Final Evaluation Report

Your Details	
Full Name	Chiara Lucila Guidino Bruce
Project Title	Participatory risk assessment of humpback whale (*Megaptera novaeangliae*) and leatherback turtle (*Dermochelys coriacea*) bycatch in Northern Peru
Application ID	27741-1
Grant Amount	5000
Email Address	chiara@prodelphinus.org
Date of this Report	

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
Compile primary and secondary data from both publicly accessed online sources and local fishermen interviews to create a spatially explicit (data with known location points on earth) geodatabase of the study area, fisheries activity, and animal sightings			■	Data collection was completed in July- August of 2019 in northern Peru. Data was compiled and organised into a GIS in the following months.
Model species distribution of humpback whales (HBW) and leatherback turtles (LBT) within fishing areas			■	Species distributions for humpbacks were modelled for the whale season months between June - November. Leatherbacks distribution was modelled for December - May.
Apply the open-source Bycatch Risk Assessment (ByRA) toolbox to identify high/med/low bycatch risk sites to the HBW and LBT			■	Map outputs of ByRA showed a continuous risk scale from low to high risk.
Produce risk maps, documentation of methods, and infographics to display ByRA toolbox results that will be made accessible to community members, and local and regional management for bycatch mitigation planning			■	

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

Our greatest unforeseen difficulties were overall communication with scheduling meetings with administrators at one of the fishing ports. There seemed to be withholding of information about our meetings from our contact by a facility administrator due to personal motivations. We were able to tackle this by making do with other locations to facilitate our meeting. A restaurant at the dock was generous enough to allow us to use their space to host a few fishermen for a smaller meeting as well as taking advantage of meeting fishermen on their boats while they worked

on boat upkeep and maintenance. Additional difficulties that arose during the project were recruiting an equal distribution of fishermen who worked with varying gear types. Our final collection of interviews was a majority of fishers who worked with gillnet and longline. Fortunately, these specific gear types were most important for our research goals, but we were not able to acquire a fully representative sample of all fishing gears at the ports. A more obvious unforeseen obstacle was the SARS-COVID19 pandemic. This delayed our final travel dates to the study sites to present our findings. However, we were able to return to the sites and present the results to the fishermen through socially distanced methods. We put up posters at the ports and gave small talks, handed out flyers and t-shirts to fishers, and played the results through a radio on a moto taxi for a day in one of the towns.

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

Identifying key areas high risk for both animal and fishermen.
Humpback whales and leatherback turtles are of high risk for bycatch in northern Peru but specific areas of when and where were previously vaguely known and locally observed, but rarely documented. Using the Bycatch Risk Assessment (ByRA) modeling framework (Hines et al. 2020; Verutes et al. 2020) we combined information gathered from varying sources to elucidate the spatial and temporal high-risk areas for these species (Figure 1, 2).

