

Final Evaluation Report

Your Details	
Full Name	Catherine Alves
Project Title	Belize's coral reefs: fostering sustainable practices with community-based management
Application ID	23872-1
Grant Amount	£5,000
Email Address	Calves06@live.unc.edu
Date of this Report	30 October 2019

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
Design socio-economic survey and get approval of survey and implementation plan by the Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill (UNC).				This component was completed prior to beginning data collection in April 2019. The UNC IRB deemed this work to be non-human subjects research because it was more of a programme evaluation.
Training field assistants and pre-testing survey instrument				This objective was completed during the first several weeks of fieldwork, from 15 – 25 April 2019. I partnered with two community-based organisations (the Toledo Institute for Development and Environment, TIDE, and the Southern Environmental Association, SEA) to hire and train assistants. They helped me pre-test the survey instrument.
Survey implementation				I was able to survey 119 total fishers for this project. Although this is smaller than the initially planned 200 study participants, I was able to collect qualitative data from our interviews and conversations to supplement and contextualise the data collected in the quantitative questionnaire.
Analysis and dissemination of study results				Prior to leaving Belize at the end of June 2019, I gave presentations of preliminary results to managers at the Belize Fisheries Department, TIDE, and SEA. During those presentations, we discussed the interpretation of results and next steps for the project. I will return to Belize in early 2020 to present more results to these partners as well as to the 10 fisher communities where we collected data. I need to continue analysing the data, particularly comparing the 2019 data with the 2014 pre-implementation data.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

One of the unforeseen challenges of this project was associated with employing a field team for temporary work. Although we were working full-time for about 2 months, this was not a long-term job for most. Because of that, I think it led to some apathy from my assistants on particularly long days of surveys. We would survey fishers early in the morning, and then have some free time midday, and then return to central locations to survey fishers in the evening. I tackled this challenge by trying to remain positive with my team and get to know them outside of work. Another challenge associated with this was having one of my field assistants unexpectedly quit on me by having another assistant (who was also her cousin) do it for her over a message in WhatsApp. While I was disappointed in losing her help, I did not dwell on it, as I had several other assistants still ready to work with me. When I confronted her about it over telephone, she said she wanted to do her other job instead of work for me, and I wished her well in the future. This was a learning experience for me because I have not had someone I've hired quit, but as I hope to be in a managerial position in the future, I anticipate needing to develop good conflict resolution skills.

Another challenge associated with this project was that of survey fatigue among the fisher communities and getting in touch with the fishers. Belize is a very popular location for socio-economic research, particularly with fishers, so a few very vocal individuals expressed to us their lack of desire to take the survey. I understood and did not want to pry, but I knew that I needed enough data. So, we tried a variety of methods to reach enough fishers to take our survey – including accessing their telephone numbers, addresses, and names from the NGO partners, intercepting them while they returned from/went out to sea, and using trusted community members to access them.

3. Briefly describe the three most important outcomes of your project.

1. I travelled to 10 fisher communities to interview participating fishers about their experiences and opinions related to fishing. This required a lot of coordination of travel, scheduling with fishers, managing my field team, securing safe and affordable accommodation for us while we travelled, and covering our meals. We travelled via bus, taxi, boat, and bike to and within the following communities in southern Belize: Dangriga, Hopkins, Independence, Riversdale, Seine Bight, Placencia, Monkey River, Punta Negra, Punta Gorda, and Barranco. Through this process, I developed additional skills in project and budget management – essential for my continued career in marine conservation research. Pictured below (Figure 1) is my field team with our boat captain (also a fisher!) on our way to Punta Negra, which is a small coastal community only accessible via boat.



Figure 1: I (in sunglasses and blue tank-top) am posing with three field assistants and our boat captain (and local fisher) on our day trip to Punta Negra, Belize. We left the dock in Punta Gorda, Belize, at 8 am to arrive in Punta Negra for 9:30 am. We spent several hours interviewing fisher's one-on-one before eating lunch (local snapper, rice and beans, and juice).

2. Understand how fishers' livelihoods and perceptions of the Managed Access (MA) program improved since inception of the program (in 2011) to present and determine how those metrics differ between fishers from the pilot (older) and newer sites. While I am still working to compare the 2019 data, I collected to the 2014 pre-implementation survey, I was able to gain some insights into what the fisher populations we surveyed know and perceive about managed access (MA). Preliminary data indicate fishers overall have positive perceptions about MA participation but are dissatisfied with illegal fishing by unlicensed transboundary fishers. Out of 119 fishers surveyed, 95% are male, while 6% are female – pretty representative of the nationwide fisher population. 41% of respondents rely on fishing for 81-100% of their income, and 32% are 41-50 years old.

