

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	Lourdes Martinez Estevez
<b>Project Title</b>	Hawksbill Tortoiseshell fishery and conservation in the Gulf of California, Mexico
<b>Application ID</b>	38403-2
<b>Date of this Report</b>	November 27, 2023

**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
Reconstruct general trends in hawksbill fishery in the southwest Gulf of California.				We did formal and informal interviews with old and young fishers to document the relationship with hawksbill turtles in the past and today. According to old fishers, hawksbill capture and trade was fortuitous, so it was difficult to get substantial information on how it happened. We also documented the difference in size of hawksbill turtles seen today compared to 40 years ago, as well as the abundance of individuals and current threats. We want to interview more fishers to have representative information of the region.
Determine hawksbill presence in capture locations from the hawksbill fishery data and expand our knowledge on hawksbill movements in the southwest Gulf of California.				Six hawksbill turtle surveys were carried out in four locations along the south of the Baja California peninsula and islands. In total, 30 hawksbill turtles were captured, measured and photographed for the regional photo-identification archive. We found individuals captured for the first time in 2016. Two satellite transmitters were attached to two adult females to track their movements. One of them has sent 8,727 messages and transmitted for 354 days. The other one has transmitted for a total of 132 days and a total of 6,063 messages have been received. Both individuals have remained in rocky reef and mangrove habitats.
Determine the demographic connectivity of traded individuals.				We successfully got tissue samples from 74 individual hawksbill turtles, ranging in weight from 3.8 to 74 kg. Of them, 13 samples belonged to stuffed individuals traded in the late 1980s. Currently, we have 61 amplified sequences. In the next few weeks, we'll complete the editing of sequences

				and start the calculations of haplotype diversity, genetic structure, statistical analyses, and comparisons with previously reported control region haplotypes available from GenBank based on previous studies.
Proposing hawksbill conservation strategies in collaboration with local fishers.				<p>From the interviews, we identified nets as an important threat for hawksbill turtles and other coastal species. We conducted a workshop on ghost nets, and we had representatives of fishing communities, non-profits, government agencies and the touristic sector. Workshop participants identified sites with ghost nets along the coast of Baja California Sur, both in the Gulf and the Pacific, as well as around the islands. Among the identified sites, 15 were categorised as sites with historical presence and 43 sites with current presence of ghost nets.</p> <p>We did a FODA analysis to identify strengths, opportunities, difficulties and threats to tackle this problem. We also addressed the good practices in the management of ghost nets, detailing the official procedure for reporting them and the conditions under which they can be removed.</p>

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

- a) Identification of juveniles in coastal habitats along the Baja California Peninsula that used to be sites of hawksbill captures 50 years ago.
- b) Identification of ghost nests on islands and coastal habitats along the peninsula that are also hawksbill sites.
- c) Successful PCR amplifications from 61 fresh tissue samples of hawksbill sea turtle individuals with Sanger Sequencing in both forward and reverse directions. Most of the fresh samples produced sequencing results of high quality that were assembled into configs to create a consensus sequence, while currently some sequences are being curated by eye to create consensus. Once the editing of the final sequences is completed in the next few weeks, we will start the calculations of haplotype diversity, genetic structure and statistical analyses and comparisons with previously reported control region haplotypes available from GenBank based on previous studies.

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

- Bad weather conditions affected some of the fieldwork activities, so we tried to get information from fishers at their houses in La Paz city instead of in the field sites.
- Getting information about the hawksbill sea turtle fishery for two reasons: 1. most of the fishers that used to catch hawksbill turtles have passed away, so it was hard to find people that know from direct experience how things happened 50 years ago or more, and 2. the trade was fortuitous due to the low abundance of individuals with respect to other species like green turtles, so there was not much information available. We tried to visit as many fishers as possible to get reliable information.
- None of the tissues from old, traded individuals produced the expected PCR product, even after several attempts modifying the PCR protocol, PCR reagents and DNA volumes used in the reaction. We concluded that while the dry skin under the historic shells from 40-50 years old stuffed animals is a potential source of DNA, the DNA present shows very low quality and quantity related to their age or the effects of the chemicals used during the fixation or preservation process. The presence of only small DNA fragments likely prevents the amplification of large PCR products, and new primers targeting smaller sections of the control region (e.g., 150-250 bp) are needed to try to recover some sequence information from these historical samples. We'll try to redesign the primers and redo the analysis for these samples.

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

Local communities were a key piece in this project. We had conversations with several members of the communities we visited, not only to gather information on the trade but to understand the current situation with their activities and the state of the ocean. We invited people to our monitoring activities and to the work done with captured individuals so they can experience first-hand the scientific work with these animals and why is important to have healthy oceans and these species. We also supported their attendance to the workshop by providing gas so they can travel from their communities to the main city.

