Falkland Islands Seabird Monitoring Programme

Annual Report 2015/2016 (SMP23)

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Summary

The Falkland Islands support seabird populations that are of global importance; both numerically, and in terms of conservation status. Accordingly, fluctuations in local populations impact the global conservation status of these species.

Currently the Falkland Islands Seabird Monitoring Programme (FISMP) monitors Gentoo Penguin (*Pygoscelis papua*) at 11 sites (16 colonies), Magellanic Penguin (*Spheniscus magellanicus*) at one site (one colony), and Southern Rockhopper Penguin (*Eudyptes c. chrysocome*) at five sites (13 colonies). Imperial Shag (*Phalacrocorax atriceps*) is monitored at three sites. King Penguin (*Aptenodytes patagonicus*) and Black-browed Albatross (*Thalassarche melanophris*) are monitored at single, but key, sites; in terms of population numbers. Southern Giant Petrel (*Macronectes giganteus*) is monitored at one site (three colonies). Additional count data have been contributed by landowners at two further sites.

During the 2015, season indications were of stable or increasing populations of Gentoo Penguin, Southern Rockhopper Penguin and Black-browed Albatross. Mixed trends were observed in the monitored populations of Southern Giant Petrel. Breeding success was variable amongst the monitored species of seabirds, but on whole was down from the previous season of 2014 and overall below the seasonal average.

Estimated numbers of Gentoo Penguin breeding pairs at monitored sites increased by 6.4 %. The majority of colonies continued to show upward trends from the 2014 season and given previous fluctuations in what has been an increasing population trend since 2003, there is currently no indication of any change in this situation. The only exception in this trend was at the three North-east colonies, with Volunteer Green showing the largest decline in breeding pairs. The East Falkland Colonies continued to show partial recoveries in breeding pair numbers following the drop in numbers during the 2013 season. Steeple Jason colonies in the North-west showed upward trends with the Neck colony reaching a new maxima, the House colony moved towards a partial recovery from the decline in the previous season. Average estimated breeding success for Gentoo Penguin fell to take it below the seasonal average. Regionally, estimated breeding success showed variability in the decline from the previous season with declines in the North-east being the most evident. Only the Steeple House colony exhibited an increase in breeding success from the

previous season.

The total breeding pair estimate of Southern Rockhopper Penguin for monitoring sites continued to increase and reached another new high since monitoring began in 2005. Estimated breeding populations at individual sites were considered generally to be stable/ increasing. The estimate of average breeding success however, fell below the average seasonal mean. Breeding success declined at all individual monitored sites from the previous season.

Magellanic Penguin at Gypsy Cove remain broadly in three groupings, which appear to be associated with the extent of tussac habitat at the monitoring site. Occupancy rates for Gypsy Cove were the highest recorded and well above previous seasonal averages.

Estimated numbers of pre-fledged King Penguin have shown a strong positive trend at the Volunteer Green colony. No counts were conducted during the 2015 season.

Black-browed Albatross breeding pairs at the monitoring sites at Steeple Jason showed an increase from the previous season, and despite some annual fluctuations the overall trend since monitoring began in 2005 suggest a stable population. Estimated breeding success at Steeple Jason fell from last season taking to below the average seasonal mean. The chick counts at Dunbar fell considerably making it the worst year on record for the site.

After an apparent steady upward trend in the Steeple Jason population of Southern Giant Petrel, notable declines were observed at all the individual colonies during the 2015 season. A new location for nesting pairs was observed at the NW Black-browed Albatross colony with 6 pairs attempting to breed, although all failed. Breeding success improved on last season as part of a recent upward trend, however, overall breeding success has shown a general decline. At Bleaker Island, chick counts gave good indication that breeding pair numbers were stable with only a small decline in chick numbers from the 2014 season.

Contents

Introduction

The Falkland Islands support seabird populations that are of global importance; both numerically, and in terms of conservation status. An estimated 72 % of the global population of Black-browed Albatross (*Thalassarche melanophris*) breeds in the Falkland Islands (ACAP 2010, BirdLife International 2016). This species is currently listed as 'Near Threatened' on the IUCN Red List (IUCN 2013). The Falklands are also home to approximately 36 % of the world's population of Southern Rockhopper Penguin (*Eudyptes c. chrysocome*) (Red Listed as 'Vulnerable') and approximately 34 % of the world's population of Gentoo Penguin (*Pygoscelis papua*) (Red Listed as 'Near Threatened'). Accordingly, fluctuations in local populations impact the global conservation status of these species.

Falklands Conservation initiated the Falkland Islands Seabird Monitoring Programme (FISMP) in 1989/90. Its initial purpose was to monitor the diet and population dynamics of Gentoo Penguin, Magellanic Penguin (*Spheniscus Magellanicus*), Southern Rockhopper Penguin, and Black-browed Albatross. Diet sampling was discontinued in 2003. Since then, population monitoring has continued on an annual basis with some changes taking place to the original format, such as the addition and loss of some monitoring sites and the addition of other species.

Currently the FISMP monitors Gentoo Penguin at 11 sites (16 colonies), Magellanic Penguin at one site (one colony), and Southern Rockhopper Penguin at five sites (13 colonies). King Penguin (*Aptenodytes patagonicus*) and Black-browed Albatross are monitored at single, but key, sites, in terms of population numbers. Since 2006, Southern Giant Petrel (*Macronectes giganteus*) has been monitored at one site (three colonies). Monitoring of Imperial Shag (*Phalacrocorax atriceps*) has been initiated recently at three sites.

In 2010, monitored colonies made up approximately 18 % of the Falklands' breeding population of Gentoo Penguin (estimated at 132,000 breeding pairs); approximately 2.6 % of the Falklands' breeding population of Southern Rockhopper Penguin (estimated to be 319,000 breeding pairs) (Baylis 2012) and approximately 0.5 % – 0.6 % of the total Falklands' breeding population of Black-browed Albatross (estimated to be between 475,500 and 535,000 breeding pairs) (Wolfaardt 2012). Based on 2005 figures (the last Island-wide Census for Southern Giant Petrel), the monitoring site for Southern Giant Petrel made up approximately 7.3 % of the total Falklands'

breeding population (Reid and Huin 2005). The only population estimate for Magellanic Penguin in the Falkland Islands is for 76,000 to 142,000 pairs (Woods and Woods 1997). As a very broad estimate, the current monitoring site is likely to represent less than one percent of this. There are no other significant King Penguin colonies within the Falkland Islands and the small numbers of individuals at other locations are not systematically monitored. The current monitoring site is likely to represent over 95 % of the breeding population.

The information gathered as a result of the FISMP has contributed to the identification of local, regional and global conservation priorities and provided information necessary for IUCN Red Listing of both Southern Rockhopper Penguins and Black-browed Albatross. The FISMP provides an important long-term data set on population trends and breeding success, which further contributes to other areas of research.

This report details monitoring results from the 2015/2016 breeding season as well as contributed current and historic data collected by landowners at Dunbar and Bleaker Island settlements.

Materials and Methods

Within this report, breeding seasons are referred to by the year in which they commenced, for example; 2015 describes the 2015/2016 season. 'Location' or 'site' refers to a named geographical area, such as a settlement or 'camp', and this may support more than one colony. For example, Volunteer has Gentoo Penguin colonies at Volunteer Green, Lagoon Sands and at Cow Bay; Race Point has Gentoo Penguin colonies at Rookery Sands and Fanning Harbour. 'Colony' refers to a group or groups (sub-colonies) of birds in close proximity, typically within 50-100 m of each other and/or with the same or proximate access from the sea. Monitoring locations are shown in **Figure 1**, exact grid references are provided in **Appendices 2** to **5**.

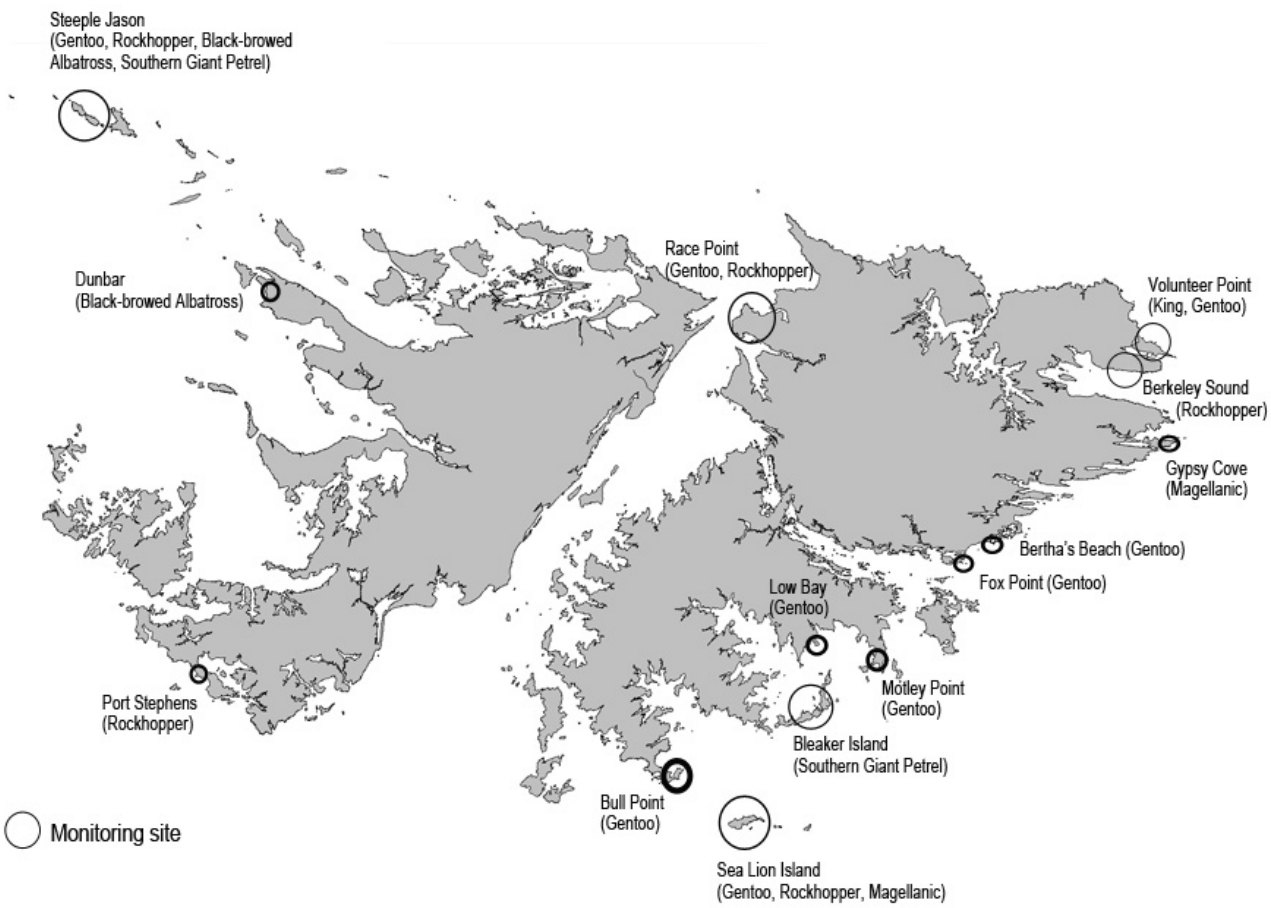

Figure 1: Map of monitoring locations.

In addition to those counts undertaken by Falklands Conservation (below), counts have also been undertaken at Dunbar (Black-browed Albatross) and Bleaker Island (Southern Giant Petrel) by the landowners. Any variation from the standard methodology is reported in the text.

