on waterproof paper, only pencils work, and they have to work fast with their catch to be able to release the live non-target species back into the water. Then it is a race to sell their products. In other words, they are subsistence fishers, and it is a huge competition. For them to take the time and effort to fill out my elaborate forms that were honestly made more for scientific research than a fisherman, was too much. So, we moved to a voice message reporting system which is still gaining traction and relieves fishers who cannot write.

I didn't think it would require so much to be part of the Mexican digital accounting system and didn't realize that while I was receiving a Mexican scholarship for my PhD, I could not have a business on the side. This made it challenging to start selling seafood to ecotourism operators who require a "FACTURA" which is the digital receipt of sale that is processed within one electronic tracking accounting system for the country.

So, realising we could not yet implement sales and also, we needed to refine the certification of the fishermen for their participation, and subsequently work on the eco-label that we could use on seafood packaging and outreach materials with the QR code, my team and advisory board suggested that we work on the certification first. We needed to develop a strong scientifically valid criteria that clearly outlines what a responsible fisher certification is. The criteria needed to be referenced from the research data and using the cameras we received from Shellcatch, managed by Upwell, co-funder. The data would be subject to academic and professional peer-review through two federal research institutions as part of my PHD. My team, some of whom serve as my PhD committee, made some changes officially at the federal level for me to incorporate my research into a formal certification for Mexico. We are not certifying the fishery that reduces bycatch, rather we are certifying the fisherman, the individual who contributes to bycatch research by reporting bycatch, recruiting other fishers to report bycatch to them directly, even anonymously, participates in gear modification trials, and participates in remote electronic monitoring.

Lastly, as we ran several trial runs of our travel programme to bring groups to monitor for sea turtles, academic groups and eco travellers, we learned that we needed a special permit that linked our valid research permit with the secretary of tourism. Only one organisation has ever received this permit and it was specifically created for them as Mexico does not want to promote sea turtle tourism in any other form than scientific-based and only with the non-profit organisation, grupo tortuguero (GTC) of whom we and the fishermen are members and all on the same research permit. So, we are working on that with the fishers, and we needed to raise the money. Dr. Jesse Senko, a sea turtle biologist, member of gTC, and professor at Arizona State University has provided the funding to obtain the permit which also requires a management plan. The total cost is approximately £1500.

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

There are fishermen who were invited by Alan to participate in the training workshops and be part of the research team. These fishermen talked to other fishermen in their communities, many of whom are extended family members, but also other non-family members. They began reporting sea turtles, alive and dead, anonymously to our "lead" trained fishers. They are recognised in their small communities where everyone knows everyone. They really like and benefit from the recognition. The online conference in which I presented our project, "Pescador Responsable", which means "Responsible Fisherman", is also the name of the certification I am developing formally through my PhD. I recognised them for their efforts, and they told me they felt famous. Some were interviewed by the local news and TV, they brought their grandchildren out to release turtles that they reduced from fishing gear, and they read their names in the newspapers. They benefited monetarily as well when we were building the bycatch protocol, we paid them for their time and provided gas for their fishing boats turned into research vessels for the day. Yet, they also do it for the recognition. The benefit is that together, we are changing the paradigm of fishing from extractive, subsistence, to responsible. We are creating examples for other fishing communities to look to for change and they see that it is not the government telling them what to do or not do by placing restrictions and closures for not following the rules. They benefit from their recognition and participation in the research and the management. We are also together changing the opportunities for the next generation. We can't fight the cartel fisheries, the industrial armed fishing boats who fish illegally and unregulated, but we can help the small-scale fishermen take pride in what they can do for their communities and their families on a small, yet powerful scale.

5. Are there any plans to continue this work?

Yes, this continuation grant was intended to provide funding to build and evolve my business, Blue Turtle Sustainable. It has done just that. We are slowly incrementing our funding each year as travel has opened back up and we are gaining tracking in the tourism communities known for having wild and responsible seafood. I have been asked to present and serve on panels as an expert in responsible fisheries focused on mitigating sea turtle bycatch. We have the support of the Mexican Sea Turtle Network (Grupo Tortuguero de Las Californias, GTC), and my team member and PhD advisor, Dr. Alan Zavala was invited to serve on the board of GTC. For the next 2 years, I will be finishing my PhD which will accumulate into the first Mexican certification for small-scale fishermen. As the NOAA sea turtle representative, Dr. Jeff Seminoff, said to me at the MARES meeting, "this certification is a paradigm shift from certifying fisheries, to certifying individual fishermen and recognizing them for their vital efforts in sea turtle conservation." This certification will set the stage for the seafood eco-label and allow for a structured, scientifically viable method to monitor changes for sea turtle conservation through our business model.