**5. Are there any plans to continue this work?**

Yes, I want to finish the genetic analysis and I want to explore the feasibility of redoing the analysis for the traded individuals.

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

The results will be available for the scientific community with a publication in a peer-reviewed journal and with the participation in international and national congresses

and forums. For the public, I want to work on an outreach publication explaining the project, the outcomes, and the potential ways to help protect this species.

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

The important steps are: 1. having the results of the genetic analysis to understand the structure of the population, 2. expanding the analysis to include samples from other locations within the Gulf of California, especially in the continental side and south Mexican Pacific, 3. documenting the current state of ghost nets in the places already identified, and 4. creating awareness to the public and plan strategies to remove the nets wherever possible and specially in sites with highly vulnerable species like sea turtles.

**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?**

I'm planning to use the logo for the outreach materials. Rufford Foundation received publicity in the talks and interviews I did in the communities, and in the workshop. I'll give credit to the foundation in the peer-reviewed publication and in any presentation in international and national forums.

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

**Michelle María Early Capistrán** – Help design the interviews done to local fishers and local communities related to their experience and knowledge about the hawksbill sea turtle uses in the region.

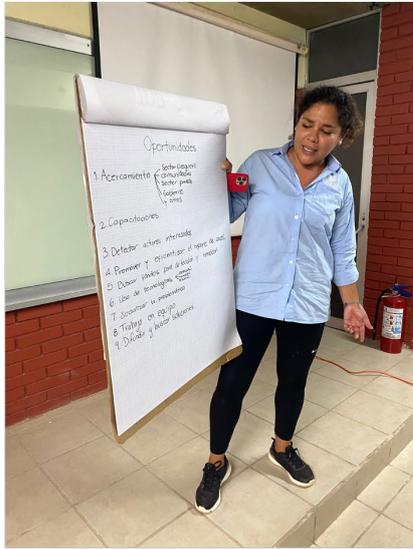
**Amy Hudson Weaver** – Connections with local communities and fishers to develop the interviews.

**Juan Cuevas Amador** – Help conduct the field activities including boat logistic, interviews with old fishers, and capture/release of the turtles.

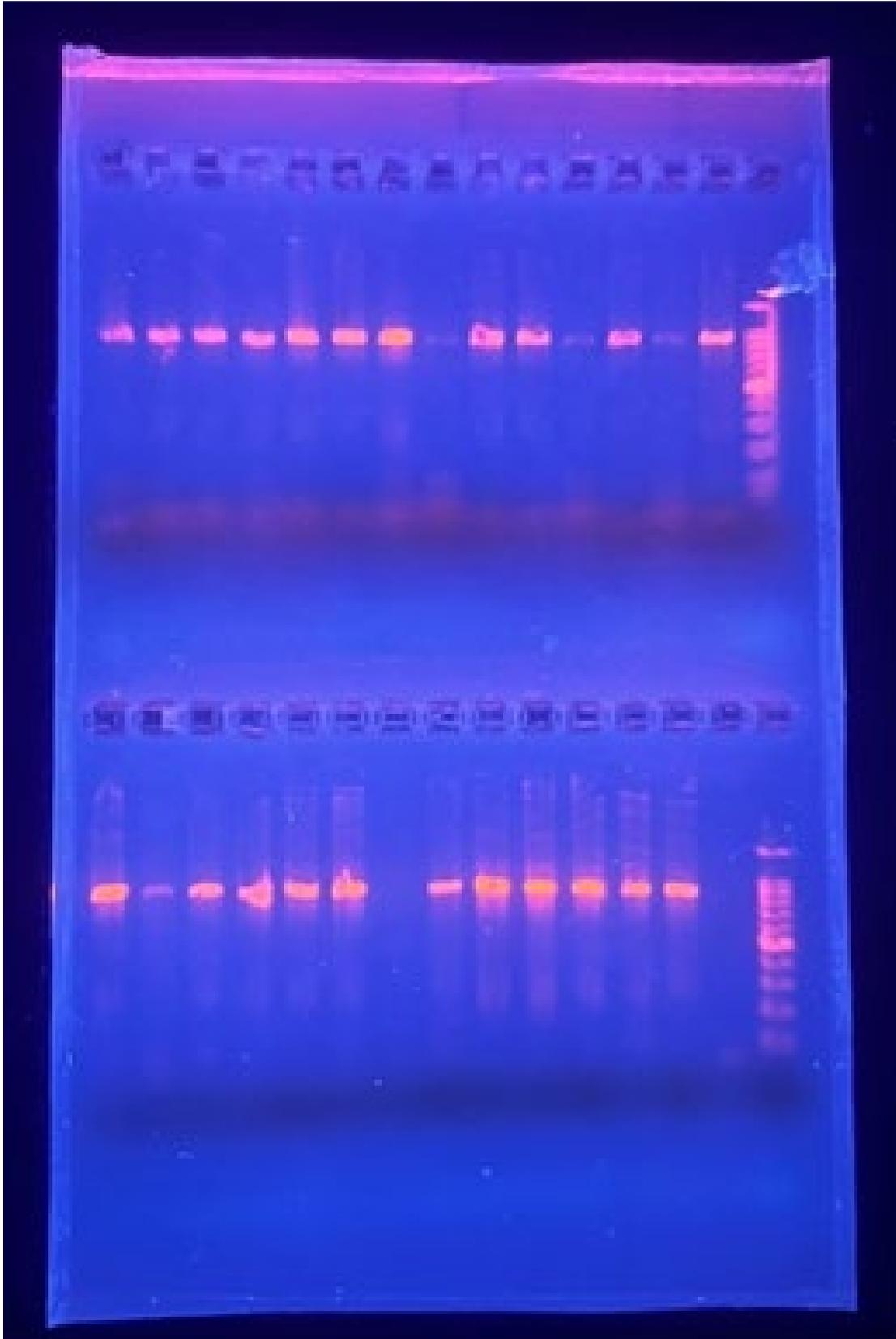
**Felipe Cuevas Amador** - Help conduct the field activities including boat logistic and capture/release of the turtles.