Gentoo Penguin

Breeding pairs of Gentoo Penguins were counted during egg-laying, over the period 1-18 November 2015. The number of chicks was counted soon before fledging, during the period 3-17 January 2016, and used to estimate breeding success. The monitoring locations (colonies in brackets if more than one) were:

- Volunteer (Volunteer Green, Cow Bay and Lagoon Sands);
- Race Point (Fanning Harbour and Rookery Sands);
- Sea Lion Island;
- New Haven;
- Bull Point (Bull Point and Bull Roads);
- Motley Point;
- Low Bay;
- Bertha's Beach;
- Fox Point;
- Pleasant Roads; and
- Steeple Jason (House and Neck).

Southern Rockhopper Penguin

Southern Rockhopper Penguin breeding pair counts were performed from the commencement of egg-laying during the period 28 October to 19 November 2015. Chick counts were carried out between 3 and 18 January 2016. The locations (colonies in brackets if more than one) were:

- Steeple Jason (North West Flat, North West Ridge, S5Tip and South East);
- Sea Lion Island (Rockhopper Point);
- Race Point (Fanning Head North and Fanning Head South);
- Berkeley Sound (Diamond Cove, Rugged Hill and Eagle Hill); and
- Port Stephens (Stephen's Peak).

Magellanic Penguin

Transects were carried out every 100 m (approximately) from Engineer Point to the Car Park at Gypsy Cove on 15 December 2015. Transects were 4 m wide, starting from the shore line, and running perpendicular to it, for a distance 40 m further than the last burrow found. Using a pole with torch attached, burrows within the transect were categorised as either 'occupied', 'unoccupied' or 'unknown' if it was not possible to determine occupancy. Burrow density was derived from each transect as number of burrows in the transect area from the start of the transect to as far as the last recorded burrow.

King Penguin

The only significant population of King Penguins within the Falkland Islands is found at Volunteer. This population has been monitored annually since the onset of the FISMP, with the first independent counts having been performed earlier, since 1980. A few individuals also breed at nearby Lagoon Sands. The breeding cycle of King Penguins extends over a year and consequently is not synchronised to summer breeding as with the other penguin species. The chosen unit of measure for King Penguin is pre-fledged chicks that have survived the winter. This is not a measure of the total number of chicks produced (as some will have perished over the winter), nor is it an exact indicator of the number of breeding pairs.

Imperial Shag

Counts of Imperial Shag were conducted at Motley Point (17 November 2015), Berkeley Sound (11 January 2016) and Steeple Jason (18 January 2016). Due to the variable and generally late breeding of Imperial Shag, numbers derived represent potential breeders rather than actual breeding pairs.

Black-browed Albatross and Southern Giant Petrel

Counts of Black-browed Albatross and Southern Giant Petrel breeding pairs at Steeple Jason were performed between 26 October and 3 November 2015, and in order to estimate breeding success, chicks from these colonies were counted between 14 and 15 March 2016. Three colonies of Southern Giant Petrel and five sub-colonies (distinct nodes from the main colony, or groups of breeding birds that are slightly separated from the main colony) of Black-browed Albatross are monitored.

Counts of Black-browed Albatross chicks were made at Penguin Point South, Dunbar on 21 February 2016 by the landowner. Counts of Southern Giant Petrel chicks were made at Bleaker Island in February by the landowner.

Count Methods

Whenever possible the total counts were made of all breeding pairs/chicks at individual locations, whilst in the field, by paired observers (**Appendix 1**). The count units for estimated breeding pairs and estimated breeding success were 'apparently occupied nest' and 'pre-fledged chick', respectively. The decision to utilise photo counting was made on an individual colony/sub-colony basis, where it was felt that a paired tally count in the field would not provide a reliable estimate. This was generally due to the size of some colonies (e.g. Steeple Jason Neck). In some instances, for chick counting, large numbers of highly mobile chicks had merged sub-colonies over large areas. Here again, it was felt, that reliable estimates could not be derived and the decision was made to count the other various sub-colonies that had remained distinct. These counts still related to individual breeding pair numbers from the counts earlier in the season, and from this breeding success could be derived; in essence a sub-sampling technique. The various methods, or combination of methods, employed for each location/ colony are presented in **Appendices 2** to **5**.

Grid references of individual colonies (due south of the approximate centres, 5m from the colony edge) were taken where possible and are provided in **Appendices 2** to **5**.

Field Counts

Whenever possible, the number of 'apparently occupied nests' and 'pre-fledged chicks' were counted at least three times by two or more observers using tally counters in accordance with standard methods (Thompson and Riddy 1993). These counts (and those few of reduced replication) were subsequently averaged to give estimates of breeding pair and chick numbers. These counts are referred to as 'Tally Repeated'. Counts at Penguin Point South, Dunbar and Bleaker Island were single counts by a single observer. In some instances groups or count unit numbers were so small that it was felt the number of count units could confidently counted without error on a single occasion. These counts are referred to as 'Tally Agreed'. Breeding success is expressed as the number of chicks per breeding pair for species with two or more chicks and as a percentage for those with one chick on graphs.

Photo Counts

The majority of photographs were taken using a GoPro HD Hero. The camera was pole mounted and held aloft from a vantage point to a height of approximately 5 m whilst a minimum of three photos were taken in 1920x1080 resolution in jpeg format giving a 127 ° field of view. Where colonies were too large to fit into a single photograph, markers or natural features were used to subdivide the colonies into sections that could be photographed. There was no evidence of disturbance in the colonies from using this technique. A number of other photos were taken using digital SLR cameras using the highest possible resolution images.

Photographs were down-loaded and were counted using ImageJ software. Counts were repeated a minimum of three times and the average taken. These are referred to in Tables as 'Photo Counts'.

Results

Gentoo Penguin

Breeding Pairs

There is a complete data set for the current annually monitored locations (excluding Pleasant Roads) for the last 13 seasons. The combined total of estimated breeding pairs for all these locations is shown in **Figure 2**. At these monitored sites, the total estimated number of pairs increased from 28,330 in the 2014 season to 30,139 in the 2015 season; 6.4 % overall.

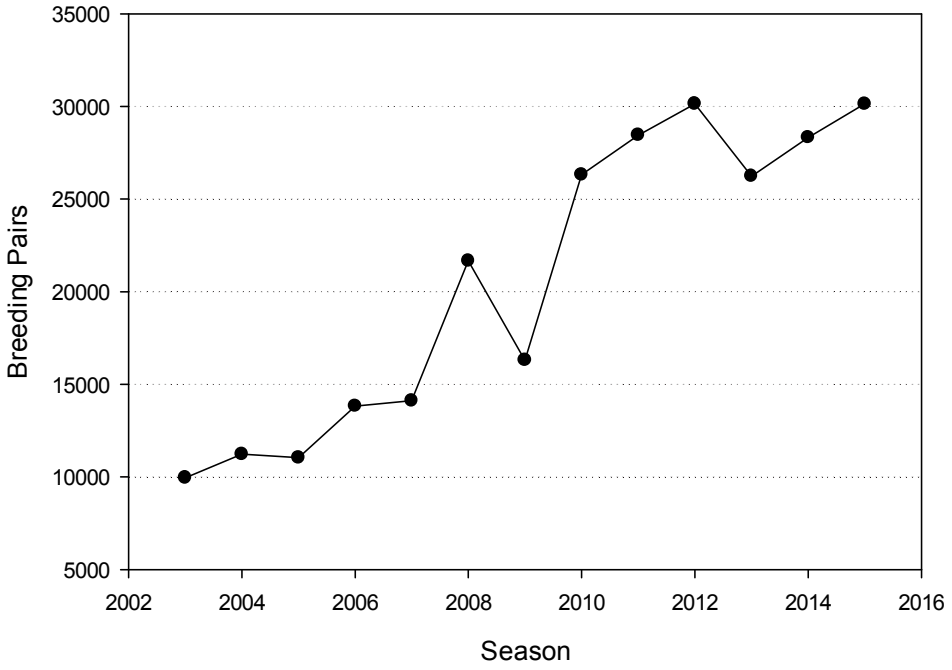

Figure 2: Seasonal changes in total estimated Gentoo Penguin breeding pairs from current annually monitored locations.

The estimated number of Gentoo Penguin breeding pairs increased at 13 of the 16 monitoring colonies (**Figures 3** to **8**). Colonies at the South-east (Sea Lion Is, Bull Pt, Bull Rds.) continued to show an upward trend towards partial recovery from the marked declines of the 2013 season, with Sea Lion Is. reaching a new maxima (increase of 29.7 % in the 2015 season from 2014). Colonies at the mid-east and Falkland Sound regions also exhibited upward trends with an increase of 15.6 % and 17.6 % in 2015 from the 2014 season respectively. Notably declines were evident at all of the North-east colonies, with the largest decline at Volunteer Green (36.3 %), followed by Cow Bay (24.9 %) and Lagoon Sands (22.7 %). Bleaker Island continues to exhibit an upward trend, and a partial recovery in the 2015 season from a notably decline in the 2014 season.

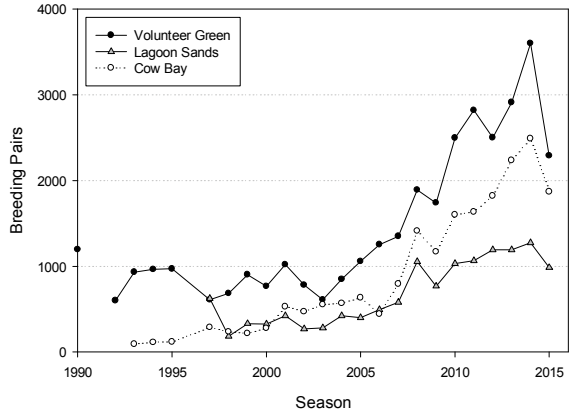

Figure3: Seasonal changes in estimated Gentoo Penguin breeding pairs for locations in north-east Falkland.

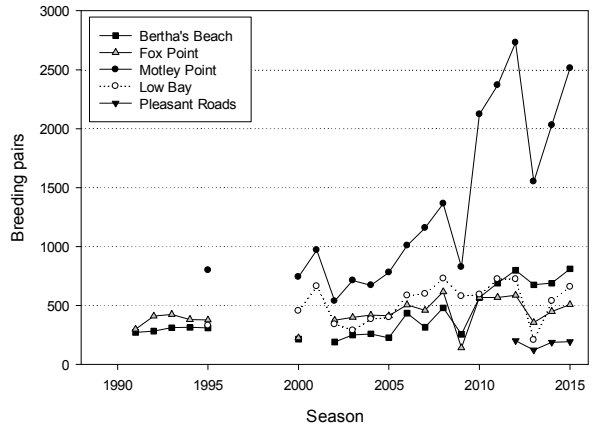

Figure 4: Seasonal changes in estimated Gentoo Penguin breeding pairs for locations in mid-east Falkland.

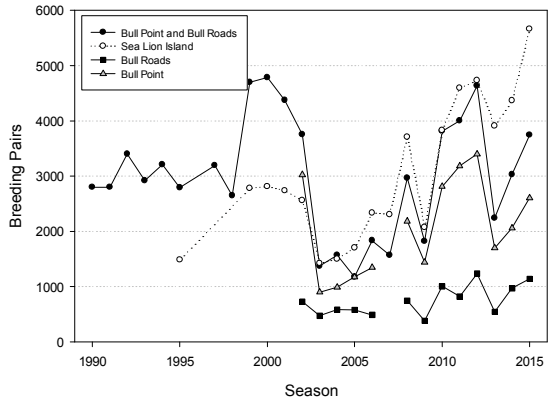

Figure 5: Seasonal changes in estimated Gentoo Penguin breeding pairs for locations in south-east Falkland.

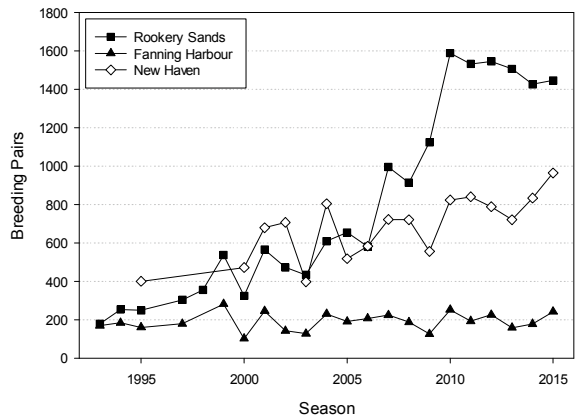

Figure 6: Seasonal changes in estimated Gentoo Penguin breeding pairs for locations on Falkland Sound.

