

Conservation Status of Craveri's Murrelet in Mexico

Final Report



Grupo de Ecología y Conservación de Islas, A.C.

Moctezuma 836, Centro

Ensenada, B.C. 22800

Tels. 646.1734943 y 1734997

federico.mendez@islas.org.mx

www.islas.org.mx

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3. Full names of author(s): Yuliana Bedolla Guzmán, Alfonso Hernández Ríos, Esmeralda Bravo Hernández and Alejandra Fabila Blanco.
4. Permanent contact address, email and website: Moctezuma 836, Zona Centro, Ensenada, B.C., 22800.
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Project Partners & Collaborators

Laboratory of Ornithology, Cornell University

Training on automatic and non-automatic recording units to record high quality vocalizations of Craveri's Murrelet to be used in social attraction systems, as part of active restoration projects.

National Commission for Protected Areas (CONANP). APFF – Islas del Golfo de California

Permits, field logistical support, part of the at-sea transportation to the islands. Direct participation in the at-sea spotlight surveys.

Prescott College

Fellows from this institution were involved in the monitoring of Craveri's Murrelet at Alcatraz Island. They also provided advice for the planning of the field work on this island.

Enriqueta Velarde, PhD, Universidad Veracruzana

As a pioneer in the study of seabirds from the Gulf of California, and particularly the ones in Rasa Island, she kindly advised us about potential nesting areas and supported the field work on that island.

Slim Foundation

The foundation kindly supported part of the field work in the Midreiff islands, Gulf of California.

Conservation Leadership Programme

Kindly provided training on conservation and financial support for the development of this work.

We are grateful with all the people working on these institutions, for their trust and all the support through the development of this project. It is also important for us to thank everybody at Grupo de Ecología y Conservación de Islas A.C. who supported this endeavor.

Section 1:

Summary (max 200 words)

The Craveri's Murrelet (*Synthliboramphus craveri*) is an endemic seabird to Mexico that is considered endangered. Its population has been affected in the first instance by the presence of invasive mammals in the islands where they breed, this threat has caused the extirpation of some nesting colonies. The lack of updated information on the reproductive status of the species does not allow establishing clear strategies for its conservation. In this project, both the reproductive status of the species and the presence of its main threat were updated on nine islands of the Gulf of California. Two new nesting locations were recorded for Craveri's Murrelet and a house mouse was recorded on a single island, Alcatraz.

Because the Gulf of California is tourism and productive, it was imperative to identify and consider stakeholders so that conservation measures can be established with permanent and long-term results.

Introduction

The Craveri's Murrelet (CRMU; *Synthliboramphus craveri*) is a Mexican endemic seabird, listed as *Vulnerable* by the IUCN Red List and as under *Risk of extinction* by the federal Mexican Government. Its breeding habitat is restricted to the Gulf of California and the Mexican Pacific Ocean (Figure 1). However, the status of CRMU in the Gulf of California was uncertain, the last records of this species were made decades ago; moreover, in the Gulf of California alien invasive species (AIS) mainly mammals, have remained on many islands causing CRMU colonies extirpation or decimation.

The Gulf of California involve several islands and all of them are Natural Protected Areas (NPA) and although there is no management scheme focused directly on Craveri's Murrelet, there are management and conservation measures that have been implemented throughout its distribution, through the management plans of the different NPA. Some of the most important conservation actions along the breeding habitat of CRMU have been the eradication of invasive mammals (dogs, cats, black rat, house mouse). Now, following these restorations actions, the next assignment should be to update and generate information regarding to the CRMU colonies in order to develop conservation strategies for this species that include the removal of AIS and the development of biosecurity protocols. To achieve these goal, to build a network was fundamental; The National Commission for Natural Protected Areas (CONANP), the Cornell Lab of Ornithology, the Prescott College, the Centre of Scientific Research and Higher Education of Ensenada, the tourism service providers and the local people committed with the birds conservation as "Mujeres con Alas" in Bahía de Los Ángeles, as well as fishermen from Baja California and Sonora became partners during this journey. Together, we updated CRMU breeding status information on the main breeding colonies and generated an Action Plan specific for the conservation of Craveri's Murrelet that also include a feasibility study to examine the possibility to remove AIS from the islands where remain.

During this project, we worked on nine islands Estanque, Partida, Rasa, Las Ánimas and Salsipuedes close to Baja California; San Pedro Mártir, Choyudo, Dátil and Alcatraz close to Sonora. We performed exhaustive research regarding to CRMU (nest, adults captures and vocalizations) as well as outreach talks at local communities about the importance of CRMU and island biosecurity to prevent the introduction of invasive.



