

SC/64/SH13

Preliminary voyage plan for the 2013 austral summer SORP Antarctic Blue Whale Project.

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ABSTRACT

The Australian Antarctic Division of the Australian Government is planning an Antarctic Blue Whale Voyage in the austral summer of 2013. This voyage is a project of the Southern Ocean Research Partnership's (SORP) Antarctic Blue Whale Project. The Antarctic Blue Whale Project aims to develop technologies and collect data that will result in an estimation of the abundance of Antarctic Blue Whales (*Balaenoptera musculus intermedia*), improve understanding of population structure and linkages between breeding and feeding grounds, and characterise the behaviour in the feeding grounds.

The 2013 Antarctic Blue Whale Voyage aims to further develop passive acoustic tracking methodologies to increase sighting rates of Antarctic Blue Whales. Individuals identified based on photography identification, genetic biopsies and tagging will contribute to further develop mark-and-recapture methods to meet the aims of the Antarctic Blue Whale Project.

The voyage is currently planned to be a minimum of 42 days in length, departing from either Nelson (New Zealand) or Hobart (Australia) in early February 2013. There are currently two possible study sites; in the Ross Sea (i.e., 135-175°E) and the Davis Sea (i.e., 60 – 100°E). These areas have been identified from the analysis of Blue Whale historical catch data (SC/64/SH14) and IWC-SOWER sonobuoy deployments.

Further collaborations and developments from countries and scientists who could contribute to the Antarctic Blue Whale Project are welcome and encouraged. Feedback on this, the preliminary Antarctic Blue Whale Voyage plan is also welcome and encouraged through the soon to be established SORP Technical Committees and the Scientific Coordinator of the Antarctic Blue Whale Project.

KEYWORDS: MARK-RECAPTURE, IWC-SOWER, PASSIVE ACOUSTICS, PHOTO ID, GENETICS, SORP, ANTARCTIC BLUE WHALE

INTRODUCTION

The Blue Whale is an iconic species. Reaching over 30m in length, it is the largest animal to have existed on Earth. Two subspecies occur in the Southern Hemisphere, the Antarctic Blue Whale and the pygmy Blue Whale (*B. m. brevicauda*). During the austral summer Antarctic Blue Whales feed in the krill rich waters close to the Antarctic continent. Half a century ago Antarctic Blue Whales were perilously close to extinction (SC/63/SH3 and SC/64/SH10). During the late 19th and early 20th century, some 330,000 Antarctic Blue Whales were killed, first by shore-based operations and then by the pelagic catcher and factory ships. With Antarctic Blue Whales close to extinction, in 1964 the International Whaling Commission banned the hunting of Blue Whales, although they were still caught by illegal Soviet whaling operations until 1973 (Branch *et al.* 2004).

The Antarctic Blue Whale Project is one of six collaborative research programs of the Southern Ocean Research Partnership (SORP). The project aims to undertake research to better understand Blue Whales recovery from near extirpation by developing technologies and collecting data that will result in an estimation of the abundance of the Antarctic (or true) Blue Whale (*Balaenoptera musculus intermedia*) and will provide an insight into their general ecology in a post whaling environment by improving our understanding of the population structure and linkages between breeding and feeding grounds, and characterisations of the Blue Whales' behaviour in the feeding grounds. The Antarctic Blue Whale Project is in its infancy stage and we welcome and encourage further collaborations and developments from countries and scientist who could contribute to the Project.

One of the first Antarctic Blue Whale Projects is the 2013 Antarctic Blue Whale Voyage being planned by the Australian Antarctic Division of the Australian Government to be undertaken in a survey area between 60°E and 175°W. The voyage is currently planned to be a minimum of 42 days in length, departing from either Nelson (New Zealand) or Hobart (Australia) in early February 2013. There are currently two possible study sites; in the Ross Sea (i.e., 135-175°E) and the Davis Sea (i.e., 60 – 100°E). These areas have been identified from the analysis of Blue Whale historical catch data (SC/64/SH14), IWC-SOWER sonobuoy deployments and a spatial model of Blue Whale encounters (SC/63/SH3).

Two trial voyages in early 2012 successfully demonstrated the potential for passive acoustics using DIFAR-sonobuoys to increase the encounter rate with Blue Whales. Vocalising pygmy Blue Whales are acoustically similar to Antarctic Blue Whales (McDonald *et al.* 2006) and during the two 2012 voyages provided a successful surrogate for the ABW (SC/64/SH12). The 2013 Antarctic Blue Whale Voyage aims to further develop passive acoustic tracking methodologies used in SC/64/SH12 to increase sighting rates of Antarctic Blue Whales. Individual Blue Whales that are sighted will be identified based on photographic identification, genetic biopsies and tagging. This data will contribute to further develop mark-and-recapture methods to meet the aims of the Antarctic Blue Whale Project.