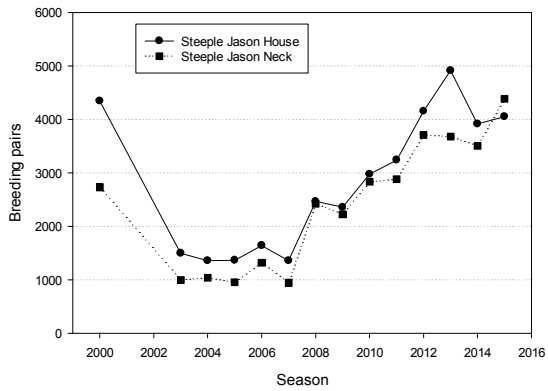

Figure 7: Seasonal changes in estimated Gentoo Penguin breeding pairs for locations on Steeple Jason.

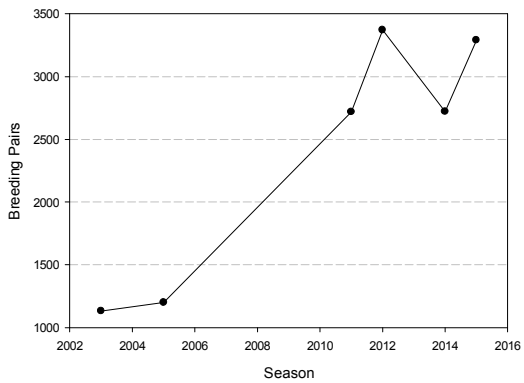

Figure 8: Seasonal changes in estimated Gentoo Penguin breeding pairs for Bleaker Island.

Breeding Success

Average estimated breeding success fell from 1.05 chicks/pair in 2014 to 0.72 chicks/pair in 2015 taking it to below the seasonal average (**Figure 9**).

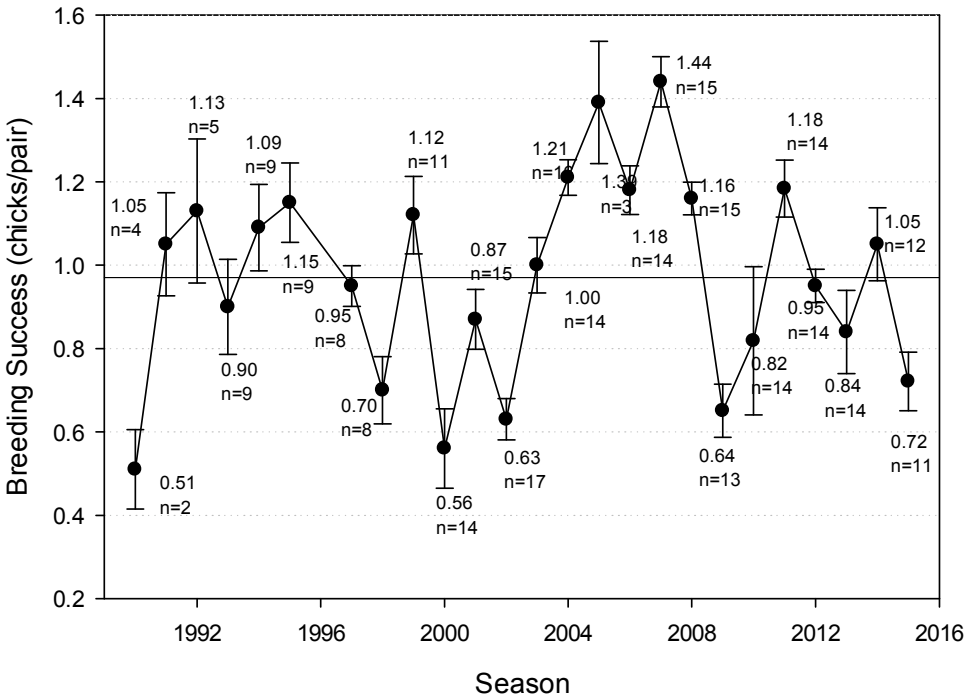

Figure 9: Seasonal changes in estimated Gentoo Penguin breeding success from current annually monitored sites (solid line – seasonal average). Standard Error bars show error about the overall mean by site means, and do not incorporate error about individual sites.

The range of breeding success between locations (*n* =11) varied from a minimum of 0.42 ± 0.03 chicks/pair at Cow Bay to a maximum of 1.14 ± 0.01 chicks/pair at Sea Lion Island (**Figures 10** to **14**). All but one of the colonies with chick counts obtained for 2014 and 2015 showed a decline in breeding success (Volunteer Green, Lagoon Sands, Cow Bay, Rookery Sounds, Fanning Head, New Haven, and Steeple Neck). Sea Lion Is. showed only a slight decline from 1.19 ± 0.02 chicks/pair in 2014 to 1.14 ± 0.01 in 2015. The only colony to show an increase was at Steeple Jason House (up 48.5 %). Decreases in breeding success were most evident in North-east colonies (Volunteer Pt., Cow Bay and Lagoon Sounds) with an average decline of 53.7 ± 19.9 %. (Standard Error figures report error about the overall mean by site means, and do not incorporate error about individual sites).

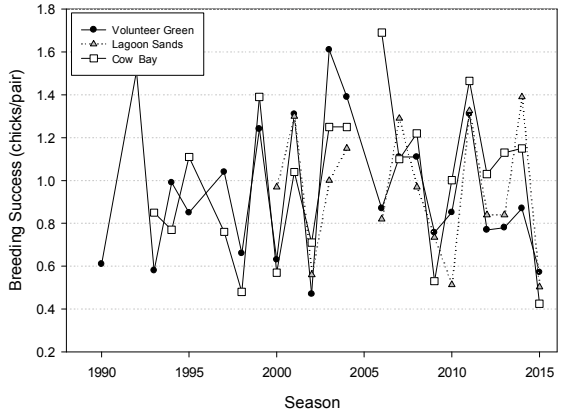

Figure 10: Seasonal changes in estimated Gentoo Penguin breeding success for locations in north-east Falkland.

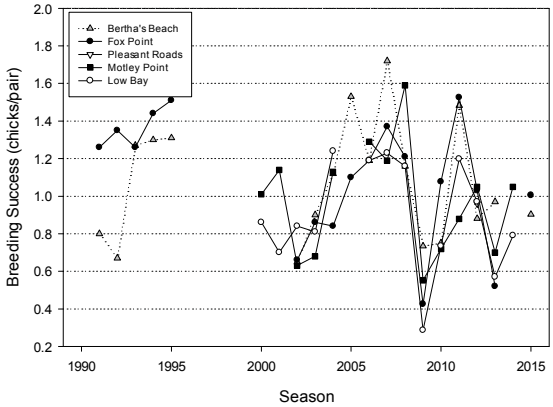

Figure 11: Seasonal changes in estimated Gentoo Penguin breeding success for locations in mid-east Falkland.

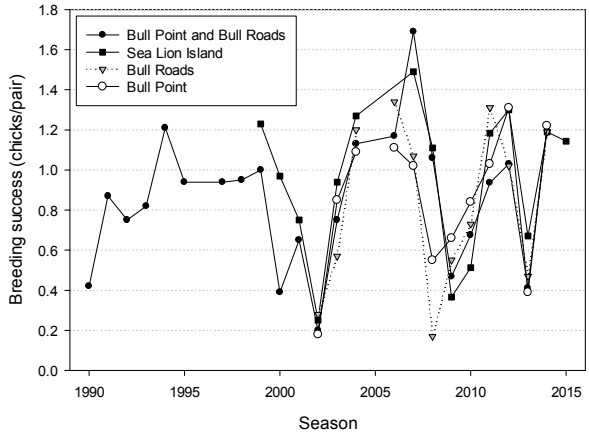

Figure 12: Seasonal changes in estimated Gentoo Penguin breeding success for locations in south-east Falkland.

Figure 13: Seasonal changes in estimated Gentoo Penguin breeding success for locations on Falkland Sound.

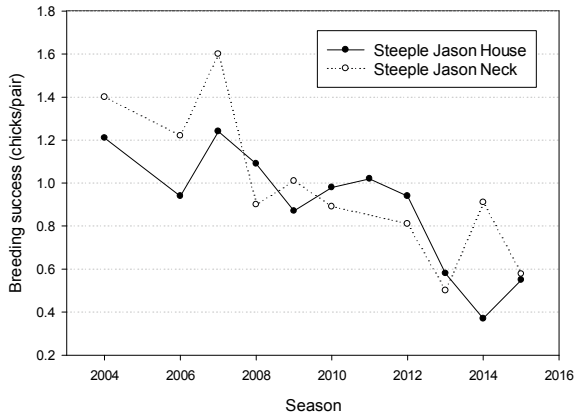

Figure 14: Seasonal changes in estimated Gentoo Penguin breeding success for locations on Steeple Jason.

Southern Rockhopper Penguin

Breeding Pairs

Five locations have been monitored yearly since 2005 (Fanning Head, Steeple Jason NW & SE colonies, Sea Lion Is., and Berkeley Sound). At these sites, the combined total estimate of the number of breeding pairs increased from 6,136 in the 2014 season to 6,965 in the 2015 season, a 13.5 % increase (**Figure 15**), and the highest number recorded since monitoring began at these sites.

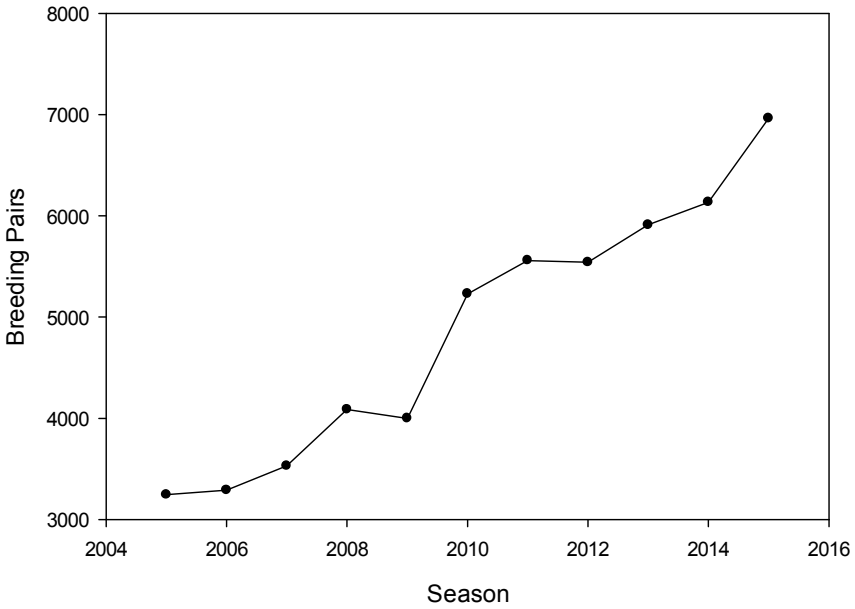

Figure 15: Seasonal changes in total estimated Southern Rockhopper Penguin breeding pairs from current annually monitored locations.

The estimated number of Southern Rockhopper Penguin breeding pairs increased or remained stable at the five monitoring locations since 2005. Berkeley Sound estimated breeding pairs increased by 12.2 % on last season, whilst numbers at Race Point (Fanning Head) and Sea Lion Island remained more or less stable (0.7 increase and 0.18 % decline respectively). The colony at Port Stephens (which has only been monitored annually since 2012) exhibited an 8.1 % decrease of breeding pairs from the 2014 season (**Figure 16**). The largest increases of estimated breeding pairs were seen at Steeple Jason with an average of 53.7 ± 14.1 % increase at the three sites (NW colonies, SE colony and S5), however, after a reported decline in breeding pairs during the 2014 season, the figures now remains similar to the estimated pair counts for 2013 season (**Figure 17**). Breeding pair estimates for Bleaker Island have been fairly stable between 2002 and 2012, but have indicated a 27% increase since then to the highest value since monitoring began (**Figure 18**).

