Falklands Conservation

Jubilee Villas, 41 Ross Road,

Stanley,

Falkland Islands

+500 22247

info@conservation.org.fk

www.falklandsconservation.com

Public Consultation Response: Sea Lion Environmental Impact Statement (EIS)

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Summary Statement:

The International Energy Agency has stated that no new oil and gas fields should be opened if we are to achieve net zero emissions by 2050. This would be necessary to keep temperature rises under the safe 2°C limit, avoiding far more severe climate change effects on wildlife, ecosystems and people, including for the Falkland Islands. Opening a new oil field in the Falkland Islands would not align with this, therefore Falklands Conservation (FC) cannot support the proposal laid out in the Environmental Impact Statement (EIS).

The presented EIS is not fit for purpose

FC believes the EIS sets out an avoidable and clearly environmentally damaging development proposal that is inconsistent with the Government's objective to 'reduce our carbon emissions, in order to ensure we act as a responsible global citizen' (Islands Plan 2022).

The EIS is an incomplete update to previous submissions. It remains inadequate in meeting key requirements of EIA process. It provides an incomplete picture of the risks to the Falklands environment.

A major shortcoming is the failure to provide a firm commitment to offsetting all carbon emissions: the 9 million tonnes produced during the development and the more than 100 million tonnes from burning of Falklands oil. EIS statements regarding local offsetting guarantee nothing, are likely unachievable, and could easily be viewed as climate-washing.

The EIS contains significant data omissions and errors. Key data, highlighted as required 10 years previous have still failed to be collected, existing data have not been included. Two sections looked at in detail, though not exhaustively, contain over 100 errors, omissions or uncertainties. These put Falklands and other globally significant wildlife at risk.

FC believes the current EIS confirms a corner-cutting approach, which unnecessarily results in environmental and reputational impacts for the Falklands community, and one which has limited meaningful commitment to mitigating key environmental harms.

The current legal framework is incomplete for good environmental governance

In conjunction with the above concerns, FC believes that Falkland Islands Government (FIG) has not made the promised progress in three key areas of environmental legislation that would help ensure that environmental impacts are minimised and would therefore help guide any Environmental Impact Statements to best practice standards. These were 'polluter pays', updated wildlife ordinance and 'environmental case' legislation.

The lack of any identified key marine features such as Marine Protected Areas and Vulnerable Marine Ecosystems, and associated protective policy is a significant weakness for risk assessment, decision-making and protection of the marine environment.

There is risk that many new oil projects could become uneconomical before the intended project end-date. The lack of an early commitment to how decommissioning would happen in an environmentally sustainable manner is therefore a critical omission.

If FIG gives a green light to this Environmental Impact Statement that does not meet best practice standards and before legislation is put in place, it makes the legal reliability of the agreement uncertain in case of any infringements and puts the government at risk of being sued if trying to impose standards later.

Recommendation

FIG should not sanction unnecessary environmental impacts caused by a corner-cutting development proposal, under high-risk and inadequately legislated circumstances.

Determining an EIS of this quality would be to endorse low standards and commitment that delivers a poor outcome for the environment and the community. The EIS should be re-submitted only once key gaps have been filled, errors addressed, and standards met.

1. Carbon emissions and lack of commitment to offsetting

The EIS lists CO_2 emissions from oil production at approximately 9 million tonnes (p.825). Emissions from the burning of Falklands Sea Lion field oil (a legitimate inclusion in the Statement [1]) are listed as more than 150 million tonnes if production were to be maximised. The developers have also indicated that further development phases could more than double production of Phases I and II. These are very large amounts of CO_2 that would launch a major increase in national carbon pollution and would make the Falkland Islands the highest per capita carbon emitting country in the world – but could be avoided as offsetting is a viable option right now. Comments regarding local offsetting guarantee nothing and are likely unachievable. FIG Guidance [2] requires that mitigation and off-setting measures 'should not be hypothetical or unrealistic'. The EIS currently fails to provide a realistic and firm commitment to offsetting all carbon emissions and is inconsistent with FIG guidance. There needs to be a solid commitment in the EIS to offset all emissions.

The EIS does not set out how the development will increase emissions in comparison to other local sectors, or the Falkland Islands national figures, as stated as required in FIG Guidance [3]. A comparison with UK budgets and emissions is neither in line with this guidance or consistent with use of UK comparisons in the rest of the EIS. At over approximately 60% of Falkland Island's recent annual emissions, the proposed development has an enormous and significant national impact.

FC is concerned that the current approaches contradict FIG guidelines, good environmental assessment principles and global commitments, while also having negative reputational impacts for the Islands. Given that the amount of carbon emissions is presented as small in global terms, it is even more important that FIG ensure a real and viable commitment to offsetting all emissions within the EIS.

[1] Key oil project must count full climate impact – court: www.bbc.com/news/articles/cxwwzmn12g9o
[2] FIG Hydrocarbons EIA Guidance 2016, paragraph 3.22
[3] FIG Hydrocarbons EIA Guidance 2016, paragraph 3.15

2. Impacts on our wildlife and data gaps

There still remain many gaps in information in the EIS – a number of these are acknowledged within the EIS itself. For such a major proposal and for a robust assessment these should be filled prior to the determination of any EIS, as is consistent with good practice, and to avoid significant risks to environmental features and processes. These are critical, given the Falklands economy is underpinned by a healthy environment. Data gaps include those on invasive species risk, bird strike, waxy oil implications for pinniped fur and cetaceans, impacts on benthos, as well as seabirds and cetaceans:

Seabirds

The Falklands supports globally important breeding populations of penguins, albatross and prions during the breeding season. However, a much larger diversity of seabirds has been recorded in Falklands waters than simply breeds. Seabirds can be extremely wide-ranging, particularly during winter migrations and consequently, birds from colonies hundreds or thousands of kilometres away occur in Falklands waters and could be at risk from the development proposals. These can include those of conservation concern such as the 'Vulnerable' wandering albatross including those from South Georgia, the 'Endangered' Atlantic petrel from St Helena, Ascension and Tristan, and the 'Vulnerable' southern royal albatross from NZ which have all been sighted in the Falklands even close inshore - however, the potential range of species at risk is much larger.

The EIS identifies that seabirds are at risk from a number of impacts, including oil spills and bird-strike. In order to determine which seabirds could be at risk and how to avoid or mitigate such risk, *up-to-date baseline data on the total range of seabirds that utilise potentially impacted areas are required*. Species-focussed approaches, such as tracking studies, are no substitute for this all-inclusive baseline data[4] as they inform on only those species, life-history stages and locations tracked. Neither are they an effective way to track changes in the use of the site by a changing seabird assemblage over time. The approach to delivering useful seabird data therefore needs to be area-based boat or aerial surveys, with a survey method that will provide appropriate representation of the diversity and abundance of all seabirds using the risk area.

The only presented seabird data of a broadly appropriate type in the EIS is more than 20 years old. It is well-known that climate change is rapidly changing the distribution of seabirds and their prey at sea. Good practice in places such as the North Sea would expect data to be collected within five years. Projects are expected to provide comprehensive data on bird distributions and movements over a two-year period at

[4] Webb A, Elgie M, Hidef CI, Pollock C, Barton C et al. (2016) Sensitivity of 683 Offshore Seabird Concentrations to Oil Pollution around the United Kingdom: Report to Oil & 684 Gas UK. 103 pp

considerable cost, before submitting consent applications. This is done ahead of projects being approved, and with all the associated risks of having to change the development. We would consider that this Environmental Impact Statement has cut corners in this potentially expensive but essential aspect of data collection.

The consequences of a lack of appropriate data are strongly evident in the assessment of risk to seabirds in the EIS, these include:

- Superfluous referencing to data that are not subsequently used, or analyses that could occur, but do not;
- Acknowledgement of data weaknesses and data gaps that could have been addressed, but have not;
- Inconsistent and inaccurate representation of data and analyses that are included; and
- Unjustified and contradictory argument for use of data sets that are too old and do not follow good practice.

Further detailed comments on these points are included in Appendix 1.

Cetaceans

The Berkeley Sound development area is proposed to operate within critical sensitive whale habitat. The extent of the global importance of these areas for whales has not been recognised through the omission of large whale datasets in the EIS. Important Marine Mammal Areas (IMMAs) have been designated for endangered sei whales and for wintering southern right whales. Such non-statutory designations of sites should be a standard part of any EIS that wishes to determine adequate risk categories and suitable mitigation e.g. how to adapt operations for animals engaged in sensitive behaviours including feeding and mating within Berkeley Sound. Information on whale distribution, movements, seasonality, behaviour, habitat, site fidelity, conservation status and population trends are provided in the supporting evidence for these IMMAs, almost none of which has been used to recognise the extent of whale sensitivities in the EIS which should be changed to Very High sensitivity.

The EIS risk assessment relies on the identification of 'Key Environmental Sensitivities', and the sensitivity assessment is based on criteria including conservation status, critical habitat, seasonality, vulnerable parts of a species lifecycle etc. Consequently, it is essential to correctly identify and consider the latest available information on those Sensitivities. Eight years of data, primarily for sei whales and southern right whales in Berkeley Sound, has not been appropriately represented in the EIS. In addition, erroneous findings from early studies are perpetuated (e.g. that Berkeley Sound is a fin whale hotspot). The importance of nearshore Falklands waters for wintering southern right whale aggregations has been almost completely omitted from the EIS.

Offshore: information on the offshore occurrence of cetaceans that would facilitate a robust assessment of the Key Environmental Sensitivities at the Sea Lion field is largely lacking. Efforts have not been made to implement offshore cetacean surveys as an environmental baseline assessment ahead of production commencing. However, a potentially useful year-round dataset was collected. Only 5% of this appears to have been fully analysed and used to inform the EIS.

Whale entanglement risk: there has been little recognition of the risks of cetacean entanglement in mooring equipment in the EIS. Foraging sei whales, that use subsurface lunge feeding, and breeding southern right whales in Berkeley Sound are vulnerable to entanglement, potentially leading to mortality by drowning, unrecoverable injuries, or subsequent infections. Offshore cetaceans can also become entangled.

Vessel collisions: the sections on vessel collisions make no acknowledgement of the existing Code of Conduct (endorsed by FIG) for the Falklands which provides guidance on suitable speeds, wide berths etc for avoiding injurious/fatal collision with cetaceans. Small cetaceans have been omitted despite local documented mortalities of dolphins from vessel strike. With regard to nearshore wintering southern right whale aggregations, reducing the risk of vessel collision would benefit from an expanded 'reduce vessel speed' (10 knots) zone between 1 June and 31 August to 10 km from the coast to match the IMMA and telemetry data showing highest-use habitats. This would greatly improve confidence that the vulnerable surface groups of mating southern right whales - which occur out from the coast - would be at lower risk of a fatal collision, and would be a better all round mitigation approach than only the use of visual observers (given there are 16 hours of darkness in winter).