As for scientific travel, we had originally planned to recruit yoga and wellness travel groups since their profile is that of nature, compassion, and volunteering. However, this industry has shifted trends into eco-luxury accommodations which we can't offer

at the off-grid, remote research sites where we work which only offers camping. So, I recently created a series of sea turtle expeditions that incorporate the mindfulness philosophy, inspired by the book, *Blue Mind*, by Dr. Wallace J. Nichols, the founder of GTC. I now call them, "Blue Mindfulness Expeditions" and will be updating our website into the new year. After COVID, we all need healing, we learned that life needs to move slower, we value mental health differently, and honour the priority we all need to take for self-care.

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

I have been sharing my work at various conferences, including the annual meetings of GTC with over 500 students, volunteers, researchers and fishermen in attendance and other similar conferences in Sinaloa and Baja Sur, Mexico. I have shared my work with Upwell Turtles, a supporting fiscal sponsor, with over 20 international researchers supported by Upwell, like a Rufford conference. Each semester at the Center for Marine Science in La Paz, Baja Sur, Mexico, I share my research progress with the student body from the fisheries department and my PhD committee. I also share my research with ecotourism groups invited by the ecotourism operator with the intention of adding value to their ecotourism offerings through more community involvement, citizen science activities and research funding support. I share my progress with the fishermen, sailboats, and others who participate in supporting my research and the conservation model to protect sea turtles who provide vital citizen science data. I do this through videos and in-person, informal presentations and small groups meetings. While I have been a bit too busy to focus on social media, interns during this project have helped me share our work on Instagram and to a lesser extent Facebook. I have supplied interviews to reports in Mexico on our conservation work and to We Travel you tube channel about our expeditions. I have completed my pre-doctoral written exam which highlighted my research and my business development that was supported by this continuation grant and early in 2023, I will be publishing a set of articles for scientific journals and conservation magazines. As soon as I can carve the time, I plan to still share a video with the International Ocean Film Festival, hopefully in October 2023, but I am still on a huge learning curve in video editing. Yet this is something that I feel is a necessary and vital outlet to share our work and share gratitude to Rufford and our co-funders for their support, confidence and trust in my research-focused conservation initiatives. Finally, as I carve out time to work on my website, I will be including a page specifically to my research supporters, Rufford, Upwell, CICIMAR, CONACyT, and new funders such as MARES and Arizona State University.

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

Getting set up in the Mexican digital accounting system to sell seafood at a higher volume. We have several restaurants and ecotourism operators interested in supplying responsibly caught shrimp and fish to their clientele once we have the digital fiscal tracking in place.

Yet before that is mapping out the supply chain with all options for the best cost and least amount of error. We want to maintain traceability from "boat to fork" and this will require trust along the chain and as close to three sets of hands as possible. I

envision a map with all the locations around northwest Mexico who serve responsible seafood with our logo.

I feel that I have a much better direction, alignment with the travel programme to maintain funding on a sustainable and expandable scale. Finishing my PhD is a priority and with that comes the vital part of creating the certification to recognise responsible fishermen for their participation in bycatch reporting, live release of sea turtles, efforts in finding new types of fishing gear that reduce entanglement of sea turtles to reduce bycatch incidents. Any fishermen who is current with this certification, can sell healthy seafood stocks in our boutique seafood market we are creating and receive a premium, fair-trade price.

We want to begin to offer more alternative economic opportunities to certified fishermen or as an alternative way to become certified and reduce fishing gear in the water. For example, we are also looking forward to offering a vegan seaweed product, first some dried products like smoothie powders, seasonings, and snack chips, then following up with fresh ingredients that can complement recipes or be the focus of vegan healthy recipes. We are also working on an idea with some shark fishermen to offer a "pesca-tourism" expedition whereby eco-travellers, especially academic student groups, can accompany fishermen on the boat or on a support boat to go fish for sharks (and rays). Rather than kill and sell at the market, we want to offer the alternative economic opportunity to fishermen to still enjoy the catch, and then collect vital population data, tag, and release to expand our research. In this we aim to further build trust with them to report and release alive bycatch of elasmobranchs. Through our work, we learned just how dire the situation in Mexico is with shark and ray fishing, including bycatch. We will never move away from sea turtle conservation work as there is so much to be done and we have gained the trust of so many fishermen and international colleagues, yet we feel this is the area in which we can expand our research and travel programmes which still enhance our CSF.