The figures below (Figures 2 and 3) express preliminary perceptions data for all respondents. Over 65% of respondents know the rules for obtaining and renewing their commercial license, but only 43% see the benefits of catch reporting (an important part of the MA process). 70% of respondents support MA in the long run, but 62% report observing illegal fishing behaviour. These data suggest a need to educate fishers about the benefits of accurate catch reporting, improve

enforcement, and develop fisher empowerment programs. While MA is fairly new in Belize, the lessons learned can be applied to other small-scale fisheries contexts.

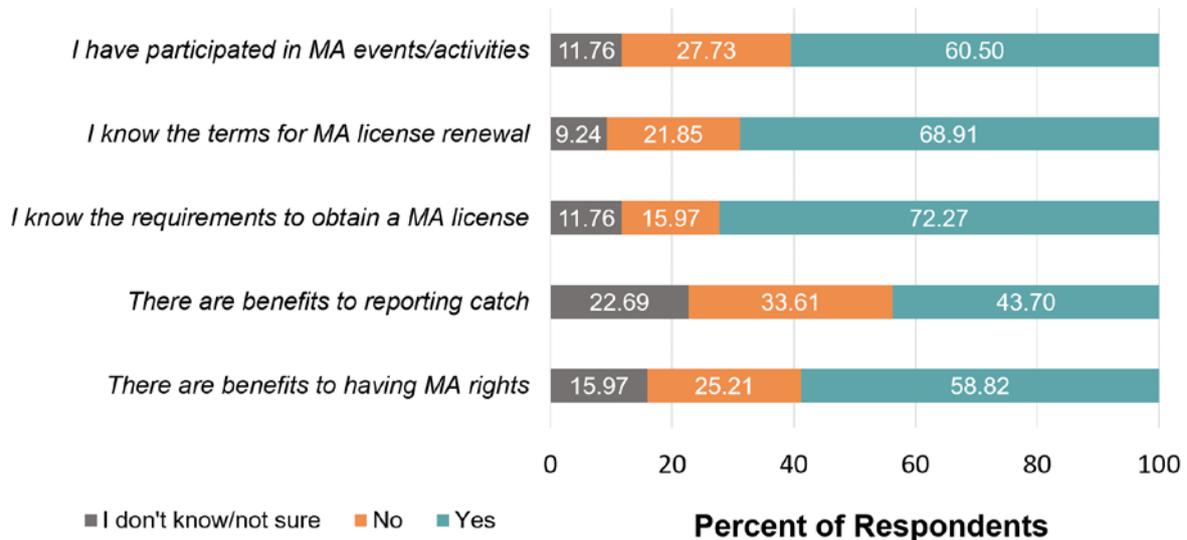


Figure 2: Fishers' knowledge of Managed Access program rules (n = 119).

