Message from Bec and Ross

We are very happy to be providing our first SealSpotter newsletter to you as our Citizen Scientist collaborators. Thank you so much for your work on this project, we are producing some exciting results and your contribution to SealSpotter has been extremely successful.

What are the Australian fur seals up to at the moment?

The seal pups are getting ready to wean now, with the next breeding season about to start, so they have moulted into their waterproof coat.

Males are arriving to set up harems.

OUR TOP FIVE COLLABORATORS
and rows of data contributed
Sue Sorrell, 18073
Naomi Wells, 17008
Julee M, 15492
Jane, 13063
SuBeDooBe, 12592

Summary of your contribution to the research

Including replicates:

- 84,410 images have been labelled
- 610,281 seals have been classified
- 644 Citizen Scientists have participated

Figure 1. Seal Rocks mosaic image with zoom (left). Bec catching drone on boat after survey (right)

Celebrating our Citizen Science collaborators

"Counting the Phillip Island seals is a lot like doing an addictive puzzle with the joy of knowing that what I am doing is helping out the Phillip Island Nature Parks researchers and with luck the fur seals - it's a win win outcome. It's also great to be able to do this whenever I can fit it into my schedule, which keeps my motivation for accuracy up.

Having worked in a university as support to researchers I know how important this type of data collection is. I know too how much more important it is to have the researchers doing what they do and love best and it's not usually this type of work." Jullee M

"I loved taking part in Seal Spotter – knowing that my time could contribute to better understanding Victorian seal populations and assist in their future was part of my motivation. It became quite addictive and each day I would set a target and usually exceed this! Seal Spotter was very easy to use and a very rewarding thing to participate in."
Sue Sorrell

"I found it quite relaxing and felt pleased I was contributing to something worthwhile. I have been involved in sampling populations of insects so understand the benefits of a large amount of data. And like you I found it strangely addictive." Jane

"I loved SealSpotter so much that I became addicted. I loved watching the amount of seals I counted slowly increase. I also loved knowing that I was contributing to real science with tangible outcomes." Naomi Wells

The reach of SealSpotter

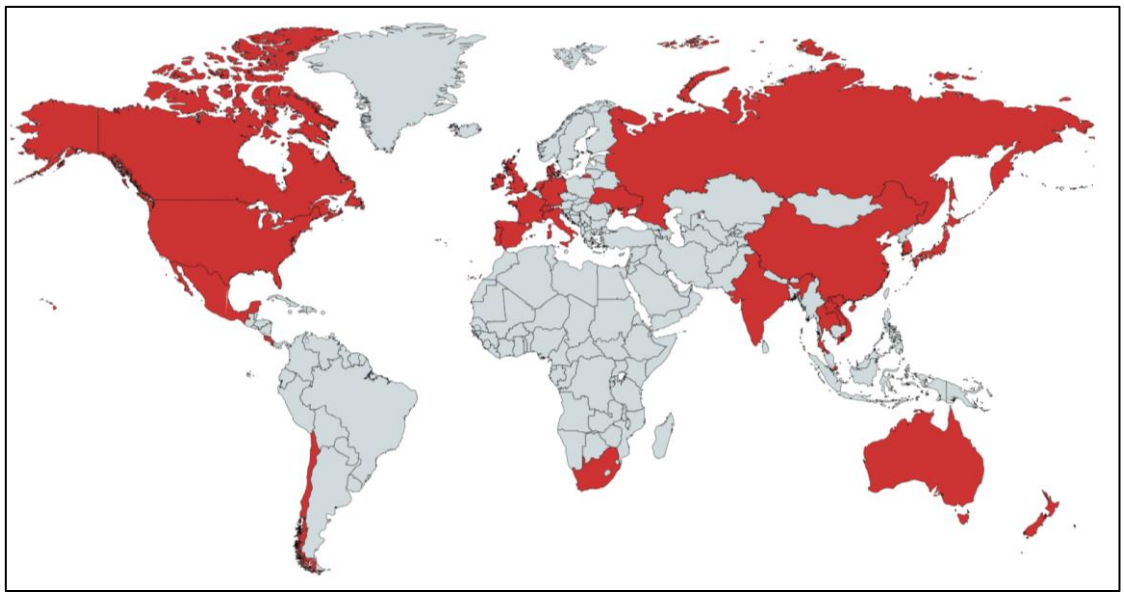

Figure 2. We have Citizen Scientist collaborators around the globe (red), but there are also a few funny ones we couldn't include on the map: namely "Here", "Pluto", "Space" and "Hamburger, Melbourne" LOL.

Research outcomes from SealSpotter

One of our recent projects has identified that Citizen Scientists are very good at counting fur seals and counts from drone images produce better results for monitoring the population with no observable disturbance. This is a wonderful outcome for science and the fur seals and will be published soon by Karina Sorrell with Rohan Clarke from Monash University.

We presented at the Australian Marine Sciences Conference and International Marine Debris Conference in 2018 (see last page of newsletter) and published a methods paper: (https://www.frontiersin.org/articles/10.3389/fmars.2018.00202/full) you can download.

