Project: Reducing light pollution for creating safer skies to the Chilean storm-petrels

Report for Pacific Seabird Group’s Craig S. Harrison Conservation Fund

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Red de Observadores de Aves y Vida Silvestre de Chile (ROC)
Grant Recipient

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1. INTRODUCTION

This report refers to the activities supported by the Pacific Seabird Group’s Craig S. Harrison Conservation Fund for the project “Reducing light pollution for creating safer skies to the Chilean storm-petrels”, part of the efforts of Red de Observadores de Aves de Chile (ROC) for advancing in natural history and conservation of the storm-petrels of Humboldt’s Current.

Beside identifying several long-time sought breeding colonies for Markham’s and Hornbyi’s storm-petrels way inland in Atacama, the most arid desert in the world, light pollution stood out among other threats because of several thousands of birds die every year in cities and industries of northern Chile, becoming one of the more serious “fallout” events in the world.

The activities framed into this project were focused into handle the problem of light pollution affecting storm-petrels in Arica and Iquique cities, identifying most conflictive areas, promoting local and national policies but also short-term actions to reduce the impact on storm-petrels and enhancing public awareness about this topic in order to build a supporting community.

The proposal was submitted and accepted to be funded with US$1990 in January 2019 and activities were planned to run from March to December 2019.

Figure 1. Markham’s storm-petrel (Oceanodroma markhami) and its breeding ground in Atacama Desert. The species is now classified as Near Threatened by IUCN Red List, after being Data Deficient for a long time mostly because of the lack of knowledge on their breeding sites. In Chile, Markham’s storm-petrel is now Endangered, in part, due to habitat degradation because of light pollution.
2. PROPOSED OBJECTIVES

- To quantify the impact of artificial light at night on storm-petrels in Iquique area
- To assess the actions conducted to reduce the impact of artificial light at night on storm-petrels in Iquique area
- To promote a local regulation against light pollution in Iquique
- To promote an agreement involving key stakeholders for voluntarily reducing their impacts during fallout peak season
- To increase the scope of storm-petrel rescue programs in Arica and Iquique through advertising
- To raise awareness in local communities about the impact of light pollution on storm-petrels through recording and editing a short video

3. PROPOSED ACTIVITIES AND ACTIONS

<table>
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<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Schedule</th>
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| To quantify the impact of artificial light at night on storm-petrels in Iquique area | • To strengthen relationships with local rescue team in Iquique for them to keep keen records on rescue birds.  
• To strengthen relationships with local wildlife authority, *Servicio Agrícola y Ganadero* (SAG).     | March - April 2019                                                      |
| To promote a local regulation against light pollution in Iquique          | • To meet local authorities in Iquique and promote developing a local normative to reduce the light pollution in the city. | June - September 2019     |
| To promote an agreement involving key stakeholders for voluntarily reducing their impacts during fallout peak season | • To strengthen relationships with local representatives of the Environment Ministry for them to lead the voluntary agreement.  
• To meet key stakeholders and to convince them about the importance of them to reduce their artificial lighting at night | March - December 2019                                                  |
| To assess the actions conducted to reduce the impact of artificial light at night on storm-petrels in Iquique area | • To meet companies which are the main responsible for fallout in Iquique, to press them for adopting actions for reducing fallout during peak season. | March - April 2019         |
| To increase the scope of storm-petrel rescue programs in Arica and Iquique | • Advertisement for rescue programs in Arica and Iquique.                                          | April &                   |
4. ACTUAL ACTIVITIES AND ACTIONS

Conducted actions are shown, following proposed objectives.

To quantify the impact of artificial light at night on storm-petrels in Iquique area

Based on a cooperative work with the rescue team grounded in Iquique (ONG Golondrinas de mar, Iquique) we got to know about 1743 storm-petrels rescued for 2018-2019 season, way more than the 892 rescued by them during 2017-2018. To our understanding, the almost-doubled in the number of rescued birds from one year to the next one reflects more the increase in the scope of the rescue in Iquique, more than a truly increase in the fallen birds.