Figure 1. Distribution of Craveri's Murrelet

Project members

Yuliana Bedolla Guzmán

PhD. Candidate. Team leader and Seabird Restoration Project Director since 2015. Relevant qualifications: Knowledge in fauna monitoring techniques and seabird species, fieldwork experience, experience leading field expeditions, work with fisherman, logistics, data collection and analysis, reports, proposals and scientific papers writing.

Esmeralda Bravo Hernández

Master in Science. Seabird Restoration Project Coordinator since 2015. Close contact with people in the influence zone, experience manipulating burrowing and surface seabirds, experience in experimental designer and knowledge on population ecology. Almost four years working on islands conducting seabird monitorings including biological sampling, GPS attachment, evaluating population variables, invasive mammals detections, educational activities with fishermen and students.

Alfonso Hernández Ríos

Master in Science. Seabird Restoration Project Coordinator since 2015. Relevant qualifications: Logistics, development of biological hypothesis and objectives, field surveys and sampling techniques, experience on seabirds, reptiles and mammals management, wildlife photography, 8 years of experience on wildlife ecology, outdoors activities and data analysis. Four year of experience with seabirds doing biological sampling, GPS attachment, and social attraction techniques.

Alejandra Fabila Blanco

Master in Science. Seabird Restoration Project Coordinator since 2015. Knowledge in seabird monitoring techniques and seabird species, ability to work on field, teamwork, experience leading field expeditions, logistics. Five years working on seabird monitorings that include biological sampling, bading, GPS attachment, invasive mammals detections, educational activities with fishermen and students.

Section 2:

Aim and objectives

The main aim of this project was to generate an action plan with updated information, biosecurity, conservation and restoration strategies, joint to stakeholder's involvement for future implementation. To build up towards reach the main goal, particular objectives included:

1. Identify and engage the main stakeholders into the implementation of conservation measurements and future biosecurity actions.
2. Update the breeding status of CRMU on nine islands.
3. Assess the presence of alien invasive species (AIS).
4. Assess the feasibility for eradication of AIS

Changes to original project plan

We faced three changes to the original project plan, the causes included climate conditions, phenology of the species and stakeholder engagement:

- a) The original schedule contemplated to carry out the assessment of alien invasive species during February and March. However, the surrounding oceanographic conditions of two islands (Estanque and Partida) forced us to return to mainland before finishing. To overcome this challenge we had to arrange another expedition after a couple of months to complete the assessments of AIS on these islands.
- b) According to the literature, the breeding adults of CRMU start arriving to the islands on January. Therefore, the nests searching activity was planned to be on February and March. Nevertheless, when we carried out our first expedition on the Baja California islands during February we registered that the breeding season was just starting with individuals surrounding the islands during night but hardly a few active nest. To take advantage of this, we recorded vocalizations of individuals at-sea, we assess the presence of AIS on the islands we could (Rasa, Las Ánimas and Salsipuedes) and
- c) The first attempt to convey information to stakeholders, during June, in one of the communities (Bahía de los Ángeles) was cancelled. The meeting with stakeholders was rescheduled and completed. And although just part of them were reached, the links with important actors, as a group of communitarian environmentalist, an NGO and the local government, was made.

Methodology

We worked on nine islands located in the central part of the Gulf of California: Estanque, Rasa, Partida, Las Ánimas, Salsipuedes, San Pedro Mártir, Alcatraz, Dátil and Choyudo.

Objective 1. Identify and engage the main stakeholders into the implementation of conservation measurements and future biosecurity actions.

During the time of our expeditions to the islands we worked on the engagement of the stakeholders on two communities of both sides of the Gulf of California (Bahía de los Angeles, Baja California and Bahía de Kino, Sonora) we shared information about the biology and conservation of Craveri's Murrelet, as well as the threats and biosecurity measurements to prevent the introduction of invasive mammals. We distributed brochures contained proper biosecurity information; bracelets and t-shirts were used to promote interest in local people. We implemented two workshops on each locality (Sonora and Baja California) and also we carry out "on board" outreach activities from our boat to fishermen and touristic boats.



Figure 2. "On board" outreach activities with fishermen from Sonora

Objective 2. Update the breeding status of CRMU on nine islands.

We carried out intensive nests searching that consist on looking for nests in rocky habitat and crevices. Each nest was georeferenced and located in a map. We implemented systematic at-sea monitoring around each island to detect sites where we needed to focus the intensive nest searching and also to count individuals (Whitworth and Carter, 2014).



