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Recovery of satellite tags from an elephant seal on Motley Island

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Introduction

A female southern elephant seal (*Mirounga leonina*) was instrumented with two CTD (conductivity, temperature, depth) satellite tags by Dr. Christophe Guinet of the Centre d'Etudes Biologiques de Chizé (UMR 7372 Université de la Rochelle-CNRS, 405 route de Prissé la Charrière, 79360 Villiers en Bois, France). The deployment was carried out in the Valdés Peninsula during the past breeding season (October 2018). The female, nicknamed Beppa by the Elephant Seal Research Group (ESRG, www.eleseal.org), had a rather unusual post-breeding foraging pattern (Figure 1), with a lot of roaming around and, after an unusually long trip at sea (about 120 days), hauled out to moult on Motley Island, an island in the south of the Falkland Islands, owned by Falklands Conservation.

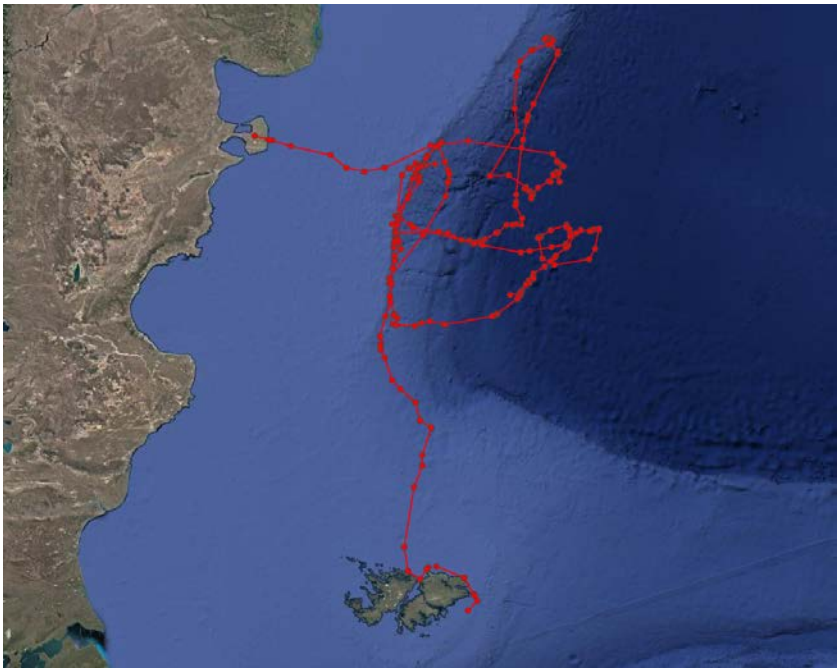

Figure 1 - Beppa's post-breeding migration track.

Dr. Guinet contacted the ESRG asking help to recover the tags. The tag recovery was considered particularly important because the female was carrying two CTD tags, to permit the comparison and calibration between a new prototype CTD tag by Wildlife Computer (www.wildlifecomputers.com; tag 1, Figure 4) and the standard CTD tag by the Sea Mammal Research Unit (SMRU, www.smru.st-andrews.ac.uk; tag 2, Figure 4).

The ESRG obtained permission to visit Motley Island from Falklands Conservation and an extension of the elephant seal research licence to sedate and handle Beppa from the Environmental Planning Department of the Falkland Islands Government, arranged transportation to the island, searched and located the female, and recovered the tags that will be returned to the owners for data downloading and decoding. Here, we briefly describe the recovery operation.

Description of the seal search and tags recovery

The tags recovery was attempted on 22/02/2019. We left Stanley on the Game Changer helicopter, driven by pilot Richard Williams and co-pilot Matt Jacobs. Take off was approximately at 09:25.

We arrived to Motley Islands at approximately 09:55. We landed in a flat grass area at the south end of the island (Latitude: -52.1491, Longitude: -58.6111; Figure 3, blue star). The most likely Beppa's haul out location, from the Argos fixes of the tags (Figure 2), was the southernmost pebble beach of Motley, and we tried to land as close as possible to that beach, but far away from any area with sensitive wildlife, as indicated in Stanworth et al. (2018).

Figure 2 - Argos fixes around the southernmost beach of Motley.

We made a first search attempt by flying a Mavic drone (DJI) over the south part of the Motley coastline. During this flight, we located only two elephant seals, on the pebble beach mentioned above, one of which was definitely a female. We walked to the place and located the two elephant seals, but the female was actually a fully moulted female previously tagged by us at Sea Lion Island. Therefore, we walked all along the pebble beach and we accurately searched all the tussac grass area behind it (see Filippo's track, Figure 3), making multiple passes. We also carefully checked the ground looking for any lost satellite tag.

We observed some elephant seals on the north part of the Mot islet, in particular on the northernmost pebble point, facing Motley. That was another possible place, compatible with the Argos fixes of Beppa's tags. Therefore, we sent our drone to check the group of elephant seals on the small point of the Mot, finding no seal with satellite tags. We then scanned with the drone the whole coastline of the Mot, finding no evidences of Beppa's presence. Lastly, we walked again the whole beach and surrounding tussac grass area, but we did not find her.

As last resort, we moved to the west of the south pebble beach of Motley. This is an area of flat rocks with deep inlets that was not accessible at the beginning of the search because of the high tide. We finally located Beppa in a small group of tussac grass under the cliff of a narrow inlet (Latitude: -52.1510, Longitude: -58.6105; Figure 3, blue star). She was in the tussac grass and in the shadow, and that was the reason why we did not see her from the drone.

Figure 3 - Filippo's track of the search in the tussac grass. Blue stars: helicopter landing location and Beppa's location.