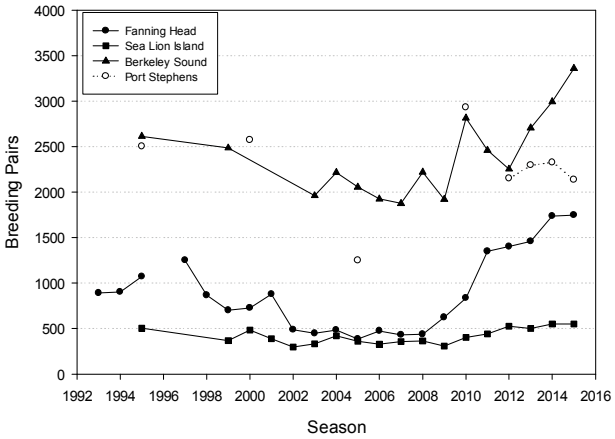

Figure 16: Seasonal changes in estimated Southern Rockhopper Penguin breeding pairs for locations in mainland East and West Falkland.

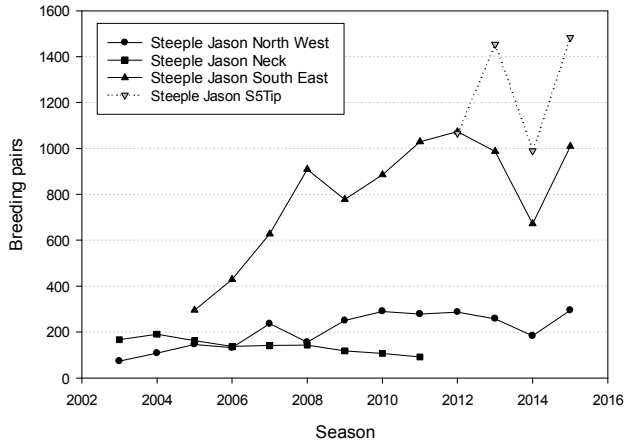

Figure 17: Seasonal changes in estimated Southern Rockhopper Penguin breeding pairs for locations on Steeple Jason

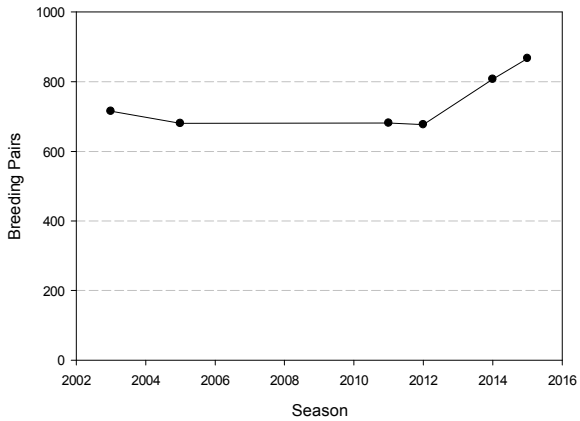

Figure 18: Seasonal changes in estimated Southern Rockhopper Penguin breeding pairs for Bleaker Island.

Breeding Success

Average breeding success in Southern Rockhopper Penguin fell from 0.82 ± 0.11 chicks/pair in 2014 to 0.52 ± 0.19 in 2015 (36.7 % decrease) (Standard Error figures report error about the overall mean by site means, and do not incorporate error about individual sites), the fourth lowest figure since records began (**Figure 19**).

Six colonies with breeding success figures obtained for 2014 and 2015 showed declines (**Figures 20** and **21**). The range of breeding success between locations varied from a minimum of 0.24 ± 0.03 chicks/pair at Steeple Jason (S5 colony) to a maximum of 0.89 ± 0.02 chicks/pair at Eagle Hill, Berkeley Sound. The most pronounced declines were at Steeple Jason with an average 57.5 %

decrease from 2014 season. The region with the least decline was at Berkeley Sound with a 14. 7 % decline from 2014.

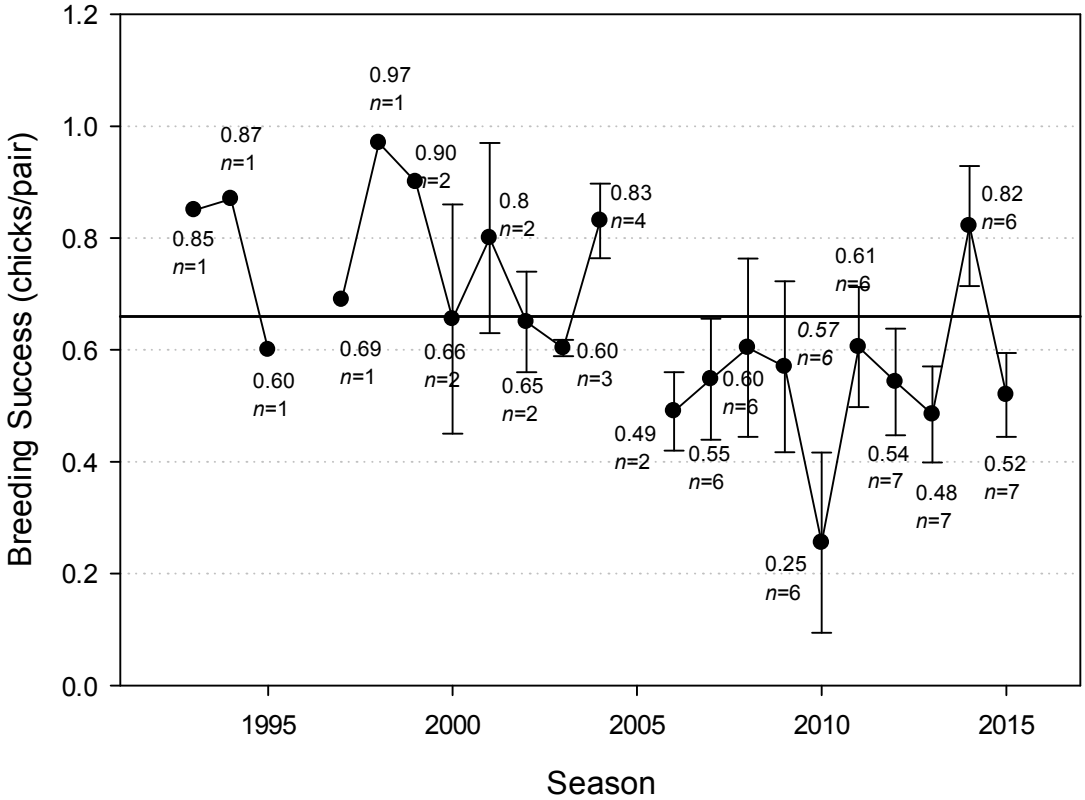

Figure 19: Seasonal changes in estimated Southern Rockhopper breeding success from current annually monitored sites (solid line – seasonal average). Standard Error bars show error about the overall mean by site means, and do not incorporate error about individual sites.

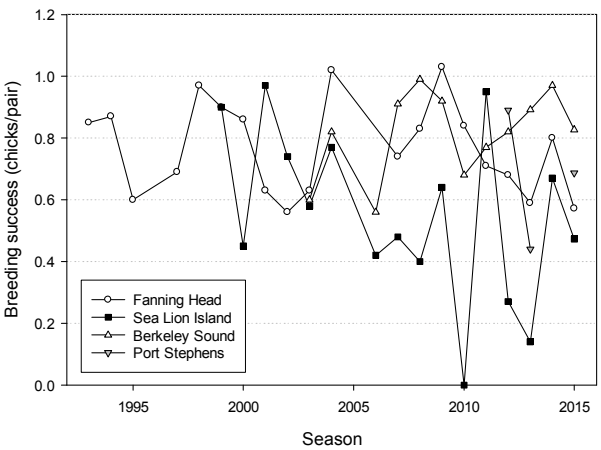

Figure 20: Seasonal changes in estimated Southern Rockhopper Penguin breeding success for locations in mainland East and West Falkland and Sea Lion Is.

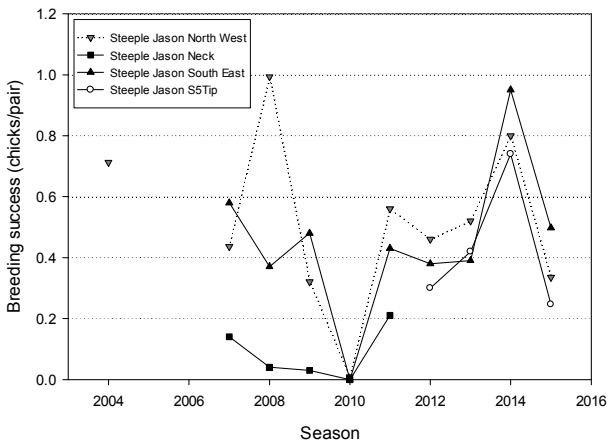

Figure 21: Seasonal changes in estimated Southern Rockhopper Penguin breeding success for locations on Steeple Jason.

Magellanic Penguin

The location and extents of transects and the estimated occupied burrow densities at Gypsy Cove are shown in **Figure 22**. Twenty eight transects were carried out between Engineer Point and the Car Park at Gypsy Cove, of which, over half (*n*=19) contained Magellanic Penguin burrows, of which 18 (yellow, orange, dark orange and red coloured bars on **Figure 22**) contained occupied burrows.

Figure 22: Transect locations for the Magellanic Penguin survey at Gypsy Cove. Yellow (≥ 0 and ≤ 10,000 breeding pairs/km²), light orange (> 10,000 and ≤ 20,000 breeding pairs/km²), dark orange (> 20,000 and ≤ 30,000 breeding pairs/km²) and red (> 30,000 breeding pairs/km²) lines show burrow densities between the shore and the furthest burrow from the shore; grey lines show the extent of each transect where no burrows are present.

Where burrows occurred, estimated densities ranged from 10,080 to 57,143 occupied burrows

/km², with an average density of 9,249 ± 3,844 /km². Mean occupancy rate derived from transects using the current methodology for Gypsy Cove was 37.0 ± 7.8 % (*n*=18). Taking all burrows (*n*=82), as per surveys prior to 2012, gave an occupancy rate of 43.8 %, well above the seasonal average for monitored sites, and the highest occupancy rate since monitoring began (**Figure 23**).