Feedback on the preliminary Antarctic Blue Whale Voyage plan and the Antarctic Blue Whale Project is welcome and encouraged through the soon to be established SORP Technical Committees and the Antarctic Blue Whale Project Scientific Coordinator, Dr Victoria Wadley.

Research area and rationale

The 2013 Antarctic Blue Whale Voyage aims to further develop passive acoustic tracking methodologies to increase sighting rates of Antarctic Blue Whales. Individuals identified based on photography identification, genetic biopsies and tagging will contribute to further develop mark-and-recapture methods to meet the aims of the SORP Antarctic Blue Whale Project.

The voyage is currently planned to be a minimum of 42 days in length, departing from either Nelson (New Zealand) or Hobart (Australia) in early February 2013. There are currently two possible study sites; in the Ross Sea (i.e., 135-175°E) and the Davis Sea (i.e., 60 – 100°E). These areas have been identified from the analysis of Blue Whale historical catch data (SC/64/SH14), IWC-SOWER sonobuoy deployments and a spatial model of Blue Whale encounters (SC/63/SH3).

Research vessel

Gardline Australia has submitted a tender for the Australian Antarctic Division to use the *FV Amaltal Explorer* (Figure 1 and Table 1), which is a 65 m long ice classed stern trawler owned and operated by Talley's in New Zealand. The vessel was built in 1986, and was originally built for a fishing company based in Spain until it was bought by Talley's approximately five years after its launch. The vessel's home port is Nelson, New Zealand. The *FV Amaltal Explorer* has the ability to support small boat operations from the main vessel, including launching and retrieving small ridged hull inflatable boats (RHIB) that are between 5-8 m in length.



Figure 1. FV *Amaltal Explorer*, a 65 m long stern trawler owned and operated by Talley's in New Zealand (photo Brian Miller).

Table 1. Specifications of the *FV Amaltal Explorer*

	<i>FV Amaltal Explorer</i>
Call sign	ZMTZ
Home port	Nelson, New Zealand
Length overall [m]	65.0
Moulded breadth [m]	12.0
Gross tonnage (GT)	1386
Monkey deck height above waterline [m]	10 – 10.5
Bridge height above waterline [m]	9 - 9.5
Engine power [PS / kW]	1986kW
Class	Lloyds 100A1 class 111D Ice no 8510805 UK Fishing vessel safety provision rules
Ice capacity	Ice classed

Choice of survey area

Three possible survey sites have been identified based on analyses of “hotspots” from Southern Ocean Blue Whale historical catch data (SC/64/SH14), IWC-SOWER sonobuoy deployments and a spatial model of Blue Whale encounters (SC/63/SH3).

The area located south of Africa, in the Haakon VII Sea (i.e., 10°W – 30°E), shown as the green area in Figure 2 is generally considered to be an area of high Blue Whale densities. Voyages in this area are not within the realistic logistical support region of the Australian Antarctic Division. The Antarctic Blue Whale research in the Haakon VII Sea will be undertaken by South African researchers and collaborators.

This leaves two possible survey areas for the 2013 Antarctic Blue Whale Voyage, the first area is in the Ross Sea (i.e., 135-175°E) and the second area is in the Davis Sea (i.e., 60 – 100°E). Figure 2 shows the proposed Ross Sea survey area as the red area and is west of the Ross Sea, around the Balleny Islands (i.e. 135-175°E) . The proposed survey area in the Davis Sea is the yellow area in Figure 2 and is east of Prydz Bay, around the West Ice Shelf and possibly into the Davis Sea (i.e. 60 – 100°E).