**10. Any other comments?**

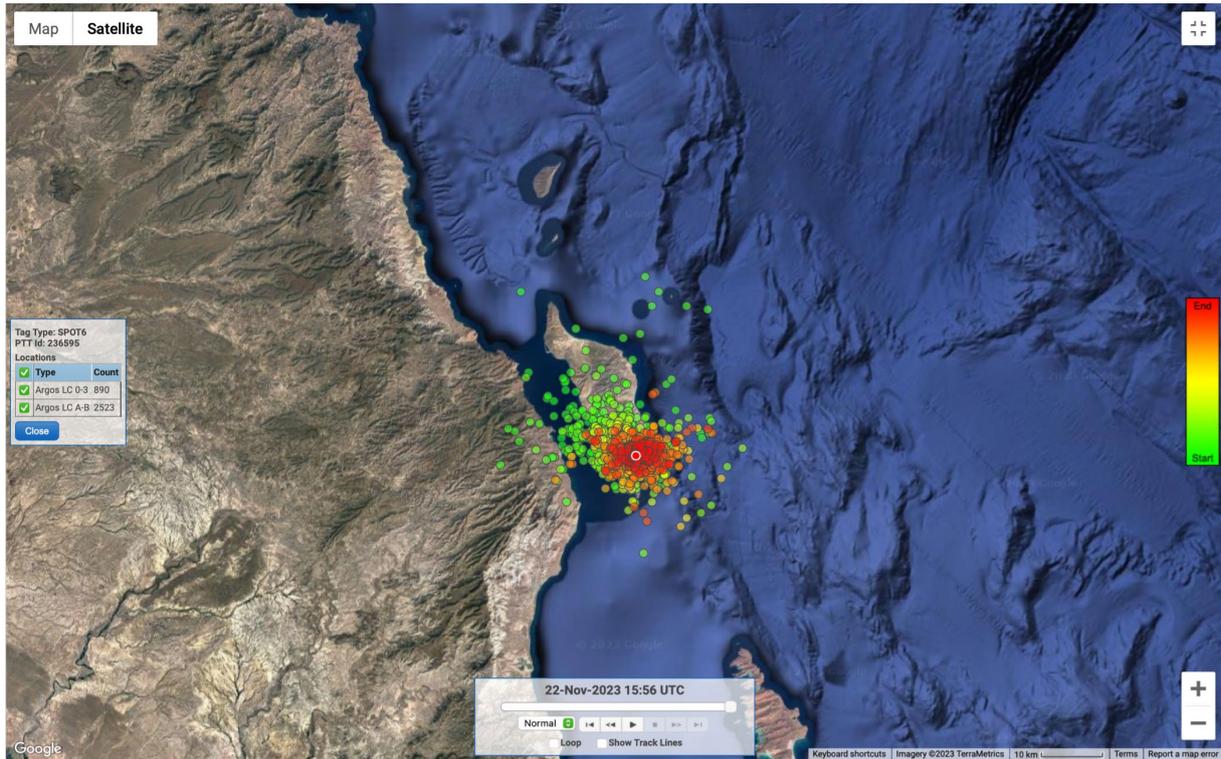
Thank you very much for supporting my research and hawksbill sea turtle conservation in northern Mexico.



Ghost nets workshop in La Paz, Baja California Sur, Mexico.



Agarose gel electrophoresis used to separate hawksbill DNA fragments.



Location points of a female hawksbill sea turtle tagged with a satellite tag in the coastal habitats of Isla San José, Gulf of California Mexico.