Beppa showed no sign of moult, and was apparently below the normal weight for a female of her size just hauled out after the post-breeding feeding migration. In fact, although we classified her as a medium-large female, we estimated her weight at only 450 kg. We prepared a 4.0ml dose of Zoletil 100 (Virbac) and we administered it as intra muscular (IM) injection using a 90mm epidural needle and a 3m extension tubing connected to a 20ml syringe. Zoletil is a mixture of tiletamine and zolazepam, and is the standard anaesthetic for

elephant seal sedation (McMahon et al. 2000). We added 1.5ml atropine, as we normally do for elephant seal sedation, to prevent excess secretions in the respiratory tract and salivation (Woods et al. 1994). Our full elephant seal sedation protocol, including details on procedures for emergency situations, is described in Galimberti and Sanvito (2012).

Figure 4 - The satellite tags. Top: the Wildlife Computers tag (1), bottom; the SMRU tag (2).

IM was effective, the needle was completely inserted, and the tubing was easily flushed. After the injection Beppa remained quiet and showed no sign of wishing to flight to the water. Following our normal sedation protocol, we checked Beppa's status at 5' after injection by touching the rear part of the body, but she was still reactive to the touch, although her reaction was already slow. We checked her again at 10', and she was almost sedated but still somehow reactive, so waited 5' more. At that stage, the sedation was good, and permitted an easy removal of the satellite tags.

The tag on the back (tag 2, Figure 4, bottom) was easily removed by cutting 2 cable ties. The epoxy glue attachment of that tag was left in place, and will be lost during the moult. The tag on the head (tag 1, Figure 4, top) was, on the contrary, more strongly glued to the fur, so the cutting of the cable ties did not permit the removal. Therefore, we had to remove the tag together with the epoxy glue attachment and with the old skin to be moulted. The removal of tag 1 was anyway easy, and Beppa showed no reaction to it. The removal of both tags took just a few seconds.

Following the satellite tags removal, we placed two numbered plastic tags on Beppa's rear flippers, one per flipper (Orange 3859 on the right, orange 3860 on the left; Cheviflex tag), to be able to identify Beppa in the future.

We monitored Beppa for a total of about one hour and 30 minutes from the initial IM injection. During this period she had only one episode of apnoea longer than one minute. We carried out a physical manipulation of the head (raising the head and scratching the throat), and Beppa immediately resumed breathing. There were no other problems during the post-

sedation recovery. When we left Beppa (Figure 5), she was breathing normally, moving to adjust herself to a more comfortable position, looking around, staring to us, and reacting in the normal aggressive way when approached at close distance. She showed no sign to want to go into the water. All together, she was behaving normally and, therefore, we decided that it was safe to leave her alone. We returned to the landing site, loaded the helicopter and left Motley Island at approximately 16:10. We landed at Stanley airport at approximately 16:50.

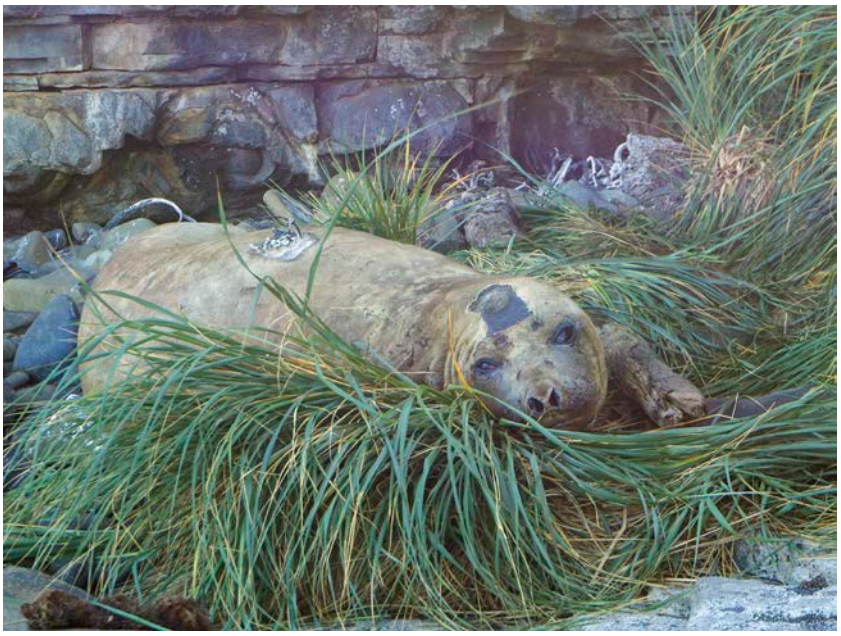

Figure 5 - Beppa at the end of the sedation. The attachment of the second tag is still in place, while on the head there is a rectangular patch of old skin and fur that has been removed together with the tag.

All together, the recovery operation was definitely successful, and posed no risk for the seal and the operators.

Acknowledgements

We would like to thank: the other members of the recovery team (Figure 6, from the left: Hannah Newton, Matt Jacobs, Richard Williams, Filippo, Simona); Beppa for having been so useful to science; Denise Blake of the Environmental Planning Department of the Falkland Islands Government for the amendment to our elephant seal research licence that permitted us to sedate and handle Beppa on Motley Island; Esther Bertram and Sarah Crofts on behalf of Falklands Conservation (landowner of Motley Island) for giving us permission to land on Motley; Micky Reeves for the initial idea to contact the Game Changer; Jenny Luxton for help with logistic in Stanley. We also would like to thank all the people that offered help, suggestions and hints in the long days during which Beppa was roaming around the Falklands. The biggest thanks goes to Richard Williams, pilot of the Game Changer

helicopter, and to the captain and the owner of the Game Changer yacht. Without their help out visit to Motley Island would have been much more complex.

Figure 6 - The recovery team and the Game Changer helicopter.

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