Supporting evidence for the addition of the southern right whale (*Eubalaena australis*) to the Falkland Islands Inshore Key Biodiversity Area

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Contents

1. Background

Key Biodiversity Areas (KBAs) are internationally recognised sites that contribute significantly to the global persistence of biodiversity. The Global Standard for the Identification of KBAs sets out agreed criteria for the identification of KBAs worldwide (IUCN, 2016). KBAs have delineated boundaries and are potentially manageable as a unit, but designation as a KBA does not confer legal protected status or management activities on a site.

Falklands Conservation (FC) has carried out targeted research of southern right whales (*Eubalaena australis*) in the nearshore waters around the Falkland Islands since 2019. While opportunistic records of the species had been occasionally reported in earlier decades, the first evidence of a regular contemporary occurrence of the species in the Falklands emerged in May 2017 when sightings were recorded multiple times during a pilot study of sei whales, *Balaenoptera borealis* (Weir, 2017). The presence of many right whales throughout the winter of 2017, followed by a similar situation in 2018 (Weir and Stanworth, 2019), led to the onset of a Darwin Plus funded project which included monitoring of the distribution, abundance, and population structure of the species throughout the austral winters (June to August) of 2019 and 2020 (DPLUS082: Weir, 2022). In 2022 and 2023, that work was expanded to include satellite-tracking, photogrammetry, and an aerial abundance survey (DPLUS126: Weir, In Prep.), with the specific goal of collecting relevant information to potentially support a KBA assessment.

In December 2022, FC submitted a proposal for a '*North-east Falklands Right Whale Wintering Area*[1]' Important Marine Mammal Area (IMMA) to the south-west Atlantic regional IMMA workshop. IMMAs are defined as discrete portions of habitat, important to marine mammal species, that have the potential to be delineated and managed for conservation. The area was proposed using IMMA Criterion B2 (Aggregations) and Criterion C1 (Reproductive Areas). Following review, the *North-east Falklands Right Whale Wintering Area IMMA*[2] was accepted by the Marine Mammal Protected Areas Task Force in May 2023. The IMMA process is intended to provide advice on marine mammal conservation priorities in an area-based context to assist in national and international conservation efforts, including the identification of KBAs.

This document provides supporting information to also recognise the coastal waters in the north-east Falklands as a KBA that supports important southern right whale seasonal breeding aggregations. It outlines how the species has been assessed against the quantitative KBA criteria and provides additional information on the FC datasets collected in the Falklands between 2017 and 2024 in support of this application.

2. Rationale for KBA Nomination

2.1. Importance of the site

The site supports a regionally important wintering aggregation of southern right whales, which use the region as a mating, socialising and resting area (Weir and Stanworth, 2019; Weir, 2021, 2022; Cerchio et al., 2022). Systematic research of baleen whales in the Falkland Islands only commenced in 2017, providing the first indication of the winter presence of right whale aggregations in nearshore areas (Weir, 2017). Since then, full winter seasons of targeted survey work on the species have

[1] https://www.marinemammalhabitat.org/download/preliminary-report-of-the-regional-workshop-for-the-south-west-atlantic-ocean-important-marine-mammal-areas/

[2] https://www.marinemammalhabitat.org/factsheets/north-east-falklands-malvinas-right-whale-wintering-area-imma/

occurred during 2019, 2020, 2022, 2023 and 2024, with smaller amounts of work in 2021 (Weir, 2022, In Prep.; FC unpublished data). The key findings to date regarding the site's importance include:

- The site supports a persistent seasonal aggregation. Southern right whales have been present throughout the austral winter months of June, July, and August in all surveyed years, supporting the occurrence of a persistent seasonal aggregation. The aggregation begins to form between mid-May and early June (depending on year), and numbers usually peak during July (Weir 2022) with small numbers remaining until (at least) mid-September (Weir, In Prep.). However, both sightings and acoustic monitoring indicate that a regular occurrence in Falklands' coastal waters can commence as early as March in some years (Cerchio et al. 2022; Weir, 2022).

- The site supports behaviours critical to the life history of the species. There are numerous documented observations of southern right whale surface active groups (SAGs) in the Falkland Islands (Figure 1), involving whales engaged in reproductive (mating) and social behaviour (Weir and Stanworth, 2019; Weir, 2021, 2022, In Prep.). Additionally, two years of acoustic monitoring in Berkeley Sound recorded numerous calls and gunshot song; the latter is a form of male reproductive advertisement (Cerchio et al., 2022) and lends further credence to the underlying driver for the right whale aggregations comprising reproduction. However, the presence of juveniles suggests that right whale occurrence in the site encompasses more than solely mating behaviour for reproductive purposes, potentially including social behaviour and rest.

Figure 1. A mating group of southern right whales in the Falkland Islands, May 2020.

- The site is a destination rather than an area simply transited through. Photo-identification and satellite-tagging data indicate that some individual right whales remain within the site for (at least) two consecutive months during winter, which emphasises the importance of the area as a destination rather than solely transitory use (Weir, 2022; Weir et al., 2024; FC unpublished data). Satellite-tracking data[2,3] show that individuals move repeatedly back and forth along the coast during their time within the site.

- There is inter-annual use of the site by some individuals. Photo-identification has shown that some of the same individual southern right whales return to the site during winter in different years (Weir, 2022), suggesting site fidelity and supporting use of the site by aggregating right whales over longer timeframes.
- The site is used by a population of conservation concern. Although southern right whales have a global conservation status of Least Concern (Cooke and Zerbini, 2018), the population inhabiting the south-west Atlantic has been identified as higher regional concern due to widespread calf mortalities in recent decades at Peninsula Valdés in Argentina. As a result, the International Whaling Commission (IWC) has endorsed a Conservation Management Plan (CMP) for the south-west Atlantic population. Genetic analysis of right whale samples collected in the Falkland Islands during 2019 and 2020 has demonstrated their connectivity with Peninsula Valdés (Jackson et al. 2022), indicating that they are part of the same south-west Atlantic population for which the IWC CMP exists. Indeed, recent satellite tagging of southern right whales in the Falkland Islands[3,4] has revealed that many individuals subsequently move to Peninsula Valdés after they depart the Islands (Weir et al., 2024, In Press), confirming linkage between breeding areas.

