

2014 Campbell Island Southern Right Whale Survey

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Abstract

The 2014 Campbell Island Southern Right Whale Survey was conducted from July 9th, 2014 to August 10th, 2014. This survey was funded by the National Institute of Water And Atmospheric Research Limited (NIWA) and the Department of Conservation. Partners on this survey were NIWA, the Oregon State University (USA), and the Universities of Auckland and Otago. The yacht *Tiama* was used for transportation to/from Campbell Island and provided the research/sampling platform. Data collection included sightings while on boat-based visual surveys and from land, photo-identification and biopsy sampling. On six days boat-based visual surveys were conducted. A total of 53 encounters involved 84 whales. Land-based counts in Northwest bay over five days ranged between 11 and 59 whales. Almost 4,000 photographs were taken during the survey over 12 days of photo-identification effort. The revision of photographs is currently being undertaken. Twenty four biopsy samples were collected in two days for genetic and stable isotope analyses. A number of high quality videos were filmed.

Introduction

The 2014 Campbell Island Southern Right Whale Survey was conducted from July 9th, 2014 to August 10th, 2014. This survey had the goal of exploring the status of southern right whales (SRW) after 14 years from the previous survey conducted by Stewart & Todd (2001). This survey was funded by the National Institute of Water And Atmospheric Research Limited (NIWA) and the Department of Conservation (DoC). NIWA administered the contracting side of the project. Partners on this survey were the Oregon State University (USA), which provided logistical support, expertise and coordinated the project, the University of Auckland, which provided equipment for biopsy sampling, and the University of Otago which provided equipment for the photo-identification work.

The yacht *Tiama* (Figure 1) was used for transportation to Campbell Island and provided the research/sampling platform. The SRW survey was conducted in parallel to a grey petrel survey, which required the logistic support of *Tiama* and my assistance during some of the surveys.

This report describes the SRW survey and sampling. The raw data and associated information is described in the appendices.



Figure 1. *Tiama* at Northwest bay (Photo Keith Jacob).

Personnel

The personnel involved in the SRW survey included:

Name	Role
Carlos Olavarría	Whale researcher
Graham Parker	Seabird researcher
Henk Haazen	<i>Tiama's</i> skipper
Keith Jacob	<i>Tiama's</i> first mate

Itinerary

Listed below is the survey itinerary by day

Date	Event
7 July	Arrive in Invercargill
8 July	Check and clean of gear in DoC Invercargill for quarantine. Briefing. Last shopping of gear before heading south
9 July	Moving to Bluff. Load <i>Tiama</i> . Safety briefing and departure to Campbell Island
10 July	Transit to Campbell Island
11 July	Transit to Campbell Island
12 July	Arrive to Perseverance harbour. Helping Seal team unloading their gear into the station. Checking and organizing our gear for starting survey
13 July	At Perseverance harbour. Grey petrel survey
14 July	At Perseverance harbour. Grey petrel survey
15 July	At Perseverance harbour. SRW survey, from Perseverance harbour north, via east coast, entering Northeast harbour. Finished at North Cape due to weather. Photo-identification work. Arrive to Northwest bay. Opportunistic photo-identification work
16 July	At Northwest bay. SRW photo-identification and biopsy sampling work in Northwest bay. Moving to Monument harbour due to weather
17 July	At Monument harbour. Grey petrel survey and SRW organization of data
18 July	At Monument harbour. Grey petrel survey and SRW organization of data
19 July	At Monument harbour. Grey petrel survey. SRW survey, from Monument harbour east, entering Southeast and Perseverance harbours. Back to Monument harbour. Photo-identification work
20 July	At Monument harbour. Moving to Northwest bay due to favourable weather to work there for some days. Opportunistic photo-identification work
21 July	At Northwest bay. Grey petrel survey. Opportunistic photo-identification work
22 July	At Northwest bay. SWR survey at Northwest and Cattle bays. Biopsy sampling, with photo-identification work at Northwest bay
23 July	At Northwest bay. Grey petrel survey. SRW organization of data. Opportunistic photo-identification work
24 July	At Northwest bay. Grey petrel survey. Opportunistic photo-identification work
25 July	At Northwest bay. Grey petrel survey. SRW biopsy sampling with photo-identification work at Northwest bay
26 July	At Northwest bay. Grey petrel survey. Opportunistic photo-identification work
27 July	At Northwest bay. SWR survey at Northwest and Cattle bays. SRW survey along the coast up north and east to North cape, entering Northeast harbour and finishing at Perseverance harbour
28 July	Free day for <i>Tiama</i> 's crew. Watchman for the day onboard. SRW organization of data
29 July	At Perseverance harbour. SRW survey from entrance of Perseverance harbour to Monument harbour. Back to Perseverance during the night
30 July	At Perseverance harbour. Storm. Wind gusting up to 70knots. No work. Anchored. Anchor watch over night
31 July	At Perseverance harbour. SRW survey in the harbour in our way out to Monument harbour. Grey petrel survey
1 August	At Monument harbour. Grey petrel survey
2 August	At Perseverance harbour. Crossing overland to Northwest bay hut. Afternoon count from hut area
3 August	At Northwest bay. All day 15-min count each hour from hut area. Photo-