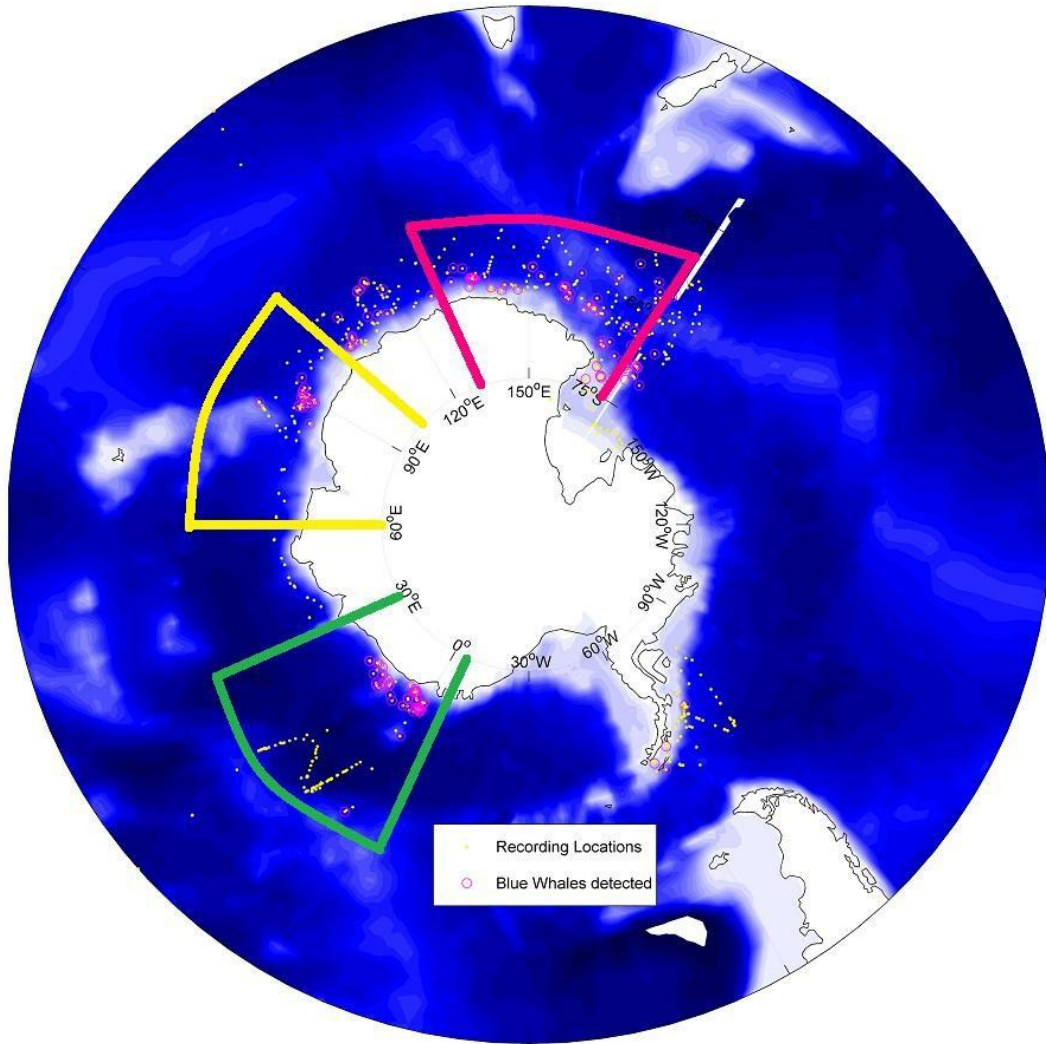


Figure 2 Blue whale detections on sonobuoys deployed during various IWC-SOWER voyages, 1999-2009. Map shows possible survey sites, the area in the red lines is west of the Ross Sea, around the Balleny Islands (i.e., 135-175°E) and in the yellow survey area east of Prydz Bay, around the West Ice Shelf (60 - 100°E). The comparable survey area (in green lines) south of Africa in the Hakkon VII Sea (between 10°W and 30°E).

Using analyses of historical catching histories (SC/64/SH14), it can be determined where, in the early to mid twentieth century, Blue Whales were being encountered and caught in the Southern Ocean. It is assumed that whatever brought the whales to those locations in the early-to-mid twentieth century could also be influencing their distribution today.

The estimated apparent densities (i.e., catch-per-catcher-searching-day-worked) of Blue Whales generated for the circumpolar plots (SC/64/SH14) were taken and summarised for the three potential Antarctic Blue Whale Voyage survey areas, between the latitudes 60°S down to 75°S. Using the same periods as SC/64/SH14 used to summarise the apparent densities (i.e, 1930-34; 1935-40; 1943-49; 1950-54; and 1955-1963), we further summarised to derive mean catch-per-catcher-searching-day-worked per survey area, per month, and per nominated period.

Figure 2 shows these means, with each monthly ‘box plot’ containing the apparent densities, by month, across all time periods, for each potential survey area. Note this is not the optimal way to present the data (i.e., the periods of time over which each apparent density value were calculated should be displayed).

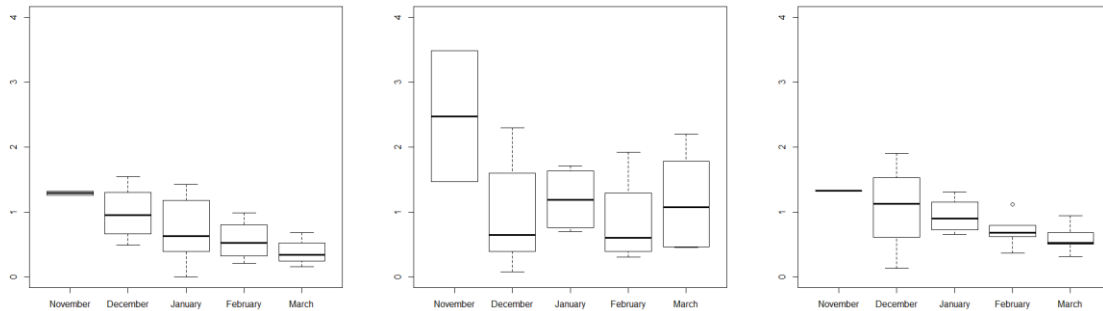


Figure 2 Mean catch-per-catcher-searching-day work for each survey area: left Ross Sea 135-175°E, middle: Davis Sea 60-100°E; and right, Haakon VII Sea 10°W-30°E, over the summer harvesting season (November-March). Data for each ‘box’ is taken across each time period.