2.2. Anthropogenic activities in the site

The Falkland Islands are a relatively remote South Atlantic archipelago, with a population of around 3,700 people. Marine habitats are in pristine condition compared with many other regions worldwide. The primary marine activity occurring around the Islands is fishing, with a management system in place to license and regulate fishing vessels operating within the 200 nm Exclusive Economic Zone (EEZ). Fishing within the EEZ primarily targets two species of squid (*Illex argentinus* and *Doryteuthis gahi*) which are caught by jiggers and trawlers and account for 75% of all catches. Other fish species are targeted by bottom trawls (mixed species) or longline (Patagonian toothfish). A 3 nautical mile 'no fishing' buffer zone extending from the coastline has been declared through commercial licence conditions and is enforced under the Fisheries (Conservation and Management) Ordinance 2005. However, a crab potting fishery has recently commenced within this area (initially under scientific permit but with a view to developing a commercial enterprise), presenting a potential new risk to whales from entanglement in ropes. Additionally, the onset of salmon farming in the Islands continues to be discussed, which also brings the potential for whale entanglements.

Within the next decade, the Falkland Islands Government has committed to the development of an expanded port facility in Stanley, and to supporting hydrocarbon extraction in offshore waters which could also have impacts on inshore habitats from increased vessel traffic and supporting coastal infrastructure. The marine environment already experiences vessel traffic related to a seasonal tourist industry (cruise and expedition vessels, and local whale-watching excursions), various privately owned watercraft, cargo vessels, a ferry service, support to the fishing industry (e.g., license visits, transiting, bunkering, crew changes and transhipments), and some commercial activities (e.g., bathymetric surveys). Most activity occurs in the north-east of the Islands, in the vicinity of Stanley Harbour, Port William and Berkeley Sound.

While the level of impacts from human activities on southern right whales is currently unknown, there is spatial and temporal overlap between some of the areas used by right whales and vessel traffic (e.g., Berkeley Sound: Weir, 2017, 2022). Propeller wounds and other injuries consistent with ship strike have been recorded on right whales in the Falkland Islands (FC, unpublished data), and concerns have been raised about the acoustic disturbance from vessel traffic on right whale breeding activity in Berkeley Sound (Cerchio et al., 2022). Recently (June 2024) a southern right whale carcass washed

[3] https://falklandsconservation.com/southern-right-whale-tracking-2024/
[4] https://falklandsconservation.com/southern-right-whale-tracking/

ashore at Pebble Island with fishing gear embedded in its tailstock, highlighting the potential of entanglement risk for this species. The recognition of a KBA as an important breeding area for recovering populations of southern right whales would serve as a useful tool in ensuring that potential impacts are considered during marine spatial planning and species management recommendations.

2.3. Conclusion

Falklands waters are important in supporting a persistent seasonal breeding aggregation of right whales from a population of conservation concern. The area comprises habitat that is currently of a relatively pristine nature and without major anthropogenic impacts, and if maintained it could therefore be expected to support right whales for decades to come.

3. Application of the KBA Criteria

3.1. Selection of relevant criteria

The southern right whale was assessed as globally Least Concern in the most recent IUCN Red List assessment (Cooke and Zerbini, 2018), and, given its relatively wide circumpolar range across the Southern Hemisphere, the species does not fulfil criterion A (Threatened biodiversity) or B (geographically restricted biodiversity). The incorporation of right whales into the existing Falkland Islands Inshore KBA is therefore based on the application of Criterion D1 (global persistence of demographic aggregations).

For a site to qualify as a KBA under criterion D1 it must hold *a significant proportion of the global population size of a species during one or more life history stages or processes, and so contribute significantly to the global persistence of biodiversity at the species level*. The site must predictably hold one or more of the following:

- An aggregation representing ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle (criterion D1a); or
- A number of mature individuals that ranks the site among the largest 10 aggregations known for the species (criterion D1b).

An aggregation is defined in the KBA Standard as: *a geographically restricted clustering of individuals that typically occurs during a specific life-cycle process such as breeding, feeding or migration. This clustering is indicated by highly localised relative abundance, two or more orders of magnitude larger than the species' average recorded numbers or densities at other stages during its life-cycle* (IUCN, 2016).

The southern right whale aggregates at a number of seasonal breeding sites across its range (for example the southern tip of South Africa, southern Australia, and Península Valdés), and it is currently unclear whether the Falkland Islands may meet Criterion D1b as representing one of the 10 largest known aggregations for the species. Consequently, the importance of the proposed KBA for southern right whales is instead considered here using Criterion D1a.

3.2. D1a Threshold

The global population of southern right whales is slowly recovering from heavy exploitation during centuries of whaling, and was estimated to comprise 13,600 individuals in 2009 (International Whaling Commission, 2013). Although no global mature population size was published in the Red List assessment by Cooke and Zerbini (2018), application of the percent mature estimate (58%) calculated by Taylor et al. (2007) to the 2009 total global population size would produce an estimated number of

mature animals within the global population of 7,888 individuals. Consequently, the threshold for meeting Criterion D1a would be evidence of 79 mature animals using the proposed KBA.

An indication of the number of southern right whales (adults and juveniles) using the site is provided by the two sources summarised below:

1. **Photo-identification**. Photo-identification effort during small boat work in the easternmost part of the proposed site (Cape Pembroke to MacBride Head) documented a minimum of 246 individuals using the site in 2017, 2019, 2020 and 2021 combined (Weir, 2022). This number is highly conservative because: (1) in 2017 and 2021 only a small portion of the winter season was surveyed; (2) adverse weather in all years greatly limited the number of survey days; and (3) photo-ID images were not acquired for all whales encountered on surveys. A further 80 individuals have been catalogued to date for June and July 2022 (FC, unpublished data), bringing the total number of individuals catalogued in the Falklands to well above 300 animals.
2. **Aerial abundance surveys**. In June 2023, August 2023 and July 2024, aerial surveys were carried out along the north coast of the Falkland Islands and to 30 km offshore. The surveys used established methods to determine the abundance of cetaceans, and each monthly survey was carried out over two days to generate a 'snapshot' of whale abundance in the area at that time. The resulting estimates comprised 399 (CV=24.9) animals in June, 345 (CV=25.9) animals in July and 229 (CV=46.2) animals in August (Weir et al., In Prep.).