Figure 3. Nests searching of Craveri's Murrelet

The capture of individuals involved a night-lighting technique for at-sea capture (Whitworth et al. 1997); all individuals were banded, we took body measurements and registered the presence of brood patches. We disposed automatic recording units (Wildlife Acoustics, SM2) on inaccessible places to detect breeding activity; the files obtained were analyzed to look presence/absence of Craveri's Murrelet.



Figure 4. At-sea nocturnal census around the islands

Objective 3. Assess the presence of alien invasive species (AIS).

We followed the specification indicated by Rodríguez-Malagón et al. (2013) to detect mammal invasive species like black/brown rats, house mice and cats. We installed three transects on three different locations/habitats; along these transects we placed 15 stations separated by 20- 30 meters. Each station consisted of one Tomahawk and one Sherman baited traps. Additionally, we installed 10 stations with a bait of sardine and one camera trap on potential sites for feral cats.



Figure 5. Monitoring of invasive mammals

Objective 4. Assess the feasibility for eradication of AIS

We gathered information regarding to the social and economic uses of the islands and identify the stakeholders involved, we assessed the potential pathways for introduction of AIS, as well as key sites for biosecurity stations. We inspect the islands under certain criteria that include geographic aspects of the island (terrain, size and distance from mainland), species richness and cost of the eradication (Malczewski 1999). This information was essential for the development of the Action Plan for the Conservation of Craveri's Murrelet.

Outputs and Results

Objective 1. Identify and engage the main stakeholders into the implementation of conservation measurements and future biosecurity actions.

We designed outreach material specialized on Craveri's Murrelet Conservation theme. This material included 125 T-shirt, 700 stickers and 600 field guides for seabird identification (300 english, 300 spanish) and all of this was distributed during the workshops, meetings or during the outreach activities "on board" (14 boats).

Table 1. Stakeholders involved in the workshops and outreach activities.

State	Sector
Sonora and Baja California	Fishermen
	Academic researcher
	Park rangers
	Tourists

Objective 2. Update the breeding status of CRMU on nine islands.

The recent expeditions to the Gulf of California brought relevant information, we achieved to update the breeding status of Craveri's Murrelet on nine islands. This represented new data since 30 or 40 years.

The information was gathered through two main activities nest searching and nocturnal census at-sea.

Table 2. Updated information regarding to Craveri's Murrelet breeding habitat during 2018.

Island	CRMU previous status	Nest searching	Nocturnal census (individuals)
Estanque	1962	Breeding. 12 nests	79
Rasa	2010 ^x	Breeding. 7 nests	36
Partida	2017	Breeding. 14 nests	87
Las Ánimas	1974	Breeding. 3 nests	67
Salsipuedes	No previous register	¹ Breeding. 27 nests	74
San Pedro Mártir	2017 ^x	Breeding. 16 nests	70
Alcatraz	2017	Breeding. 14 nests	10
Cholludo	No previous register	¹ Breeding. 1 nest	1

^xextirpated colonies, the years refers to the first register after eradication. ¹New breeding location

The nocturnal census at-sea helped us to identify potential breeding sites to focus searching efforts. We generated a density map for each island.

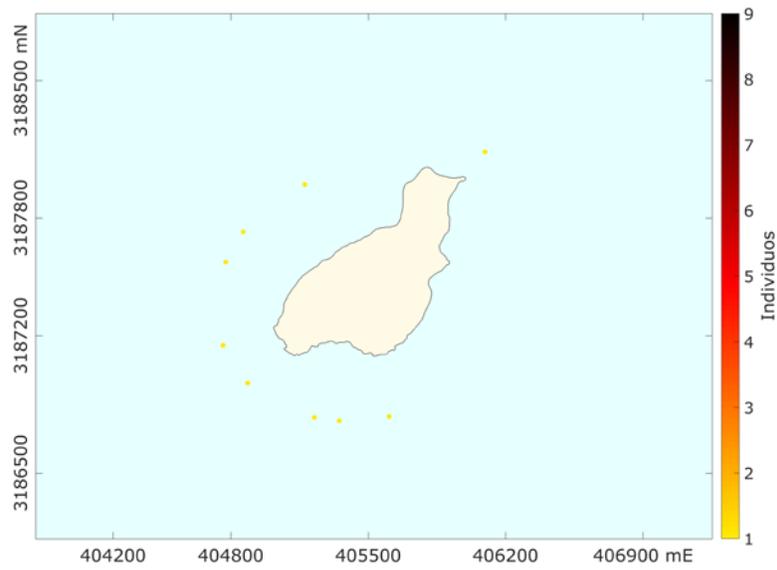


Figure 6. At-sea nocturnal census at Alcatraz Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

