BEAUCHÊNE ISLAND CENSUS OF BLACK-BROWED ALBATROSS

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1. SUMMARY

To assess current population size of black-browed browed albatross breeding at Beauchêne Island, we undertook a census during early incubation between the 4-6 November 2022. We used a DJI Mavic pro at a flight height of 60 m to take images of the breeding colony. There was no detectible disturbance to albatross, and no risk of bird strike at a flight height of 60 m. In total 5,320 photographs were taken over 3 days (first and last day being half days) to build a composite georeferenced image, and 121,117 albatrosses on nests counted. When applying a correction factor for loafing birds and unobserved nests, this yielded 119,725 Black-browed albatrosses on nests. With an uncertainty of 5 to 10% in counts, gives confidence intervals of 119,725 (95 % CI of 118,909 – 122,041). This is similar to the 2017 census, which reported 118,814 black-browed albatross nests (95% CI of 116,093-121,535). In summary, while there are a number of caveats associated with the 2022 census, we conclude that the population at Beauchêne Island has not changed significantly between 2017 and 2022.

2. INTRODUCTION

The Falkland Islands hold approximately 70 % of the global population of Black-browed albatross (*Thalassarche melanophris)*. Black-browed Albatrosses breed at 12 sites in the Falkland Islands, with Steeple Jason Island, Beauchêne Island and Grand Jason Island accounting for approximately 80 % of the Falkland Islands population, based on the most recent 2017 census (Crofts and Stanworth 2022). Population changes at the Falkland Islands impact the global population status of the species. For example, IUCN Red List classification for Black-browed albatross was down-graded in 2017 to Least Concern, after being listed been classified as Near Threatened (2013-2016) and Endangered (2003-2012) by the IUCN – principally a result of population changes at the Falkland Islands based on a 2010 archipelago-wide census of Black-browed albatross (Wolfaardt 2012).

Anecdotally there has been an increase in albatross-fishery interactions around Beauchêne Island over recent years. Population surveys of Black-browed albatross at

Beauchêne Island date back to 1982 (Prince 1982), with the most recent census in 2017 indicating that Beauchêne Island holds about 20 % of the Falkland Islands breeding population (Table 1). An increase in seabird-fishery interaction might relate to changes in abundance at Beauchêne Island. To understand population changes at Beauchêne Island, SAERI undertook a census on behalf of DNR-Fisheries in 2022. This brief report details the findings of the 2022 Beauchêne Island census.

3. METHODS

Low altitude aerial photography is the preferred census method for large colonies of surface nesting seabirds. There are two potential options to census Black-browed albatross breeding on Beauchêne Island using aerial photography. These are using aircraft to take photographs (as in 2017), or using an unmanned aerial vehicle (UAV). Each approach has advantages and disadvantages. In brief, photographs taken from a moving aircraft are taken at an angle which can yield lower quality images, and images are not georeferenced. The latter is significant, because individual images need to be manually stitched together. Although UAVs can also yield poor quality images due to motion blur, we chose to undertake the census using UAVs because of the ease of image processing, and image quality (2.6 cm/pixel at a flight height of 60 m).

Beauchêne Island was photographed using a DJI Mavic pro, 1/2.3" CMOS sensor 12-megapixel camera, ISO 200, max aperture 2.27) at a flight height of 60 m. The UAV was launched and recovered from the FPV Protegat RIB, when conditions were suitable (wind < 20kt). Flight missions were programmed using DronePilot, which automatically calculates a flight path and photograph points, based on the specified image overlap (80%) and area of interest. Ideally, we would have programmed the drone to stop to photograph to reduce motion blur. However, we did not do this because we were flying

the UAV from a RIB and it increased mission time by hours. This was at the expense of image quality. Each photograph was georeferenced, and therefore individual photographs were processed to create a single colony orthomosaic photograph, using Agisoft Metashape Pro (v1.5.0) software. Finally, a shapefile layer was created in QGIS (v3.4.2) to count birds on nests. By counting birds in QGIS, this allowed each nest to be georeferenced, and the number of birds on nests to be cumulatively tallied.