During July and August 2023, a calibrated unmanned aerial vehicle (UAV) was used to measure the body lengths of southern right whales in the easternmost part of the proposed site (Cape Pembroke to MacBride Head) using established methods to determine body length as a proxy for age composition (Christiansen et al., 2019). Of 71 individuals measured, 3 (4.2%) were yearlings, 40 (56.3%) were juveniles, and 28 (39.4%) were adults (FC, unpublished data). These results indicate that in the Falkland Islands the percentage mature estimate (39%) is lower (or at least it was in 2023 and in the portion of the study area considered) than the 58% calculated by Taylor et al. (2007). The D1 criterion applies to aggregations of mature individuals only. Calculations of percent mature using both approaches are provided in Table 1 below, and indicate that the site qualifies (i.e., exceeds 79 mature animals) using either set of maturity values and in all survey months.

Table 1. Calculation of 'percentage mature' individuals from aerial abundance estimates of southern right whales, using the 58% mature value of Taylor et al. (2007) and the 39% mature value generated from body measurements in the Falkland Islands.

Aerial survey	Total abundance	58% mature	39% mature
June 2023	399 (CV=24.9)	231.4	155.6
August 2023	229 (CV=46.2)	132.8	89.3
July 2024	345 (CV=25.9)	200.1	134.6
Combined	973 (CV=18.9)	564.3	379.5

3.3. D1a Life cycle process

Evidence that mature southern right whales use the proposed site for seasonal reproductive activity, comprising a specific life-cycle process under the KBA definitions (KBA Standards and Appeals Committee, 2019), includes:

- Marked seasonality at the site which temporally coincides with the reproductive behaviour (i.e., SAGs, mating, calving) documented in other geographic regions during winter (Wilding Brown and Sironi, 2023);
- Numerous documented observations of surface active groups (Weir and Stanworth, 2019; Weir, 2021, 2022) which are usually sexual in nature (Wilding Brown and Sironi, 2023);

- Frequent observations of mating (Weir 2021, 2022: Figure 1); and
- The presence of gunshot song (a male reproductive display: Crance et al., 2019) throughout the winter months, as recorded on hydrophones deployed in Berkeley Sound (Cerchio et al., 2022).

No calves have been recorded to date at the Falkland Islands wintering ground, and it is currently considered to be a breeding area used for mating only.

3.4. Conclusion

The proposed site meets the KBA thresholds for Criterion D1a for southern right whales, hosting an important seasonal aggregation comprising >1% of the estimated global population of mature animals and supporting a key life cycle stage in the form of reproductive activity.

4. Delineation

The site boundaries for a KBA should be *ecologically relevant yet practical for management* (IUCN, 2016). The objective of delineating the site is to provide the best conditions for the persistence of the biodiversity elements for which the site is important, dependent on their ecological requirements and the socio-cultural, economic and management context.

4.1. Available spatial data

The primary sources of available information on the spatial distribution of southern right whales in Falklands' coastal waters are:

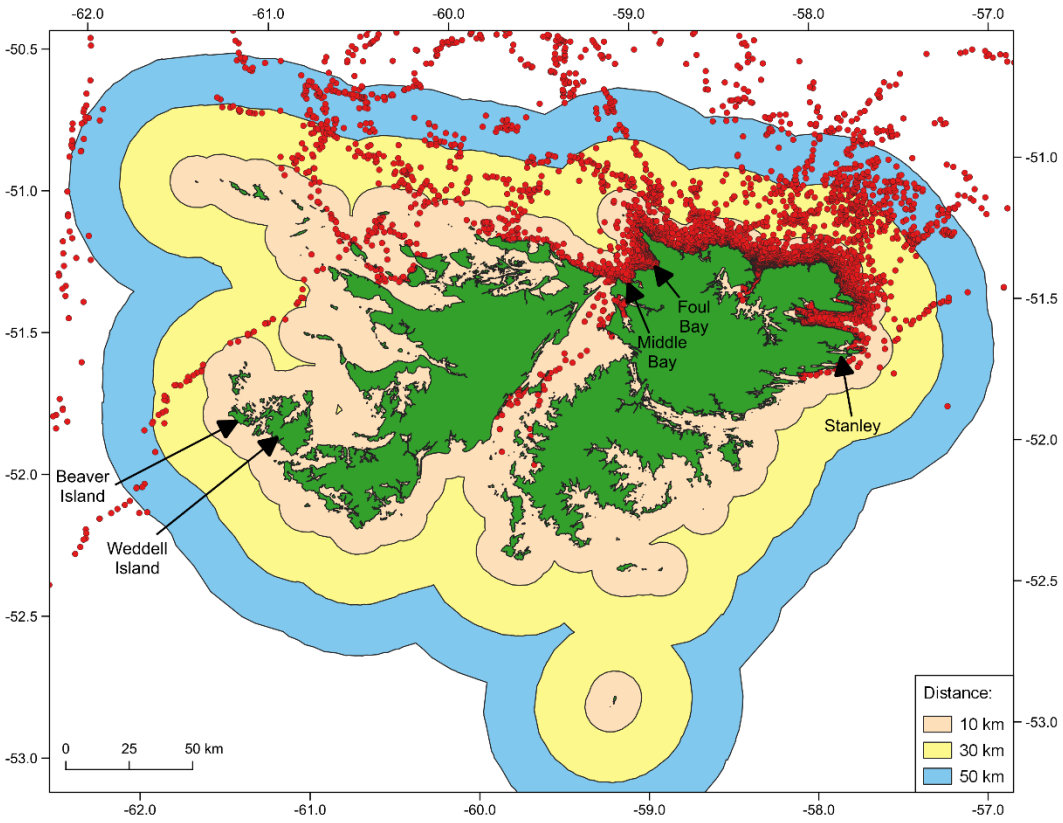
1. Telemetry data acquired for 10 satellite-tracked right whales in 2022;
2. Telemetry data acquired for 6 satellite-tracked right whales in 2024;
3. Visual sightings recorded during aerial abundance surveys carried out in June 2023, July 2024, and August 2022; and
4. Visual sightings recorded during boat surveys from 2017 to 2024.

4.1.1. Telemetry data

A combined total of 18,259 Argos satellite positions were acquired within the Falkland Islands Conservation Zones for 16 whales tagged in the winters of 2022 and 2024 (Table 2; Figure 2). The clear majority (71.6%) of positions occurred within 10 km of the coast, with the number of positions in subsequent distance categories being relatively small (Table 2). The proportions of whale positions in each distance category were very similar in 2022 and 2024, indicating that the preferred use of habitats close to the coast is consistent across years.