Information provided in the EIS indicates that the risk of injury/mortality to cetaceans from noise is negligible in both the offshore and Berkeley Sound environments. However, concerns remain about behavioural impacts, given the lack of data on cetacean residency (exposure time) in the Sea Lion field and the non-conservative approaches used in the EIS. The semi-enclosed waters, seasonally-high existing noise levels, and known importance of Berkeley Sound for feeding sei and mating right whales, raises concerns over the cumulative impacts of noise from moored vessels on whale behaviour and use of the Sound.

3. Environmental commitments and Falkland Islands legislation

Commitments

The Environmental Impact Statement presents a set of very significant environmental impacts, and it is therefore necessary for MLAs to compare policies and commitments that have been undertaken. We believe that the impacts are inconsistent with several key commitments:

The Islands Plan 2022-2026:

- **"**We will carry out work to measure and reduce our carbon emissions, in order to ensure we act as a responsible global citizen." (p. 8) [5]

Falkland Islands Environment Strategy:

- "Vision 2040: Renewable energy has been embraced, we play our role in tackling the climate emergency, and are able to understand and adapt to global change at a local level." (p.18)[6]
- "Our Strategic objectives: to reduce our carbon emissions through transitioning to using renewable (low carbon) energy sources for power generation" (p. 7)[6]
- "Our Strategic objectives: to conduct the extraction of non-renewable resources, including any hydrocarbon development, in a way that values and conserves our unique biodiversity and ecology, supported by effective regulation" (p.8)[6]

Falkland Islands laws and policies are not 'oil-ready'

FIG should have put in place rules before an Environmental Impact Statement. For good environmental protection and for Environmental Impact Assessments to work to the best standards, it is important to have a consolidated set of policies and laws to identify what elements of the environment should be protected strictly or to lesser degrees, and how projects can operate within the law. It is also important, so that if rules are infringed, reliable court challenges are possible. This is important for MLAs to know that they are making safe decisions when consenting projects – but also for potential investors in projects in order to see if their investments are safe.

Before 2020, FIG recognised this and committed to updating standards in:

[5] Islands Plan 2022-2026 – https://assembly.fig.gov.fk/jdownloads/The%20Islands%20Plan/2022-2026%20Islands%20Plan.pdf

[6] Falkland Islands Environment Strategy 2021-2040 – https://www.falklands.gov.fk/policy/downloads?task=download.send&id=110:falkland-islands-environment-strategy-2021-2040&catid=3

- the Conservation of Wildlife and Nature Ordinance 1999 [7]
- establishing clear liability rules for polluters
- introducing a form of technical environmental protection rules called 'environmental case'.

Regrettably, none of these standards were completed before the Sea Lion Environmental Impact Statement was submitted. If MLAs give a green light to the Environmental Impact Statement before legislation is put in place, it makes the legal reliability of the agreement uncertain in case of any infringements and puts the government at risk of being sued if trying to impose standards later.

The lack of this environmental framework means that international standards, as would be found in jurisdictions such as the North Sea, would be unable to be adopted. For example, there is a lack of national habitat categorisation and prioritisation in Falkland Island waters (equivalent to EU Habitats Directive, OSPAR and other UK categorisations). This makes it difficult to attribute value and risk to different sites and therefore suitable mitigation proposed.

4. Decommissioning and spill risks

Several studies have called into question how long certain oil developments can continue if the world is to meet international climate change goals which restrict warming to below 2°C. If these studies are correct, then there is a risk that many new oil projects will become uneconomical after a period of time. It is therefore important that the Sea Lion Environmental Impact Statement include decommissioning commitments up front with consent for the project. Commitment to clean and environmentally friendly decommissioning of the Sea Lion project is essential to avoid the 'cheapest option' being chosen once the economics have been agreed upon. This would avoid potential problems like those which have been seen with the decommissioning of Stanley's existing polluted barge port (FIPASS).

Spills are a key risk to the environment. Whilst there is commitment to an Oil Pollution Emergency Plan (OPEP) there is insufficient information presented within the EIS on the nature of oil impacts and the wildlife likely to be impacted. Furthermore, any OPEP should be properly financed by the developer and that liability should not be passed to Falkland Islanders as part of the National Oil Spill Contingency Plan, which by its very nature is limited by local resource.

[7] Conservation of Wildlife and Nature Ordinance 1999 – https://www.legislation.gov.fk/view/whole/inforce/2018-07-30/fiord-1999-10#:~:text=AN%20ORDINANCE%20To%20repeal%20the,wildlife%20in%20the%20Falkland%20Islands.

Appendix 1: Seabirds – detailed comments

The risk analysis for seabirds is confusing and superficial, and the type of data ultimately considered and analysed for the purpose of this risk assessment is inappropriate for several reasons:

(1) The EIS refers to several data that are not actually considered any further or are referred to as "additional analyses could be undertaken". This is misleading and makes it difficult to assess what information was actually used and how for the purpose of informing this EIS. (E.g. SAST data collected between Falklands and South Georgia 2003-2005, data from DPLUS139, data from Global Procellariiform Tracking Database and "its recent extension to penguins and other seabirds"). A similar approach is seen elsewhere in the EIS, e.g. in regard to zooplankton work which is yet to be conducted.

(2) The EIS refers to the 3-year data collected in 1998-2001. However, the vulnerability index taken from Webb et al. (2001) is actually based on only 2 years of these data. This detail is, misleadingly, not highlighted in the EIS. Best practice advice for oil & gas developments asks for a minimum of three years of data (Webb et al. 2014).

(3) Data gaps are acknowledged but are not addressed (e.g. lack of seasonal and age-specific information from tracking data).

(4) The EIS and previous responses to public concerns argue the suitability of the old ESAS data by referencing the independent review undertaken by Genesis (2017). However, a quick read of this report reveals a series of poorly supported and biased arguments with contradicting, distorted or incomplete information, and with key literature altogether missing. This superficial review process severely undermines the integrity of this EIS.

    a. Genesis (2017) did not conduct a power analysis to assess the suitability of the data to determine whether sufficient data exist to enable adequate baseline characterisation and robust assessment of changes that could arise should the project be approved.

    b. In regard to the suitability of the age of the data, the review compares the situation with UK examples, which are actually based on larger and more recent temporal extent and of more complete coverage. For example, Kober et al. (2010) used data from 24 years, and as recent as 6 years prior to analysis, compared to Falklands with 2-3 years of data, as recent as 23 years ago; "other projects" in the Atlantic Frontier (projects not specified in review of EIS) using data from 1979 – 1997. Modern developments actually use (boat-based) data from between 1980 – 2018 (see e.g. Rosebank EIS).

    c. Genesis (2017) distorts the information provided in Webb et al. (2014) with regards to data suitability. Webb et al. (2014) clearly state that surveys of less than 15 years old and certainly no more than 20 years be used to assess the sensitivity of seabird concentrations to oil pollution.

    d. Webb et al. (2016) was not considered in the review or the EIS. (Webb et al. 2016, Sensitivity of offshore seabird concentrations to oil pollution around the United Kingdom: Report to Oil & Gas UK). This report refers to data suitability in terms of age and highlights why tracking data cannot act as a substitute for at-sea data.

(5) Important information provided by Genesis (2017) in relation to data suitability and data gaps was ignored in the EIS and in responses to public concerns. Cherry-picking of information by the authors of the review further undermines the integrity of this EIS.

a. E.g. Genesis (2017) states: “Pollock & Barton (2006) recommended that data over 20 years old should not be used for assessment purposes.” The review also hints at Webb et al. (2014) recommendation, albeit in an incomplete and distorted fashion. Neither reference can be found in this EIS.

b. Genesis 2017 expresses the need for updated boat data in particular for information on risk areas in case of an oil spill. This recommendation has not been considered in the EIS.

c. Genesis 2017 states, “The seabird data collected in the Falkland Islands is less than 20 years old and therefore considered suitable for EIA and oil spill sensitivity purposes. However, it is noted that the data obtained from boat-based surveys in the Falkland Islands is becoming older and its suitability for assessment purposes may become less reliable in future years.” This information has not been considered in the EIS.

(6) This EIS has made no attempt at an updated, integrated analytical approach for refined seabird vulnerability assessments. Instead, the EIS simply reproduces the vulnerability maps produced by White et al. (2001) (which are based on 2 years of data and using an outdated method (see Webb et al. 2016) and reproduces figures from Baylis et al. (2019) and (2021) which portray the results of predicted habitat use, which is different to a vulnerability assessment. Since 2001, there has been significant progress in the statistical approaches available for seabird vulnerability assessments, with more powerful methods now in use (see e.g., Webb et al. 2016; Waggitt et al. 2020).

Detailed comments

Section 1.6.1.1.3

EIS: “the level of confidence in the assessment was used to inform the monitoring requirements for each potential impact / risk”.

FC: We understand that this informs monitoring requirements. However, it’s less clear as to whether confidence level impacts the risk level provided. How can a risk be assessed with no data?

Section 7.2.3.3.3

EIS: **“**POEPL commissioned SAERI to conduct a series of four seasonal coastal bird surveys in and around Berkeley Sound, which were carried out between February 2016 to May 2019. In the course of these surveys, the opportunity was taken to develop an initial shoreline classification index specific to the Falkland Islands for use in oil spill planning.”

FC: Tides and time of day, which significantly impact species number and types, were not considered. A baseline survey should be repeatable and allow detectability of change. However, this survey design fails in this aspect, due to the varying temporal and tidal conditions likely to be encountered at any particular season. At the very least, 3 years of seasonal data should be collected, as is the recommended period for seabird data.

Section 7.4.1.3.1

EIS: “the baseline here was generated from extant literature”

FC: Extant literature is practically non-existent, and this area is extremely data poor, as highlighted also by Van der Grient (2022). Also, up-to date references should be included, such as to highlight the importance of lobster krill to higher predators (incl. Baylis et al. 2014; Kuepfer et al. 2022; Kuepfer et al. 2023).

Section 7.4.1.3.2

EIS: "There is a PhD studentship (SAERI and the University of Aberdeen) currently working on inshore zooplankton dynamics in Berkeley Sound. However, the results of this study will not be available for another year (i.e. mid-2025)."

FC: Again, the EIS lists superfluous information that is not actually considered for the assessment. This adds unnecessary bulk to this lengthy document and is misleading.

Section 7.4.5.2.1

EIS: "Although the JNCC Seabirds At Sea Team (SAST) surveys are 24 years old, it is unlikely that broad-scale animal distribution and movement patterns have changed significantly. Hence, the SAST data remains useful to characterise occurrence of species, particularly where no tracking data exists."

FC: This statement is completely unfounded.
Seabird assemblages are known to change, particularly in a changing climate. For example, in the UK, Webb et al. (2014) concluded that the abundance of some seabird species had changed significantly, and other species had shown an increase and subsequent decrease, compared to previous vulnerability assessments. (This was also highlighted in the Genesis 2017 review.) Also see e.g. Peron et al. (2010) which specifically refer to the effect of climate change on sub-Antarctic seabird distribution and abundance at sea. Webb et al (2014) therefore recommended that data under 15 years old would be the most appropriate (with no data older than 20 years) when assessing sensitive seabird concentrations to oil pollution.