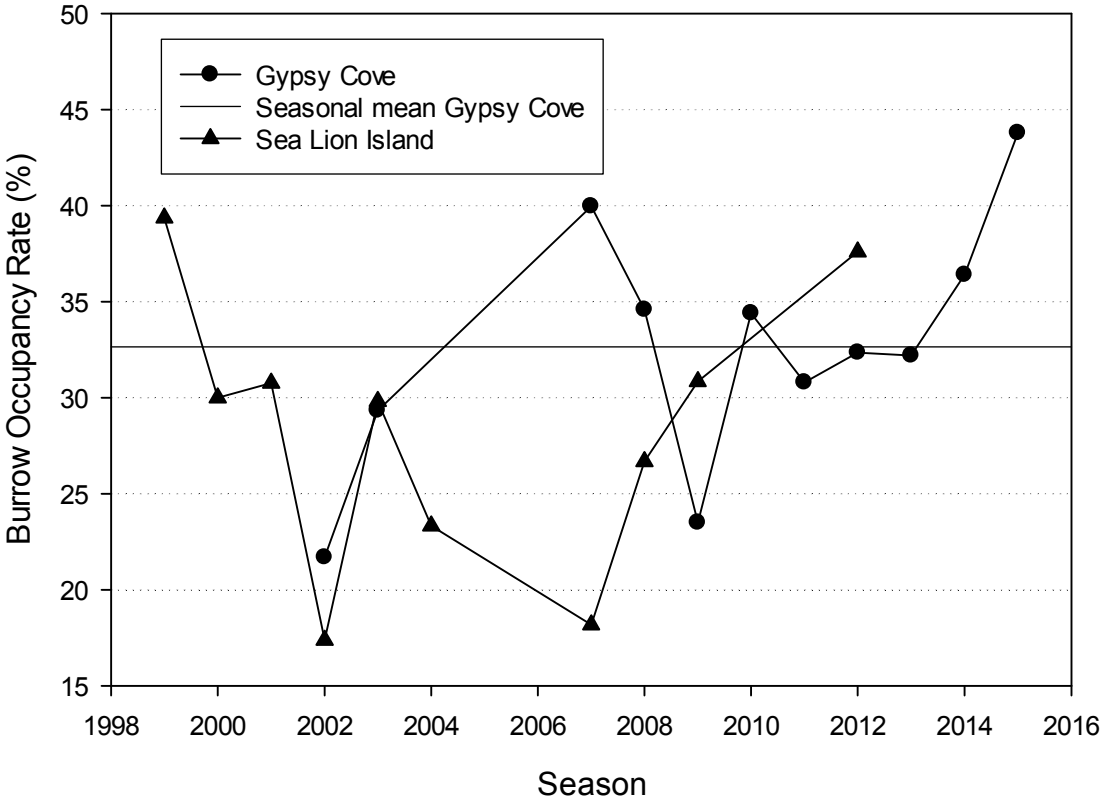

Figure 23: Seasonal changes in Magellanic Penguin burrow occupancy rate at Gypsy Cove and Sea Lion Island.

King Penguin

The King Penguin chick count was not done in 2015. The number of pre-fledged chicks at Volunteer in the 2014 season was up 23.6 % on the 2013 season (**Figure 24**), taking it to the highest recorded estimate since monitoring began.

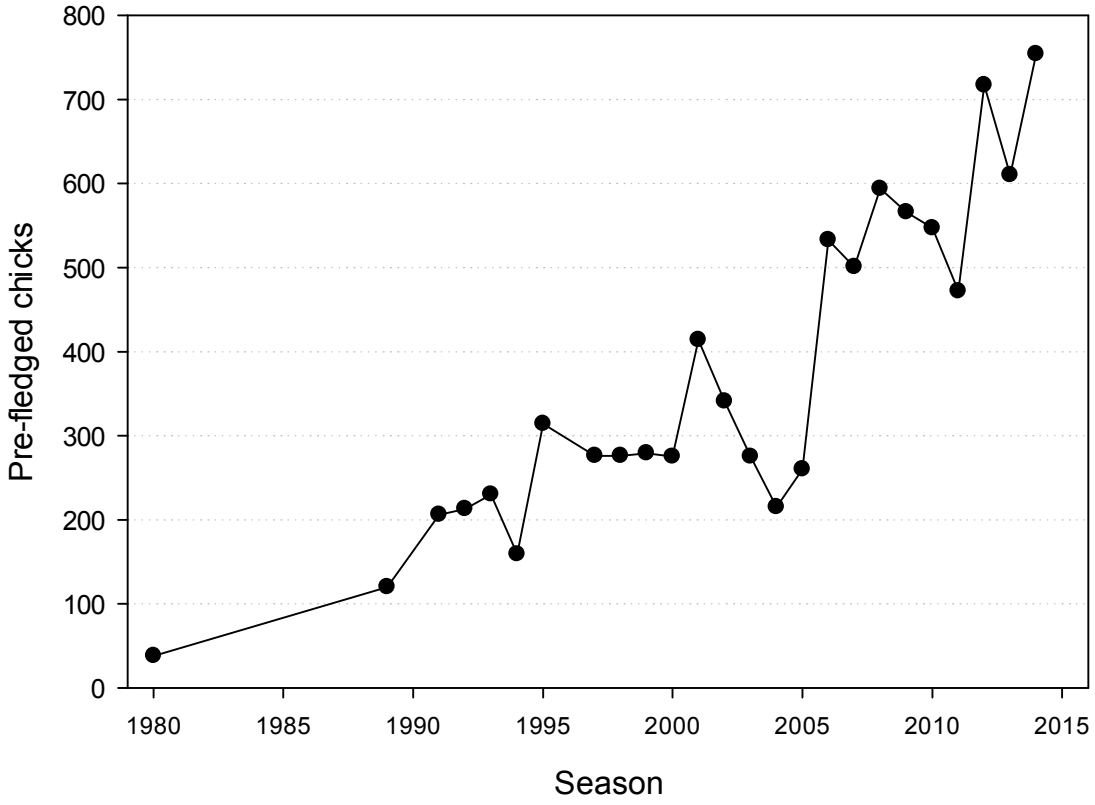

Figure 24: Seasonal changes in the number of King Penguin pre-fledged chicks at Volunteer.

Imperial Shag

At Motley Point it was estimated that there were 175 ± 2 Apparently Occupied Nests (AON) in 2015, an increase from 95 ± 2 in 2014. At Eagle Hill it was estimated that there were 375 ± 5.7 AON, down from 462 ± 15 in 2014. At Steeple Jason NW Flat it was estimated that there were 60 ± 0 AON, down from 82 ± 4 in 2014.

Black-browed Albatross

Breeding Pairs

The total estimated number of breeding pairs of Black-browed Albatross at Steeple Jason monitoring sites increased by 16.8 % from 2,777 to 3,227 breeding pairs (**Figure 25**).

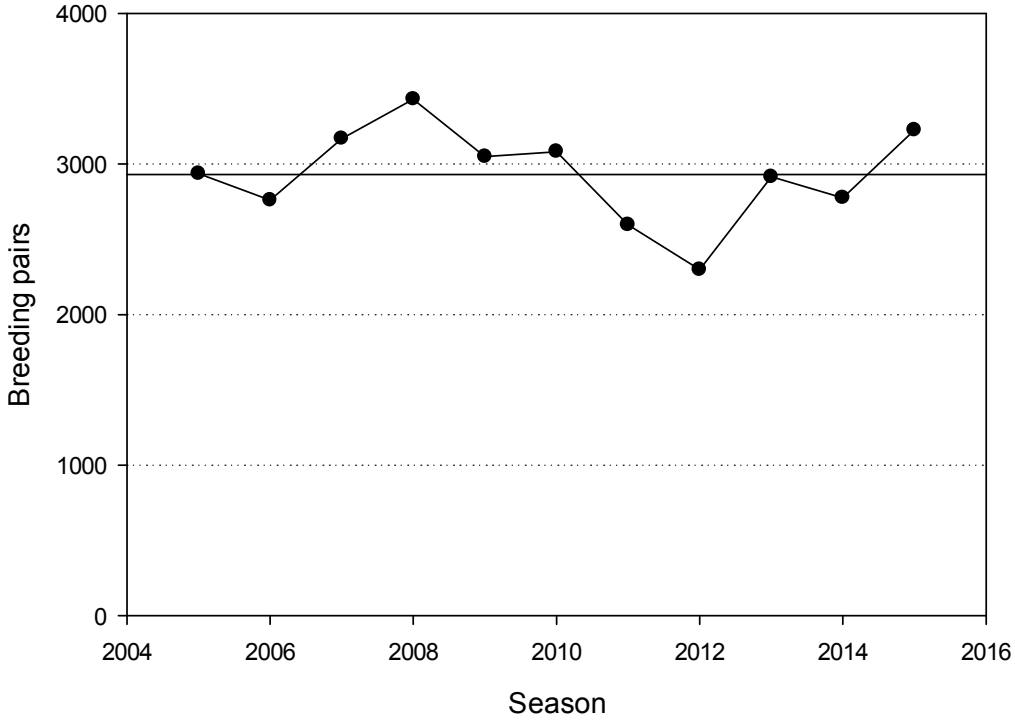

Figure 25: Seasonal changes in total estimated Black-browed Albatross breeding pairs from current annually monitored locations on Steeple Jason (solid line – seasonal average).

When compared to 2014, estimated breeding pair numbers increased at all smaller monitoring sites (**Figure 26**), namely; S5Tip - up 22.1 %, NW Flat - up 29.9 %, NW Ridge - up 43.8 % and the largest increase at the Penthouse - up 77.9 %. A smaller rate of increase was observed at the largest monitoring sub-colony (Study Area) which rose by 3.9 %.

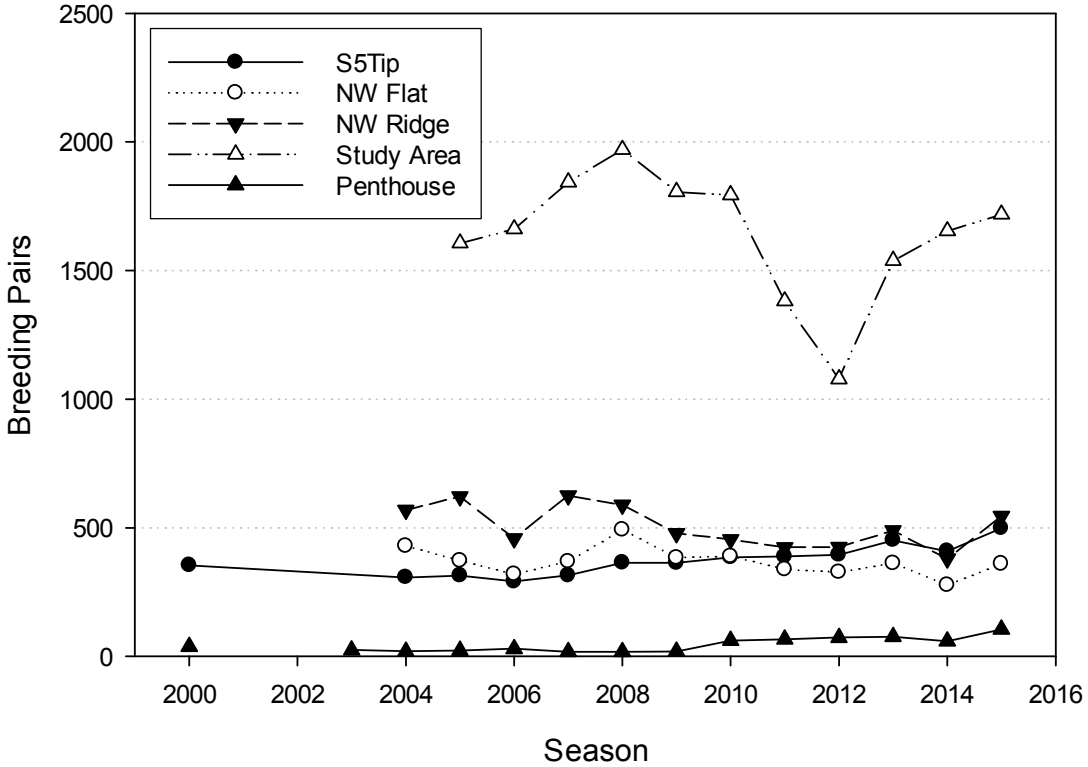

Figure 26: Estimated breeding pair counts of Black-browed Albatross at monitoring sub-colonies on Steeple Jason.

Breeding Success

Overall, mean breeding success for all sub-colonies on Steeple Jason decreased from 85.8 ± 12.3 % in 2014 to 52.0 ± 16.2 % for this season (**Figure 27**). This is the fifth lowest mean observed over the course of the monitoring period and below the seasonal average (55.7 %).