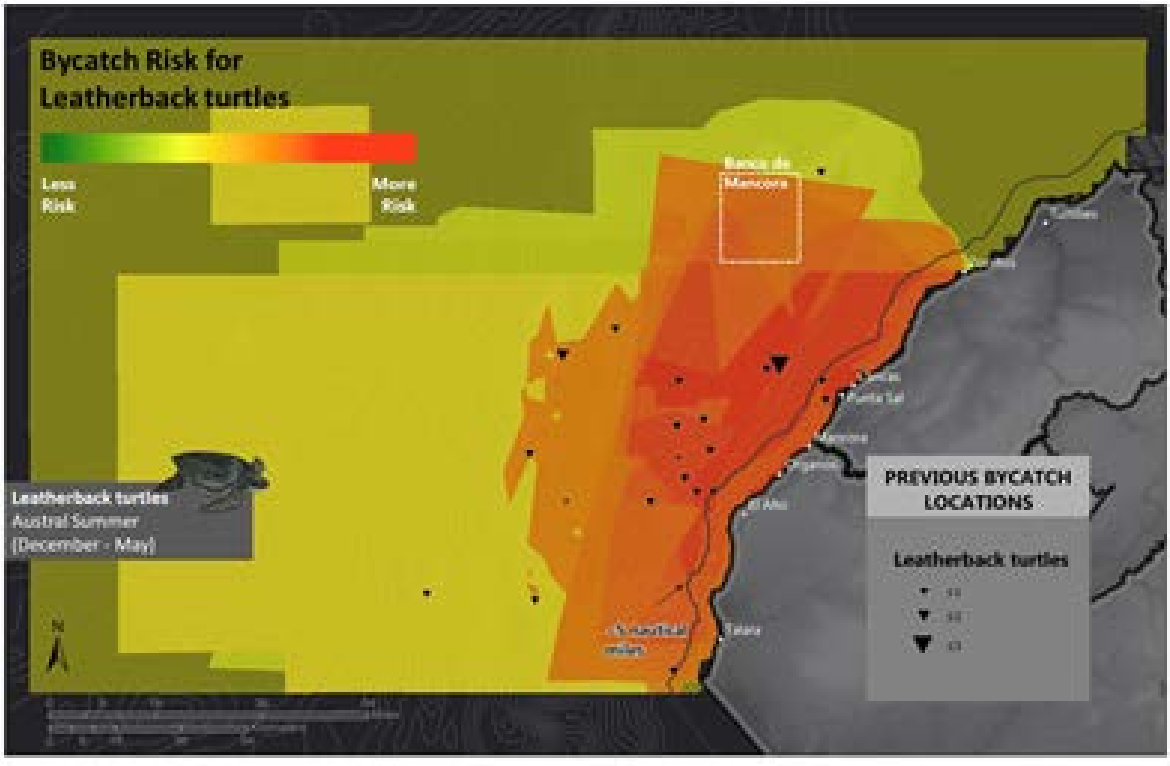

Figure 1: ByRA output showing bycatch risk map for the South Pacific leatherback turtle. Surprisingly from what fishers have reported, leatherbacks have been sighted and caught closer to shore which has been considered atypical for the species. This output is of critical importance for fishers to better interact with the species and guide protection efforts due to the species stark decline.

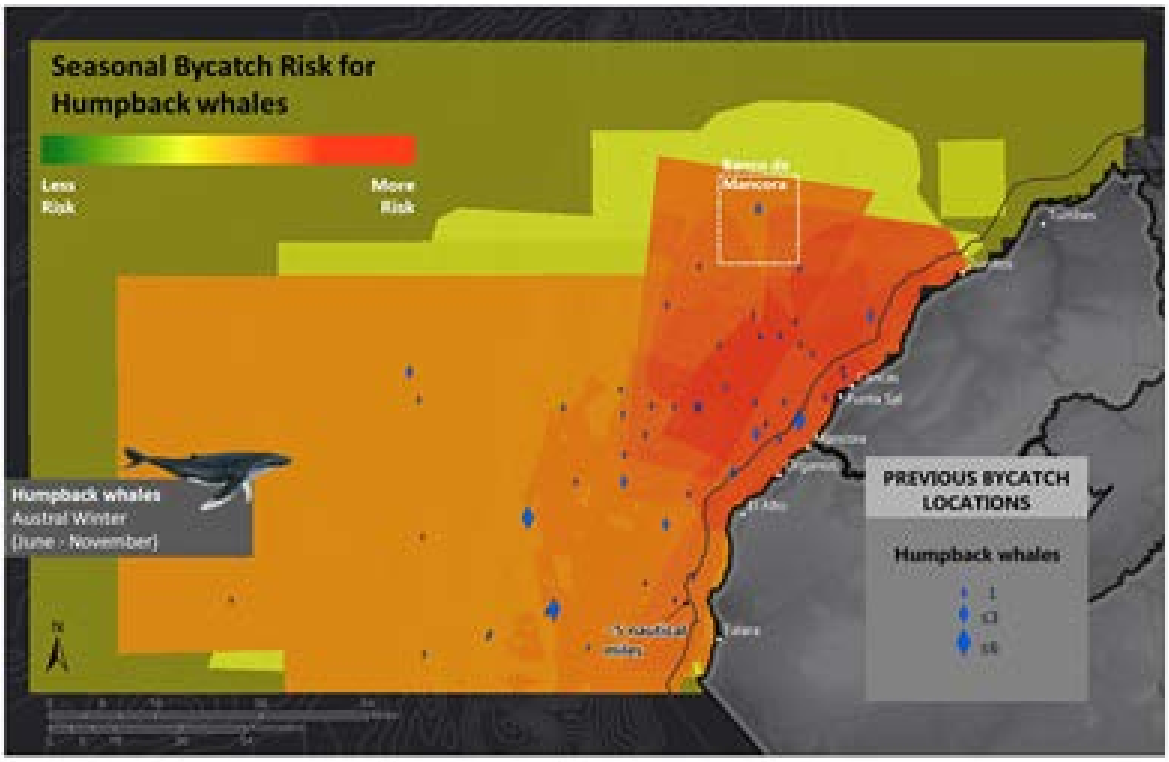

Figure 2: ByRA output showing bycatch risk map for the Southeast humpback whale. It appears on the seasonal bycatch risk map that everywhere is risky, highlighting a higher risk nearer to the coast. This aligns with the migratory route and the higher fishing densities closer to shore.