Section 7.4.5.2.1.1

EIS: "Surveys commenced in 1998 and continued for three years"

FC: *Nowhere within this EIS is it highlighted that the OVI presented is actually based on just 2 years of data (see White et al. 2002: "The results of <u>the first two years of surveys</u> were published as an atlas depicting vulnerability of seabird concentrations to surface pollution Vulnerable concentrations of seabirds in Falkland Islands waters (White et al. 2001)".) As highlighted by Genesis (2017): Webb et al. (2014) recommend at least three years of data for assessment purposes. In addition, nowhere is it explicitly shown what the actual survey effort was, relative to area of interest, not just the drilling site, but also the risk area in the event of a spill.*

EIS: "Over a two-year period between 2003 and 2005, additional data was collected by one of the original SAST observers using the same methodology en route between the Falkland Islands and South Georgia (Black, 2005b)."

FC: These data are not actually considered further anywhere. Merely mentioning (potentially) useful data for informing this EIS is misleading and adds unnecessary bulk.

EIS: "There remain gaps in the SAST coverage but it is possible to infer the species assemblages that are likely to be found in these areas with the data available, therefore, White et al., (2002) has been used as a reference in the EIS."

FC: Please elaborate on the methodology used for such inferences and provide results of such analyses.

EIS: "The [Genesis 2017] review concluded that the survey methods used, the coverage and the age of the data are comparable with existing datasets used to inform similar impact assessments undertaken in the UK"

FC: This statement is deceptive and cherry-picks information provided within a highly biased and superficial review. FC make the following points:

- *The Genesis 2017 report is not available online, reducing procedural transparency. FC appreciate that the report was provided to FC by Navitas for consideration upon request.*
- *Even if data were comparable (which they are not), this does not mean that the approach is adequate.*
- *Genesis 2017 did not conduct a power analysis to assess the suitability of the Falklands data to determine whether sufficient data exist to enable adequate baseline characterisation and robust assessment of changes that could arise should the project be approved. The review merely discusses the results of a power analysis conducted on UK data.*
- *The Genesis 2017 report misinterprets information that it uses for its arguments in relation to data suitability. For example, Kober et al. (2010) actually used data from 24 years ago, and as recent as 6 years prior to analysis, compared to Falklands with 2-3 years of data, as recent as 23 years ago. Other similar and more recent analyses to Kober et al. (2010) (e.g. Wilson et al. 2014) used data from 2009 – 2011 (i.e. <7 years old), yet this very comparable example was not used as would be expected in a non-biased review. The review further states that "The data obtained in the Atlantic Frontier is widely used as the baseline information used to assess potential impacts and vulnerability of seabirds from oil and gas developments within waters to the north and west of Scotland." The specific projects are not actually referenced. Also, the data referred to spans from 1979 – 1997, and as highlighted in the review, "the survey effort is greater than that from waters around the Falkland Islands, particularly in the main areas of interest".*
- *An example of an up-to-date O&G EIS in the UK is the Rosebank EIS, which uses the JNCC SOSI (data from 1995 - 2015), and analyses by Waggitt et al. 2020 (data from 1980 – 2018).*
- *Genesis 2017: "In their review of the ESAS data, Pollock & Barton (2006) recommended that data over 20 years old should not be used for assessment purposes." This information / reference is not considered in the EIS.*
- *Genesis 2017: "Similarly, Webb et al. (2016) [should be Webb et al. 2014] advised that data in excess of 20 years may be 'too old' for all species but as a 'compromise' data from 1995 could be used as this was when the quality of data improved through standardised survey techniques." This interpretation of the information is false and misleading. Webb et al. 2014 recommended that surveys of less than 15 years old and certainly no more than 20 years be used to assess the sensitivity of seabird concentrations to oil pollution. Webb et al. (2014) further stated the recommendation "Revise and update maps of seabird distribution and of the sensitivity of seabird concentrations to oil pollution using only data in ESAS collected since the start of 1995". This statement does not negate the recommendation that surveys of less than 15 years old and certainly no more than 20 years be used.*
- *Genesis (2017): "Additional surveys focussed on areas where survey coverage is relatively low would improve the information used in the baseline." This indirect suggestion was ignored in the EIS*
- *Genesis (2017): "Oil spill modelling indicates that there is a risk of oil arising from a blow-out to occur in areas to the north of 47°S for which there are no published survey data. Consequently, there is a risk that seabirds that were infrequently recorded by White et al. (2002) may occur more frequently in the largely un-surveyed areas to the north, e.g. Atlantic petrel" This concern is not mentioned in the EIS.*
- *Genesis (2017): "There are gaps in the data obtained from boat-based surveys undertaken between 1998 and 2001. Of most relevance and importance is the lack of data within the area which, in the event of a blow-out, would be at very high risk of sea surface contamination. … The collection of additional survey data using boat-based methods to reduce the gaps in the existing data may provide a more robust understanding of the temporal and spatial distribution of*

seabirds within the region. This, may help inform the risk to seabirds from either sea surface contamination or light attractions which, in turn, would help in the undertaking of EIAs." These indirect suggestions have not been considered.

- *Genesis (2017) states that, "The seabird data collected in the Falkland Islands is less than 20 years old and therefore considered suitable for EIA and oil spill sensitivity purposes. However, it is noted that the data obtained from boat-based surveys in the Falkland Islands is becoming older and its suitability for assessment purposes may become less reliable in future years." The data is now over 20 years old, and thus any inference of its suitability by Genesis 2017 is no longer a valid argument.*
- *JNCC are currently looking to update their SOSI (which is based on data from 1995 – 2015), as these data are now considered too old (J Black pers. comm., Senior Marine Industries Ornithologist at JNCC).*

EIS: "However, the survey effort is not dissimilar to the level of effort from the Atlantic Frontier waters located off the north and west coast of Scotland, where O&G exploration is also relatively new and developing"

FC: Can this be substantiated by references to any specific projects or impact assessment? The Genesis report states: "The data obtained in the Atlantic Frontier is widely used as the baseline information used to assess potential impacts and vulnerability of seabirds from oil and gas developments within waters to the north and west of Scotland." However, no particular projects or impact statements are referenced. The Genesis report further states: "Although the survey effort is greater than that from waters around the Falkland Islands, particularly in the main areas of interest, the overall coverage is also not complete."
An example of an up-to-date O&G EIS is the UK is the Rosebank EIS, which uses the JNCC SOSI (which uses data from 1995 - 2015), and analyses by Waggitt et al. (2020) (which uses data from 1980 – 2018).

EIS*:* "in addition to the SAST data, a significant amount of recent tracking data was collected and synthesised through the GAP process, which is also utilised in the impact assessment"

EIS: "Preliminary results [from GAP tracking data] showing the range of each species, as derived from probability of occurrence data, support the known distributions of the species concerned. However, while vulnerability maps were produced, there is scope for additional work to interpret this data."

(Also, in section 7.4.5.2.1.3) EIS: "The initial results of the GAP project are presented in Blockley and Tierney (2016) and Baylis et al. (2019). However, further work could potentially be undertaken to interpret this data with the aim of producing vulnerability maps."

FC: It is unclear what work has actually been conducted with the GAP data specifically for the purpose of this EIS. It appears to be limited to reproducing the maps from Baylis et al. (2019) in the EIS with the location of the drilling site superimposed on them. The maps show predicted habitat use. They are not vulnerability maps.

Tracking data can provide useful complementary data, but they unfortunately do not compensate for the lack of up-to date at-sea data.

EIS "During the three years of the project major inter-annual variations in species distribution were not identified, perhaps because the study covered a relatively short time frame. Recent studies suggest that there may be significant inter-annual and spatial variation in foraging and migration patterns, for individuals of the same species breeding on the same island (Masello et al., 2010) and on island breeding sites that are in close proximity (Granadeiro et al., 2011; Catry et al., 2013). This is likely to be the case for individual birds but whether this is reflected in the foraging ranges of populations as a whole remains to be seen."

FC: This directly contradicts a statement the EIS made in section 7.4.5.2.1 and supports the need for further data. See also Peron et al. (2010) and Webb et al. (2014) for evidence of changes in seabird assemblages over time, including within the sub-Antarctic.

EIS: "The three years of SAST surveys did detect some inter-annual variation but most of these concerned non-breeding visitors to Falkland Islands waters."

FC: This directly contradicts a statement the EIS made in section 7.4.5.2.1 and supports the need for updated at-sea data and integration of data from Procellariiformes tracking database.

Section 7.4.5.2.1.2

EIS: "A total of 242 seabird surveys were conducted from January until May 2011 during a 3D seismic survey in the licence area PL001, which is adjacent to the block containing the Sea Lion Field (Geomotive and MRAG, 2011). In addition, 226 individual seabird surveys were conducted over a larger area covering many of the [North Falklands Basin] NFB licence blocks from the end of November 2010 to May 2011 (Polarcus, 2011) … Additionally, a mixture of line transect and point surveys were conducted in March and April 2012 as part of the Sea Lion Field environmental baseline survey (Gardline, 2013a)."

FC: The numerous surveys listed sounds substantial, but this information is meaningless in the absence of effort details. For example, according to information on the MRAG website (https://mrag.co.uk/experience/marine-mammal-and-seabirds-observation-survey-north-falkland-basin) the effort of the 242 seabird surveys by Geomotive & MRAG 2011 totalled 308 hours and 1350 km, which equates to approx. 1.25 hours and 5.5 km per survey. No effort details are provided for Gardline 2013a.

EIS: Table 7.13 Number of seabird sightings during the PL001 and NFB Surveys

FC: Table 7.13 lists the species for which tracking data are available within the FCZ. However, for several species (e.g. southern giant petrel, northern giant petrel, great shearwater, soft-plumaged petrel, white-chinned petrel, wandering albatross, northern royal albatross), most of which are Endangered, Threatened or Protected (ETP) species, these data are not further considered within this EIS. Again, the report is misleading by referring to data which are ultimately not considered further in the EIS.

***Section* 7.4.5.2.1.3**

EIS: "The initial results of the GAP project are presented in Blockley and Tierney (2016) and Baylis et al. (2019). However, further work could potentially be undertaken to interpret this data with the aim of producing vulnerability maps."

FC: Why has this work not been undertaken, given data have been available for > 5 years? Also, see Webb et al. (2016), who explain why the use of tracking data is not suitable for producing vulnerability maps:

"These [tracking] studies have contributed greatly to our understanding of individual movements of seabirds but fall short when attempting to describe seabird populations and seabird concentrations as is required for this project. The main shortcomings of these data are their focus on the movements of adult birds and their focus on the breeding season. This means that there are relatively little data available covering the non-breeding season and non-breeding full-grown or immature seabirds. Furthermore, data for some species is limited by their suitability for carrying tags (e.g. on account of their size, their foraging behaviour or their behaviour in response to the tags). In order to include tracking data to determine the sensitivity of seabird concentrations to oil pollution, data would be needed for all species and all age classes in reasonable sample sizes within and out of the study area."

EIS: “Tracking data for different age-classes, breeding stages and breeding colonies are limited for most species. This is particularly the case for immature / juvenile birds, periods outside of the breeding season and species that breed elsewhere (noting that most of the IUCN Endangered, Vulnerable and Near Threatened species encountered within Falklands waters do not breed on the Islands). So, although there has been a considerable research effort on tracking seabirds in recent years, there remain substantial data gaps.”