In both 2022 and 2024 the highest use of Falklands' waters by southern right whales was around the north coast of East Falkland, from the vicinity of Stanley to Middle Bay and Foul Bay (Figure 2). Although all whales were tagged between Berkeley Sound and MacBride Head and therefore there was spatial bias at the time of tag deployment, the remainder of the dataset is unbiased and whales could have moved anywhere in Falklands' waters. Nevertheless, most animals spent considerable time moving back and forth along the north coast of East Falkland, and there were relatively few movements south or time spent around West Falkland. The use of West Falkland (Beaver and Weddell Islands) was higher during 2024 than in 2022 (Figure 2), indicating that there may be differences between years in the spatial use of Falklands' waters. However, the use of the coast between Berkeley Sound and Middle Bay was consistently high in both years of the telemetry study and that area is considered to represent important winter breeding habitat.

(A)



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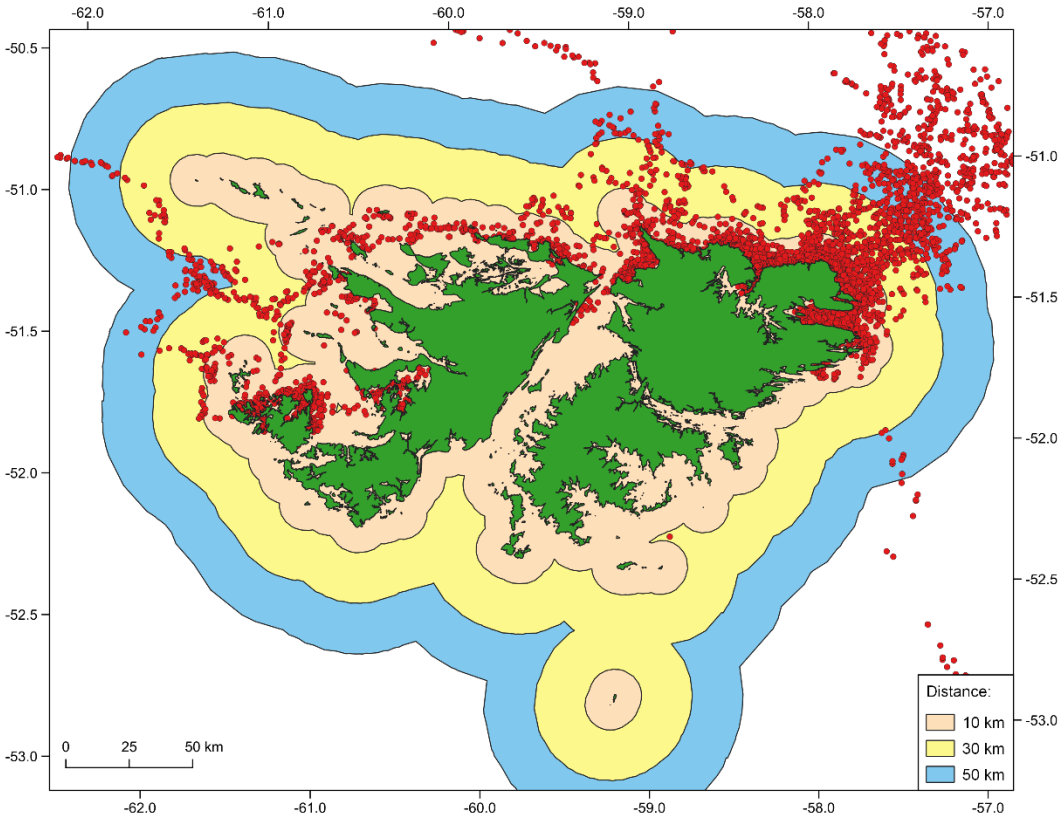


Figure 2. Satellite positions from 16 southern right whales tagged in the winters of: (A) 2022 (n=10); and (B) 2024 (n=6), plotted across distance bands from the Falklands coast.

Table 2. Distance from shore of Argos satellite positions from southern right whales tagged in the Falkland Islands in 2022 (n=10) and 2024 (n=6). The positions relate solely to whale movements within the Falkland Island Conservation Zones and exclude the remainder of the south-west Atlantic.

Distance (km)	2022 positions		2024 positions		Combined	
	N	%	N	%	N	%
≤10	6,001	70.2	7,068	72.8	13,069	71.58
10-20	453	5.3	371	3.8	824	4.51
20-30	364	4.3	291	3.0	655	3.59
30-40	286	3.3	309	3.2	595	3.26
40-50	238	2.8	162	1.7	400	2.19
50-100	501	5.9	671	6.9	1,172	6.42
100-200	387	4.5	409	4.2	796	4.36
200-300	185	2.2	307	3.2	492	2.69
>300	130	1.5	126	1.3	256	1.40
Total	8,545	100.0	9,714	100.0	18,259	100.0

The telemetry data from 2022 have been further modelled by behavioural state, showing that the waters along the north coast of East Falkland comprise a high-use habitat which southern right whales occupy intensively for prolonged periods rather than simply transiting through (Figure 3: Weir et al., In Press).