A simple measure of density of Blue Whales in the survey region was estimated considering whether Blue Whales were heard on sonobuoys deployed during IWC-SOWER voyages, between 1999 and 2009 (SC/64/SH12).

Rates of ‘success’ of hearing Blue Whales with each deployed sonobuoys are given in Table 2. A plot of all sonobuoys deployed (yellow dots) and whether Blue Whales were heard (red circles) is given in Figure 2.

Table 2 Success rate of sonobuoys deployed during IWC-SOWER voyages between 1999 and 2009.

Potential survey area	No. of sonobuoys deployed	No. that heard Blue Whales	‘Success’ rate
Ross Sea 135-175°E	132	41	31.1%
Davis Sea 60-100°E	66	21	31.8%
Haakon VII Sea 10°W – 30°E	78	59	75.6%

In the paper presented at IWC-SC last year (SC/63/SH3), a simple spatial model based on encounter rates, as observed across all years of the IDCR/SOWER voyages was created; the associated plot is reproduced in Figure 3.

In order to provide another measure of apparent densities in Blue Whales in the potential survey areas the encounter rates in CPIII and the subsequent experimental years (i.e., up to 2009/10 season when the IWC-SOWER program finished) was explored.

The encounter rate of sightings (i.e., not individual animals) was estimated per transect, and an average per potential survey area was estimated; details are given in Table 3.