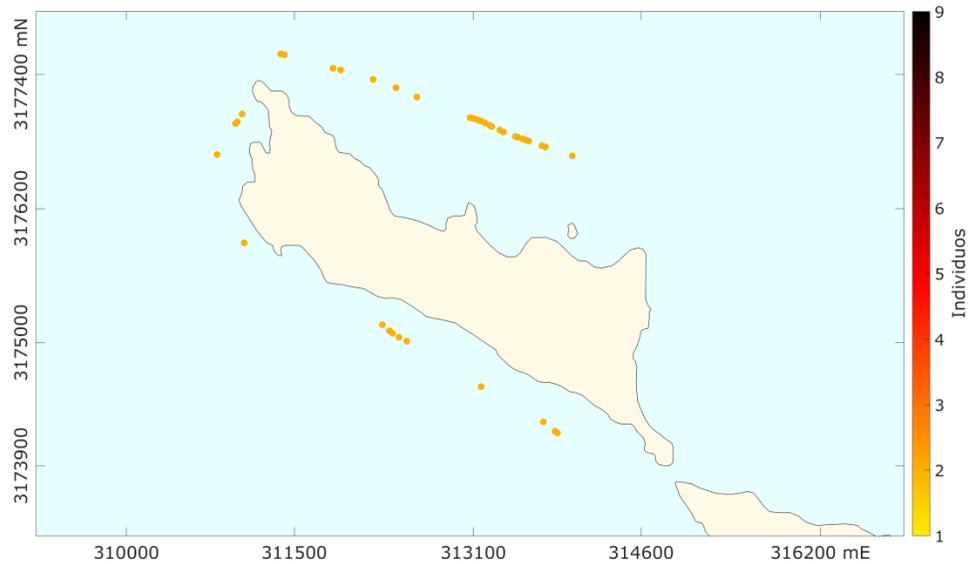


Figure 7. At-sea nocturnal census at Las Ánimas Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

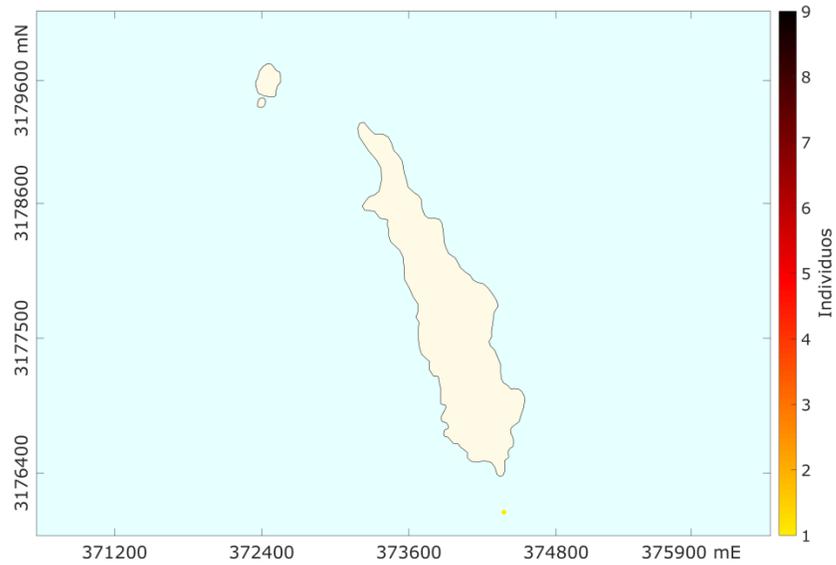


Figure 8. At-sea nocturnal census at Dátíl and Cholludo islands during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