In Arica, although not framed into this specific project when applied, we managed to keep a very keen record of the rescue program thanks to the funding of American Bird Conservancy (ABC), which is coordinated by ROC local team with support of Arica county. For the 2019-2020 season we have rescued +3000 storm-petrels and are still counting, way more than the 1183 that we recorded for the 2018-2019 season. Same as in Iquique, we understand that increasing because of the higher effort of the program. We have already mapped fallout in Arica for the 2018-2019 season resulting in the following map (Figure 2).
To promote a local regulation against light pollution in Iquique

We wrote a draft of county regulation against light-pollution, which we submitted to the counties of Arica (June 2019) and Iquique (September 2019, see Figure 3). See Attached file 1. To date, none of them have implemented it yet (but see next paragraph), since apparently, they are waiting for the national regulation lineament.

Besides that, we promoted the update of national policy against light pollution (Decreto Supremo 43) which is currently restricted to regions where astronomical observatories are settled and doesn’t control the use of rich blue-spectrum white LEDs. See Attached item 2. This process is still open, and we have been asked to join the extended committee for reviewing the updating proposal, representing the interest groups focused on biodiversity.

To support the latter, we wrote an article about this topic (Assessing the light pollution impacts on seabirds in Chile: diagnosis and proposals), informing with a draft version the updating process of national light pollution act led by Environmental Ministry, in May 2019. The article was submitted to Ornitología Neotropical in July 2019, and accepted in November 2019, not yet being copy-edited.
For doing this work we arranged 25 authors from 13 organizations to work together showing for the first time for a country in South America the effects of light pollution on seabirds, reflecting a largely underestimated situation and outstanding the case of storm-petrels in Arica and Iquique, as shown in Figure 4.

Figure 3. Rodrigo Silva (ROC) and Moyra Rojas Tamborino, regional representative of Environment Ministry meeting Mauricio Soria Machiavello, Iquique Major

Figure 4. Fallout hotspots for seabirds in Chile, extracted from the article “Assessing the light pollution impacts on seabirds in Chile: diagnosis and proposals” (Silva et al. in press). Note the situation in northern Chile, where large numbers of nationally threatened seabirds are affected.
To promote an agreement involving key stakeholders for voluntarily reducing their impacts during fallout peak season

We achieve the local chair of Environment Ministry to release a voluntary agreement called “Protégetelos desde el primer vuelo” just before the 2019 fallout season in March 2019 (“Protect them since their first flight”, referring to the fact that most of the affected birds are fledglings) engaging most of the private and public stakeholders involved in storm-petrel fallout, but apparently as a strategic decision, they excluded ROC. Results for the first season of the agreement are unknown (probably not properly measured), but some adopted actions includes:

- Compañía Minera Cordillera (CMC) adopted a series of management actions, as informed in the mail sent on April 11th, 2019 and described in the national newspaper El Mercurio (Figure 5). This included turning off and light replacement (Figure 6) and an improved rescue program.
- The Municipality of Iquique turned off some of their more conflictive lights, but according to the Major, they were requested to turn them on again by the Army, the agency in charge of safety in the area.

For the current season, March - April 2020, there are more actions expected to be adopted, some of them including the previously recruitant K+S company, but not detailed information is available on this topic yet. It is likely we will be joined to the agreement board this time.
Figure 5. The national newspaper El Mercurio announcing the agreement “Protégete desde el primer vuelo”, for reducing the effect of light pollution on storm-petrels in the Tarapacá region.
To assess the actions conducted to reduce the impact of artificial light at night on storm-petrels in Iquique area

Due to our absence in the board which defines the scope of the agreement “Protégelos desde el Primer Vuelo” and a lack of planning ahead, the results for the first season are nowadays hard to track back, making hard to properly assess the results of the implemented actions. However, due to the huge amount of lights which were switched off, it is likely that several thousands of storm-petrels were prevented to be killed. For the current season (fallout expected to occur during March - April 2020) we have promoted the local chair of Environment Ministry to keep an improved record system of the actions adopted and keen records on fallout monitoring.

