

Final Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF format**. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please DO NOT fill in and submit this form until the project has been completed.

Complete the form in English. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Simon Gartenstein
Project Title	Effects of fisheries management and habitat complexity on size structure and function of marine communities in kelp forests of south-central Chile
Application ID	36364-2
Date of this Report	29 May 2024

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
1. Fieldwork			✓	<p>12 dive trips (48 transects) were completed during the project period (June 2022 to May 2024).</p> <p>Exploration of new kelp forests. We now have seven sites where baseline data is being collected (fish, invertebrates, marine mammals, sessile taxa, and habitat characteristics).</p> <p>We now have further evidence (e.g. observations of large swarms of krill) that show the kelp forests as nursery habitats for the redspotted catshark and marine mammal species.</p>
2. Measuring habitat complexity of kelp forests			✓	<p>Estimation of kelp forest maturity, canopy cover, density, number of stipes, and plant height was successfully completed.</p>
3. Marine mammal sightings			✓	<p>The presence/absence of marine mammal species was recorded. Large numbers of marine mammal species were recorded during the monitoring period, especially whales (blue whales and humpbacks). During dives we noted large swarms of krill and fish larvae, providing evidence that the kelp forests are productive and maybe important nursery habitat for marine mammal species.</p>
4. Laboratory (ID of		✓		<p>Some algae, fish and invertebrate</p>

species from fieldwork)				species were successfully identified in the laboratory of the university. However, as most species were identified in the field this task was mostly not required.
5. Modelling of fish community size-structure			✓	This was done as part of this project, and my PhD. The results of the modelling were used in three scientific manuscripts (see section 2 below).
6. Data management and statistical analyses			✓	All data has been archived and/or analysed for my PhD, scientific publications and The Nature Conservancy (TNC) deliverables. A 4-year summary of results was presented to TNC on 16 May 2024.
7. Conferences		✓		<i>Presenter:</i> XLI Congreso de Ciencias del Mar (Concepción, May 2022). <i>Title:</i> Effects of ecological subsidies and management on size spectra of reef fish communities. As I only presented in 1 conference, I believe this task was only partially achieved.

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

a). Three scientific manuscripts have been produced as part of my PhD thesis. The Rufford Foundation has been acknowledged in all three papers. One paper is published and two are in revision. See below.

1. Gartenstein, S, A. Pérez-Matus, F. J. Heather, N. Godoy, F. Torres-Cañete, A. M. Catalán, and N. Valdivia. 2024. The Limited effects of management and ecological subsidies on the size spectra of kelp forest fish communities. *Marine Ecology Progress Series*. 732: 135-147 (**published**).
2. Gartenstein, S, E. Fica, A. Pérez-Matus, N. Godoy, F. Torres-Cañete, and N. Valdivia. 2024. Natural diet of *Prolatilus jugularis* inhabiting *Lessonia*

trabeculata kelp forests of south-central Chile. Latin American Journal of Aquatic Research (**in second stage of review process**).

3. Gartenstein, S, E. Fica, O. Villalobos, A. Pérez-Matus, N. Godoy, F. Torres-Cañete, and N. Valdivia. 2024. Limited oceanographic Influence on Reef Fish Size Spectra along the Southeastern Pacific. Journal of Biogeography (**preparing for submission**).

b). Successful delivery of TNC contract (No. 0142-2022) on the 16 May 2024. TNC were happy with our work and want to renew my contract. A presentation summarising results from the 4-year collaboration with TNC and The Rufford Foundation was delivered on the 16 May 2024. We now have a large baseline dataset, and large number of photos and videos.

c). We have highlighted the kelp forests as being high priority habitat for the redspotted catshark, and marine mammals. This has generated interest from TNC, and a new contract is currently being drafted to further investigate these findings, along with other research and stakeholder engagement activities. TNC recognises the importance of our research, which provides evidence that the kelp forest ecosystem is worthy of conservation, especially since harvesting in the kelp forests of south-central Chile may become a reality in the future.