	identification from cliffs
4 August	At Northwest bay. Crossing overland to Perseverance harbour
5 August	At Perseverance harbour. Opportunistic photo-identification work and organization of data
6 August	At Perseverance harbour, organizing boat for departure. Helping Seal team loading gear to <i>Tiama</i>
7 August	At Perseverance harbour, departing Campbell Island for Bluff
8 August	Transit to Bluff
9 August	Transit and arrival to Bluff
10 August	At Bluff. Departure to home town

Methods

Research Area and Survey Design

The survey area comprised the coastal waters surrounding Campbell Island (Figure 2).

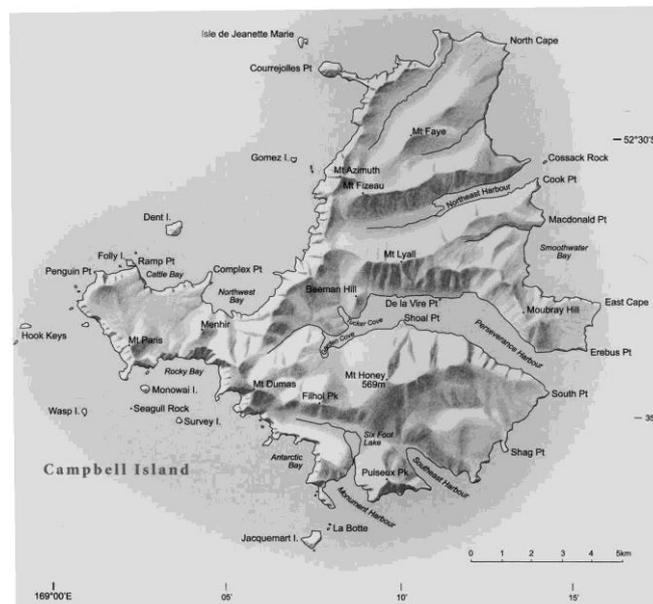


Figure 2. Campbell Island with main names of bays and harbours.

Three main types of data collection were obtained while working from *Tiama*, sightings while conducting visual surveys, photo-identification and biopsy samples. A fourth type of data was land based and tried to replicate the 1997 survey done by Stewart & Todd (2001, described below).

The boat based visual surveys were intended to be close to the shore, entering most of the main bays and harbours. One or two observers would scan constantly at each side (port and starboard) of *Tiama* from behind the cockpit. Eye distance to sea level was about 2 m. During this part of the visual survey, a closing mode was followed to allow group size confirmation as well as to obtain photo-identification data. While conducting visual survey at Northwest and Cattle bays a pre-determined survey (Figure 3) was followed due to the higher density of whales, particularly in Northwest bay. For this part of the survey two observers were used, as well as a data recorder. A passing mode was followed, were no whales were approached.

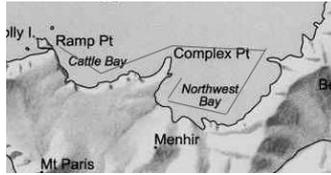


Figure 3. General view of the pre-determined survey conducted in Northwest and Cattle bays.

Photo-identification

Photographs for individual identification (photo-identification) were obtained using digital SLR Nikon D90 cameras and 70-200mm lenses from *Tiama* (Figure 4).



Figure 4. Photo-identification and biopsy sampling from the bow of *Tiama* at Northwest bay (Photo Keith Jacob).

Photo-identification in SRW is based on callosity patterns found on the lip and rostrum, crenulations along the lower lip, and scars and unusual skin pigmentation on the head or body (see Patenaude & Baker 2001). Photographs of the left and right profile of each whale head, from bonnet to post-blowhole callosities, were collected. When possible matching left and right sides of a whale were recorded (Figure 5).



Figure 5. Southern right whale photo-identification of left side of callosity pattern (Photo Carlos Olavarría).

Opportunistic photo-identification data was collected during times when *Tiama* was anchored, from a cliff below the land-based counting point and from Beeman base, sometimes a teleconverter (x2) was used (Figure 6).