> *FC: Whilst the EIS recognises the limitations of available tracking data, particularly in terms of cryptic life stages and non-Falklands breeding birds, including ETP species, it fails to acknowledge that the best way to address the data gap is through at-sea surveys, as also highlighted in Webb et al. (2016).*

In the previous EIS, it is stated: “Generally, small sample sizes and data gaps limit the ability to obtain statistically significant and biologically relevant results. Work is currently underway to address priority tracking data gaps in the Falklands (section 7.2.4.2), so that these data can be used in future assessments.” The current EIS state “Generally, small sample sizes and data gaps limit the ability to assess vulnerability for all age-classes, breeding stages and in some instances, species. Further work is required to address priority tracking data gaps in the Falklands (Section 7.2.4.2), so that these data can be used in future assessments.”

> *FC: When will this additional work actually be undertaken? Also, see Webb et al. (2016), who state why use of tracking data is not suitable for producing vulnerability maps. Tracking data are not a substitute for the all-inclusive data that can be delivered by boat surveys. Instead, the data gap should be addressed using at-sea surveys.*

EIS: “Notable additions to seabird tracking data since the GAP project, include a recent SAERI led tracking project (DPLUS139) that included six species and 5 breeding colonies (Table 7.14). Combined with the GAP project data, this yields over 360,000 at-sea locations from 10 species (Figure 7-48). This data is yet to be formally analysed but could be integrated into future assessments.

> *FC: This merely states the availability of more tracking data that have not actually been further analysed for the purpose of this EIS. Again, we highlight that tracking data are not suitable for producing vulnerability maps in the absence of much more all-inclusive at-sea data.*

EIS: “In addition, the Falkland Islands provides important foraging habitat for seabird species that breed elsewhere, particularly at South Georgia (e.g. Berrow et al., 2000; Phillips et al., 2006; Ratcliffe et al., 2014). BirdLife International manages the Global Procellariiform Tracking Database (BirdLife International, 2004), which serves as a central repository for albatross and petrel tracking data from all over the world. The model has recently been extended to penguins (and other seabirds). Work is currently underway in the Falklands to collate, and determine how best to use, the tracking data available for seabirds breeding and visiting the Falkland Islands”

> *FC: Again, the EIS refers to available data which could potentially provide useful complementary information without actually using the information. This is misleading and adds unnecessary bulk.*
>
> *The previous EIS already stated that data from the Global Procellariiform Tracking Database would be used to include more info from non-Falklands breeding birds. This has not happened. Instead, the current EIS merely repeats that this work will be conducted.*
>
> *Similarly, it was already mentioned in the previous EIS that “Work is currently underway in the Falklands to collate, and determine how best to use, the tracking data available for seabirds breeding and visiting the Falkland Islands”. Although some additional raw data figures have been reproduced in the new EIS of Falklands breeding birds, no additional analyses have been undertaken, nor have any additional data for non-breeding birds been considered.*

EIS: “The EMMP (Chapter 15) will collect further data in the field, specifically using SMMOs on two vessels for the first three years of the project (post sanction, pre-First Oil and post-First Oil). Data collected here will allow of a comparison of the SAST data going forward’.”

FC: Such data should be collected and appropriately analysed pre-sanctioning to adequately inform the EIS of this development.

This section identifies the issue of annual variation in foraging patterns, and limited temporal extent of tracking and boat-based data. Why has additional data not been collected to fill this gap?

EIS: Table 7.14 Summary of deployments from a recent multi-colony tracking project.

FC: Good to see additional tracking data from NW/SW Falklands which can serve as complementary information, although information continues to be scarce from north/northeast Falklands colonies. Importantly, we again stress the point that tracking data can only serve as complementary information to adequate at-sea data.

The previous EIS version said that these additional data would be included in vulnerability analyses. As we understand the data presented, this work has not been conducted.

EIS: Figure 7-48 Combined data, from both satellite (PTT) and GPS tags

EIS: Table 7.16 Data derived from tags other than GLS tags

FC: It would be useful to have a table showing how much data originates from individual colonies and years given the issue of inter-colony and inter-annual variation. Also, the original source of these data should be referenced.

EIS: Figure 7-53 An overview of the GAP data from Baylis et al. 2019 and Baylis et al. 2020

FC: The reference should be Baylis et al. 2021 not Baylis et al. 2020. The percentage of global population plot is misleading, as this table is about the importance of the site to Falklands birds. Whilst this additional plot has been included, the previous EIS stated that these data would be considered as part of a vulnerability analysis. This work has not been conducted. Simply superimposing the drilling area on a map is not a vulnerability assessment, particularly as a much wider area can potentially be at risk in case of a spill.

EIS: “the resources required to undertake simultaneous tag deployments on multiple predator species from multiple colonies is typically not feasible.”

FC: Resources should be made available to collect the necessary data prior to sanctioning a large project like this and though expensive, in relative terms to the development, is small. However, importantly, the focus should be on at-sea data collection, rather than tracking, for all the reasons highlighted previously.

EIS: Figure 7-59 The locations of 30 gentoo penguins tracked during the winter and early summer from five locations

FC: It would be helpful to see the drilling area superimposed on these maps, as well as the risk areas in case of a spill. In any case, it’s not clear as to where these additional data fit in. Baylis et al. (2019) uses data from 25 + 45 individuals. Baylis et al. (2021) do not show these maps. Where do these 30 birds fit in? Is this additional data or is this the same data as shown elsewhere but presented in a different way? If this is additional data, this could be added within an updated analysis.

Section 7.4.5.2.2

EIS: "The best known and probably largest colony of sooty shearwaters (*Ardenna griseus*) is found on Kidney Island, in the mouth of Berkeley Sound, which is estimated to comprise 139,000 pairs (Wakefield et al., 2017)."

> *FC: Clark 2019 is a peer-reviewed publication of Wakefield et al. 2017 report. Also see latest survey of WCP and SSW on Kidney and Top Islands (Kuepfer et al. 2024 – appreciated this report was not available at the time of the EIS preparation).*

EIS: "There is a very small breeding population of white-chinned petrels (*Procellaria aequinoctialis*) in the Falkland Islands, estimated at 55-100 pairs (Reid et al., 2007)."

> *FC: See Kuepfer et al. (2024) for updated estimates at two of Falklands breeding sites – appreciate this info was not available at the time that the EIS was prepared.*

Section 7.4.5.2.3

EIS: Table 7.17

> *FC: BBA dive to at least 19 m, not 10 m (see Guilford et al. 2022). IUCN Red List needs correcting. MAG is Least Concern, not NT (See BirdLife International 2020). For BBA population estimate in FI, reference Crofts (2020), which lists data from the 2017 census.*

Section 7.4.5.3.1.2

EIS: Table 7.20

> *FC: This is a bit confusing. How can we know the long-term trend without knowing the short-term trend for certain species? KS Eagle Hill 2010 counts – where are these data from? The EIS states that 2022 data are from Stanworth 2014.*

EIS: "all colonies are counted during the island-wide census, which takes place approximately every five years."

> *FC: This is incorrect. The last census was 14 years ago.*

Section 7.4.5.5

EIS: "For example, on the basis of the most recent archipelago-wide census, the population trend for the black-browed albatross population in the Falklands is positive (Wolfaardt, 2012)"

> *FC: Reference Crofts (2020) which lists information from the latest census in 2017.*

Section 7.4.5.6.1

EIS: "To assess the relative risk to different species, the JNCC developed an index to assess the vulnerability of bird species to the threat of oil pollution (Williams et al., 1994). One of the main outputs of the SAST surveys in the Falkland Islands was the production of an Oil Vulnerability Atlas (White et al., 2001)."

> *FC: These Vulnerability maps do not consider the full dataset collected, and only include 2 years of data. This important detail is not highlighted to readers (see White et al. 2002: "The results of the first two years of surveys were published as an atlas depicting vulnerability of seabird concentrations to surface pollution Vulnerable concentrations of seabirds in Falkland Islands waters (White et al. 2001)"). As highlighted also in the Genesis (2017) report, Webb et al. (2014) recommend at least three years of data for assessment purposes.*

EIS: "Recently, JNCC have updated the OVI to include recent survey data and using a new method, which has been named the Seabird Oil Sensitivity Index (SOSI)"

FC: It's not clear why an OVI is used as opposed to the newer method of SOSI, which is highlighted by JNCC as an improved measure of seabirds' sensitivity to oil pollution.

EIS: Figure 7-73 Seabird Vulnerability Maps for summer months

FC: The OVI by White et al. 2001 only used data from 2 out of 3 years of survey. So not only is the OVI based on very old data, but it also fails to consider all data available. According to Webb et al. 2014, vulnerability maps for oil and gas should be based on at least 3 years of data.

Additional tracking data have been collected and presented in current EIS, but this has not actually been included as part of an updated integrated vulnerability assessment analysis. The Falkland Islands waters are recognised as one of the most important seabird areas globally, and the EIS of such a large undertaking should produce a comprehensive and up-to-date seabird vulnerability index.

Section 7.2.4.2.1

EIS: "Data collection and analyses are now complete as set out by GAPII objectives. However, it will take further analysis to determine how the results of this work can best be used to quantitatively assess the potential impact of the O&G industry in the Falkland Islands."

FC: Although additional data have been collected, the EIS itself states that further analyses are required to adequately make use of these data to assess the potential impact of this project. GAP collected tracking data on 9 Falklands breeding birds, which does not provide information on all other species/ age groups/ colonies that utilise the area, many of which do not breed in the Falklands. The EIS itself states: "The SAST data set is also useful in that it includes species that do breed in the Falkland Islands but use its waters for foraging or as migrations corridors. "

EIS: "Existing data will be collated and used to perform assessments through expert-led processes."

FC: Can you clarify what is meant by "expert-led processes"? Any further analyses that can help inform this impact statement should be conducted and presented <u>prior</u> to the project being sanctioned.

EIS: "At the time of compiling this Environmental Baseline Description, initial analysis of data collected by the GAP project has been published by Baylis et al., (2019), Baylis et al., (2021) and by the seal by-catch project through SAERI (Riaz et al., 2023). The results from this work are included and referenced in the relevant sections below."

FC: Results from Riaz et al. (2023) are not referred to in any further sections. Hence, this is not relevant to the EIS.

Section 7.4.5.2.1.4

EIS: Gap results

FC: This whole section simply regurgitates the results from Baylis et al. (2019, 2021). The EIS does not attempt to make the results relevant to the Sea Lion area, or the area at risk in case of a spill. As the EIS acknowledges, this tracking data can lead to misleading conclusions being drawn and important areas missed (annual variation / seasonal variation / age-specific variation).

Section 7.4.5.6.1.2

EIS: "Vulnerable areas within Berkeley Sound, for seabirds, are linked to the location of colonies and aggregations associated with these colonies"

FC: Are the many designations (KBA/IBA/NNR/ACAP breeding sites) assigned to colonies within Berkeley Sound being considered at all?

Section 7.5.2.1.

EIS: Table 7.34

FC: New Island – Landowner should be FC.