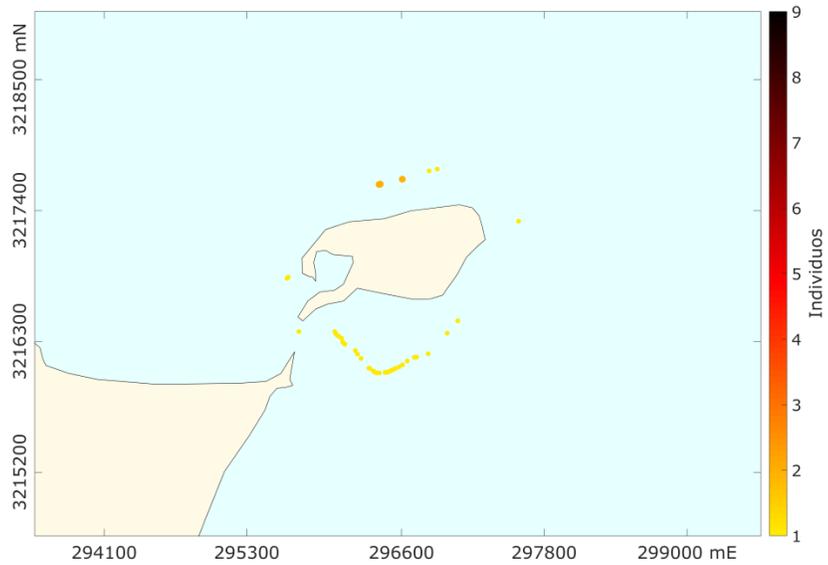


Figure 9. At-sea nocturnal census at Estanque Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

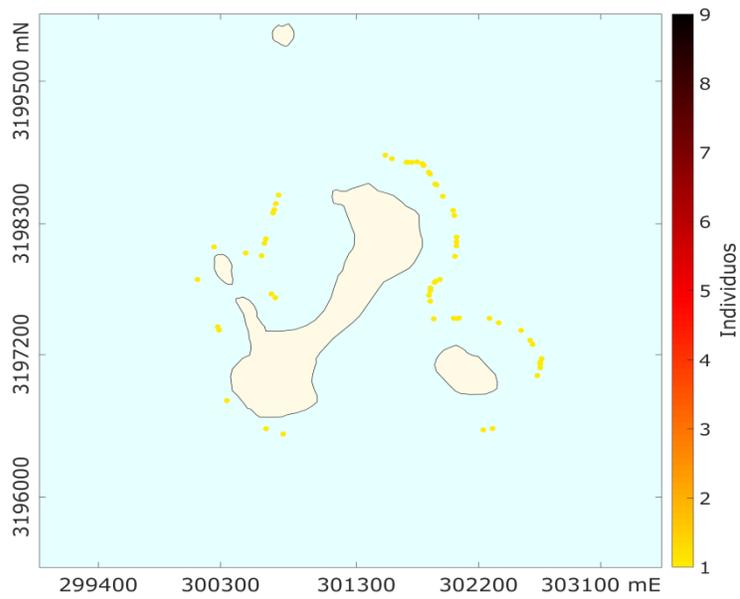


Figure 10. At-sea nocturnal census at Partida Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

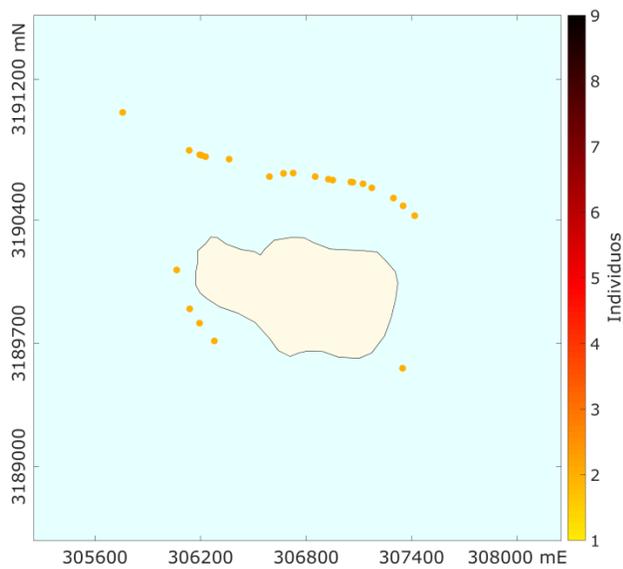


Figure 11. At-sea nocturnal census at Rasa Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