Figure 6. Photo-identification of southern right whales from cliff below the land-based counting point at Northwest bay (Photo Marcus Salton)

Biopsy sampling

Biopsy samples were collected using a modified veterinary capture rifle (PAXARM biopsy system, Figure 4). Darts heads were mostly 9x25, although a few 6x40 and 6x9 were used. All darts were

tethered to a fishing reel, as usually darts stick to SRW and is necessary to pull the dart back. A 135m 37kg/80lb/0.38mm braided strain line was used (after initial fails with a supplied unknown strength nylon line). Cartridges were red dot RAMSET charges as no original PAXARM charges were available.

Skin samples (Figure 7) were preserved following the "Protocol for processing southern right whale biopsy samples. Version 3". Due to lack of freezer capabilities onboard of *Tiama*, all samples for both genetic and stable isotope analyses were stored in 99% ethanol.



Figure 7. Biopsy sample obtained using a PAXARM system and 6x40 dart.

Land-based visual counting from Northwest hut

During the survey it was suggested to try and replicate the land-based visual counting undertaken at Northwest bay from the Northwest hut, following the method used by Stewart & Todd (2001). These were done in two days by the Seal and Sea lion team while tagging seals in the area. A dedicated stay of two nights/three days at Northwest bay was done later.

Ten to 15 min counts were undertaken at each hour, weather permitted from a point by one or two observers from a vantage point located around 60m down the track from the hut (close to dead rotten sea lion), where a clear view was achieved of the whole bay, including close to shore right under the hut, and to Whaler and Middle bays and Capstan cove (Figure 8).



Figure 8. View from where dedicated counts were undertaken at Northwest bay, about 60m down the track from the hut (Photo Marcus Slaton).

Results

Visual surveys and sighting records

On six days surveys were conducted. A total of 53 encounters during these visual sightings involved 84 SRW.

On July 15th a survey was conducted from Perseverance harbour north, via east coast, entering Northeast harbour and finishing at North Cape due to poor weather conditions.

On July 19th a survey was conducted from Monument harbour east and north, entering Southeast and Perseverance harbours. Then the survey returned to Monument harbour. These two surveys were conducted in Closing mode, collecting photo-identification data. No biopsy sampling occurred during those surveys.

On July 22nd and 27th designed surveys were conducted at Northwest and Cattle bays on passing mode. No photo-identification or biopsy sampling was conducted. After finishing on the designed survey on the 27th, we continued the survey along the shore north to North Cape and east to Northeast bay and Perseverance harbour.

On July 29th a survey was conducted from the entrance of Perseverance harbour to Monument harbour.

On July 31th a survey was conducted inside Perseverance harbour.

All survey tracks were stored in the provided GPS and saved as text files in the folder "gps tracks".

The tracks of *Tiama* while conducting photo-identification or biopsy sampling work out of visual survey mode were stored too.

All positions when whales were encountered were stored as waypoints, which are included in the files "Waypoints_until_5_August.txt" and "data.xlsx" under the sheet "Visual survey - sighting data".

A section of the island was not covered during the survey. The SW side from Monument harbour to Northwest bay was not surveyed due to the lack of depth and number of pinnacles that made a coastal navigation a safety risk with the prevailing NW and SW winds we encountered during almost the entire trip. However, during a grey petrel survey to Antarctic peninsula a 15 min scan of Rocky and Antarctic bays was done. This information is included in the file "data.xlsx" under the sheet "land based sighting survey".

Photo-identification

Almost 4,000 pictures were taken during the survey over 12 days of photo-identification effort. They included a range of photographs taken from *Tiama*, while anchored and sampling, but also from land. The revision of photographs for photo-identification purposes is currently being undertaken.

Biopsy sampling

Twenty four samples were collected during the survey. The samples were collected almost entirely as biopsy samples in two days (July 22nd and 26th). One sample was collected from *Tiama*'s chain

after a whale hit the chain the night before. The data associated to the samples is included in the file "data.xlsx" under the sheet " Biopsy samples".

Not all the biopsies provided enough sample for genetics (n = 24) and stable isotope analyses (n = 18). In those cases when the biopsy was very small priority was given to genetic analyses. Pictures of samples that were split for genetic analyses and isotope stable analyses are located in folder "biopsy sample pictures".

Biopsy sampling effort started on July 16, but after three failed attempts it was interrupted to complete a full check of the gear. The three failed attempts included a line broken after the dart got stuck on the whale, a dart stuck without a line, and another one did not retain a sample after hitting a whale.