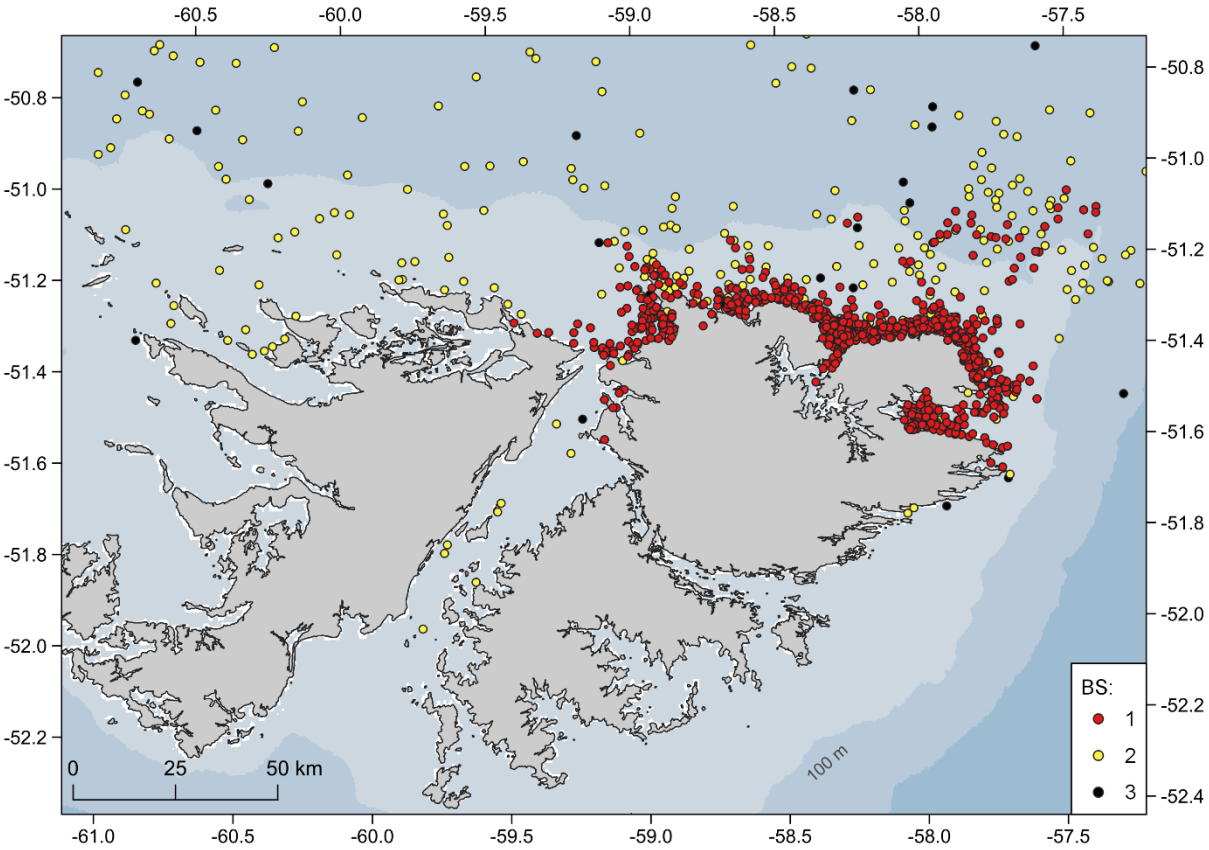


Figure 3. Model-predicted positions of 10 satellite-tagged southern right whales according to three behavioural states (BS) generated with discrete-time hidden Markov models: BS1: slow and non-directional movements, indicative of high-use habitats; BS2: intermediate use areas (likely including foraging); and BS3: directed and fast movements, indicative of transitory habitats).

4.1.2. Aerial surveys

The results of the aerial surveys support the telemetry study in finding a higher occurrence of southern right whales along the north coast of East Falkland compared with the north coast of West Falkland (Figure 4). Sightings were most widespread (from the coast to the 30 km offshore limit of the survey strata) during June (Figure 4A), intermediate in July (Figure 4B), and least widespread in August when almost all detections occurred close to the coast (Figure 4C). Those differences were reflected by habitat parameters, with the mean distances from shore and water depths of sightings decreasing as the winter progresses (Table 3).

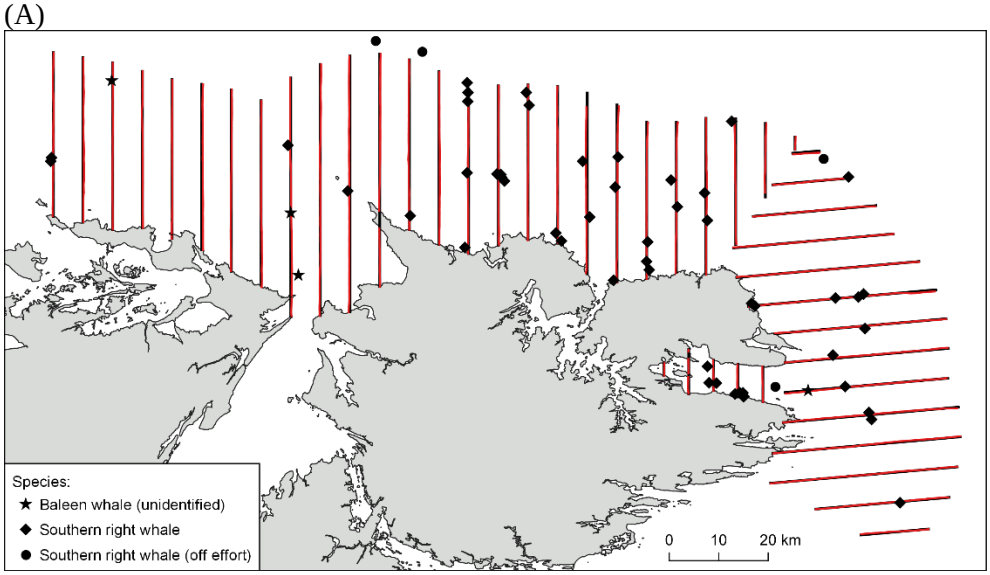
Table 3. Water depths and distances from shore of on-effort southern right whale sightings recorded during three aerial surveys (from Weir et al., In Prep).

Month	n	Water depth (m)			Distance from shore (km)		
		Mean	SD	Range	Mean	SD	Range
June 2023	51	66.7	45.6	1.0–175.0	10.8	9.4	0.0–30.9
July 2024	52	37.7	37.5	2.0–132.0	5.0	6.4	0.1–24.1
August 2023	25	13.6	28.3	1.0–141.0	2.0	3.6	0.3–16.6
Total	128	44.5	44.1	1.0–175.0	6.8	8.1	0.0–30.9

4.1.3. Boat surveys

Small boat survey work focussed on baleen whales has been carried out by Falklands Conservation since 2017. The winter work is spatially biased, and has occurred predominantly in the nearshore (<5 km from the coast) waters between Stanley and MacBride Head in the north-east of the Islands. Complete winter right whale seasons were carried out in 2019, 2020, 2022 and 2023, with lower effort in 2017 and 2021. A total of 420 sightings (1,179 animals) have been recorded during that work, with high-use areas including Cape Pembroke, Kidney Island, inner Berkeley Sound and the entire coast from Volunteer Point north to MacBride Head (Figure 5).