Section 7.5.2.3.1.1

EIS: "The Kidney Island Group are designated as an Important Bird Area (Falklands Conservation, 2006). The most significant species contributing to the IBA status are shown in Table 7.36."

FC: Kidney and Cochon Islands have National Nature Reserve (NNR) and Important Bird Area (IBA) designations. Kidney Island also has Key Biodiversity Area (KBA) designation. Kidney, Top & Bottom Islands represent ACAP breeding sites No. 80 and 81 for white-chinned petrels. The vicinity of Top & Bottom Islands is not considered in this EIS.

Section 10.1.4.3.1

EIS: "Although there is some seasonal movement of birds between the Falklands and South America, the location of the Sea Lion Field and Berkeley Sound are not regarded to be on the route of migrating land …"

FC: Please provide supporting references.

EIS: "the impact of lighting has been estimated to extend to 3-5 km around offshore installations"

FC: Please provide a reference for distance at which birds are affected by light sources.

Section 10.1.4.3.1.4

EIS: "Data compiled from at-sea surveys, annual monitoring programs, coastal surveys and tracking data were used to indicate the seasonal abundance of the most susceptible species near the Sea Lion Field (Knipe and Pendoley, 2019)."

FC: It would be helpful to make the work conducted in reports such as Genesis (2017) and Knipe & Pendoley (2019) publicly accessible for improved transparency. See above our comments why the seabird data used is inadequate / insufficient for the purpose of this risk assessment.

EIS: Table 10.3

FC: Southern rockhopper penguins are listed as Vulnerable, which does not appear to be considered in this table.

Section 10.1.6.1.2

EIS: "The available survey data indicate that there will be a low number of individuals of all of the potentially susceptible species present within the zone of influence of the Development (Section 10.1.4.3.1.4). Although accurate population estimates are not available for all species, the biogeographical populations are known to be very large. Therefore, it is anticipated that the assemblage of birds within the zone of influence of the Development, at any given time, will not be of geographical importance (i.e. <1 % of the local population).

FC: "The biogeographical populations are known to be very large." - Please reference.

This section makes assumptions based on inadequate data of bird assemblages, insufficient data on bird-strikes, and non-existing data on biogeographical populations.

Low fecundity rates and a relatively protracted time to reach maturity of procellariiformes means seemingly small impacts on survival rates can have large impacts on population viability, making them particularly vulnerable to lethal impacts. Cumulative threats will have additive impacts.

EIS: "While seabirds may be distracted from natural feeding behaviour or may expend energy flying in circles around the vessel which has the potential to affect the body condition of the birds, the impact will

be short-lived (a matter of hours) and should not have long-term consequences provided there is no contact between the birds and the vessel."

FC: Please provide supporting references for this statement. The distance from which birds may be attracted has not been considered here. This information may not be available; however, if birds are potentially attracted from several kilometres away, the adverse effects could greatly increase, as the number of birds impacted increases.

Sections 10.1.6.2.3 and 10.1.6.2.4

EIS: "the LTV anchorage location is situated approximately 10 km inshore of the breeding colony, so birds will not routinely pass the site *en route* to the colony"

FC: Please provide a reference. Particularly fledglings may become disorientated by lights up to 15 km, see e.g. https://www.dcceew.gov.au/campaign/light-pollution/seabirds#:~:text=Floodlights%20and%20deck%20lights%20cause,offshore%20oil%20and%20gas%20platforms.)

EIS: "Significant as multiple seabird strikes are closely linked to weather conditions (Section 10.1.4.3.1.3) and are more likely to occur when visibility is reduced due to fog or snow. However, under these conditions, the deck lights of vessels may not be visible at a range of 10 km such that the zone of influence is effectively reduced."

FC: Please reference what is visible to birds under various conditions. The literature suggests that collisions generally increase in conditions of poor visibility.

Section 10.4.4.3.3

EIS: "Penguins are known to use contact calls to communicate when on the surface, however, there is little evidence to suggest that they vocalise underwater (O'Brian, 2002)."

EIS: "EIS: "An SEL threshold of injury of 202 dB re 1µPa2 s was agreed on by the panel (SAIC, 2011). The threshold found for the marbled murrelet was applied here to estimate the underwater noise impacts to diving seabirds."

FC: This EIS is missing some key up-to-date literature. The EIS suggests that there is no clear evidence that penguins are disturbed by noise, or that they use sound for communication underwater. However, see e.g. Sørensen et al. 2020, Thiebault et al. 2019, Pichegru et al. 2022.

- Sørensen *et al. (2020) state: "The fact that penguins can detect and react to underwater stimuli may indicate that they make use of sound stimuli for orientation and prey detection during dives. Further, it suggests that penguins may be sensitive to anthropogenic noise, like many species of marine mammals. "*

  "strong reactions in more than 60% of the playbacks at 120 dB re 1 µPa"

  "The fact that penguins react strongly towards these rather weak sounds,... " , "Another surprise was that the 20 dB increment in received level was sufficient to change the reaction of the birds from no observable response to a strong aversive response. "

- *Thiebault et al. (2019) on use of vocalisation in hunting penguins (King, Gentoo, Macaroni) state: "All vocalisations were emitted during feeding dives and more than 50% of them were directly associated with hunting behaviour "*

EIS: "Although anecdotal, these observations indicate that penguins do not strongly avoid areas where vessel noise is prevalent."

FC : See Pichegru et al. (2017, 2022): "African penguins likely relocated away from their traditional feeding zone to avoid the disturbance generated by the noise of the seismic vessels, rather than to follow their prey"

EIS: Table 10.31 Summary of the impact assessment for underwater noise offshore

FC: Behavioural disturbance to seabirds should be included given evidence from elsewhere (see comments above)

Section 10.4.4.4

EIS: "Disturbance and behavioural response thresholds:

§ Fish (Popper et al., 2014), and
§ Marine mammals (Southall et al., 2007)."

FC: In light of information from up-to-date references, seabirds should also be considered here in terms of peak pressure level results.

Section 10.4.4.4.4.2

EIS: "For seabirds, there are no guidelines to determine what constitutes a behavioural disturbance or threshold sound level."

FC: See e.g. Sørensen *et al. (2020) who recorded strong reactions by Gentoo penguins in more than 60% of the playbacks at 120 dB re 1 µPa.*

Section 10.5.6.1.2

EIS: "levels of sound during inshore operations will be similar to the noise levels currently occurring within the Sound and therefore, there will be little or no additional impact from underwater noise on seabirds present in the area"

FC: What about the additive effects of more noise?

Section 10.1.4.3.1.2

EIS: "Where artificial light, poor visibility and high seabird numbers coincide, 1,000's of birds may collide with a vessel on a single night. While there are no published records, light induced bird collisions with vessels, with varying numbers of birds affected, are a regular occurrence around the Falkland Islands (A. Black pers. obs.),"

EIS: "Multiple bird strike events can result in hundreds of bird mortalities in a single night, however, these events usually occur close to land (i.e. breeding sites) where some birds congregate at dusk"

FC: It is unfortunate that no efforts have been made to improve the bird-strike data.

If you speak to captains from fishing vessels, it appears that larger-scale bird strikes away from shores are not uncommon. As the EIS states – "However, in conditions of poor visibility (due to fog, snow or rain) the problem is exacerbated, and more individuals are likely to interact with vessels emitting light".

Section 10.1.6.2.2

EIS: "Therefore, there is a need to identify opportunities for improvement through mitigation and controls, and to consult with project stakeholders"

FC: When will this be done? This should be done pre project sanctioning. It is disappointing that no efforts have been made to try and fill this data gap.

EIS: "With regard to the likelihood of a multiple bird-strike event occurring, such a strike is likely to occur less than once per year but more than once in 10 years."

The assumption that this will happen less than once in a year is unfounded. It is very likely that multiple bird strikes are not uncommon (based on communications with fishing captains), but simply underreported. See e.g. Coleman et al. 2022.

Section 10.4.6.2

EIS: "The Falklands population has shown a long-term decline in numbers and is the subject of a dedicated management plan."

FC: Please reference FISMP report (Kuepfer & Stanworth 2023):

Breeding population (Falkland Islands): 1991–2022, stable; last 10 years, decreasing Breeding success (Falkland Islands): 1993–2022, decreasing; last 10 years: stable-decreasing

EIS: "Although anecdotal, these observations indicate that penguins do not strongly avoid areas where vessel noise is prevalent."

FC: Please provide supporting references for such statements. Penguins are known to be sensitive to vessel noise and other marine noise pollution. See e.g. Pichegru et al. 2022 who assessed vessel-derived underwater noise levels on a penguin population.

Section 10.7.4.3.2

EIS: "Local feathers from nine species of Falkland birds were tested in dispersed oil at a concentration of 100 mg/l, and oil droplets of c. 100 microns were produced into the water column."

FC: Would be useful to refer to the table here where the species are listed. It is unfortunate that this important report is not readily accessible to the public for independent assessment of the methods used.

Section 10.12.9

EIS: "This species has a high potential for natural dispersion and is known to be established in Port William and may have reached Berkeley Sound already (P. Brickle pers. comm.)."

FC: We feel that the use of pers. comm. for statements like these is inappropriate. Please provide an adequate reference or remove.

Section 12.1.4.1.1.1

EIS: "Feathers were dipped into a concentration of 100g/m2 oil in seawater: No oil was adsorbed by feathers"

FC: how was it determined whether or not oil had been absorbed by feathers? Visual assessments under normal light conditions can be insufficient to detect sub-lethal oil concentration on feathers which may nonetheless have impacts on individual's performance and survival (See e.g. Fallon et al. 2020)

Section 12.1.4.2.4.3

EIS: "A preliminary assessment of seasonal vulnerability of seabirds to oil contamination within Falkland Islands waters was performed on data collected by the Joint Nature Conservation Committee (JNCC) to produce an Oil Vulnerability Atlas, (White et al., 2001)."