Inclusion of fishermen in conversation on bycatch and build on their awareness and involvement

With the focus groups we were able to engage fishers and local authorities to give their opinions about bycatch and incorporate their experiences and reviews into the ByRA model (Figure 3).

Location	Month	Attendees
Mancora port	Aug-19	14
Mancora public “Micaela Bastidas”	Aug-19	28
Mancora public “Tupac Amaru”	Aug-19	32
Cancas port	Jan-20	12
Mancora port	Jan-20	9
Cancas port	Aug-20	10
Mancora port	Aug-20	20
Mancora port	Nov-15	5
Total		

Figure 3. Focus group in Mancora.

We also hosted meetings mid research project to collect feedback and edits to the preliminary maps that presented data that would be used in the ByRA model. These meetings helped align the project with the fishers needs and concerns. Instead of our final meetings in the two ports, due to COVID-19 restrictions we manage to talk to fishers in separate groups in the ports in two final trips one in August and the second one in November 2020, explaining the final maps. We handed out t-shirts as a gift for their collaboration in the project (Figure 4).

Figure 4. Final talks with fishers with COVID-19 restrictions. T-shirts handouts.

Identifying gaps in research and ways to improve participatory methods and interview structure.

The greatest gap in research within this area is the lack of consistent bycatch reporting on various marine megafauna species. There are few avenues to communicate bycatch incidents to either government or non-governmental agencies which all currently depend on self-reporting (which is very rare) and on sea inspection from authorities (this also is very rare). This can be difficult due to the

historic uses of by-caught marine mammal and sea turtle meat. Reporting of bycatch is more dependable if a fisheries observer is present on the vessel which seems to happen infrequently and usually for specific research purposes.

In our own research project, we identified four prominent gaps in our study. These were:

1. Not being able to calculate bycatch rate from the format of our interview.
2. Animal sightings and fishing grounds were estimated locations.
    - This could be improved upon with more regular reporting or use of GPS devices.
3. We learned that many fishers had encountered whale entanglements and engaged in detangling the animals.
    - This could have been a valuable layer to add to the risk assessment since this is a dangerous act.
4. We recognised a strong economic perspective that needs further research.
    - We were limited in our practical recommendations for switching to friendly gears or avoiding areas. Gear switches can still be costly and would need help from government to be incentivised. Exploring the cost/benefit of these recommendations would be of strong interest to fishers.

For future research with similar goals and circumstances we would encourage several improvements to the participatory methods but also reaffirm some experiences that worked well.

Improvements to be made:

- It is very important to test the interview with several fishermen multiple times first to make any necessary changes to the format prior to officially collecting data.
- Establish a formalised contact database of fishers who showed further interest in conservation work and mitigation technologies.
- Establish a consistent form of bycatch reporting or communication avenue between the fishers and ProDelphinus.

What worked well:

- Partnering with other scientists that had a diverse set of skills to aid in the different steps of the project.
- Local contacts and connections at each port were pivotal to our research team's ability to reach as many fishers as we did for interviews.
- Our questionnaire contained questions at the end for the interviewer to gauge level of confidence of the answers from the participant. This quick poll helped filter out unreliable data.

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

Our project involved a few local government officials (IMARPE), and 85 local fishermen from three ports (Mancora = 53, Cancas= 30, Los Organos = 2). Several fishermen played a key role in organising other fishermen for interviews, introducing

our team of researchers to fishermen and helping translate interviews to team. These individuals may have benefitted from the project by growing awareness on bycatch, having their knowledge translated to maps for personal use, creating new alliances with other fishermen, and starting more organised conversations on bycatch mitigation and fisheries management. We organised three workshops (Mancora =2 and Cancas =1) with fishers, and two presentations and activities with children in publics schools. Here members of the communities learned about marine life conservation, and what they could do to lessen their impact (Figure 5).

Figure 5. Activities with children in public schools in Mancora, interviews with fishers, meeting and focus group including local authorities.