To increase the scope of storm-petrel rescue programs in Arica and Iquique through advertising

We commissioned resources to be broadcasted on social media and to be spreaded into the community (Figure 7). In December 2019, during the fallout season in Arica, we delivered about 300 pins and 500 handouts, funded partially with this grant, complemented with funds of American Bird Conservancy. The social media are planned to be exploited during the next fallout season in Iquique, during March - April 2020 (we did not use it for the Arica’s case, since matched with the Chilean social outbreak).
Figure 7: Graphic design for pins and social media

Figure 8: Folding handouts and pins once printed
**To raise awareness in local communities about the impact of light pollution on storm-petrels through recording and editing a short video**

In cooperation with the Youtube Channel “Wild Track”, by then developing a series of videos regarding different topics of chilean nature and conservation challenges, we recorded and edited a video for raise awareness about the effect of light pollution on storm-petrels focused in the situation of Iquique. Video is available in the following link: [https://www.dropbox.com/s/i9jgqv4joklylz/Wild%20Track%20Iquique%204.mp4?dl=0](https://www.dropbox.com/s/i9jgqv4joklylz/Wild%20Track%20Iquique%204.mp4?dl=0)

For doing this we ran a field trip in April 2019, being the video finally edited and available in October 2019. In order to increase the impact of the video we agreed to spread it in March 2020, at the beginning of next fallout season in Iquique.

5. **SUBJECTIVE / OBJECTIVE EVALUATION OF THE EFFECTIVENESS OF YOUR ACTIONS IN CONSERVING SEABIRDS**

It is hard to assess the impact of this project on the populations of storm-petrels due to the nature of available data. In strict terms, the number of fallen birds in Arica and Iquique increased in >153,5% and 95,4% from 2017-2018 to 2018-2019 respectively, but this is more likely to reflect an increase in public awareness than a real increase in fallen birds. As said, due to the huge amount of lights which were switched off, it is likely that several thousands of storm-petrels were prevented to be killed.

To get a better tool which will allow us to assess the impact of conservation measures, in 2019 we started with ABC and Conservation metrics to use songmeters, for trying to monitor the trends of the breeding populations.

In terms of raising awareness of local authorities to this topic we consider that, although not having success yet in counties to promote a local regulation against light pollution, they have certainly gotten into known this conservation problem. On the other hand, the national update of the policy against light pollution, although not finished yet, is a major success because it’s supposed to include white LEDs, whole national territory and biodiversity protection as a goal.
6. COMPARED PROPOSED AND ACTUAL EXPENDITURES

<table>
<thead>
<tr>
<th>Item</th>
<th>Budget as proposed</th>
<th>Actual expenditures</th>
<th>Balance</th>
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<tbody>
<tr>
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<tr>
<td>Flights Santiago-Arica</td>
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<tr>
<td>Provided by ROC</td>
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<td>2,730</td>
<td>-130</td>
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7. SUGGESTIONS FOR FURTHER WORK OR IMPROVEMENTS TO THE COMPLETED PROJECT DESIGN

For further work, a systematic assessment of fallen birds would be needed, conducted in standardized conditions.

Regarding bird rescue and the assessment of success of release actions, it would be valuable to band as many birds as possible.

8. DATA SUBMISSION TO SEABIRD INFORMATION NETWORK AND GLOBAL SEABIRD COLONY REGISTER

Our project was not focused on generating new information for seabird colonies. Nevertheless, we will submit all the information related to Atacama’s storm-petrels to both platforms during the next month.

ATTACHED ITEMS

1. Municipal ordinance draft submitted to Arica and Iquique Municipalities.
2. Letter submitted to the Environment Ministry on May 30th, 2019 as part of the updating process of current regulation against light pollution.