(A)



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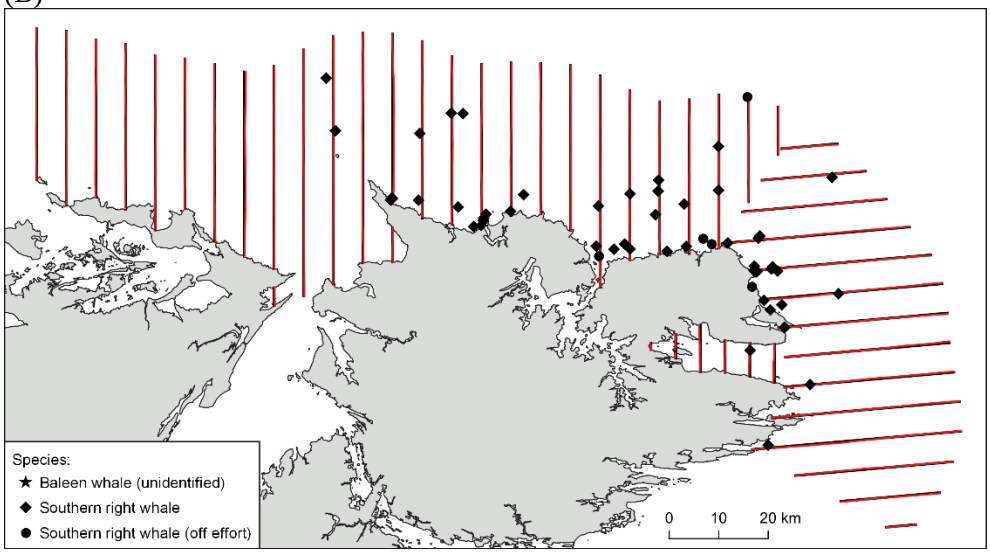

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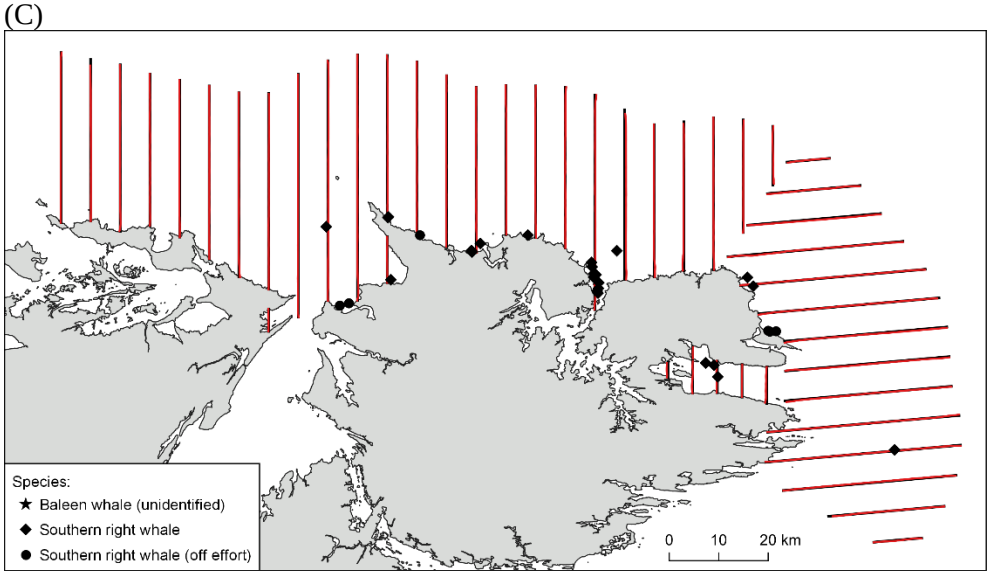

Figure 4. Distribution of planned (black) and realised (red) transect effort and sightings of southern right whales during aerial surveys in: (A) June 2023; (B) July 2024; and (C) August 2023.