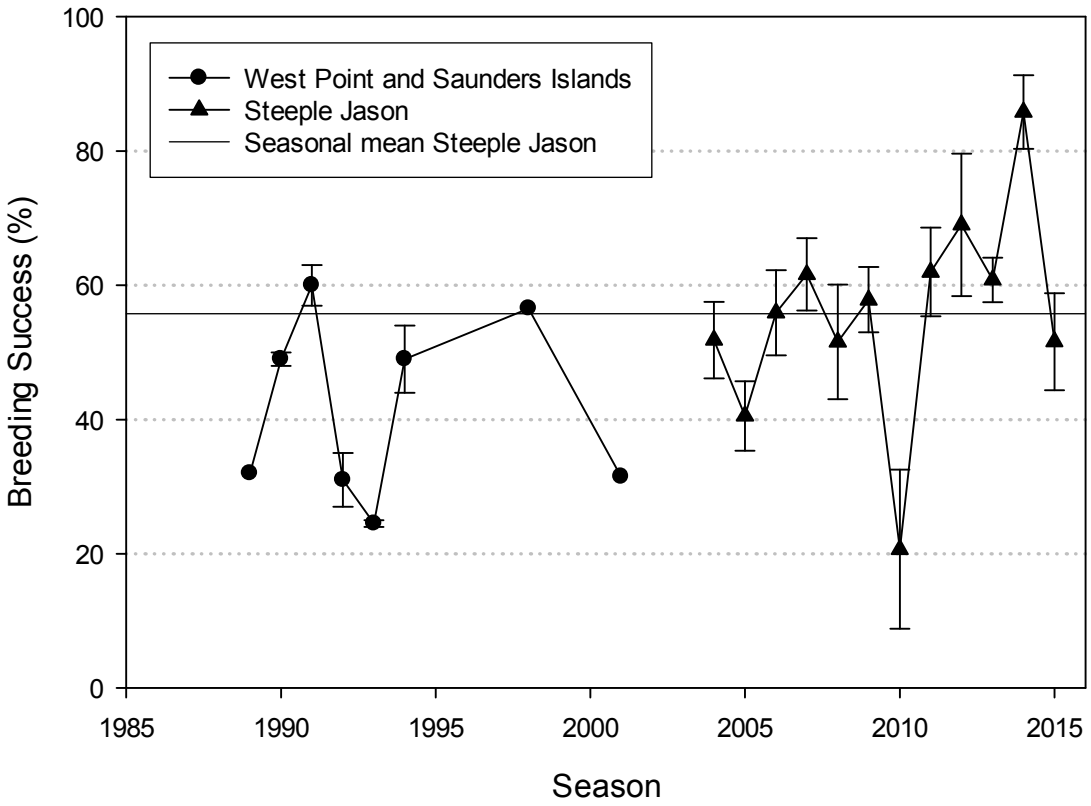

Figure 27: Estimated breeding success of Black-browed Albatross at monitoring sub-colonies on Steeple Jason. Standard Error bars show error about the overall mean by sub-colony means and do not incorporate error about individual sites.

Estimated breeding success was down at all sub-colonies/sites (**Figure 28**). Breeding success decreased in total by 39.3 % from 2014 with the highest decrease of 66.3 % (NW Ridge) and the smallest decrease at 23.3 % (Penthouse).

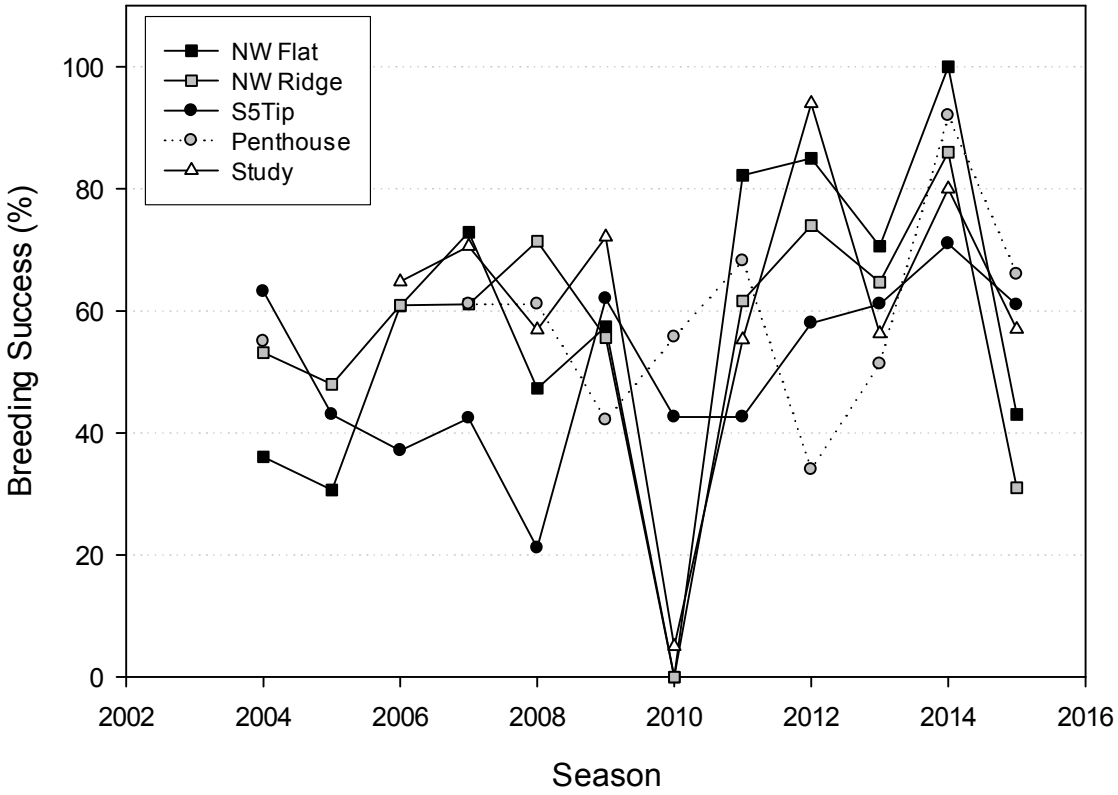

Figure 28: Estimated breeding success of Black-browed Albatross at monitoring colonies/sub-colonies on Steeple Jason.

Penguin Point South, Dunbar

The chick counts at Dunbar fell considerably by 38.8 % from 160 in 2014 to 98 in 2015 (**Figure 29**), making it the worst year on record for the site.

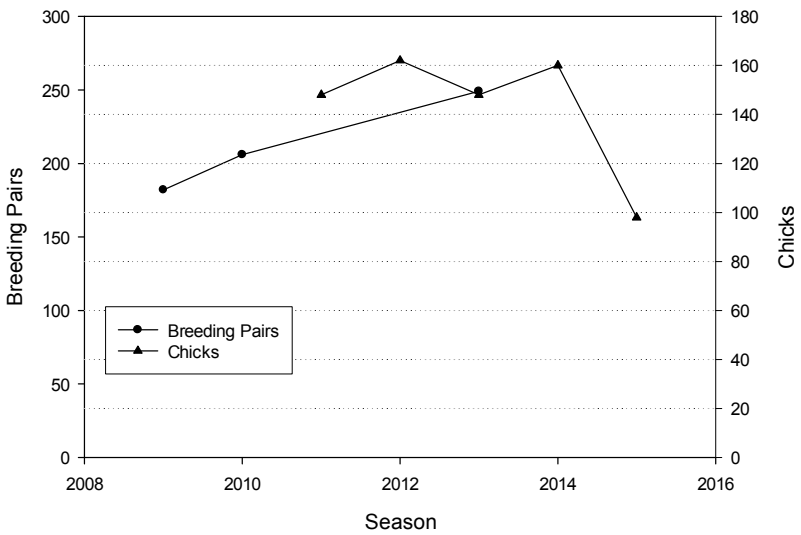

Figure 29: Black-browed Albatross breeding pair and chick counts for Penguin Point South, Dunbar.

Southern Giant Petrel

Breeding Pairs

The total estimated number of breeding pairs of Southern Giant Petrel at monitored colonies on Steeple Jason noticeably fell by 33.0 % from an estimated 2,015 breeding pairs in 2014 to 1,378 pairs in 2015 (**Figure 30**). Declines were observed at both the Neck and NW colonies, with 29 % and 39 % declines respectively. No birds attempted to nest at the Steeple NE. site.

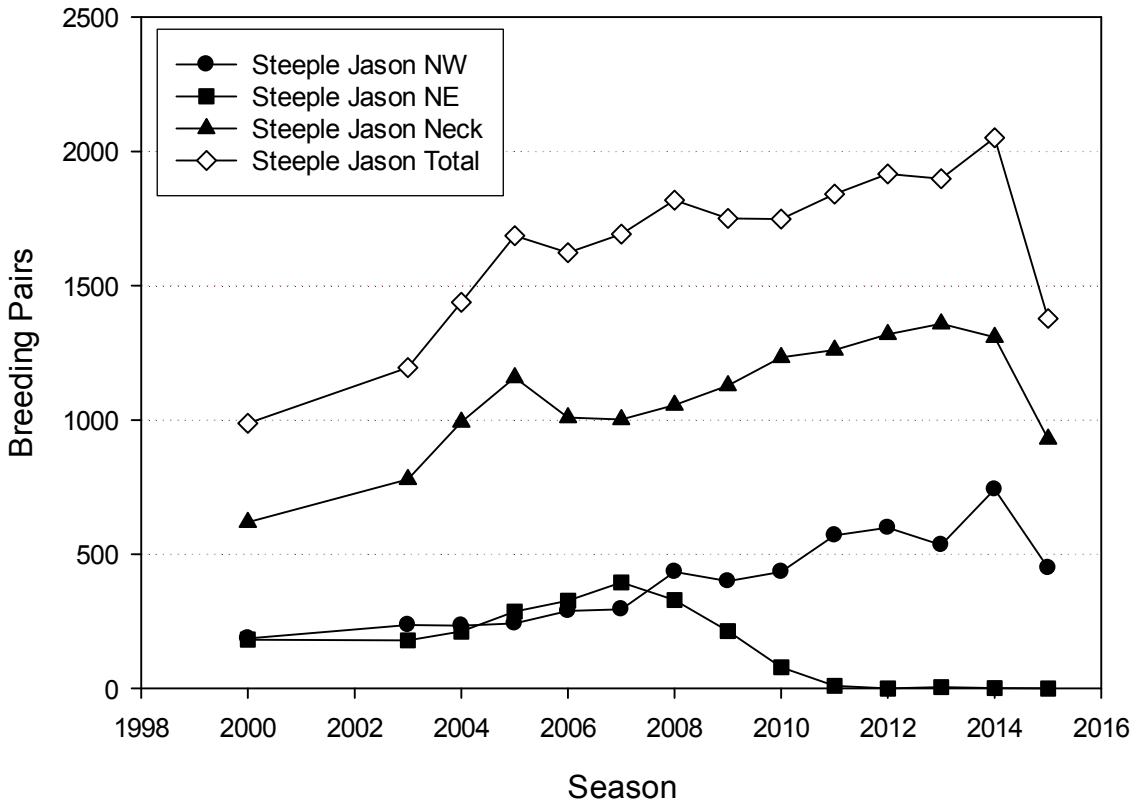

Figure 30: Estimated breeding pair numbers of Southern Giant Petrel at monitoring colonies on Steeple Jason.

Breeding Success

Estimated breeding success was up from 20 % in 2014 to 25 % in 2015 at the NW colony, and up from 42.8 % in 2014 to 45 % in 2015 at the Neck colony (**Figure 31**). The combined breeding success of these two sites was 35.5 ± 14.1 %, just below the seasonal average of 38.7 ± 12.1 %.