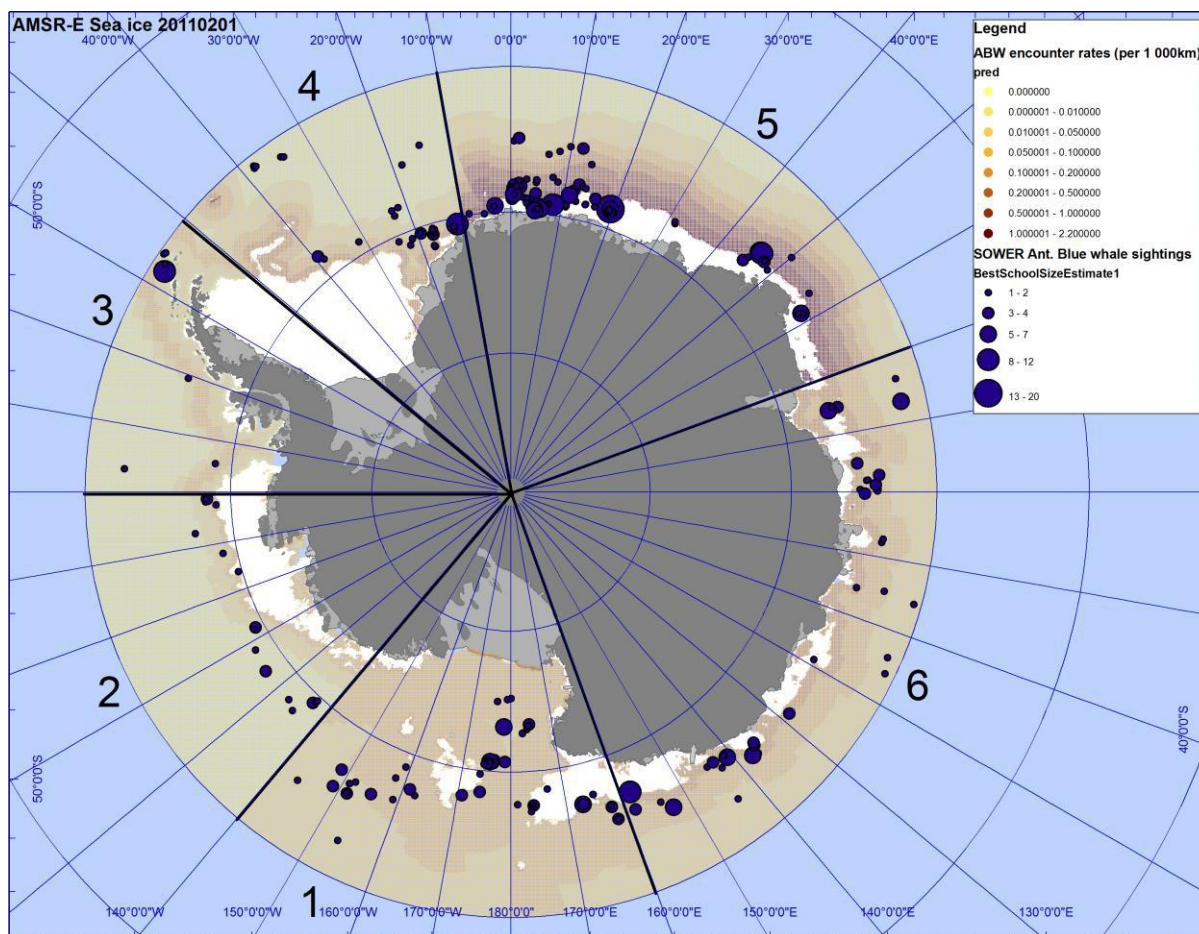


Figure 3 Spatial model of Blue Whale encounter rates (sightings per 1000 km), as observed on IWC-SOWER voyages. Figure is as it appeared in SC/63/SH3.

Table 3 Summaries of sighting rates (per 1000 km of effort) for CPIII and subsequent ‘experimental’ years of IWC-SOWER surveys, for each potential survey area, between latitudes 60S and 70S (down to 75S in the 10W-30E area).

Potential survey area	Mean sighting rate	No. transects	Total track length (km)	Number sightings	Number of individual animals [#]
Ross Sea 135-175°E	0.00094 (0.01732)	4432	33141	22	56
Davis Sea 60-100°E	0.00067 (0.01372)	2103	16532	7	13
Haakon VII Sea 10°W – 30°E	0.00485 (0.06575)	5330	40338	98	232

[#] Derived from best group size estimate

The analyses of the Blue Whale “hotspots” from the historical catch data (SC/64/SH14), IWC-SOWER sonobuoy deployments (SC/64/SH12) and the spatial model of Blue Whale encounters (SC/63/SH3) indicate that both of the two possible survey areas for the 2013 Antarctic Blue Whale Voyage are viable as survey areas. Therefore it will be logistical/operational requirements that will determine which of the two survey areas is

surveyed during the 2013 voyage. This includes considering the sea ice conditions and weather for the regions and potential departure and arrival ports that impact on transit time and survey time.

The *FV Amaltal explorer* is ice strengthened so will be able to survey Blue whales at the ice edge. The location and extent of the ice edge to be surveyed during the survey period has not been analysed or forecasted for this preliminary voyage plan. The weather records from CPII to the end of the IDCR-SOWER program were for the three “hotspot” regions have been analysed (Figure 4). A ‘good day’ is classified as one where the average of sightability over an effort-day of 2 or more (where 1=no sighting possible (i.e., thick fog), 2=poor, 3=moderate, 4=good, 5=excellent) and an average Beaufort sea state of 4 or less. These weather conditions were recorded each hour of each effort day. For each 10 degrees longitude x 5 degrees latitude cell, a proportion of good days to all days surveyed was estimated. For the two possible survey areas the Ross Sea (135-175E) has an average proportion of around 0.55 ‘good days’ and the Davis Sea (60-100E), an average proportion of 0.53 ‘good days’. The weather across the Prydz Bay area affects the Davis Sea; more suitable weather may occur around the West Ice Shelf and Davis Sea.