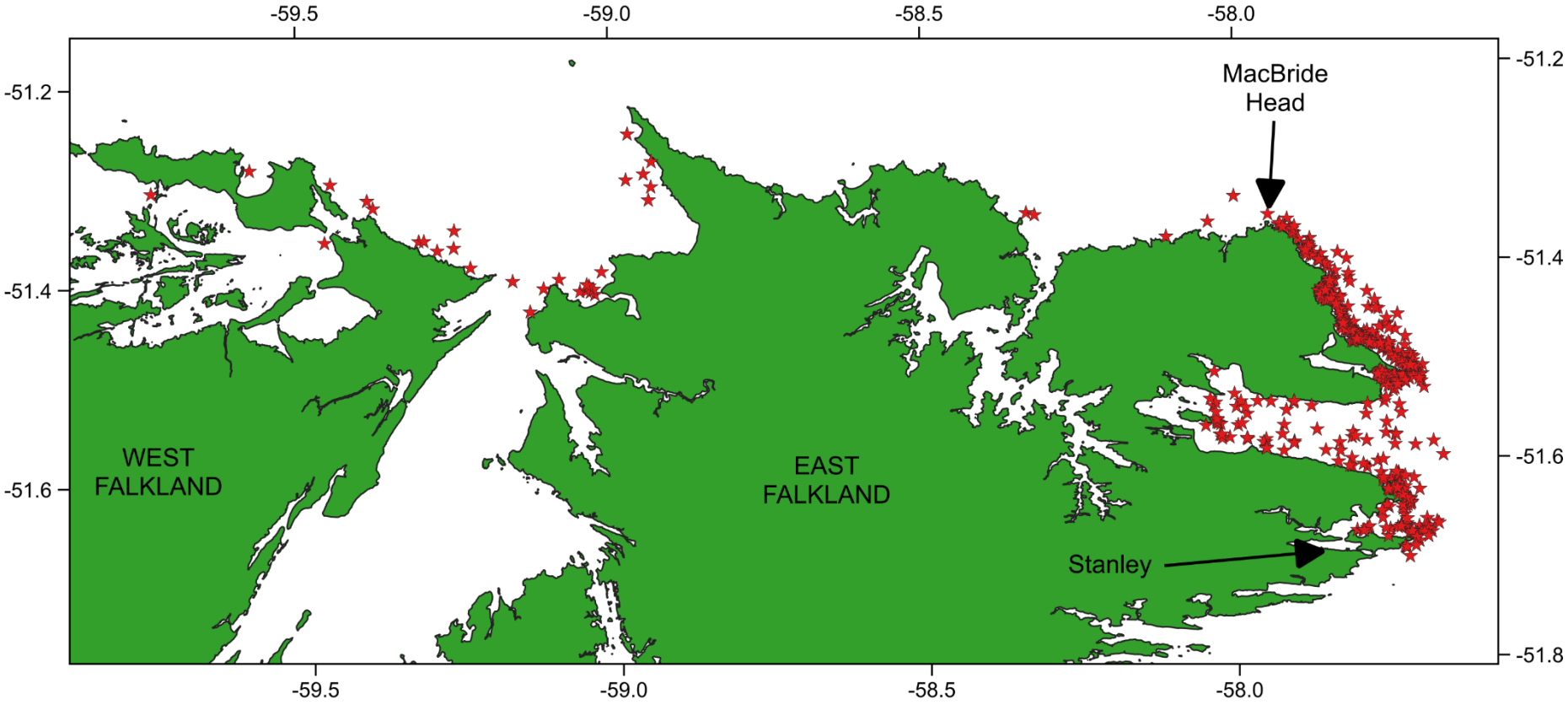

Figure 5. Locations of southern right whale sightings (n=470) during Falklands Conservation boat survey work from 2017 to 2023 (FC, unpublished data).

4.2. Delineation of the site

The combined datasets indicate that the coastline between Cape Pembroke and Middle Bay, spanning the entire north coast of East Falkland, comprises important high-use winter breeding habitat for southern right whales. This region was consistently used in both years of the telemetry study, provided the highest number of sightings in the winter aerial surveys, and has been used by mating and socialising aggregations persistently since 2017 shown by boat survey data. This spatial area is therefore identified as an appropriate KBA for right whales.

All datasets indicate that southern right whales are most numerous within nearshore, shallow habitats in the Falklands (Section 4.1). The waters from the shoreline to 10 km offshore are likely to encompass the core wintering aggregation given that:

1. The majority (71.6%) of positions from tagged right whales occurred within 10 km of the coast (Table 2);
2. Behavioural modelling shows that inshore waters are the highest-use habitat (Figure 3); and
3. The mean distance of sightings from shore during aerial surveys was 6.8 km (Table 3).

It is therefore proposed that KBA includes the waters along the north coast of East Falkland to 10 km offshore (Figure 6).

It is recognised that:

- Southern right whales do occur in the waters further from shore along the north coast of the Falklands, as shown particularly in the June aerial survey and by the telemetry work. However, the modelled behavioural state in those offshore areas is generally BS2 or BS3 which indicate a lower level of habitat use (see Figure 3); and
- Other geographic areas around the Falkland Islands are also used by southern right whales during winter, but those occurrences are less supported by available data because of the logistical challenges of working in remote parts of the Islands during winter.

Therefore, while there is very high confidence that the site proposed here (i.e., the waters along the north coast of East Falkland to 10 km offshore: Figure 6) represents a high-use habitat suitable for nomination as a KBA, there is lower confidence in the omission of other areas which may largely reflect the absence of survey effort. Additional telemetry work and research effort in other parts of the Islands may improve knowledge of right whale distribution and result in future amendments to the boundaries proposed here.

4.3. Manageability

The second step of delineation requires that the ecological boundaries are refined as needed to yield a manageable site (IUCN, 2016), so that it is possible to implement actions locally to ensure the persistence of the biodiversity elements for which the KBA has been identified. The KBA proposed here is entirely marine. It falls completely within the Falkland Islands Inner Conservation Zone and has a high amount of overlap with the existing 3 nautical mile no fishing zone. It should therefore represent a single manageable unit, since there is no division of ownership, political boundaries, or existing protected areas that would need to be coordinated.

4.4. Incorporation into the Falkland Islands Inshore KBA

The site proposed here for wintering southern right whales is much smaller than, but overlaps fully with, the existing *Falkland Islands Inshore KBA* which extends to approximately 100 m depth around the coast of the Falklands (Figure 6). The latter site was originally recognised as the *Falkland Islands*

Inner Shelf Waters KBA for endangered sei whales in 2021 (Weir, 2021), and its borders were subsequently moved slightly to the south-west in 2022 to incorporate high densities of seabirds, at which time the site was also renamed as the *Falkland Islands Inshore KBA*[5]. It is proposed that the southern right whale is added as a trigger species to the existing *Falkland Islands Inshore KBA*.