After some modifications, that included changing the nylon line for a stronger line and increasing in general the power of shooting, biopsy sampling was resumed successfully. There were still a few stuck darts where the line broke. It is my feeling that the 9x25 heads are too wide for SRW getting stuck too hard on the whales which makes the line or the tracer more susceptible to break. The 6x40 heads felt easier to pull when darts got stuck.

Visual counting from Northwest hut

Three land-based visual counting were undertaken at Northwest bay from the Northwest hut by the Seal and Sea lion team on July 24 and 25. Their counts ranged from 11 to 17 SRW.

A dedicated survey was undertaken on August 2,3,4 in Northwest bay. One observer scanned with naked eye while the other with binoculars, all the way to Isle de Jeanette Marie, Courrejoles point and Gomez island. Counts ranged from 33 to 59 SRW.

Media

Two folders are included, which contains media material in the folder "others".

One is called "Photos Edited" and includes pictures I edited in Lightroom. There are high resolution .JPG and web page resolution .JPG of each picture. The name of the corresponding photographer is included at the end of each file name. All photographers have agreed using their pictures for media use.

The second folder is called "henks go pro". There are a number of high resolution videos Henk Haaze took. I would recommend the file GOPRO0550.mp4 as it shows a good and successful approach towards a SRW for biopsy sampling and photoidentification taken from the mast of *Tiama*. The file GOPRO0583 also has good footage from behind the sampler and photographer. The file GOPRO0558 has a good footage at 03:39. The file GOPRO0571 has good footage the first 2:24. The files GOPRO0573, GOPRO0576 GOPRO0582 have good footage too. The file GOPRO0590 has footage of the photographer only between 0:35 and 1:21 and good biopsy sampling footage after that. The file GOPRO0591 has good footage from 06:20 (although notice at the beginning of the same file there is a sequence of an approach that was too close).

Recommendations and final remarks

Overall, the technique and equipment worked well as allowed me to collect SRW data. The use of *Tiama*, instead of the small inflatable boat, allowed me to work well as it is a very manoeuvrable boat that makes easy and safe approaching whale groups.

The main limitation that precluded me to obtain more data was the number of days available for whale survey. Only three days were spent exclusively at Northwest bay (where most of the whales were found) undertaking SRW data collection. The main reason for precluding further effort was the weather. The area where whales were found is exposed to the NW winds, which were the prevalent winds during the time at Campbell island. Some days, when the wind was from the SW but too strong to work safely (30 knots with gusts up to 50 knots), opportunistic effort for photo-identification was done from the anchorage when SRW approached *Tiama*.

A limitation to the quality of the data obtained was be the number of personnel familiar with the work with whales. This probably was more related to the visual sightings and photo-identification work, particularly while I was conducting biopsy sampling and the photo-identification was being undertaken at the same time. However, I want to make clear my appreciation for all the efforts my colleague Graham and crews of *Tiama* Henk and Keith did to help collecting SRW data.

A main limitation on the obtained number of biopsies was the problems with the gear. First, the line that was provided with the reel was not strong enough. After losing some darts I changed it to a stronger line (37lb), which worked better. Then problems occurred with the 9x25 darts. The o-ring was slightly big, the darts wouldn't fit inside the barrel, so I took off all the o-rings from the darts. However, they were sticking harder on the whales. I have the feeling they stuck too much into the whales because the wide size, and that was enough for the darts to stick more and for the line to break easier. On the contrary, the 6x40 heads felt easier to pull from the whales and retained a longer sample. I would recommend using the 6x40 heads when sampling SRW. Finally, there was a bottleneck in the number of tails supplied. There were enough darts, bodies and tracers, but only 5 dart tails. Eventually, we had to stop biopsying because we didn't have enough tails.

I think it would be easier for the sampler and better for the storage of the sample if larger vials (than the commonly used 1.8 or 2 ml) are used if big head tips are used (either 9x25 or 6x40).

I was supplied with a heptane based lube for cleaning the rifle. The manufacturer (PAXARM) states that only rifle oil (without solvents) should be used, as residues can damage the darts. I recommend a full clean with oil of the rifle systems once they are received in Auckland.

Finally, after seeing the quality of footage Henk got with his GoPro camera, I think it would be excellent to have a set of cameras attached to different parts of the vessel, filming while working with SRW, as a source of videos for media purposes.

References

Patenaude, N. J. and C. S. Baker. 2001. Population status and habitat use of southern right whales in the sub-Antarctic Auckland Islands of New Zealand. *Journal of Cetacean Research and Management* Special Issue 2:111-116.

Stewart, R. and B. Todd. 2001. A note on observations of southern right whales at Campbell Island, New Zealand. *Journal of Cetacean Research and Management*:117-120.