> *FC: For reasons explained earlier, these data and analyses are inadequate for the purpose of a risk assessment. There is no evidence to suggest that bird assemblages and distributions have remained the same as documented 20+ years ago. The data are too old (see best practice advice by JNCC, Webb et al. 2016). In addition, the vulnerability maps are based on 2 years of data, which is less than the recommended number of years of data (see Webb et al. 2014, 2016).*

Ch. 14

EIS: Table 14.1: Overall summary of EIA findings

> *FC: Large scale bird strike with vessels is not "possible", it's at best "probable" ("Likely"). Efforts to collect appropriate data should be made pre-sanction. Cumulative bird strikes over the years and with other anthropogenic sources should also be considered.*
>
> *Small scale bird collision is not "likely", it is "certain". An effort to collect appropriate data should be made pre-sanction.*
>
> *Behavioural disturbance to seabirds from underwater noise is not considered, despite evidence that this can be an issue.*

Ch. 15

EIS: "where uncertainties in the EIS arise from lack of baseline data"

> *FC: Baseline data need to be available prior to project sanctioning. Also, previous EIS have promised certain work that has not been completed. Given this history, what assurance do we have that any further information will be provided in a timely manner?*

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Webb A, Elgie M, Hidef CI, Pollock C, Barton C *et al.* (2016) Sensitivity of 683 Offshore Seabird Concentrations to Oil Pollution around the United Kingdom: Report to Oil & 684 Gas UK. 103 pp

Appendix 2: Cetaceans – detailed comments

Overall key points

- **Omission of relevant spatial areas identified as having global importance for marine mammals**. Although the following areas are non-statutory, they have been identified and accepted by the IUCN. Section 7.5.2.3 (P475) of the EIS acknowledges that such areas should be considered during planning and risk assessment. However, Important Marine Mammal Areas (IMMAs) have not been mentioned in the EIS (despite both Important Plant Areas and Important Bird Areas being acknowledged as relevant and shown in Figures). While the FI IMMAs are relatively recent (2023 to 2024), the process has been ongoing since 2022 and been publicised locally. The areas relevant to marine mammals in the Falklands include:

    i. Key Biodiversity Area (KBA) for endangered sei whales (and more recently also for seabird species): www.keybiodiversityareas.org/site/factsheet/49174 The KBA is shown in Figure 7-96 and mentioned in Section 7.5.2.3.4 and briefly on P858, 1058 and 858. The KBA was accepted by the IUCN following independent review and its existence for sei whales warrants improved recognition in the EIS considering that Berkeley Sound falls within it;

    ii. Important Marine Mammal Area (IMMA) for endangered sei whales (and for marine mammal aggregations): https://www.marinemammalhabitat.org/factsheets/falkland-islands-malvinas-inner-shelf-waters-imma/

    iii. Important Marine Mammal Area (IMMA) for wintering southern right whales: https://www.marinemammalhabitat.org/factsheets/north-east-falklands-malvinas-right-whale-wintering-area-imma/

    iv. Important Marine Mammal Area (IMMA) for foraging elephant seals: https://www.marinemammalhabitat.org/factsheets/south-western-patagonian-continental-shelf-imma/

    v. Important Marine Mammal Area (IMMA) for breeding/moulting elephant seals and for killer whales: https://www.marinemammalhabitat.org/factsheets/sea-lion-islands-group-imma/

    The latter two IMMAs do not overlap with either the Sea Lion field or Berkeley Sound, but are included here for information. The boundary of one additional IMMA (https://www.marinemammalhabitat.org/portfolio-item/slope-front-of-the-argentine-shelf-imma) is located approx. 100 km north-west of the Sea Lion oil fields and supports a high diversity of marine mammal species. This should be recognised and discussed in relation to the oil spill modelling results.

    The boundaries of the KBA, Inner Shelf Waters IMMA and North-east Falklands IMMA include the waters of Berkeley Sound and Port William, and their existence should be incorporated throughout the EIS in relation to their recognised high marine mammal sensitivity, especially in sections where other spatial sites (e.g. NNR, IBA) are discussed. A wealth of information on whale distribution, movements, seasonality, behaviour, habitat, site fidelity, conservation status and population trends are provided in the supporting evidence for the sites (see IMMA links and Weir, 2021), almost none of which has been used to recognise the extent of whale sensitivities in the EIS.

- **Identification of Key Environmental Sensitivities (KES).** The risk assessment relies on the identification of 'Key Environmental Sensitivities (KES - also 'Environmental Receptors')', and the sensitivity assessment is based on criteria including conservation status, critical habitat, seasonality, vulnerable parts of a species lifecycle etc (Section 8.5.2.1 and Table 8.1).

Consequently, it is essential to correctly identify and consider the latest available information on those KES. With regard to cetaceans, the eight years of work on baleen whales (primarily sei whales and southern right whales, SRWs) in the Berkeley Sound area has not been appropriately represented in the EIS. Erroneous findings from early studies are listed throughout the EIS (for example, that Berkeley Sound is a fin whale hotspot, and that 2017 was a 'one-off' year for Southern Right Whales). Key concerns regarding the cetacean sensitivity assessments are:

i. Information on the **offshore occurrence** of cetaceans that would facilitate a robust assessment of the KES at the Sea Lion field is largely lacking, and the limited information presented has been over-interpreted and over-described in the EIS, risking making it appear to be a more reliable indicator of offshore cetacean occurrence than evidence suggests. For example:

   - the seismic MMO data is approximately a decade old (the last survey in FI waters was 2013). The total amount of data is small;
   - the White et al. (2002) report is two decades old (data collection from Feb 1998 to Jan 2001) and primarily used ESAS methods aimed at recording seabirds in a strip transect (rather than methods that optimise for cetaceans);
   - the Hipsey et al. (2013) report analysed only 5% of the data from a 1-year period (Jul 2012 to Aug 2013) of continuous acoustic monitoring, and the remaining 95% has not been assessed. Notwithstanding caveats (like animals might be present but not vocalising), this latter dataset could have potentially provided the best information on year-round occurrence of cetaceans at the Sea Lion field. Additionally, some conclusions reached in the Hipsey et al. (2013) report have since been shown to be erroneous (specifically they stated that they did not record Sei Whales, whereas Cerchio and Weir (2022) show that the vocalisations they attributed to Leopard Seals were Sei Whale song). The latter finding is significant in terms of confirming reproductive behaviour (singing) of sei whales at the Sea Lion field, but has not been mentioned in the EIS. While we accept that robust information for cetaceans at the Sea Lion field simply isn't available at this time, it's unfortunate that: (1) efforts haven't been made to implement such surveys as an environmental baseline ahead of production commencing; and (2) the existing year-round acoustic dataset hasn't been fully analysed and used to inform the EIS as would have been good practice.

ii. **Nearshore: Sei whales**. Seven seasons of fieldwork on Endangered sei whales in the Berkeley Sound area have been conducted (each year except 2018). Despite this, it is repeatedly stated in the EIS that information on cetaceans in that area is scant (see detailed comments below). Only Weir (2017) is expanded upon in Section 7.4.6, with subsequent data either omitted or briefly mentioned. Consequently, there is significant under-representation of the importance of Berkeley Sound for sei whales. With regard to the criteria for determining sensitivity provided in Section 8.5.2.1:

   - The species is of high global conservation concern (IUCN: Endangered);
   - The numbers using nearshore FI waters are globally significant according to IUCN thresholds (see Weir, 2021 – KBA assessment) and the 1% thresholds applied in the EIS (Table 8.1);
   - The numbers using Berkeley Sound specifically are almost certainly also of global significance – over 400 individuals have been photo-identified in Berkeley Sound between 2017 and 2021 (excluding 2018, see Weir, 2022) which is 0.5% of the estimated global all-age population in the IUCN Red List assessment. (It is realistic that this value may double to 1% once the 2022–2024 data are analysed);
   - Mother-calf pairs of sei whales inside Berkeley Sound have been documented (Weir 2022), indicating that lactating adults and newly weaned juveniles also forage at the site. Moreover, Berkeley Sound is the only location globally where sei whale singing

has been confirmed (but see below also for the Sea Lion field). These sensitivities are not recognised within the EIS in the context of threats such as noise, entanglement, vessel strike or disruption of prey species.

- There are important conservation habitats (KBA and IMMA) for the species in the FI, including Berkeley Sound, which should warrant a 'Very High' sensitivity (Table 8.1);
- Their seasonality has been well documented from a 2-yr acoustic programme and effort-related visual datasets collected from 2017-2024 (see Cerchio et al., 2022; Weir et al., 2019; Weir, 2022). However, the EIS has focussed on presenting anecdotal and unconfirmed interview data as the supporting temporal information;
- Their occurrence in the FI represents critical periods of the species lifecycle, specifically feeding (Weir, 2017; Weir et al., 2019; Weir, 2022) and reproductive behaviour (singing: Cerchio and Weir, 2022). The fact that sei whales use Berkeley Sound as a foraging ground has not been appropriately recognised in this EIS (apart from brief mentions on p.444/454/697, but it isn't considered in the context of sensitivity to noise etc). Potential impacts on prey species (especially *Munida*, but also *Themisto* and other species – see Jackson et al. 2022a for a full list of documented prey species) should therefore be expected to have indirect impacts on sei whales too, because the occurrence of those species inside Berkeley Sound is the primary reason why sei whales are present. This link hasn't been considered.

- **Nearshore & offshore: Southern right whales (SRWs)**. The importance of nearshore FI waters for wintering SRW aggregations has been largely omitted from the EIS, despite five years of research widely known within the local community. It is repeatedly stated within the EIS that the winter of 2017 saw an 'unprecedented influx' of SRWs. However, it is widely understood that coastal right whale aggregations have formed every year since. The evidence-base is extensive (boat surveys, aerial surveys, telemetry work), such that the nearshore waters in the north-east of the Falklands have been recently recognised as an IMMA for wintering southern right whales. The EIS fails to distinguish between the different uses of the FI by SRWs (which means that their occurrence at the Sea Lion field and in Berkeley Sound is in different seasons and for different behaviours), comprising: (1) a winter breeding/socialising area in coastal waters; (2) occurrence in pelagic waters perhaps year-round for foraging (and probably used also by SRWs from the South African breeding area: Vermeulen et al., 2023); and (3) seasonal use in spring and autumn while making movements between wintering and foraging areas. Much of this is explained in the literature (Weir and Stanworth, 2019) and updated more recently in International Whaling Commission papers (Weir, 2021, 2024), yet these sources are not used. SRW has been treated as a species that just occasionally passes through the Berkeley Sound area (e.g., lumped with minke whales in Table 1.3 on P63), rather than as a KES for which nearshore FI waters (including Port William and Berkeley Sound) comprise a globally significant wintering area. The following details are relevant with regard to the criteria for determining sensitivity provided in Section 8.5.2.1:
  - The species has an IUCN conservation status of Least Concern; however, the south-west Atlantic population of SRWs is of regional conservation concern and there is an International Whaling Commission Conservation Management Plan (IWC-CMP) in place which is not mentioned in the EIS. Moreover, >1% of the global population occurring in FI waters would warrant a 'Very High' sensitivity category (P539/540) – this is the case for SRWs in the FI;
  - The numbers using nearshore FI waters are globally significant according to IUCN thresholds (results from 2023-2024 aerial surveys, available by Dec 2024) and will form the basis for a forthcoming KBA application;
  - There is an important conservation habitat (IMMA – see below) recognised for the species that includes Berkeley Sound which should warrant a 'Very High' sensitivity (Table 8.1);

- The annual (winter) and seasonal (mid-May to early September) aggregations in nearshore FI waters (including Port William and Berkeley Sound) has been well documented using a 2-yr acoustic programme (Cerchio et al. 2022), satellite tracking (Falklands Conservation website), and effort-related visual datasets collected from 2017-2024 (Weir, 2021, 2022, 2024), yet the EIS repeatedly refers to an 'unprecedented' influx of SRWs in 2017 and does not acknowledge them as being an important KES in Berkeley Sound;
- Their occurrence in the FI represents critical periods of the species lifecycle, specifically reproductive (mating and singing) behaviour (Cerchio et al. 2022; Weir, 2021, 2022, 2024) which are sensitive to underwater noise (see Cerhio et al., 2022 for example) and other disturbances.