The census was timed to occur during the early incubation period (4-6 November in 2022), similar to previous censuses (Table 1). All birds on nests were counted. The majority of the colony was counted by a single observer – with a second observer checking for errors or missed birds (combined approximately 120 hours of effort). We applied correction factors to the total number of Black-browed albatross counted to account for non-breeding birds occupying empty nests and immature or non-breeding birds, which are often around the edge of breeding colonies, that could be mistaken for a bird on a nest. For ease of comparison, we used the same correction factor values applied to the 2017 census, which was 4.15 % for loafing birds (based on an average of nine breeding sites in 2017), and a 3 % correction factor for nest concealment (Crofts 2022). We assumed that uncertainty in counts would be between 5 to 10%, which was used to generate our 95% confidence intervals.

Table 1: Censuses at Beauchêne Island over the past 20 years have been generally timed to occur during the early incubation period (October/November).

Year	Date counted	Method	Total	CI
1980	Dec 11 – 14	Transect/direct (Prince 1982)	162,360	140,000-170,000
2000	Oct 21 – 22	Transect/direct (Huin & Reid 2007)	96,963	4,707
2005	Nov 3 - 9	Transect/direct (Huin & Reid 2007)	94,010	5,300
2005	Late Sept/Oct	Aerial (Strange 2008)	108,247	
2010	Oct 23 – 26	Transect/direct (Baylis 2012)	139,336	12,937
2010	Late Sept/Oct	Aerial (Strange 2011)	105,777	
2017	Oct 21	Aerial – FIGAS (Crofts 2020)	118,814	116,093-121,535
2022	Nov 4 - 6	Aerial - UAV (this report)	119,725	118,909-122,041

4. RESULTS AND DISCUSSION

There was no detectible disturbance to albatross, and no risk of bird strike at a flight height of 60 m. In total 5,320 photographs were taken over 3 days (first and last day being half days), and 121,117 albatrosses on nests counted. When applying the correction factor for loafing birds and unobserved nests, this yields 119,725. With an uncertainty of 5 to 10% yields 95% confidence intervals of 119,725 (118,909 – 122,041).

The main part of the Black-browed albatross colony in the north of Beauchêne were of good image quality (defined as being able to clearly identify albatross on nests) (Fig 1). However, the image quality for the colony in the south of Beauchêne was far more

variable, with quality ranging from good (see definition above) to poor (where albatrosses were pixilated, and confirming birds nesting was challenging) (Fig 2). Counts in the southern part of the Beauchêne colony were further complicated by the terrain being broken flat rock, meaning that limited nesting material was available and therefore, nests were difficult to detect even when images where good quality, as they were not the typical mud pedestal nests.

Hence, the southern part of Beauchêne had a low degree of certainty in the accuracy of our counts (total birds 2,186 albatross). This is unlikely to significantly impact the total population estimate, because Black-browed albatross density was low in the south (Fig 3) and therefore, error is small comparative to the total number of nesting Black-browed albatross counted.

Despite these uncertainties, the 2022 estimate for Beauchêne Island (119,725) is similar to the 2017 census (118,814). Hence there has been no large increase in the number of Black-browed albatross breeding pairs on Beauchêne Island between 2017 and 2022. However, several challenges exist when assessing population changes over time. The first is that, over the past 20 years, a number of different census methods have been used, including aerial photographic surveys via aircraft, direct counts, transects and most recently, aerial photographic surveys via UAV. Each of these methods have different sources of error and accuracy, which makes them inherently difficult to compare. For example, the decline in number of Black-browed albatross between 2010 and 2017 could simply reflect the different methods used, with transect counts likely being less accurate than aerial survey. In addition, there have also been differences in the dates when counts where undertaken (Table 1), which could have large effects on our population estimates (too early and you miss breeding birds, too

late and birds that have failed have already left). At present, there is little data available to correct for differences in the timing of censuses.