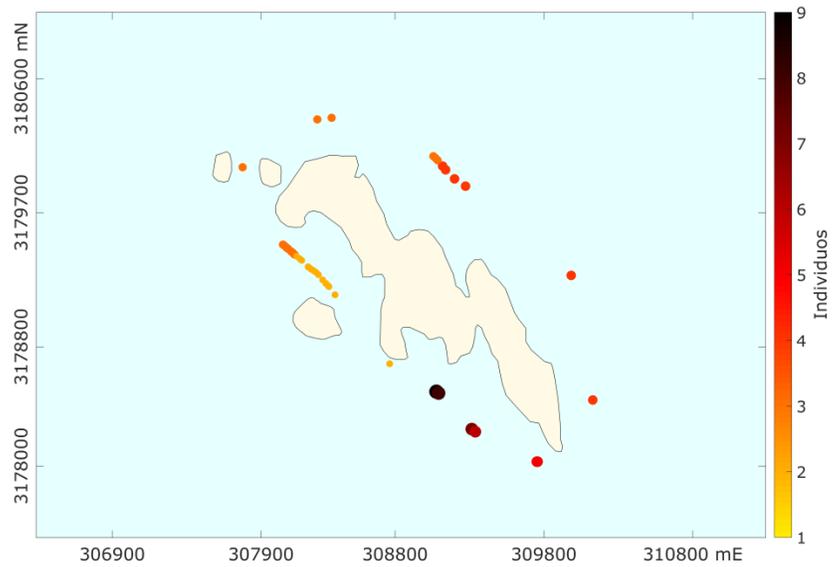


Figure 12. At-sea nocturnal census at Salsipuedes Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

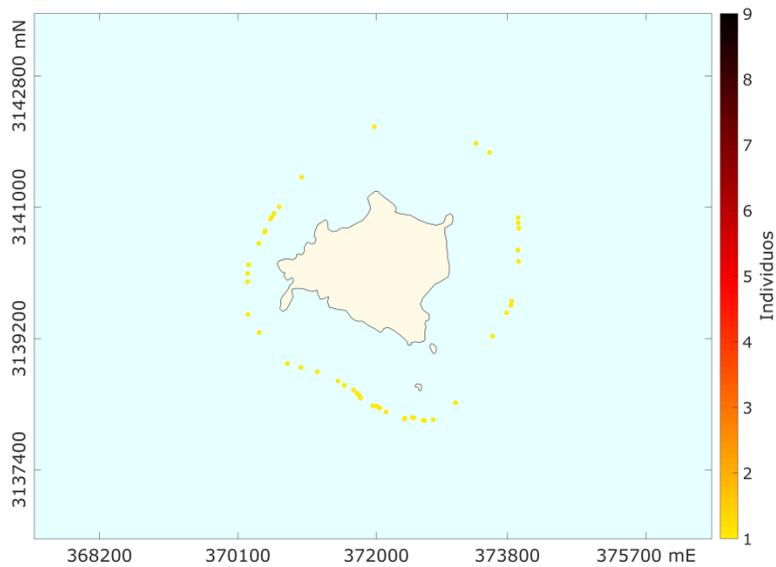


Figure 13. At-sea nocturnal census at San Pedro Mártir Island during 2018. The warmer is the color the highest is the number of sightings of Craveri's Murrelet registered.

Objective 3. Assess the presence of alien invasive species (AIS).

During the evaluation of the presence of invasive mammals the quantity of trap transects depended on the size of the island. Using camera traps with attractive bait we did not detect any feral cat on these islands

Table 3. Monitoring effort to detect invasive mammals on the islands.

Island	Quantity of transects	Traps Camera station	Invasive species detected
Estanque	3	2	None
Rasa	1	0	None
Partida	3	2	None
Las Ánimas	2	1	None
Salsipuedes	3	2	None
San Pedro Mártir	3	2	None
Alcátraz	1	0	House mice
Dátil and Cholludo	2 (one on each island)	0	None

Objective 4. Assess the feasibility for eradication of AIS

During the expeditions we made observations regarding to the main threats for Craveri's Murrelet. We classified these threats (table 4) and found out the presence of invasive mammals are the highest threat.

The evaluation of the current and potential threats for Craveri's Murrelet was carried out through the threat classification method of "WWF Standards of Project & Program Management". This method considers three criteria: scope, severity and irreversibility. The scope refers to the proportion of the global population that is likely to be affected within 10 years under current conditions. The severity measures the degree of reduction of the population of the species in the period of time specified in the scope. Irreversibility refers to the degree to which the effects of a given threat can be reversed and the affected population can be restored.

Table 4. Classification of current and potential threats for Craveri's Murrelet

Threat	Scope	Severity	Irreversibility	*Total	Classification
<i>Invasive alien mammals</i>	3	4	2	16	Very High
<i>Risk of introduction of invasive alien mammals</i>	2	4	2	14	High
<i>Native predators</i>	2	2	1	9	Low
<i>Solid waste</i>	2	1	3	9	Low
<i>Light pollution</i>	2	3	2	12	Medium
<i>Oil spill</i>	1	4	2	12	Medium

Therefore, the eradication of invasive mammals is a priority for the conservation of the species. The feasibility study considered seven islands located in the Gulf of California and the Mexican Pacific where the threat involve black rat, house mice, feral cat, feral dog and White-tailed Antelope Squirrel.