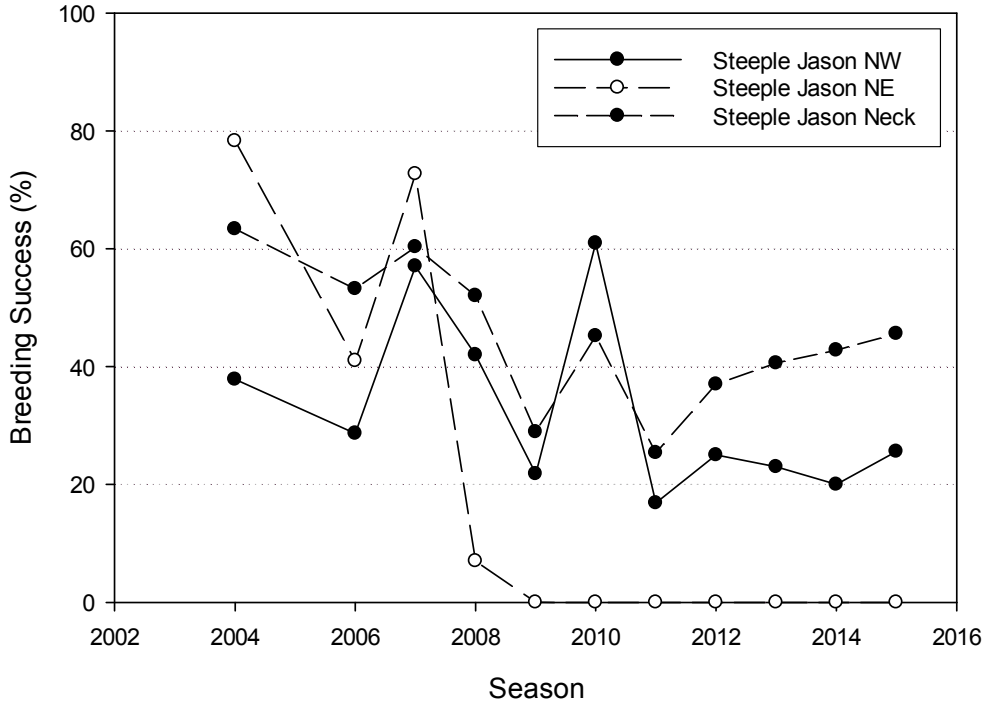

Figure 31: Estimated breeding success of Southern Giant Petrel at monitoring colonies on Steeple Jason.

Bleaker Island Chick Count

Chick count data from Bleaker Island continues to show an overall increasing trend despite annual fluctuations (**Figure 32**). The chick count figure fell slightly by 3.1 % from 320 in 2014 (the highest figure recorded for Bleaker Island since monitoring began) to 310 in 2105.

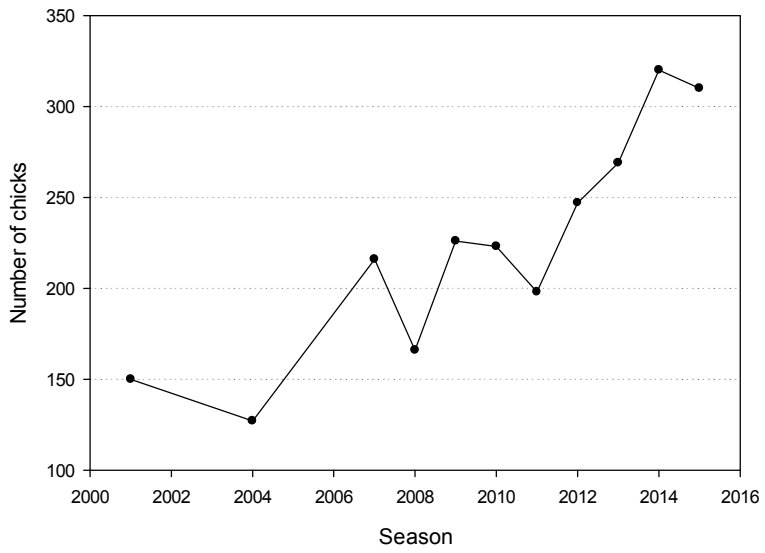

Figure 32: Southern Giant Petrel chick counts for Bleaker Island.

Discussion

Gentoo Penguin

In the 2015/2016 season, estimated numbers of Gentoo Penguin breeding pairs at monitored sites increased by 6.4 %. The majority of colonies continued to show upward trends from the 2014 season, and given previous fluctuations in what has been an increasing population trend since 2003, there is currently no indication of any change in this situation. The only exception in this trend was at the three North-east colonies, with Volunteer Green showing the largest decline in breeding pairs. The East Falkland Colonies continued to show partial recoveries in breeding pair numbers from the drop in numbers during the 2013 season. Steeple Jason colonies in the north-west both showed upward trends with the Neck colony reaching a new maxima, the House colony moved towards a partial recovery from the decline in the previous season. Overall estimated breeding success for Gentoo Penguin fell to take it below the seasonal average. Regionally, estimated breeding success showed variability in the declines from the previous season with declines in the North-east being the most evident. Only the Steeple House colony exhibited an increase in breeding success from the previous season.

Southern Rockhopper Penguin

The total breeding pair estimate of Southern Rockhopper Penguin for monitoring sites continued to increase in the 2015/16 season and reached another new high since monitoring began in 2005. Estimated breeding populations at individual sites were considered generally to be stable/ increasing. The average estimated breeding success however fell below the seasonal average and declines were exhibited at all individual monitored sites from the previous season.

Other species continue to be observed within Rockhopper colonies. The Northern Rockhopper Penguin (*Eudyptes moseleyi*) that was observed at Diamond Cove since 2009 was not seen at the colony during 2015/16 and it is possible this individual perished after its breeding attempt with a Southern Rockhopper in 2014/15 (Crofts & Robson 2016). Macaroni Penguin (*Eudyptes chrysolophus*) and hybrid Macaroni x Southern Rockhopper were observed in mixed pairs at Berkeley Sound.

Magellanic Penguin

Birds remain broadly in three groupings, which appear to be associated with the extent of tussac habitat at the monitoring site. Occupancy rates for Gypsy Cove were the highest recorded and well above the seasonal average.

King Penguin

Estimated numbers of pre-fledged King Penguin have shown a strong positive trend at the Volunteer Green colony. No counts were conducted during the 2015 season.

Black-browed Albatross

Black-browed Albatross breeding pairs at the monitoring sites at Steeple Jason showed an increase from the previous season, and despite some annual fluctuations the overall trend since monitoring began in 2005 suggests a stable population. Estimated breeding success at Steeple Jason fell from last season taking to below the seasonal average. The chick counts at Dunbar fell considerably making it the worst year on record for the site.

Southern Giant Petrel

After an apparent steady upward trend in the Steeple Jason population of Southern Giant Petrel, notable declines were observed at all the individual colonies during the 2015/16 season. A new location for nesting pairs was observed at the NW Black-browed Albatross colony with 6 pairs attempting to breed, although all failed. Breeding success improved on last season as part of a recent upward trend, however, overall breeding success has shown a general decline. At Bleaker Island, chick counts gave good indication that breeding pair numbers were stable with only a small decline in chick numbers from the previous 2014 season.

Reported mortality in seabirds during 2015/16 season

Anecdotal and photo reports indicated signs, at some locations and across the species, of low breeding success, starvation in chicks, some reports of emaciated fledglings, and towards the end of the season adults starving during the moult period, particularly for the Southern Rockhopper Penguin. Landowners were contacted (with accessible seabird colonies) to report observations during the 2015/16 season, particularly during the moult period in April – May (**Figure 33**). Reports of mortalities due to starvation and signs suggesting avian pox at some locations were made,

particularly at Saunders Islands were some 300-400 Rockhopper and some 100 Gentoo Penguin mortalities were observed at the colonies (S. Pole-Evans pers. comm.). Reports also suggest the adult moult period was delayed and prolonged, particularly for Southern Rockhopper Penguin. The findings of **Figure 33** indicate that the north/west regions may have been affected more than the south/east regions. At this stage all the information collected has not been verified and is only an anecdotal account of observations.

Initial reports from South America noted Southern Rockhopper Penguins were turning up in unusual coastal areas of Patagonia, (e.g. Useless Bay, Tierra del Fuego and northern Santa Cruz province, near Puerto Deseado). Many were reported as underweight and moulting (end of March – May). The findings will likely be published describing the event and the causes of mortality by South American researchers. Southern Rockhopper Penguins in Argentina and Chile breed at offshore islands and it is unusual to find them moulting on the mainland. It is possible that a number of these moulters were birds from the Falkland Islands that had been forced to forage further during the pre-moult period in search of food, and as a result landed to moult on the continental mainland rather than returning to moult at their Falklands colonies.

Four Southern Rockhopper Penguins (13 March - 30 April 2016) were reported at locations in and around Stanley and picked up by Falklands Conservation to be taken to the Oiled Seabird Rehabilitation Facility. All were underweight (ranging 0.9-1.2 kg) adults in various stages of their moult. Two birds only began moulting during June, significantly later than the typical moult period (late March – late April). Their low weights on arrival suggest they struggled to find sufficient food during the pre-moult forage (pre-moult typical weight >3.0kg). Once the birds had begun to moult it was evident that the duration and progress of the moult was protracted, probably due to the sub-optimal condition of the birds. This could indicate that a prolonged and delayed moult in individuals of sub-optimal weight, as a result of poor pre-moult foraging, could compound their situation and likely increase a bird's overall risk of starvation.

Unpublished observations and data (FC) of events when penguins are reported in sub-optimal conditions correspond to out-break of the Avian Pox disease (avipoxvirus). This viral disease causes lesions, and in severe cases leads to fatalities, and is highly contagious between individuals.