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?

We mentioned RF in social media posts, added the logo to conference presentations, PhD seminar defence presentations, and business pitch deck for outreach. We also use the logo in citizen science publications.

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

Dr. Alan Zavala - He provides safe and confident hosting in Sinaloa. He has been coordinating with fishermen for over a decade, in some cases up to 2 decades. He intimately knows the fishing areas and the fishing communities and has been a vital mentor in my PhD as my advisor and on this project.

Dr. Agnese Mancini - She too has provided mentorship and is a committee member of my PhD. She supports my learning advancements in ArcGIS publication of data

into maps. She supports me in the role of permitting and guidance on regulations. She also supports interns.

TJ Tate - TJ served as advisory board moderator and expert consultant in seafood sustainability. She was the director of Gulf Wild in the U.S. and Director of Sustainability at the National Aquarium at Baltimore for the majority of the project. Her leadership was key in supporting our administration and how to evolve the seafood area of Blue Turtle.

Mary Heeney - Mary was not originally identified as a team member in 2021 when I applied, however, she has proved to be a key component of our project. She has been leading the organization of the Advisory Committee, has been recruiting travel groups and leads our citizen science area by recruiting sailboats to report sea turtle sightings. While we were not able to successfully submit a documentary for the International Ocean Film Festival, she is on the board and has provided vital contacts from the professional administrators of the festival. Once we have a film ready, we have a spot to showcase our successful project and will be sure to highlight the generous support of the Rufford Small Grants Foundation in the film.

Kaitie Schneider - Intern Kaitie was instrumental in preparing our marketing materials, running our social media, and designed our website. She created several unique graphic designs for outreach and marketing that will be used for years to come.

Dailyn Souder Dailyn - provides 100's of GB of video clips and conducted interviews of fishermen and some of our team members. She produced a short video for We Travel, a travel booking platform, and created some promo videos for social media that we will be publishing when we are ready to really go public. She also created our newsletter template and created a video tutorial for us to use when we are ready.

Keegan Sentner Keegan - provides 100's of GB of photos and documents the bycatch training process so that we can use his photos in the training manual. He also published several articles in conservation journals and blogs, such as Earthwater and Journal del Pacifico.

Dr. Kristin Reed Kristin - provided much needed mentorship and support from Upwell turtles, including financial co-funding. She has guided me and taught me how to use the Theory of Change approach to structure the problem, assumptions and solutions for parts of our project. She is directly supportive of our research, but since Upwell has voiced their statement not to get involved with the seafood or travel aspect, I am designing a favourable exit strategy with Upwell and moving more of my focus to my own organization Blue Turtle and have developed a formal research agreement with Grupo Tortuguero. I will continue to collaborate with Upwell for the citizen science aspect of our sea turtle conservation model, providing incidental sightings of sea turtles from citizen science.

Adlalberto Garcia - Fisherman in La Reforma, Sinaloa - provides vital data on sea turtle sightings within fishing zones, recruited several new fishermen to report sea

turtles, co-presented with me at an online conference to other researchers and fishermen.

Melina Maldonado - Fisherwoman in Lazaro Cardenas, Sinaloa. She contributed vital data on sea turtle bycatch and served as an informant of poaching in her own community. She rescued several sea turtles from being butchered and brought children from her community out to the beach to release the confiscated live turtles. She is a hero for conservation, and I feel so grateful to know her.

Dozens of fishermen - In their own way, they contributed to this project and continue to support us as scientists and students in our collaborative initiative to reduce sea turtle bycatch and positively change the future for the next generation of fishermen with alternative economic opportunities.

10. Any other comments?

I feel a bit sad that this is my last official report to share with Rufford yet also immensely grateful for the trust and support that RSG has provided to my initiative to build a citizen science approach to sea turtle conservation. I have been able to meet and integrate so many amazing community members including sailboats, other researchers, volunteers, students, and my heart full of the incredible, honourable fishermen I now feel part of my team. RSG will always have a special place in my heart as well as my research moving forward and of course one of the main reasons my business is already so successful.

As an alumni of the RSG five cycles, I would like to contribute to other grantees as a mentor if the occasion arises. I would also love the opportunity to host/co-host a 2023 RSG new-look learning event to support your new Grants Officer, Mariam. If there is another vision you may see where/how I can support Rufford, please let me know.

Much gratitude for this amazing journey.