- **Whale Omission of relevant data**. The use of 'pers. comms.' and 'pers. obs.' has been widely applied within the EIS for cetaceans. While these are legitimate data sources, they should not be used as substitutes for available peer-reviewed and published information where available. Little or none of the published data or accessible telemetry data for SRWs and omission of the single most robust available report on whale occurrence in the Islands (distribution and seasonality during boat surveys; photo-identification (movements, fidelity); diet (faecal analysis and stable isotopes); genetics, suction cup tagging, and passive acoustic monitoring (seasonality, singing, behaviour) which has been available since 2022 (Weir, 2022) and none of the distribution or effort-related seasonal data are represented appropriately. Recognition of publicly accessible satellite telemetry data for whales is included on P444, yet no reference to the movements or maps is made elsewhere in the EIS, and although the telemetry data reveal extensive use of Berkeley Sound over weeks by individual sei whales then they are described elsewhere in the EIS as only using the area in transit (P453). The identification of KES is critical to the EIS and should use the evidence base available.

- **Whale entanglement risk**. There has been little or no recognition of the risks of cetacean entanglement in mooring equipment in the EIS. It should be recognised that anything in the water column (cables, ropes, lines, chains), particularly anything with slack around tides, has the potential to entangle whales. This includes gear that is looped off the seabed. There are numerous documented examples of whale entanglements, including in deep habitats (where sperm whales can become stuck in underwater cables) and in shallow habitats (most commonly vessel and aquaculture mooring gear, and fixed fishing gear such as pots and gillnets). While entanglement should be considered for all aspects of the project, it is especially pertinent to the Berkeley Sound area which is used by foraging sei whales (with vulnerable subsurface lunge feeding) and breeding southern right whales (*Eubalaena* species are highly vulnerable to entanglements, see published literature). Entanglement is both a welfare issue (when whales swim off carrying equipment) and likely to lead to mortality (by drowning or subsequent injury infections). It wasn't possible from the EIA to properly understand how the moorings would work for various vessels, but entanglement consideration should be made in the planning of these. We would also recommend that a clear and transparent reporting system for large whale entanglements is introduced, such that expert advice can be sought for handing live entangled animals and the corpses of dead animals can be recovered for sampling/analysis.

- **Vessel collisions**. The sections on vessel collisions make no acknowledgement of the fact that a Code of Conduct (endorsed by FIG) already exists for the FI and provides guidance on suitable speeds, wide berths etc for avoiding injurious/fatal collision with whales. The EIS has omitted small cetaceans from the vessel collision risk assessment, which is inappropriate considering there are documented mortalities of dolphins from vessel strike in the FI (see detailed comments below).

With regard to nearshore wintering SRW aggregations, reducing the risk of vessel collision (considering there are 16 hrs of darkness in winter during which visual observation will not be valid) would benefit from an expanded 'reduce vessel speed' (10 knots) zone between 1 June and 31 August to 10 km from the coast to match the IMMA and telemetry data showing highest-use habitats. This would greatly improve confidence that the vulnerable surface groups of mating SRWs which occur out from the coast would be at lower risk of a fatal collision, and would be a better all round mitigation approach than the use of SMMOs (especially at night).

As a general comment, there is a heavy reliance on SMMOs for all of the mitigation listed for vessel collision, but there are obvious limitations with this: (1) SMMOs cannot see in the dark, and especially in winter then it is dark for two-thirds of the time; (2) SMMOs are engaged in simultaneous seabird observations (in a strip transect on one side of the boat if ESAS methods are being used) which means that they are not looking in a concentrated manner ahead of the boat on both sides as would be optimal for cetacean detection; (3) the weather is likely to be unsuitable most of the time in offshore areas for reliably detecting whales; and (4) whales are submerged for most of the time and may surface unpredictably close to a ship when it is too late to respond. The use of SMMOs is definitely preferable to no-one looking, but these limitations do need to be factored in. Mitigating vessel strike is not an easy thing to achieve.

- **Cumulative Impacts**. Section 13 (3 pages) is inadequate. See detailed comments for examples.

Detailed points on specific sections with regard to cetaceans

(n.b. in this section comments are not ordered by priority and they are not exhaustive)

Table 1.2 (P62) and same comments for Table 7.57 (P532)

- The blue whale is recorded within the Falklands and has an IUCN status of Endangered, so there are actually two Endangered species of cetacean known in the Islands. The southern right whale is also of regional conservation concern (IWC-CMP) and, given their documented abundance in the FI, should also be listed here as a key marine mammal sensitivity in the FI.
- Given the lack of knowledge of the seasonality of almost all of the cetaceans in offshore waters, it is not clear why the monthly sensitivity (low, medium high) has been assigned. Certainly, key sensitive species such as sperm whale (Vulnerable) are present year-round (as is recognised on P429) and therefore the marine mammal sensitivity would better be considered high year-round. It is difficult to understand the shading for low/medium/high on Table 7.57, because the colours of the key at the top does not match the actual shading provided for the species.

Table 1.3 (P63) and same comments for Table 7.58 (P533)

- Marine mammals: There is very good information available on the seasonality of sensitive marine mammals in Berkeley Sound, which is not reflected here. The months from December through June should all be marked as high sensitivity for sei whales which are an endangered species which forage in this area throughout those months. The southern right whale aggregates in nearshore waters including Port William and Berkeley Sound from mid-May through to early September. The SRW uses this area for breeding purposes, and the SW Atlantic population is of regional conservation concern (IWC-CMP) - this species should be recognised as a KES within Berkeley Sound. Therefore, the entire period from December through to early September is of

high sensitivity for baleen whales in Berkeley Sound (and adjacent waters), and these Tables should be revised accordingly.

- Commerson's and Peale's dolphins do breed in Berkeley Sound (i.e. this is a 'definite' not a 'likely').
- The influx of SRW in 2017 was not 'unprecedented' as stated in the Table – it has been repeated every year since.
- Conservation sites: this table does not recognise that Berkeley Sound is part of three internationally-important sites for marine mammals – one KBA and two IMMAs.

1.7.1, P66.

- Entanglement of cetaceans in mooring apparatus should be added to 'Environmental aspects' and considered in relevant Tables (e.g. 1.5, 1.6, 1.9, 2.2 etc.).
- The locations shown in Figure 5.5.2 (Section 5.5.1) are within high-use habitats for both sei whales and southern right whales (indicated by FC vessel data, aerial surveys, acoustic monitoring and satellite-tracking). Since the mooring locations seem to have some flexibility, it would be useful if consultation regarding anchorage locations also included whale experts in addition to FIMA/Fisheries in order to minimise disruption to both humans and whales. Same comment for P684 and P697.

3.2.18.1, P128. Project Specific Environmental Management.

- We suggest that the production of a Whale Collision and Entanglement Management Plan would be appropriate in order to raise awareness of these topics and of the sensitivity of local whale populations and to communicate commitments clearly to all key personnel.

5.11.1, P205. Port Facilities and Onshore Supply Base.

- Discussion "*on the EIA requirements for the construction of any new facilities will be held with FIG prior to the submission of the relevant planning applications / requests for extension of existing planning permission*." We take the opportunity here to highlight that pile-driving and other loud impulsive noise sources associated with construction has the potential to injure and disturb dolphins and other marine mammals within Stanley Harbour, and FC would seek reassurance that appropriate mitigation (i.e. the JNCC piling guidelines) would be followed during activities associated with Temporary Dock Facility (TDF) construction/expansion. Especially since on P248 it states that "*the full environmental baseline of Stanley Harbour is provided in the EIS previously submitted to support the construction of the Temporary Dock Facility (NEFL, 2013)*" and so possibly an EIA/EIS has already been submitted for this? FC and SAERI have collected considerable data on dolphin sensitivity within Stanley Harbour in recent years that should be used to inform mitigation.

7.2.1, P251. Environmental Baseline – Literature Sources.

- It is stated that the FI Data Portal has been consulted for the literature review. Metadata for the whale projects has been submitted to the Data Portal, yet whale information since 2017 is hardly represented in the EIS and FC has not been approached to discuss whale sensitivities.

7.4.6.1.1, P418. Environmental Baseline – Marine Mammals.

- "*It is believed that many of the baleen whales recorded offshore within Falkland Islands waters are on passage …*" As an important deduction this statement needs a reference. It may in fact be likely that sei whales and right whales forage routinely in offshore FI waters (i.e. it's a destination rather than just passing through) as shown by e.g. whaling catch data, Zerbini satellite data papers, etc.

- "*It is thought that the productive inshore waters around the Falkland Islands (including Berkeley Sound) are of importance as feeding areas*". Again, a reference would be needed. There are eight years of data demonstrating the importance of Berkeley Sound (and other areas) as a feeding area for sei whales. Additionally, the KBA and IMMA designated for sei whales both recognise the global importance of inshore FI waters as a feeding ground for this species.

7.4.6.2.1, P419. Environmental Baseline – Marine Mammals Offshore.

- This subheading should be 'relative abundance' not abundance as it does not describe actual abundance.
- "*However, the age of the dataset, and inherent limitations associated with at-sea surveys, raise uncertainty as to how representative it is of present day populations*." While the reliance on White et al. (2002) is understandable (given the total absence of other effort-related data from offshore areas) it is clear that it does not represent contemporary populations (as highlighted at the July FIOHEF meeting) and this should be given greater acknowledgement in the EIS. For example, the White et al. (2002) report includes only 31 sightings of sei whales and 5 sightings of southern right whales from three years of year-round survey effort (both coastal and offshore). Currently, those numbers can be exceeded in a single day in Berkeley Sound area. There has obviously been substantial changes in whale populations over the 20 years since that report, and those sensitivities are simply not reflected in this EIS.
- The Hipsey et al. (2013) report analysed only 5% of the one year of acoustic data collected at Sea Lion. It isn't clear why only 5% of that potentially very informative dataset has been analysed, especially when the EIS acknowledges (P422) that recent improvements in knowledge of species calls may mean that the Sea Lion acoustic dataset contains records of species hitherto overlooked. Since this dataset potentially comprises the best available source of information on the temporal occurrence of cetaceans at the exact location of the oil field, it is a pity that the other 95% has never been analysed and especially in light of recent findings (such as sei whale song – Cerchio and Weir 2022).
- Figure 7-78: Using percentage to allocate months of importance for species for which there are few sightings is inappropriate and misleading. And also, this must be number of individuals not number of sightings as stated in the legend. Because White et al. (2002) reported only five sightings of southern right whales in total.

7.4.6.2.1.2, P422. Environmental Baseline – Marine Mammals Offshore.

- "*Additionally, there is limited knowledge regarding the range of vocalisations produced by each species. For example, Hipsey et al. (2013) did not record any sei whales, although they are known to be regularly sighted during visual surveys*". The study did record sei whales at the Sea Lion field, they just incorrectly assigned those vocalisations to leopard seals (this should be corrected in Table 7.27). See Cerchio and Weir (2022). As there have not been regular visual surveys in the areas of the acoustic deployments the source of the 'regularly sighted' statement is unclear. <u>The presence of sei whale song at the Sea Lion field needs to be acknowledged in the EIS, as it implies higher acoustic sensitivity and sensitive behaviour of an Endangered species in the vicinity of a drilling operation and FPSO.</u>

7.4.6.2.1.3, P426. Environmental Baseline – Marine Mammals Offshore.