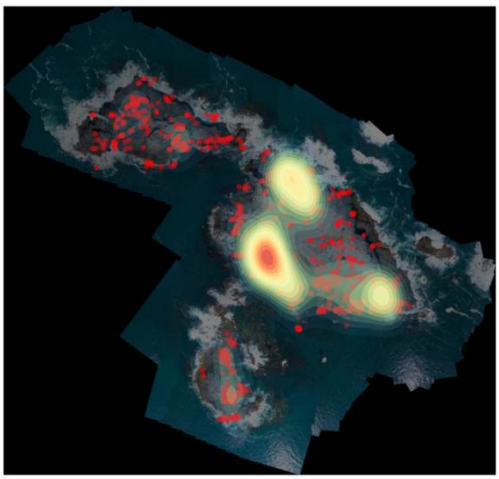

Figure 3. Mapped x and y co-ordinate data (red dots) for Australian fur seal pups at Seal Rocks counted from Unpiloted Aerial Vehicle (RPA) images and SealSpotter. Overlayed heat map shows the density of aggregated pups from less dense (yellow) to more dense (red).

Source: McIntosh, Holmberg and Dann. 2018. "Looking without landing – Using remote piloted aircraft to monitor fur seal populations without disturbance Frontiers in Marine Science.5:202. doi: 10.3389/fmars.2018.002

Your feedback

We have had some useful feedback from you that we are working on:

"I wish for better resolution too lol, being able to zoom in without so much pixilation would be great." Jullee

Figure 3. We are working hard to improve this and we now have a DJI Matrice (right). We hope that we will be able to improve resolution of the images with more specific gear.

"The task is heavy on using the mouse, is there a way I can use the keyboard?" Jill

Ross programmed keyboard shortcuts: you can use the numbers 1, 2, 3, 4 to move between the classes of seals for counting.

"Can you add sub-titles to the video explaining how to count seals? I am hearing impaired and would love to do this."

Yes we can, but it hasn't been as simple as we expected. We are planning on getting a media intern to help us and we hope to have subtitles running soon.

"I would like to have the ability to delete a spot (not just the previous one)
I suspect there were a lot of dead pups I included, so some guidance there would be helpful. "

We expect people to count dead pups and live pups in one group. We want total number of pups and each pup represents one adult female. Thermal imagery overlapped with RGB (photo) images should be able to do this. We will have a think about your first idea.

Thank you again for all your hard work. We will be refreshing SealSpotter images soon, so stay tuned. Bec and Ross ☺, Conservation Department, Phillip Island Nature Parks

Looking Without Landing

Using Remote Piloted Aircraft (RPAs) and Citizen Science to monitor the prevalence of marine debris entanglements in fur seals

Rebecca R. McIntosh*, Ross Holmberg and Peter Dann
Research Department, Phillip Island Nature Parks, PO Box 97, Cowes Victoria 3922, Australia
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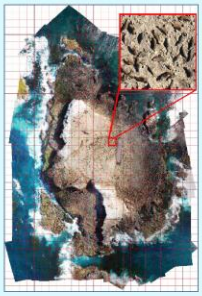
Goal

- Develop a method for repeatable, standardised and reliable estimates of prevalence of marine debris entanglements for trends analyses
- Promote community interaction with science and the issue of marine debris

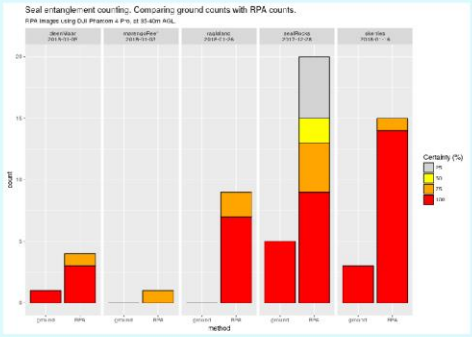
Background

- Difficult to compare rates of entanglement in marine debris across literature and over time
- Over 10 different methods in use
- Typically counts of entangled seals are positively correlated to effort
- Many do not provide a true estimate of prevalence



Method

- Use RPAs to obtain high resolution static ortho-mosaics per site and survey
- RPA method outlined in McIntosh et al. 2018 (QR code provided to download reference)
- Obtain counts of Australian fur seals entangled by marine debris through collaboration with Citizen Scientists and an interactive web portal (SealSpotter) http://natureparksresearch.com.au/sealSpotter/
- Compare counts obtained using RPA images + SealSpotter to those obtained using traditional on-site method of ground counting



Results

- RPA counts of marine debris entanglements higher than ground counts at all sites
- RPA surveys provide standardised estimates of prevalence for reliable trends analyses
- Online Citizen Science portal successfully engages the community in a positive way: 392 participants from 21 countries
- Archived ortho-mosaics can be retained for further data extraction using different and/or improved techniques in the future

Acknowledgements
Karina Sorrell (Monash University) for flight time and efforts both in the field and at the computer. Rohan Clarke (Monash University) for discussions regarding RPA survey methodology. Thanks also to our Citizen Science collaborators.