5. Are there any plans to continue this work?

There are plans to continue using the Bycatch Risk Assessment framework in other areas of Peru for other fisheries and other taxa along the coast. There has been and will be continued collaboration with fishermen from these ports for other fisheries management projects within ProDelphinus. Also, as we reinforced our idea after talking to fishers, that humpback whale bycatch is important in this area. We want to continue working on trying to mitigate further entanglements of humpbacks and another marine megafauna. Also, it would be helpful to generate more maps based on information from different ports, (e.g., Zorritos) that also have an important number of fishing boats using gillnets.

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

We shared the results of our work through several competitions, an international conference, and are currently working on a scientific publication. Our research project competed at the California State University Research Competition and placed as a top competitor at San Francisco State University whose presentation

was made available for public viewing via YouTube. We also presented the research and results virtually at the International Marine Conservation Congress Conference in August 2020. There was an article published in a local Peruvian newspaper *El Tiempo, El Diario de Piura* describing the project goals and results which can be publicly viewed (https://eltiempo.pe/piura-ballenas-jorobadas-mp/?fbclid=IwAR0_CHfW2uJ3iLV6pWxbyOlEPboRw6Fpy1HMPqmFQ3KMQ6mKWpO2I7qtl2Y). This was shared to the fishers through Facebook, Instagram and phone messages. An additional side project was created that illustrated fisher stories and animal maps via an ESRI Story Map that can be publicly viewed (https://arcg.is/00Liqn) and has been shared to several classrooms in the United States to support lessons on human relations with the environment. This website was shared through Pro Delphinus' social media pages and among other team members' personal accounts.

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 issued from May 2019 till May 2020. Due to unprecedented travel restrictions to complete our final meeting, brought by COVID-19, the project continued longer than anticipated, until December 2020.

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
Field site Accommodations				
ProDelphinus local staff	647	2310	+1663	Details: 7 trips, 2 team members, duration of 2 months and one week.
Travel and lodging x2	2246	647	-1599	Details: 2 trips, 3 team members, duration of two weeks.
Travel				
International travel	624	618	-6	Details: due to COVID-19 restrictions the international travel couldn't be done, so we made t-shirts as a thank you gift for fishers that participated in the interviews and final meetings (figure 9).
Local travel to Talara	780	763	-17	Details: Considering 8 plane round trip tickets
Urban transportation (cancas - mancora)	235	191	-44	

Supplies				
Workshop material, facility rentals, flyers, snacks	234	220	-14	Details: coffee break for meetings and messages played in radio and rental of moto-taxi to play message of the project results to communities in the two ports.
Stationary, printing, copies, internet credit, SIM cards	78	83	+5	
Printing material for final presentations on conservation and bycatch to village councils and schools	156	125	-31	Details: printing of maps that were handed out in the port and also posted on the walls in the two piers and materials for the school presentations.
Total	**5000**	**4957**	**-43**	

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

The most important next steps are continued outreach with fishermen in the area and inclusion of fishermen in bycatch reduction mitigation strategies. Identifying key fishermen to contribute to this work and leadership will be crucial in establishing greater participation and adaptation of any new regulations of use of mitigation gear.

We have realised there is a significant lack of information on whale and leatherback turtle bycatch in Peru. Fishers are commonly damaging or losing their fishing gear as humpback whales get entangled in gillnets which is experienced by almost every gillnet boat in Mancora every year. There are strong concerns among fishers for whale entanglements as replacing and repairing their gear each whale season is a substantial financial burden (i.e., $500 per pane, they use approximately 43 panes per boat). Reduction mitigation strategies are urgently needed in this area to levitate risk to both marine biological health and fishers' livelihoods. Additionally, it will be very important in our next steps to more accurately define bycatch rates and calculate overall numbers of whales and leatherbacks killed as bycatch each year.

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?

The Rufford Foundation logo was used on all PowerPoint presentations, informational flyers, map documents and on the poster presentations. The Rufford logo was used during the five presentations we organised for fisher workshops,and with students in the public schools of Mancora. For each of these presentations, the Rufford logo was included on the slides. We also printed and donated the informational flyers which give credits to Rufford (Figure 7).