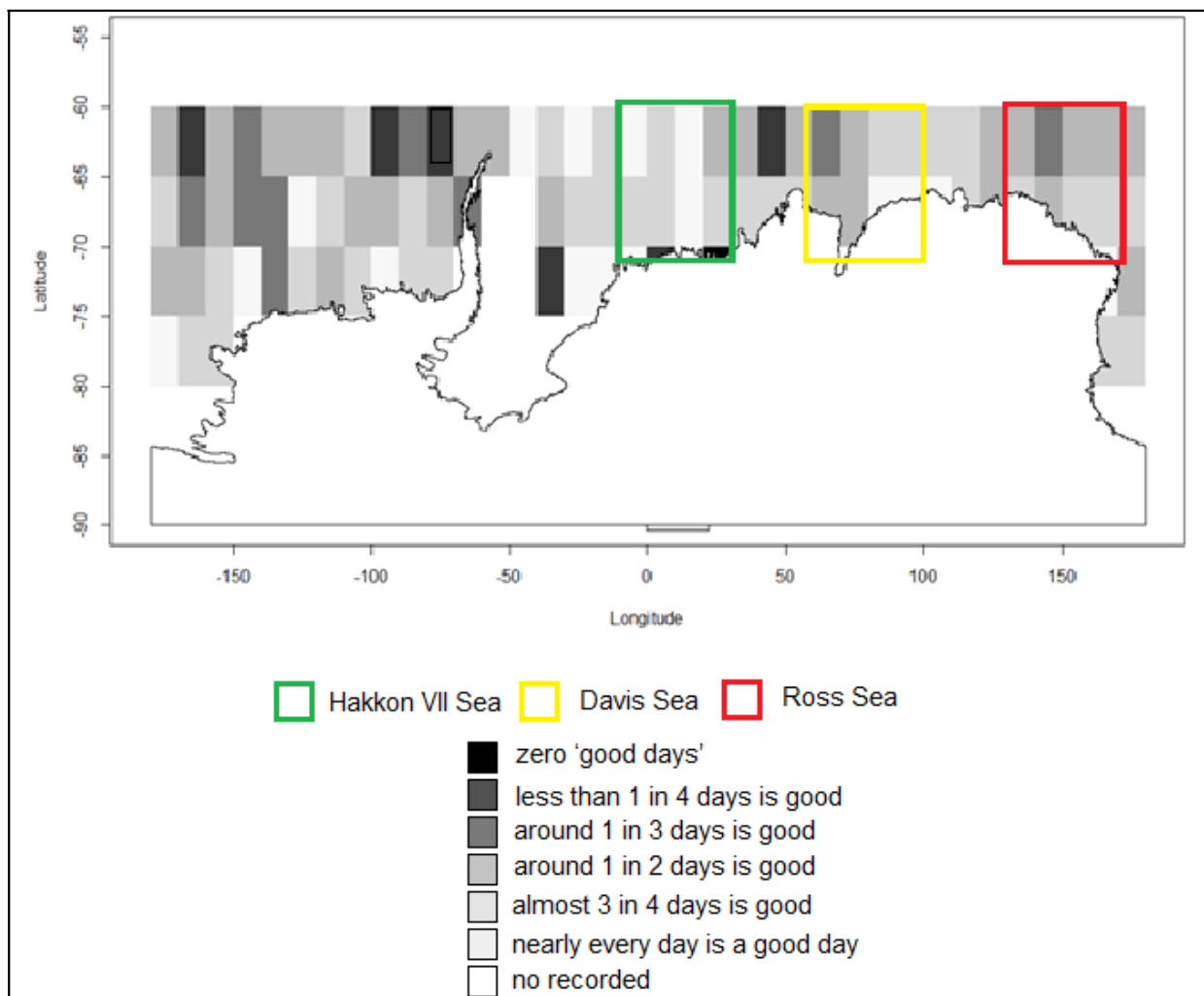


Figure 4. Weather records from CPII to the end of the IDCR-SOWER program for Antarctic Blue Whale “hotspots”.

There are three potential voyage departure locations; Nelson (New Zealand), Hobart (Australia) and Fremantle (Australia). The transit and survey times for the two potential study sites and three potential voyage departure locations are presented in Table 4.

The calculations in Table 4 use the current tendered hire period for the *FV Amaltal Explorer* of 42 days and assumes that the vessel must transit to/from Nelson, NZ, to whichever port(s) are nominated during that 42 day hire period, assuming a steaming speed of 10 kts. Approximately 24 hours turn around at that port(s), for both start and finish of survey is also assumed. The start and end point of the survey area have been defined as the boundary longitudes, and a latitude of approximately 65°S.

Table 4. Transit and survey times for the two potential study sites and three potential voyage departure locations.

Departure and Arrival port	Transit details	Transit time (includes both ways)	Survey time
Ross Sea Survey area 135-175°E			
1. Departing Nelson/Arriving Nelson (NZ)	No transit times to either Hobart or Fremantle. A total distance of 3470 nmiles to/from (1450 + 2020 nmiles) boundaries of survey area.	15 days	25 days
2. Departing Nelson/Arriving Hobart (Aust) (then ship back to Nelson)	No transit times at start, but transiting 1230 nmiles back to Nelson at the end of voyage. A total distance of 2770 nmiles to/from (1450 + 1320 nmiles) boundaries of survey area (i.e., 4000 nmiles transiting all up)	16.6 days	23.4 days
3. Departing Hobart/Return Hobart (ship comes from and returns to Nelson)	There will be vessel transit times at start and end of voyage, 1320 nmiles each way. A total distance of 2920 nmiles to/from (1600 + 1320 nmiles) boundaries of survey area (i.e., 5380 nmiles transiting all up).	22.4 days	17.6 days
Davis Sea Survey area 60-100°E			
4. Departing Hobart/Arriving Hobart (ship comes from and returns to Nelson)	There will be vessel transit times at start and end of voyage, 1320 nmiles each way. A total distance of 5050 nmiles to/from (2050 + 3000 nmiles) boundaries of survey area (i.e., 7510 nmiles transiting all up).	31.3 days	8.7 days
5. Departing Fremantle	There will be vessel transit times at start and end of voyage, 3000+1230 nmiles in	37.3 days	2.7 days