Alcatraz Islands was the only one within the nine investigated islands where persist an invasive mammals, this eradication need to be seriously studied since its proximity to the continent increase the risk of reintroduction.

Communication & Application of results

The project involved two federal Mexican states and that means that the information needs to be distributed on both. We took advantages from formal events like the First Symposium on Science in the Midriff Islands on 2018 where several national researchers gathered to communicate our recent scientific findings in the Gulf of California. Formal talks with the scientific community is as important as informal gatherings day by day encounters which allowed us to communicate with local community, touristic services providers, fishermen and their families since they provided solid support to take management actions towards the conservation of the species.

The project's conservation problem was the lack of an action plan with updated information, biosecurity and conservation recommendations and involvement of stakeholders for future implementation. In order to address it, the results were analyzed and incorporated to the action plan, setting the basis to propose future management through updated information.

This document has becoming real and after take the suggestions from the National Commission for Protected Areas, a document that contain conservation strategies for Craveri's Murrelet and another 7 species is the final stage of review. This document describe also the needs of information regarding to know better other threats than AIS than CRMU could face at sea.

Monitoring and Evaluation

The current monitoring is qualitative. During our expeditions we registered behavior, interests and priorities of the stakeholders to improve the biosecurity measurements. Through the National Commission for Protected Areas we receive others observations that are also considered.

Achievements and Impacts

Engagement of the main stakeholders into the conservation measurements and biosecurity actions.

The collaboration with relevant stakeholders, as the National Commission for Protected Areas (CONANP), academics, fishermen communities and environmental groups, have generated strong links and enhanced our capacity to involve them in the future implementation of the management plan. It was through this network that we could really make an impact. The information generated in this project is part of an Action Plan for the Species Conservation, this plan is on its last review and represent a national document that incorporates the current status of the species and its threats; as well as information gaps where there is a lot of opportunity to learn more about this alcid.

Complete the assessment of the current breeding status of CRMU.

This represents the most comprehensive evaluation generated along CRMU's core breeding area. We confirmed the nesting on two non-previously known places: Choyudo and Salsipuedes Islands. This information was fundamental to enrich the management plan for this species, to know better the threats that face CRMU conservation, to know which are the most vulnerable colonies and allow environmental managers of the region to know where to focus the restoration efforts in the future.

Recognize the potential vectors for AIS intrusions and vulnerable areas.

During the project we achieved to assess the presence of alien invasive species on the nine islands. We found the presence of house mice just in one of them (Alcatraz Island) and registered keys sites crucial for biosecurity measurements. This information was crucial for the feasibility of eradications analysis and also for the ongoing development of biosecurity protocols for this region.

Capacity Development and Leadership capabilities

As part of a diverse team with different abilities, each team member developed or refined specific skills through the involvement on the project. Some of the most important techniques were: at-sea spotlight surveys and at-sea capturing of CRMU.

Along this project the team also improved another skills related to leadership, team work and social relationships during the field work that sometime can be exhausting and full of challenges that not always are in our hands. The opportunity to collaborate with different sectors gave let us work on the community skills and to know how important is to really know the stakeholders and their interests.

Section 3:

Conclusion

The updated information about breeding status of CRMU represents the biggest achievement of this project. For Estanque and Las Ánimas islands this information represents the first one since 56 and 44 years, respectively. Moreover, we registered two new breeding locations for this species; these expeditions also give us the chance to find another new breeding location for Black-vented Shearwater on Partida Island where we registered the most density of sightings of Craveri's Murrelet during the nocturnal census. Salsipuedes and San Pedro Mártir were the islands with highest amount of nests registered. However, this number is still very low considering that the Gulf of California is the main breeding habitat for this species; it is a reason to keep working on the restoration of the species that demand the coordination of national efforts.

The eradications of the invasive mammals are a priority to restores the populations of Craveri's Murrelet since they represent the most severe threat.

Problems encountered and lessons learnt

- *Which project activities and outcomes went well and why?*

The evaluation of the current status of our target species and exotic invasive species went well. We were able to achieve our goal because the teamwork was integrated by different specialists, starting with the captain of the boat with an accurate knowledge of the landing sites on these remote areas, the biologists with experience on wildlife monitoring, up to the handy technicians with the skills to solve logistical challenges during fieldwork. The detailed planning, the prior knowledge of the region and the teamwork were keys for the success of this project.