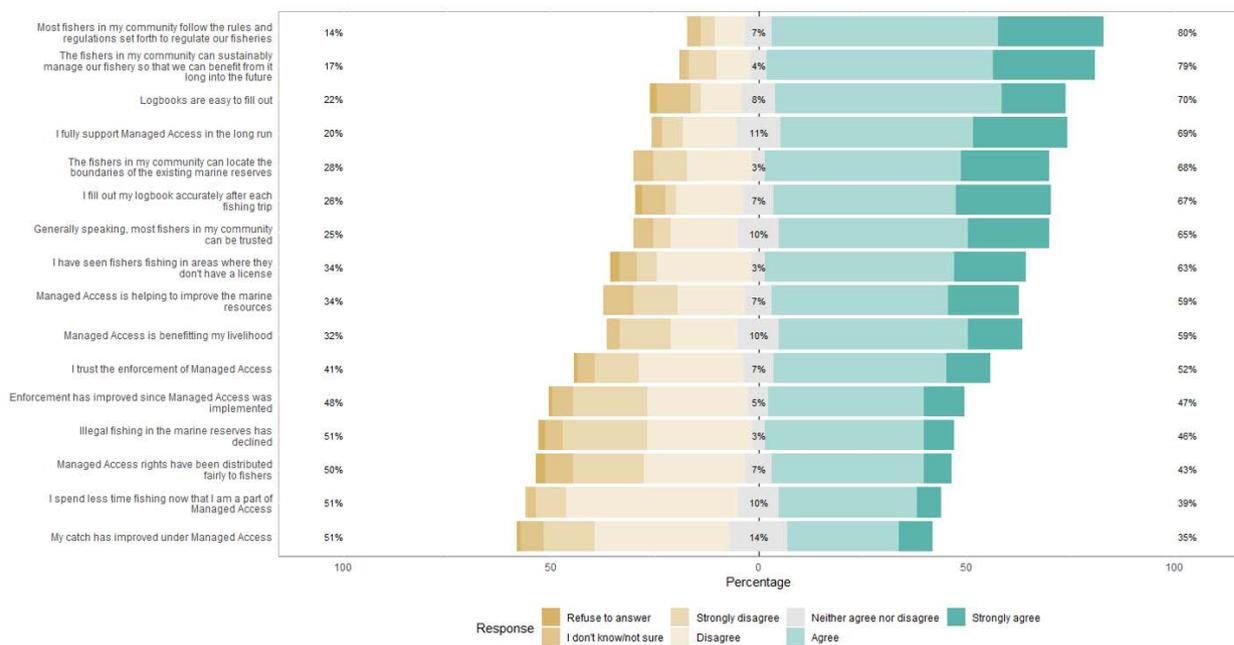


Figure 3: Fishers' perceptions of Managed Access components (n = 119).

3. I strengthened my professional and personal relationships with individuals at two NGOs (TIDE and SEA) and the Belize Fisheries Department. This project was the culmination of over 2 years of planning, coordinating, fundraising, and problem solving with individuals at all these organisations. While I was in Belize, I participated in local community events, shared my preliminary results with them (in oral and written formats), and worked in the office with their employees. I hired and trained four community researchers from each NGO to work as my field assistants (photo

below). I plan on continuing to work in Belize and build upon these relationships. This project would not be possible without the help of my collaborators in Belize.



Figure 4: I am posing (on right, in UNC hat and flower tank top) with my eight field assistants. Four were from TIDE and four from SEA. This was taken on TIDE's dock in Punta Gorda, Belize, after our three-day enumerator training session.

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

As was previously stated, the local communities were highly involved in many aspects of this project, including the logistics, data collection, information sharing, and planning of future projects. In 2017, I started building relationships with individuals at the Belize Fisheries Department, TIDE, SEA, and numerous other local NGOs in Belize. I reached out to them about my plans to evaluate the managed access programme and sought advice about the implementation of my study. Without numerous in-person and Skype calls, and emails back-and-forth, this project would not have been possible.

I partnered with TIDE and SEA to hire four community researchers from both organisations to be my field assistants. I value the insights and local knowledge they brought to my field team. They were young adults who were already working in the conservation field and looking to gain more work experience. They travelled with me to the 10 fisher communities in Southern Belize, and we supported the local

economies there by staying in lodging owned by Belizeans, eating food made by Belizeans (sometimes the wives of fishers), and using local transportation. When in the fisher communities, I emphasised the importance of the information the fishers were sharing with me and promised that I would return to share the results of the study with them. They were receptive of this, noting that other organisations who've done research in their communities have not returned. I hope to set myself apart from the rest. I respect the unique experiences and cultures of the different communities and honour them in my work.

5. Are there any plans to continue this work?

I plan on continuing this work, both in the communities where we visited, and by expanding the study to other locations throughout Belize. Also, because this project is a component of my ongoing dissertation research at the University of North Carolina at Chapel Hill, I hope to expand on the insights gained from this study to evaluate the managed access programme in other locations in Belize. I have already begun conversations with another community-based organisation, the Turneffe Atoll Sustainability Association (TASA), who is interested in conducting the study in the area they co-manage, just like SEA and TIDE. I hope to return to Belize to train their staff in the data collection methods we used and potentially be a part of that process.

Furthermore, I plan on incorporating the socio-economic results from this study with ecological data (such as catch per unit effort) collected by TIDE and the Fisheries Department to determine the social and ecological efficacy of the managed access programme in Belize. To do this, I will operationalize Elinor Ostrom's social-ecological systems framework and use structural equation modelling to tease apart the relationships between social and ecological variables. For my career, I will continue working in the field of sustainable fisheries management, focusing on evaluating the impact of such practises on the livelihoods of small-scale fishers in Belize and elsewhere.