(Aust)/Arriving Hobart (or the other way around; ship comes from and returns to Nelson)	total. A total distance of 4720 nmiles to/from (2700 + 2020 nmiles) boundaries of survey area (i.e., 8950 nmiles transiting all up).		
6. Departing Fremantle /Arriving Fremantle	There will be vessel transit times at start and end of voyage, 3000+3000 nmiles in total. A total distance of 4700 nmiles to/from (2700 + 2000 nmiles) boundaries of survey area (i.e., 10700 nmiles transiting all up).	44.6 days	-4.6 days

The analyses of the Blue Whale “hotspots” indicate that both of the two possible survey areas for the 2013 Antarctic Blue Whale Voyage are viable as survey areas. The analysis of the weather records from CPII to the end of the IDCR-SOWER program indicate that the Davis Sea is probably not impacted by weather days. The analysis of the transit and survey times indicates that the Ross Sea is the preferential survey area as this area allows the greatest time in the survey area and it is thought that the longer time in the survey area the number of sightings will increase. Taking this in to account the departures and arrival into Nelson or departing from Hobart and returning to Nelson (or *vice versa*) are the two preferred options.

Timing of the 2013 Antarctic Blue Whale Voyage

The 2013 Antarctic Blue Whale Voyage is currently being planned as a minimum 42 day research voyage between early February and late March 2013. If the voyage is extended the departure date will be brought forward.

Preliminary analysis completed by Miller (*pers. comm.*) indicates that some of the higher signal to noise ratios have been recorded in the later part of March in the east Antarctica region. Mid-March is the end point for surveying for 24 hours as the daylight is greatly reduced as the austral summer is drawing to an end.

In order to conduct small boat operations safely and to effectively sight whales from *FV Amaltal Explorer* good weather conditions, with relatively calm sea states and good visibility are required. In the Southern Ocean. Ideal conditions are expected to occur on two out of three days (SC/62/O12) for the late January to mid-March time period.

DATA COLLECTION

The 2013 Antarctic Blue Whale Voyage aims to further develop passive acoustic tracking methodologies used in SC/64/SH12 to increase sighting rates of Antarctic Blue Whales. Individual Blue Whales that are sighted will be identified based on photographic identification, genetic biopsies and tagging. The methods used during the 2013 Antarctic Blue Whale Voyage will incorporate the findings from SC/63/SH3 and SC/64/SH12 and feedback from the SORP Technical Committees. This data will contribute to further develop mark-and-recapture methods to meet the aims of the Antarctic Blue Whale Project.

Passive acoustics

The 2013 Antarctic Blue Whale Voyage aims to further develop passive acoustic tracking methodologies used in SC/64/SH12 to increase sighting rates of Antarctic Blue Whales.

Passive acoustic improved sighting rates of Pygmy Blue Whales during the early 2012 voyages (SC/64/SH12) and it is hoped that the technology can be applied in Antarctic waters during the 2013 Antarctic Blue Whale Voyage as vocalising pygmy Blue Whales are acoustically similar to Antarctic Blue Whales (McDonald *et al.* 2006). We will need to take into consideration differences in sound propagation and song characterisations of the Antarctic Blue Whale.

A fully-operational, dedicated, real-time tracking system was used to locate pygmy Blue Whales at a distance of more than 60 km (SC/64/SH12). The core element of the acoustic tracking system consisted of DIFAR sonobuoys, VHF radio receivers, and custom analysis software operated for 24 hours by a team of acousticians. They operated continuously during the voyages, recording nearly 500 hours of audio, while acousticians processed over 7000 Blue Whale calls all in “real-time”. During the 20 days at sea, 32 vocalising Blue Whales were “targeted” and, of these, 29 yielded visual sightings of one or more Blue Whales, giving a combined success rate greater than 90%.

One potential pitfall of this particular acoustic tracking system is the dependence on the donation of expired DIFAR sonobuoys from the military. There is presently no alternative sensor in place should the supply of DIFAR sonobuoys dry up. Furthermore, sonobuoys may only be available to government researchers, researchers in a few select countries, and may be subject to additional export restrictions.

The aim is that passive acoustic method will increase locating “hotspots” and thus sighting rates. Individual Blue Whales that are sighted will be identified based on photographic identification, genetic biopsies and tagging. These data will contribute to further developing methods to meet the aims of the Antarctic Blue Whale Project.

Photo identification

Research time will be allocated for photo-identification and/or videotaping of Antarctic Blue Whales. The dedicated time during the survey for photo-identification will be decided by the Chief Scientist and Voyage Management.