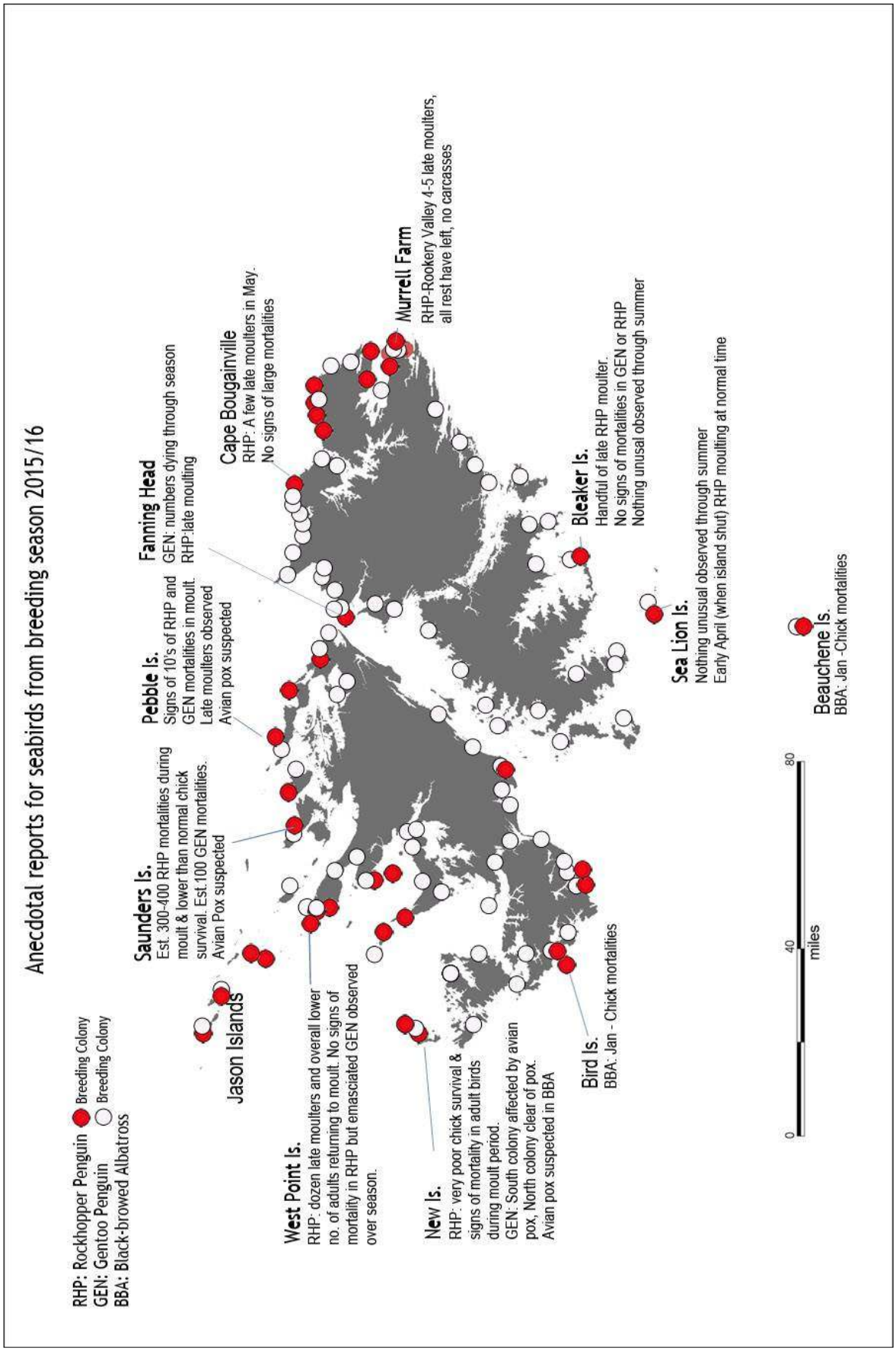

Figure 33: Anecdotal landowner reports for seabirds during season 2015/16

The impact on the adult breeding population is unknown at this stage and FISMP counts during 2016/17 (which only represents 2.6 % of the SRHP population) will only be able to detect significant changes in the number of breeding pairs. The last mass mortality events for seabirds at the Falklands was during the 2002/03 red-tide event and in the late 1980s when birds were reported starving during the moult. The population of seabirds have on the whole recovered from these events (Baylis *et al*. 2012, 2013; Wolfaardt 2013). There are indications of large, potentially cyclical population fluctuations in both Southern Rockhopper Penguins and Gentoo Penguins; however, evidence suggests more rapid and significant recovery in Gentoo Penguins following declines than Southern Rockhopper Penguin which may not be able to recover fully between cycles.

Overall

During the 2015 season indications were of increasing/ stable breeding pairs at the long-term monitored sites (Gentoo & Southern Rockhopper Penguin, Black-browed Albatross), with the exception of declines of breeding pairs from the previous season in the Southern Giant Petrel. Variable breeding success across species and locations were recorded, however the overall trend was a decline from the previous season and breeding success below the seasonal average. Reports of some adult mortalities and starvation, particularly in Southern Rockhopper Penguin, were made towards the end of the season.

A strong El Nino Southern Oscillation event was in place during the season of 2015/16 (http://www.noaa.gov). At sea, the water temperature below the surface was much colder than normal, the Argentine Shortfin Squid *Illex argentinus* failed to migrate to the Falkland Waters and Loligo Squid *Dorytheuthis gahi* made their offshore migrations late, and were of much smaller sizes than usual due to slow growth at colder temperatures (A. Arkhipkins, Falkland Islands Government Fisheries Department pers. comm.).

Rockhopper penguins occupy the lowest trophic level among the diving seabirds breeding in the Falkland Islands (Masello et al. 2010), and as a consequence this species is likely to be directly and rapidly affected by temperature changes that exert influences at the base of food webs (Dehnhard et al. 2011).

Acknowledgements

The continuation of the FISMP is dependent on access to seabird colonies. Falklands Conservation would like to thank the landowners/managers who have allowed us to conduct fieldwork on their land, including the Wildlife Conservation Society, Falkland Islands Government, Port Stephens, Fitzroy, Race Point, Johnsons Harbour, Goose Green, Walker Creek, and North Arm. We thank Mike Clarke, Derek Pettersson and Rob McGill for logistical support and the many volunteers that participated in data collection, particularly Mike Morrison for his long-standing support. We would also like to thank the landowners at Dunbar and Bleaker Island for providing their survey data and allowing it to be included within the report. The FISMP is made possible with financial support of the Falkland Islands Government through the Environmental Studies Budget.

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Appendix 1: Count Information

Location	Date of breeding pair count	Counters	Date of chick count	Counters
Volunteer Green	17/11/15	S. Crofts S. Cleminson J. Hall	12/1/16	A. Stanworth J. McInnes
Race Point	16/11/15	S. Crofts S. Cleminson J. Hall	10/1/16	A. Stanworth J. McInnes
Sea Lion Island	11/11/15	M. Morrison	3/1/16	M. Morrison
New Haven	15/11/15	A. Stanworth J. Bird	3/1/16	S. Cleminson E. Bertram
Bull Roads	15/11/15	A. Stanworth J. Bird	Not Done	NA
Bull Point	16/11/15	A. Stanworth J. Bird	Not Done	NA
Cow Bay	21/11/15	S. Crofts S. Cleminson J. Hall	12/1/16	A. Stanworth J. McInnes
Low Bay	16/11/15	A. Stanworth J. Bird	Not Done	NA
Motley Point	17/11/15	A. Stanworth J. Bird	Not Done	NA
Bertha's Beach	14/11/15	M. Morrison	17/1/2016	M. Morrison
Fox Point	14/11/15	M. Morrison	17/1/2016	M. Morrison
Pleasant Roads	15/11/15	M. Morrison	09/1/2016	M. Morrison
Steeple Jason	Gentoo 1-2/11/15. Rockhopper 28/10 – 3/11/15. Black-browed and giant petrel 26/10/15 - 3/11/15	S. Crofts J. Bird J. Pierce	Gentoo and Rockhopper 17-18/1/16. Black-browed and Giant Petrel 14-15/3/16	A. Stanworth J. McInnes T. Poole A. Guest W. Miles J. Peck M. Poole
Lagoon Sands	17/11/15	S. Crofts S. Cleminson J. Hall	12/1/16	A. Stanworth J. McInnes
Diamond Cove	19/11/15	S. Crofts J. Bennet	11/1/16	A. Stanworth J. McInnes
Rugged Hill/Eagle Hill	19/11/15	S. Crofts J. Bennet	11/1/16	A. Stanworth J. McInnes
Port Stephens	17/11/15	L. Milston D. Robertson	14/1/2016	L. Milston D. Towsey
Penguin Point South	Not carried out	NA	21 February 2016	M. Delignieres
Bleaker Island	Gentoo – Nov. 2015, Rockhopper - 23/11/2015	M. Rendell	Giant Petrel 20-21/2/2016	M. Rendell

Appendix 2: Gentoo Penguin Count Data

Location	Colony	Grid Ref.	Breeding Pairs (Mean±1SD)		Breeding Success (Mean±1SD)	
			Count	Count Type*	Count	Count Type*
Bertha's Beach	Bertha's Beach	-58.358916 -51.882233	810 ± 5	TR	0.90 ± 0.01	TR
Bull Point	Bull Roads	-59.398188 -52.309364	1138 ± 45	TR	Not done	
Bull Point	Bull Point	-59.321461 -52.342591	2604 ± 38	Ph, TR	Not done	
Fox Point	Fox Point	-51.92 -58.45	508 ± 13	TR	1.00 ± 0.05	TR
Low Bay	Low Bay	-58.879630 -52.077608	657 ± 29	TR, TA	Not done	
Motley Point	Motley Point	-58.643177 -52.108576	2512 ± 31	TR, TA, Ph	Not done	
New Haven	New Haven	-59.222044 -51.742073	964 ± 64	TR	1.14 ± 0.01	TR
Pleasant Roads	Pleasant Roads	-51.83 -58.24	193 ± 4	TR	0.68 ± 0.03	TR
Race Point	Fanning Harbour	-59.087958 -51.464667	241 ± 6	TR	0.61 ± 0.04	TR
Race Point	Rookery Sands	-59.106928 -51.434122	1447 ± 12	Ph, TR	0.9 ± 0.01	TR, Ph
Sea Lion Island	Sea Lion Island	-59.072513 -52.426578	5663 ± 49	TR	1.14 ± 0.01	TR
Steeple Jason	House	-61.233113 -51.020186	4055 ± 133	Ph	0.54 ± 0.03	TR, Ph
Steeple Jason	Neck	-61.214888 -51.034787	4388 ± 143	TR, Ph	0.57 ± 0.03	TR, Ph
Volunteer	Cow Bay	-57.879051 -51.428572	1869 ±37	TR	0.42 ± 0.03	TR, Ph
Volunteer	Lagoon Sands	-57.77581 -51.513702	984 ± 15	TR, Ph	0.5 ± 0.01	TR
Volunteer	Volunteer Green	-57.837858 -51.478494	2289 ± 20	TR, TA, Ph	0.57 ± 0.01	TR, TA, Ph

* TR – Tally Repeated, TA – Tally Agreed, Ph – Photo Count.

Appendix 3: Southern Rockhopper Penguin Count Data

Location	Colony/Sub-colony	Grid Ref.	Breeding Pairs (Mean ± 1 SD)	Breeding Success (Mean ± 1 SD)
Berkeley Sound	Diamond Cove	-57.923512 -51.538059	239 ± 0	0.57 ± 0.03
	Eagle Hill East	-57.785118 -51.544064	136 ± 3	0.71 ± 0.05
	Eagle Hill	-57.802981 -51.544497	918 ± 16	0.89 ± 0.02
	Eagle Hill West	-57.810499 -51.545082	887 ± 28	0.83 ± 0.03
	Rugged Hill East	-57.845031 -51.543674	469 ± 12	0.8 ± 0.03
	Rugged Hill West	-57.851570 -51.543488	710 ± 15	0.83 ± 0.02
Port Stephens	Stephen's Peak	-60.859281 -52.133803	2138 ± 47	0.68 ± 0.02
Race Point	Fanning Head North	-59.141540 -51.460831	752 ± 16	0.49 ± 0.04
	Fanning Head South	-59.137749 -51.469284	1098 ± 0	Not done
Sea Lion Island	Rockhopper Point	-59.115501 -52.446667	549 ± 8	0.47 ± 0.06
Steeple Jason	NW Flat	-61.252682 -51.012810	121 ± 6	0.53 ± 0.05
	NW Ridge	-61.252884 -51.012939	174 ± 8	0.19 ± 0.04
	S5Tip	-61.220460 -51.037932	1484 ± 47	0.24 ± 0.03
	Study Area	-61.206635 -51.046215	1009 ± 9	0.49 ± 0.01

Appendix 4: Magellanic Penguin Survey Data

Transect	Number of Burrows	Occupancy (%)	Distance to last burrow	Minimum Pair Density per Km²
1	0		0	0
2	0		0	0
3	0		0	0
4	5	80	57	17544
5	4	50	19	26316
6	6	67	56	17857
7	1	100	20	12500
8	3	0	72	0
9	0			0
10	0			0
11	2	0	20	0
12	5	50	62	10081
13	7	33	40	14583
14	9	63	37	38007
15	8	50	68	14706
16	1	0	14	0
17	0			0
18	1		2	0
19	0			0
20	0			0
21	3	0	14	0
22	6	17	17	14706
23	10	57	25	57143
24	3	67	24	20833
25	6	33	34	14706
26	1	0	3	0
27	1	0	9	0
28	0		0	0

Appendix 5: Black-browed Albatross and Southern Giant Petrel Count Data

Black-browed Albatross

Sub-colony	**Breeding Pairs (Mean ± 1 SD)**	**Breeding Success (chicks/pair) (Mean ± 1 SD)**
Study Colony	1718 ± 9	0.57 ± 0.01
S5Tip	498 ± 15	0.42 ± 0.03
Penthouse	105 ± 0	0.31 ± 0.01
NW Flat	360 ± 30	0.65 ± 0.01
NW Ridge	545 ± 9	0.65 ± 0.01

Southern Giant Petrel

Colony	**Breeding Pairs (Mean ± 1 SD)**	**Breeding Success (chicks/pair) (Mean ± 1 SD)**
Neck	929 ± 48	0.45 ± 0.05
North-west	449 ± 9	0.25 ± 0.02
House	0	0
North-west Flat	6 ± 0	0