Findings of extended redspotted catshark habitat has also resulted in the commencement of a PhD project from the Pontificia Universidad Católica de Chile (Research group: Subelab).

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

We encountered some challenges during the project. On the 25 August 2023 (approx. 11 months after fund money was transferred), photographic equipment and other dive equipment was stolen from my house in preparation to do fieldwork. Based on this, and because of long periods of poor weather, I asked for an extension to take advantage of the summer to do fieldwork (Dec 2023 – March 2024). This request was agreed by Simon Mickleburgh in an email on the 5 September 2023. A second extension was granted by Jane Raymond (19 March 2024), to deliver the final Rufford report at the end of May 2024. This coincided with the finishing of TNC contract, and to allow for the completion of two PhDs (Eliseo Fica and myself).

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

We had consistent dialogue with the local fishing communities during fieldwork as we were given permission to use their boat launching facilities. We have been able to share some of our key research findings with them, which they appreciate and have assured us that they will consider when working along the coast. We have been able to share information about the location of high priority habitats, e.g. shark breeding areas, that should be avoided during fishing activities. We have also been able to provide reasons for the large number of marine mammal sightings during the project period (e.g., probably due to the large abundances of krill observed in the kelp forest). Further work with local communities has been highlighted as priority by TNC and they have assured me, that it will be part of the next work contract, which is in draft.

5. Are there any plans to continue this work?

Yes, a new contract is currently being drafted with TNC so that research can continue in the Valdivian Coastal Reserve. Research will involve continuing dive monitoring at fixed sites, and greater collaboration with the fishing community, which will include presenting our results, and the delivery of updated posters and photos of selected species.

In addition, I am drafting a postdoc to follow up some of the recommendations from my PhD thesis. This work will take place in collaboration with TNC and the Universidad Austral de Chile in the Valdivian Coastal Reserve.

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

As we have approximately 4 years of data, we are now in a stronger position to communicate our results in the following ways:

- Presentations to local fishing communities, and other environmental or conservation groups.
- Work collaboratively with research groups from other universities (e.g. Universidad de Antofagasta and the Pontificia Universidad Católica de Chile).
- Continue presenting at conferences and producing scientific publications in collaboration with TNC and academic community.

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

Building on the outcomes of my PhD and results of the project, it is important to understand more about the migratory patterns of fish, and where they feed. This is still mostly unknown. This will assist in the development of more sustainable fishing

practices, and a legalised conservation status for some species, which at this point does exist for any species due to the deficiency of data.

Investigate the importance of kelp forests as habitat for biodiversity, which will involve analysing biodiversity data with data on habitat complexity. This will be a task in the new contract with TNC.

Further contact with local fishing communities. Although we engaged on numerous occasions during fieldwork, we need to communicate in greater detail about our results. TNC have acknowledged that this part of the project requires more action and will form a major part of the next project. Up until now, research and fieldwork has been the focus.

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 all my public presentations at the university, conference, TNC presentations, academic manuscripts, and in the instagram account of the laboratory from the Universidad Austral de Chile (see Lab Ecologia Litoral).

I was also interviewed by the University as part of the doctoral programme, where I took the opportunity to promote The Rufford Foundation and our work in the kelp forests (see www.postgradociencias.uach.cl/doctoradoenbiologiamarina/).

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

Universidad Austral de Chile

Dr. Nelson Valdivia (Statistics and approvals of Rufford budget)

Dr. Eliseo Fica (Diver and logistics)

Diego Morales (Diver)

Vicente Villalobos (Diver)

University of Tasmania

Dr Freddie Heather (Statistics)

Huiro fishing community/Dive school (Valdivian Coastal Reserve)

Vuelvo al Oceano (Boat and dive tank rentals)

David Carcamo (President of fishing community)

10. Any other comments?

Besides being a challenging 2 years, we were able to successfully deliver the project, with many positive outcomes. As we will be coming up to our 5th year of research in the Valdivian Coastal Reserve, we still have a lot to do and achieve, to meet our vision for the conservation of kelp forests in this relatively unexplored part of Chile.

I would like to thank you for your support and hope we can continue working together.