Individual Blue Whales are identifiable from unique patterns of mottling on both sides of the body near the dorsal fin (Sears *et al.* 1990) and in some cases permanent scars can be used to identify or confirm individuals. Identification photos and video will be taken following the methods established in SC/62/SH29. Selected images and footage for each whale will be submitted to the Southern Hemisphere Blue Whale Catalogue (SC/63/SH8).

Generally the Antarctic Blue Whale will be approached within approximately 15-20 meters. Photo-identification of adult and juveniles males and females will occur. If the opportunity arises, females accompanied by calves may be approached for photo-identification, but efforts will cease immediately if there is any evidence that the activity may be interfering with a pair bonding, nursing, reproduction, feeding or other vital functions.

Genetic biopsy sampling

Biopsy samples will be taken of Antarctic Blue Whales as appropriate and decided by the Chief Scientist and Voyage Management. Biological samples will be collected from the RHIB using biopsy sampling (skin/blubber collected by projectile dart). Projectile biopsies will be collected using pneumatic line throwers and biopsy rifles (Larsen gun system).

During a single encounter, no more than five biopsy sampling attempts per individual will be made. The Antarctic Blue Whale that is selected to be sampled will either approach the vessel or be approached by the RHIB. If signs of harassment such as rapid changes in direction, prolonged diving and other behaviours are observed from an individual or a group, the biopsy activities will be stopped on that individual or group.

Additional research

Additional research will be undertaken at the discretion of the Chief Scientist and Voyage Management. This may include satellite tagging, oceanographic studies and SONAR – active acoustics.

Currently there are no satellite tags for Antarctic Blue Whales. If satellite tagging is successful on this voyage it will increase the understanding of the movements of Antarctic Blue Whales.

If oceanographic studies are undertaken, they would involve deploying and retrieving a Conductivity Temperature and Depth (CTD) Sensor to at least 500 m depth at a minimum speed of 1 m/sec.

SONAR – active acoustics could be used to determine the distribution and abundance of pelagic organisms, for example krill, with the to link between acoustic backscatter dynamics and whale distribution and movements.

Sample and data sharing and repository

All data collected on the 2013 Antarctic Blue Whale Voyage will be presented to the IWC Scientific Committee and made available. All photo identification digital photos and video footage are to be catalogued in the Southern Hemisphere Blue Whale Catalogue (SC/63/SH8). Photographs will be made available under standard IWC guidelines.

The repository and processing of the acoustic and genetic data will be determined by the soon to be developed SORP and Antarctic Blue Whale technical committee and will be made public through the IWC and/or the data centre at the Australian Antarctic Division.

OPERATING ENVIRONMENT

Number of personnel

The *FV Amaltal Explorer* will consist of a crew of 16 and there will be up to 18 passengers onboard. The number of researchers dedicated to each of the acoustician, observing and biopsy teams are yet to be confirmed. The SC/64/SH12 report recommends that at least 5 acousticians are required for 24 hour operations. The RHIB crew will consist of a driver, tagger, biopsier and photographer (derived from a mix of the acoustics and observer teams).

The Voyage Management Team will include a Voyage Leader, Deputy Voyage Leader, Chief Scientist, a medical doctor and possibly an Ice Pilot.

International researchers

We encourage national and international collaboration and input from countries and researchers who could contribute to the SORPs Antarctic Blue Whale Project and the 2013 Antarctic Blue Whale Voyage plan.

Length of research days

The 2013 Antarctic Blue Whale Voyage survey will involve 24 hour operations to undertake passive acoustics and general Blue Whale science (e.g. tagging, biopsy, photo-identification). This will be subject to Standard Operation Procedures and Job Hazard Analyses.

Acceptable conditions

In order to conduct small boat operations safely and to effectively sight whales from *FV Amaltal Explorer* good weather conditions, with relatively calm sea states and good visibility are required. Acceptable conditions will be determined in Standard Operating Procedures and Job Hazard Analysis. As a guide the usual guidelines for acceptable conditions will apply i.e. visibility (to see a Blue Whale) is greater than 2.0 nmiles and wind speed is < 20 knots; the sea state should be < Beaufort 6.

FUTURE PLANNING

The 2013 Antarctic Blue Whale Voyage plan will be refined by the soon to be established SORP Technical Committees. We hope that the passive acoustic method used in the SC/64/SH12 voyages will increase sighting rates and the individual Antarctic Blue Whales that are sighted will be identified based on photographic identification, genetic biopsies and tagged. These data will contribute to further develop methods to meet the aims of the Antarctic Blue Whale Project.

The vessel charter will be secured shortly and logistical and operational preparation will commence in earnest. Feedback on the preliminary 2013 Antarctic Blue Whale Voyage plan and collaboration from nations and researchers who could contribute to the Antarctic Blue Whale Project is welcome and encouraged through the soon to be established SORP Technical Committees and the Antarctic Blue Whale Project Scientific Coordinator, Dr Victoria Wadley.

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