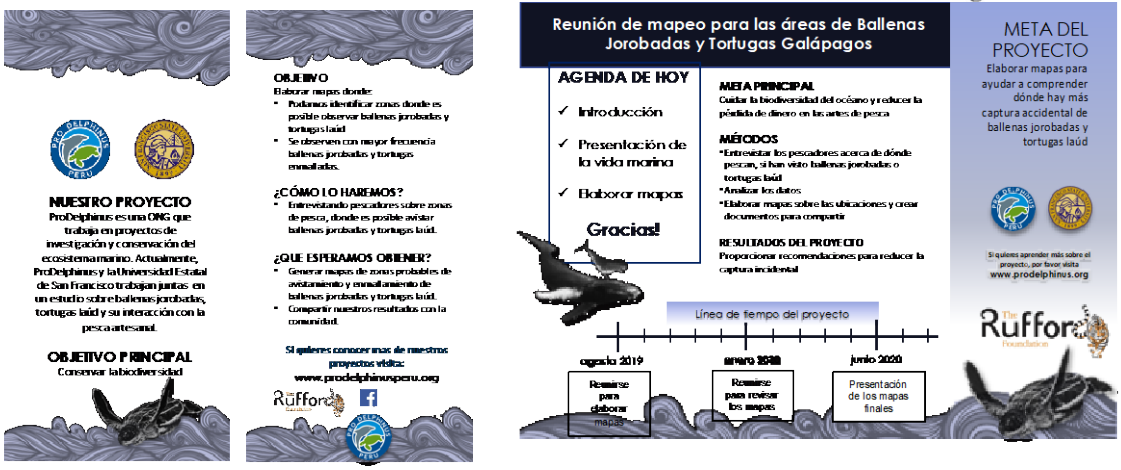

Figure 6. Flyers designed and printed for our project

Figure 7. Example of printed final brochures showing risk maps and recommendations for each species

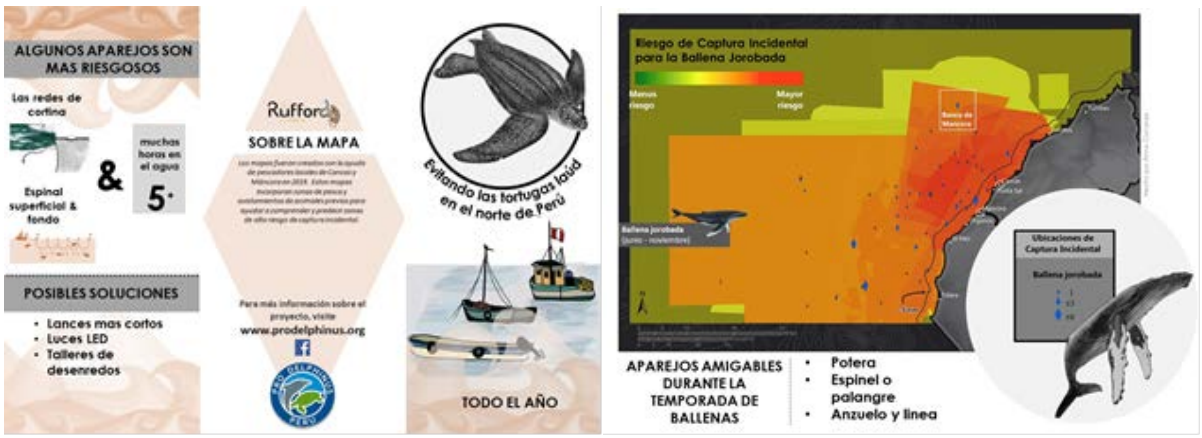

Figure 8. Final brochures showing risk maps and recommendations for each species

Figure 9. Calendar and T-shirts, we designed and printed as a "thank you" gift to the fisher's participation.

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

Chiara Guidino Bruce

- Trips logistics and project supervision.
- Lead logistics with fishermen (i.e., called fishermen, arranged meetings) conducted interviews and presentations, presented results and lead final trip

Anna Costanza

- Conducted interviews, inputted interview data and participatory map data into GIS, analyzed GIS data, conducted species distribution models and ran ByRA

Joanna Alfaro

- Conducted interviews and helped in the meetings with fishers.

Jeff Mangel

- Offered expert opinions on risk of gear to species for ByRA ratings

Ellen Hines

- Developed project goals and theory, offered technical assistance to ByRA model process

Clara Ortiz

- Conducted interviews

Field assistants that oversaw assisting in field activities:

- Kelly Diaz
- Adriana Gonzales
- Elizabeth Campbell
- Carlos Belupu
- Daniela Thorne

12. Any other comments?

We are very thankful to The Rufford Foundation for providing us with this grant to start working with understanding humpback whales and leatherback turtles bycatch in northern Peru.