In summary, and taking the caveats discussed into consideration, we can conclude that the population size of Black-browed albatross breeding at Beauchêne Island has not changed significantly between 2017 and 2022.
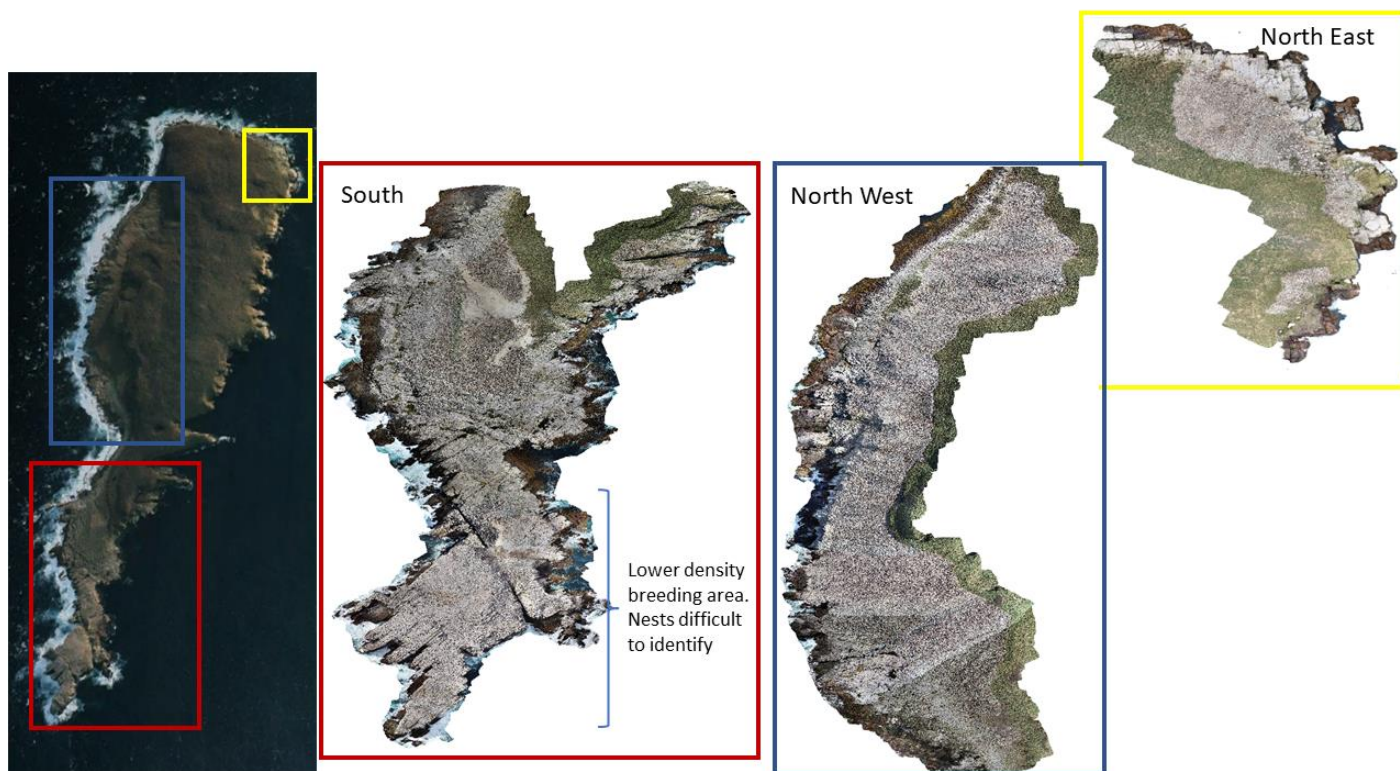

Fig 1: An overview of Beauchêne Island and the Black-browed albatross colony orthomosaic constructed from UAV photographs taken in 2022.

Fig 2: A small section of the NW breeding colony (see also Fig 1).

Fig 3: There was a low density of birds in the south of Beauchêne. The terrain was predominantly broken flat rocks, with limited nesting material available, which meant nests were not the usual mud pedestals. Identifying birds on nests was challenging, but the number of birds in the southern part of the Beauchêne colony was small (2.5 % of the total estimate).

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