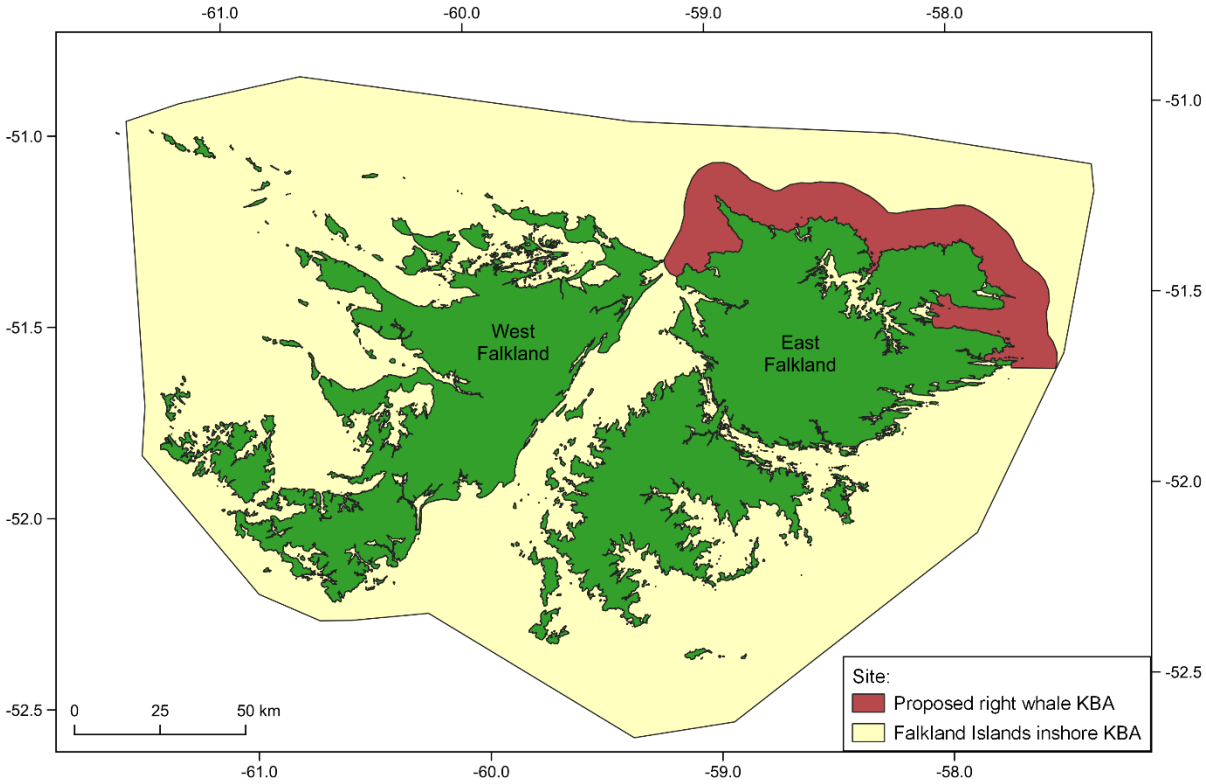

Figure 6. The boundaries of the proposed southern right whale KBA and its overlap with the existing *Falkland Islands Inshore KBA* and the Falkland Islands Inner Conservation Zone.

5. Acknowledgements

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[5] https://www.keybiodiversityareas.org/site/factsheet/49174

6. References

Cerchio, S., Stanworth, A. and Weir, C.R. (2022). Passive acoustic monitoring. In: Weir CR (ed) Conserving Falklands' whale populations: addressing data deficiencies for informed management. Falklands Conservation, Stanley, Falkland Islands, pp 175–218.

Christiansen, F., Sironi, M., Moore, M.J., Di Martino, M., Ricciardi, M., Warick, H.A., Irschick, D.J., Gutierrez, R. and Uhart, M.M. (2019). Estimating body mass of free-living whales using aerial photogrammetry and 3D volumetrics. Methods in Ecology and Evolution, 10: 2034–2044.

Cooke, J.G. and Zerbini, A.N. (2018). *Eubalaena australis*. The IUCN Red List of Threatened Species 2018: e.T8153A50354147. https://dx.doi.org/10.2305/IUCN.UK.2018-1.RLTS.T8153A50354147.en. Accessed on 18 May 2023.

Crance, J.L., Berchok, C.L., Wright, D.L., Brewer, A.M. and Woodrich, D.F. (2019). Song production by the North Pacific right whale, *Eubalaena japonica*. Journal of the Acoustical Society of America, 145: 3467–3479.

International Whaling Commission (2013). Report of the IWC workshop on the assessment of southern right whales. Journal of Cetacean Research and Management, 14: 439–462.

IUCN (2016). A Global Standard for the Identification of Key Biodiversity Areas, Version 1.0. First edition. Gland, Switzerland: IUCN.

Jackson, J.A., Buss, D.L., Carroll, E.L. and Weir, C.R. (2022). Genetics. In: Weir CR (ed) Conserving Falklands' whale populations: addressing data deficiencies for informed management. Falklands Conservation, Stanley, Falkland Islands, pp 152–164.

KBA Standards and Appeals Committee (2019). Guidelines for using a Global Standard for the Identification of Key Biodiversity Areas. Version 1.0. Prepared by the KBA Standards and Appeals Committee of the IUCN Species Survival Commission and IUCN World Commission on Protected Areas. Gland, Switzerland: IUCN. viii + 148pp.

Taylor, B.L., Chivers, S.J., Larese, J. and Perrin, W.F. (2007). Generation length and percent mature estimates for IUCN assessments of cetaceans. NOAA, Southwest Fisheries Science Center Administrative Report LJ-07-01. La Jolla, California.

Weir, C.R. (2017). Developing a site-based conservation approach for sei whales *Balaenoptera borealis* at Berkeley Sound, Falkland Islands. Falklands Conservation report. Version 1.0, September 2017. 115 pp. https://www.ketosecology.co.uk/PDF/FC_SeiWhale_Report.pdf

Weir, C.R. (2021). Southern right whale (*Eubalaena australis*) surveys in the Falkland Islands (Malvinas) during winter 2019 and 2020: preliminary results. Paper SC/68C/CMP/09Rev1 submitted to the International Whaling Commission Scientific Committee. https://archive.iwc.int/pages/view.php?search=%21collection30095&k=&modal=&display=list&order_by=title&offset=0&per_page=240&archive=&sort=DESC&restypes=&recentdaylimit=&foredit=&noreload=true&access=&ref=19177

Weir, C.R. (ed.) (2022). Conserving Falklands' whale populations: addressing data deficiencies for informed management. Technical Report for DPLUS082. Falklands Conservation, Stanley, Falkland Islands. Version 2, 30 Oct 2022. 231 pp. https://www.ketosecology.co.uk/PDF/DPLUS082_Tech_Report_FINAL.pdf

Weir, C.R. (ed.). Distribution, abundance and movements of sei whales and southern right whales in the Falkland Islands. Technical Report for DPLUS126. Falklands Conservation, Stanley, Falkland Islands. In Prep., draft available from Falklands Conservation.

Weir, C.R., Miller, A. and Hammond, P.S. Southern right whale (*Eubalaena australis*) abundance at the Falkland Islands wintering ground. In Prep., draft available from Falklands Conservation.

Weir, C.R. and Stanworth, A. (2019). The Falkland Islands (Malvinas) as sub-Antarctic foraging, migratory and wintering habitat for southern right whales. Journal of the Marine Biological Association of the United Kingdom, 100: 153–163. https://doi.org/10.1017/S0025315419001024

Weir, C.R., Fernandez, S., Jackson, J.A., Miller, A., Sucunza, F., Slesser, H.W. and Zernini, A.N. Movements and behaviour of southern right whales satellite-tracked in and beyond a subantarctic archipelago wintering ground. In Press, Endangered Species Research.

Weir, C.R., Jackson, J.A., Miller, A., Sucunza, F. and Zerbini, A.N. (2024). Movements and dive behaviour of southern right whales (*Eubalaena australis*) satellite tagged at a south-west Atlantic archipelago on the Patagonian Shelf during 2022. Paper SC/69B/CMP/01Rev1 submitted to the International Whaling Commission Scientific Committee. https://archive.iwc.int/pages/view.php?ref=22044&search=&offset=360&order_by=field8&sort=DESC&archive=0#

Wilding Brown, M. and Sironi, M. (2023). Right whale sexual strategies and behavior. In: Sex in Cetaceans, ed. by Würsig, B. and Orbach, D.N., pp. 543–570. Springer, https://doi.org/10.1007/978-3-031-35651-3