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

Some of the results of this project have already been shared with TIDE, SEA, and the Belize Fisheries Department, through oral presentations to the organisations prior to my leaving Belize (Figures 5 and 6, below). I have submitted reports to the Belize Fisheries Department as required by the permitting process. I am in contact with partners at the aforementioned organisations to discuss further efforts to share project results with the fishing communities and other managers across Belize.

I will be presenting a poster of preliminary results at the annual meeting of the Gulf and Caribbean Fisheries Institute (GCFI) in Punta Cana, Dominican Republic, from 4 – 8 November 2019. This is an important component of the data-sharing process as participants at GCFI are scientists, managers, conservation practitioners and even fishers – all involved in fisheries-related work in the Caribbean.

I have also spoken with several fisher communities about my returning to Belize to share the results with them. In spring 2020, I will hold public forums and focus groups

with refreshments to discuss with them the main findings of this study and obtain their feedback. I am particularly interested in learning if the results are surprising to the fisher communities and what they hope to do with the information. I also hope to distribute posters and flyers with key findings to fish markets, fishers' homes and government/NGO offices. I hope this project improves information transfer between fishers and natural resources and empowers everyone to become better stewards of the environment.

I will produce several peer-reviewed journal articles to be shared with the broader scientific community so other researchers are aware of the methodology, results, and conservation insights from this project. Because programmes like managed access are being implemented in small-scale fisheries globally, it is important to contribute to the scientific literature evaluating their efficacy. This project is also a large component of my dissertation at the University of North Carolina at Chapel Hill.

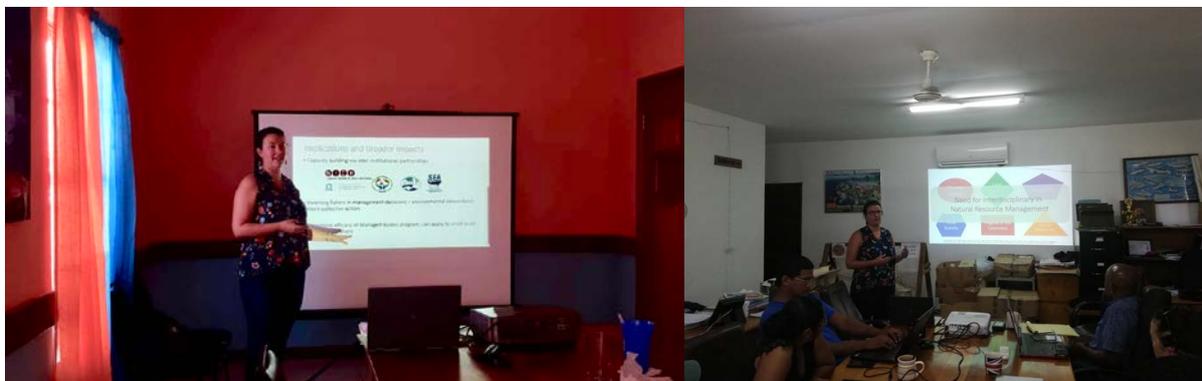


Figure 5: Sharing preliminary results to managers at the Southern Environmental Association (SEA), in Placencia, Belize. Figure 6: Presenting to the entire staff of the Toledo Institute for Development and Environment (TIDE) in Punta Gorda, Belize.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The grant was used over a 3-month period, from April to June 2019. Data collection occurred over 2 months, after a month of logistics (permit acquisition, hiring and training enumerators, and pre-testing and editing the survey instrument). In my original grant proposal, I anticipated the project would take up to 2 months. In my response to reviewer's comments, I expected it would take 3-6 months. I am satisfied with the amount of work I was able to accomplish in 3 months, but due to logistical and funding constraints, I was not able to stay in Belize for over 3 months. However, the data collected during that time will likely be used for multiple studies.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
1 Garmin GPS	185		-185	My PI (Dr. John Bruno) covered the cost of this expense with an NSF grant.
2 tablets with cases	375	375		No difference as I paid for 2 tablets with the RSG and Dr. Bruno paid for 2 tablets with his NSF grant.
Vehicle fuel	1880	200	-1680	Because it was safer and more cost-effective for me and my team to travel using in-country public transportation rather than have me rent and drive a car, the only costs for this expense were for boat fuel for our day trip to Punta Negra.
Vehicle rental	1880		-1880	As mentioned above, it was safer and more cost-effective for me not to rent and drive a vehicle, but rather pay for local public transportation to get my team around Southern Belize.
Roundtrip domestic airfare within Belize	200	385	+185	I ended up taking more domestic flights within Belize (between Belize City, Punta Gorda, Placencia, and Dangriga) than initially planned.
Roundtrip international flights to Belize City with 2 checked bags	480	557	+77	International flights were slightly more expensive than I anticipated.
In-country public transportation (taxis, buses, boat rental with captain)		762	+762	Because I did not rent and drive a car around Southern Belize, I could afford more cost-effective methods of transportation for myself and my team. This also enabled me to build relationships with
International shipping		155	155	I shipped one large box of supplies between Belize and the United States.
Permits		200	200	This cost covers research