- *Which project activities and outcomes have been problematic and in what way, and how has this been overcome?*

Perhaps the most challenging part has been gaining the attention and interest of the stakeholders on one of the communities. The meetings and workshops were planned through the local government and most of them were declined or postponed. After the first experience, we realized the need to keep working closely with the local authorities, as well as to generate a closer and more personal link with the other stakeholders in order to be able to gain their attention, bring them to the workshops, and ultimately bring them on board of the management plan.

- *Briefly assess the specific project methodologies and conservation tools used.*

Overall the biological methods used where appropriate. However, the social aspect is still a challenge, and the used conservation tools could be refined. An evaluation of the behavior changes reached after the workshops with stakeholders is needed.

- *Please state important lessons which have been learnt through the course of the project and provide recommendations for future enhancement or modification to the project activities and outcomes.*

Team work is crucial for the success of regional and inclusive projects; this includes being sensitive to the necessities of all of the participants.

Planning with vision of gender, both inside the team and with the local communities, makes a difference.

In the future

The action plan will be integrated to a broader document that includes other species. The final output is an action plan for all Mexican seabirds, supported by the federal government through the National Commission for the Knowledge and Use of Biodiversity (CONABIO). This document is in line and enhanced by the National

Biosecurity Strategy, which aims to prevent the introduction of new invasive species to Mexican islands.

Future eradications of mammal invasive species from all the former breeding areas for CRMU, and particularly Alcatraz Island, would be an important step contributing to the conservation of the species. Furthermore, active restoration would encourage the recolonization on some islands where it has been slow, as in San Pedro Mártir Island.

These future conservation efforts need to be done in parallel with a yearly population monitoring that shade light into the population dynamics of the species. Since the breeding area is a large one, it is recommended that the such monitoring *will be performed by the local stakeholders, as Park Rangers, personnel from colleges and communitary groups.*

Financial Report

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)	Proposed Spending (Preliminary Report Only)
PHASE I - PROJECT PREPARATION					
Communications (telephone/internet/postage)					
Field guide books, maps, journal articles and other printed materials	280.00	259.46	-7%		
Insurance	90.00	77.03	-14%	Reserved for coming field trips	Will be spent as budgeted
Visas and permits					
Team training	200.00	199.14	0%		
Reconnaissance					
Other (Phase 1)					
EQUIPMENT					
Scientific/field equipment and supplies	1,230.00	1162.16	-6%		
Photographic equipment	300.00	300.00	0%	Purchase will be made before the next field trip	Immediate purchase
Camping equipment	900.00	948.59	5%	Purchase will be made before the next field trip	Will be spent as budgeted
Boat/engine/truck (including car hire)	2,050.00	2108.54	3%	On schedule, funds are spent as needed	Will be spent as budgeted
Other (Equipment)					
PHASE II - IMPLEMENTATION					
Accommodation for team members and local guides	1,050.00	1078.11	3%		
Food for team members and local guides	2,100.00	2161.68	3%	On schedule, funds are spent as needed	Will be spent as budgeted
Travel and local transportation (including fuel)	2,300.00	2225.51	-3%	On schedule, funds are spent as needed	Will be spent as budgeted
Customs and/or port duties					
Workshops					
Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.)	1,200.00	1179.78	-2%		
Other (Phase 2)					
PHASE III - POST-PROJECT EXPENSES					
Administration					
Report production and results dissemination					
Other (Phase 3)	700.00	700.00	0%	On schedule, funds are spent as needed	Will be spent as budgeted
Total	12,400.00	12,400.00			

Section 4:

Appendices

Appendix 4.1 CLP M&E measures

Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project		
Number of species assessments contributed to (E.g. IUCN assessments)	0	
Number of site assessments contributed to (E.g. IBA assessments)	0	
Number of NGOs established	0	
Amount of extra funding leveraged (\$)		
Number of species discovered/rediscovered	1	We found a new breeding location for Black-vented Shearwater on Partida Island. This represents the second breeding habitat in the Gulf of California for this species.
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	0	
Number of species/sites legally protected for biodiversity		
Number of stakeholders actively engaged in species/site conservation management	2	Actively, the National Commission for Protected Areas

Number of species/site management plans/strategies developed	1	We developed a Conservation Plan for CRMU and other species in the Gulf of California and the Mexican Pacific. This document is on its second reviewed by the National Authorities.
Number of stakeholders reached	132	Community groups, park rangers, academics, fishermen, national and international tourists.
Examples of stakeholder behaviour change brought about by the project.		Touristic
Examples of policy change brought about by the project	0	
Number of jobs created	0	
Number of academic papers published	0	
Number of conferences where project results have been presented	2	First Symposium on Science in the Midriff Islands. 2018, Ensenada. International Ornithological Congress. August 2018, Canada.

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