				permits from the Belize Fisheries Department and the National Institute of Culture and History.
Lodging and food		2366	+2366	Lodging and food were particularly expensive for this project because my team travelled to several tourist destinations and several remote locations. I also prioritized safe and comfortable options for us as we spent 2-9 days in each location.
Total	5000	5000		

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

One of the most important next steps is for me to continue analysing the data, including comparing the 2019 responses with the 2014 pre-implementation data. I am also interested in examining how the responses differ between fisher communities and areas fished. I plan on evaluating the impact of fisher behaviour (number of years fishing, gear types, length of time spent fishing, number of generations of fishers in family, etc.) on the perceptions and socio-economic data collected. I hope to complete the data analysis component by early 2020.

Another important next step is continuing research and the dissemination of project results, as previously mentioned. I hope to apply to additional funds from the Rufford Foundation to continue my work in Belize, especially expanding this project to northern regions.

10. 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?

I have used the Rufford Foundation logo in the following ways related to this project:

- A. In the research poster I will present at the Gulf and Caribbean Fisheries Institute (GCFI) conference in November 2019.
- B. In an academic talk I gave to the Environment, Ecology, and Energy Program (E3P) student seminar series in October 2019.
- C. In an informal guest lecture, I gave to the ENEC 567: Ecological Applications course at the University of North Carolina at Chapel Hill in October 2019.
- D. In the preliminary data presentations that I gave to resource managers at TIDE, SEA, and the Belize Fisheries Department in June 2019.
- E. On my personal research website (www.catherinelalves.com)

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

My team consisted of eight community researchers (**Devane Martinez, Raphael Chee, Allah Nunez, Shamika Martinez from SEA, Gary Zuniga, Shalini Shal, Alejandro Baki, Jr., and James Choc from TIDE**), and three logistical consultants (**Nigel Gomez and Celia Mahung from TIDE, and Denise Garcia from SEA**) from my partner NGOs. The community researchers work for TIDE and SEA on various conservation projects within their communities; often part-time work. Nigel Gomez is the Managed Access coordinator at TIDE while Celia Mahung is the Executive Director at TIDE. Denise Garcia is the Science Director at SEA.

The two teams of community researchers (one team of four from TIDE, and one from SEA) were my field assistants and enumerators. The team from TIDE travelled with me to communities in southern Belize where fishers live who fish in the area co-managed by TIDE (Barranco, Punta Gorda, Punta Negra, and Monkey River). On the other hand, the team from SEA travelled with me to communities where fishers live who use the area co-managed by SEA (Dangriga, Hopkins, Independence, Riversdale, Seine Bight, and Placencia). While in each community, the field assistants helped me gain trust among the fishers and eventually interview willing respondents. It was important to hire and train local community members because it helped me build trust with the fishing communities as well as build capacity at the NGOs.

The three logistical consultants provided me with essential guidance about which communities to visit, how best to integrate with the fishers (telephone, in-person meetings, house visits, etc.), and about travel and lodging advice. Because the logistical consultants are all full-time employees of the NGOs and they built trust with the fishing communities that use the areas the NGOs co-manage, their advice was instrumental to the success of this project.

12. Any other comments?

I want to thank the Rufford Foundation for the financial support to carry out a large component of my PhD dissertation research! The project, and the associated broader impacts, would not have been possible without your support. I have learned a great deal about myself as a scientist, leader, and manager, while also learning more about the country of Belize. Because I travelled to several remote fishing villages in addition to several tourist locations, I was able to see more of the culture and the landscape than I would have if I stayed in one location. The conversations I had with community members and fishers will help contextualise the study, but also provide for meaningful relationships that I will build upon in the future. I look forward to returning to a place I now consider a home away from home to improve fisheries management policies for the fishers of today and tomorrow.