- It would be good to have the summary table (sightings and individuals) of species recorded during the MMO seismic datasets, since the same has been provided for White et al. (2002) and Hipsey et al. (2013). Which species were recorded by MMOs would be relevant.

7.4.6.2.1.4. P427. Environmental Baseline – Marine Mammals Offshore.

- The information presented here on southern right whales (SRWs) is very out of date. SRWs in the SW Atlantic *were* increasing, but in recent years that increase has levelled off (see papers by Crespo et al.) due to high calf mortalities and some mortalities also of adults. Consequently, since 2012 the SW Atlantic population of SRWs has been the subject of an International Whaling Commission (IWC) Conservation Management Plan (CMP) – see https://iwc.int/south-atlantic-southern-right-whale The regional conservation status of this population is therefore of higher concern (translating to higher sensitivity) than the species as a whole (globally Least Concern) which has not been acknowledged in the EIS.
- "*The migratory behaviour of southern right whales suggests that animals may travel through Falklands waters on passage between their Patagonian spring breeding grounds and summer feeding grounds near South Georgia and Antarctica*." This over-simplification is unhelpful for determining how any development should proceed sensitively. Whaling catches and satellite tracking show that SRWs utilise the entire SW Atlantic region – they aren't only breeding in Patagonia and they don't only feed in SG/Antarctica. They probably forage in pelagic FI waters year-round as well as using the area during migrations and, especially, as a wintering destination (for breeding and socialising) in nearshore waters around the FI.
- "*During the winter of 2017, an unusually high number of southern right whales was recorded in coastal waters around East Falkland (Section 7.4.6.3.1.1). This adds to the evidence of significant inter-annual variation in the number of these animals present within Falklands waters*." Again, this is over-simplified. The winter of 2017 was the first year that a wintering aggregation was documented. However, it can no longer be considered 'unusual' but in fact occurs persistently every year – one of the reasons that an IMMA was identified for the species.

7.4.6.2.1.4. P427. Environmental Baseline – Marine Mammals Offshore.

- "*Conversely, analysis of the acoustic data from the Sea Lion area did not contain any confirmed sei whale calls. … Acoustic detection of sei whales is further hampered by the absence of sei whale call descriptions for the South Atlantic*." This information is two years out of date. Sei whale song was shown in spectrograms in the Hipsey et al. (2013) report but unfortunately, they reported them as leopard seal vocalisations. The repertoire of acoustic signals produced by SW Atlantic sei whales was published in 2022 and actually relates specifically to Berkeley Sound. The sei whale is now the best acoustically characterised species in the Falklands. See Cerchio and Weir (2022) and also the acoustic chapter by Cerchio et al. in Weir et al. (2022). The full one-year acoustic dataset from Sea Lion could (and should) be re-analysed in this context, because the presence of sei whale song (linked to reproductive behaviour) in the Sea Lion oil field is a significant finding with regard to mitigation and sensitivity.
- "*Three recent projects have surveyed the distribution of sei whales, and other cetaceans, in inshore waters (Thomson and Munro, 2014, Weir, 2017; Costa and Cazzola, 2018). The preliminary results and anecdotal observations*…." This statement is out of date. Eight years of boat-based surveys, aerial surveys, three years of 24/7 acoustic monitoring, diet analysis, genetic analysis, satellite-tracking and stranding attendance has been conducted. Much of this is available online.

7.4.6.2.1.4. P428. Environmental Baseline – Marine Mammals Offshore.

- Two species of minke whale occur around the Falklands, and it isn't clear why this section focuses only on one of them. Same comment for Table 7.28, and for the summary on P454. At least one stranding in the FI has been genetically confirmed as *B. acutorostrata* not *B. bonaerensis* (C. Weir, pers. comm.).
- Humpback whales are not rare around the Falklands anymore – this information is out of date and does not represent what is currently known of species occurrence. Same comment for P455.

7.4.6.2.1.4. P430. Environmental Baseline – Marine Mammals Offshore.

- "*Pilot whales were recorded on approximately 35 days throughout the year-long monitoring period (Hipsey et al., 2013)*" This is a meaningless/misleading statement considering that only 5% of the dataset was analysed.

- Southern bottlenose whales (and beaked whales in general) are almost certainly in the NFB year-round, given what we know of the site fidelity of beaked whale species globally. The fact they were not recorded in winter doubtlessly reflects weather conditions or is just a chance result (as the sighting rate of this species is anyway very low).
- Describing Long Finned pilot whales as 'shallow divers' is incorrect. Pilot whales are very capable divers reaching 1000 m – there are numerous published papers to support this.

7.4.6.3, P444. Environmental Baseline – Marine Mammals in Berkeley Sound.

- "*This was subsequently supported by satellite tagging efforts by Falklands Conservation, which although preliminary (see https://falklandsconservation.com/sei-whale-tracking/), revealed long-distance movements of sei whales, both around the Falkland Islands and between the Falkland Islands and South America*." This is incorrect, none of the tagged sei whales went to South America.

Figure 7-96, P449. Environmental Baseline – Marine Mammals in Berkeley Sound.

- The figure legend refers to section 1.5.2.3.4 but that section does not actually seem to exist in the report.

7.4.6.3.1.6, P453. Environmental Baseline – Marine Mammals in Berkeley Sound.

- "*Notably, of the species that are regularly observed within Berkeley Sound, sei whales are listed as 'Endangered' on the IUCN Red List…and all other cetaceans, are listed as species of conservation priority and are the subject of a Falkland Islands Cetacean Management Plan (FIG, 2008c)*". They are not the focus of a FI CMP – cetaceans did have a Species Action Plan but it expired in 2018 and has not been renewed. This information also fails to acknowledge the SRW and the IWC-CMP that exists for the population.
- *"For many years large numbers of sei whales (B. borealis) have been observed in inshore waters around the Falkland Islands (White et al., 2002; Frans and Augé, 2016)"*. White et al. (2002) reported only 31 sightings in three years.
- "*However, photo-identification within Berkeley Sound indicates that the animals are transitory with most animals spending a short period of time within Berkeley Sound (Weir, 2017)*." This does not reflect current knowledge. Publicly available satellite-tracking for sei whales show sei whales remaining within Berkeley Sound continuously for periods of several weeks. This has to supersede the one-season of photo-ID data assessed in Weir (2017). More recent photo-ID data shows some individuals remaining a longer too (see photo-ID chapter in Weir, 2022).

7.4.6.3.1.6, P454. Environmental Baseline – Marine Mammals in Berkeley Sound.

- Sightings of fin whales in inshore waters are not supported (Weir, 2017). The report is that there aren't any confirmed (i.e., supplemented with photographs, video or genetic data) sightings of fin whales in inshore waters. Moreover, two years of acoustic monitoring in Berkeley Sound did not yield fin whale detection. Continuing to suggest that fin whales are common in Berkeley Sound is misleading. Given fin whales are an IUCN Vulnerable species, it isn't helpful for the industry if they are reported in the EIS as being present.
- "*Once they arrive on their feeding grounds, southern right whales (Eubalanus australis) tend to be found in coastal or inshore waters (c.f. Black, 2005b)*". This is likely incorrect. The feeding

grounds of SRWs mostly comprise pelagic mid-latitude regions, including the outer Patagonian Shelf, the Argentine Basin, the subantarctic Islands etc. Not that many feeding grounds are located close to shore – this is the premise for most of the current satellite-tracking work going on for SRWs globally, aimed at locating their pelagic foraging areas. The whole section on SRWs under-represents what we know about the species in the FI currently and requires a major overhaul to properly reflect that species' occurrence and sensitivity. There is no recognition that SRWs aggregate in nearshore FI waters every year in winter for breeding and socialising, that satellite-tracking has revealed the durations that they stay on the FI coast, that they are part of the SW Atlantic population for which the IWC CMP exists, that their occurrence has warranted an IMMA, that the same animals return in different years, that Berkeley Sound is an important breeding habitat, etc.

7.4.6.3.1.6, P455. Environmental Baseline – Marine Mammals in Berkeley Sound.

- "*Although there are no known records from Berkeley Sound, killer whales may visit the area*". Killer whales were confirmed during the DOKE project around Kidney Island and FC has seen them inside Berkeley Sound and around Volunteer Point (see social media posts), local landowners (e.g. Adrian Lowe) have reported them anecdotally, etc.
- The Peale's dolphin section for some reason focuses on the 20-year-old JNCC surveys, while not citing at all recent information in Weir (2017, 2018) or Baines & Weir (2020). The same is true of the Commerson's dolphin section on P456.

Table 7.32, P460. Environmental Baseline – Marine Mammals in Berkeley Sound.

- The behaviour column contains a high number of inaccuracies.
- SRW seasonality should be updated to reflect work done since 2019. See earlier points.
- Fin whales: see previous comment.
- Minke whales are not 'regularly sighted', occasional at best.
- Humpback whales – They have been reported in Berkeley Sound. See Weir et al. (2022) report.
- Killer whales - See comment above.

7.4.6.4, P463. Environmental Baseline – Marine Mammals in Stanley Harbour.

- SRWs, fur seals and elephant seals have also been seen inside Stanley Harbour on occasion. Commerson's dolphins are significantly more common inside Stanley Harbour than Peale's dolphins – the distribution of the latter normally ends at The Narrows and we have seen them only very occasionally inside the Harbour itself. This section could be improved to make it clear that Commerson's dolphins and sea lions are the main sensitivities within the Harbour, with the other species far less common.

7.5.2, P471. Environmental Baseline – Protected Habitats.

- This section (and subsequently Sections 7.5.2.3 and 7.6.2.1) fails to mention the IMMAs that are in existence for whales in the Falklands. Plus two additional IMMAs for elephant seals. As IMMAs are equivalent processes to IPAs and IBAs and are relevant to Berkeley Sound then they should be considered.

Table 7.38, P480.

- It is not clear why some have ticks for an Action Plan (AP) plan required and others don't. If they are identified as conservation concern, then logically all might need an AP. There is no AP currently adopted by FIG solely for dolphins, and the globally Endangered sei whale should certainly be a priority species requiring an AP. APs in the past have been for all cetacean species grouped together, and currently none are valid beyond 2018.

7.6.2.1, P482. Coastal Sensitivity to Oil Spills.

- "*While a range of taxa may be impacted by an oil spill, the assessment was predominantly based upon colonial seabirds for which census data are available*." This seems inadequate with regard to sei whales and southern right whales for which extensive data are now available and which are species of global and regional conservation concern respectively. The potential impacts of oil spills (in all areas but especially in coastal high-use habitats) on baleen whales is not appropriately considered in this EIS.

8.9. P552–553. Cumulative Impacts.

- Cumulative impacts are very difficult to measure and are likely to be complex. It should be acknowledged that Berkeley Sound is already an intermittently busy (with vessel traffic) and noisy environment for baleen whales, and that additional noise and traffic would need to be interpreted in a cumulative and additive context with that already present. Chapter 13 essentially consists of 2 pages in which both seabirds and marine mammals are evidenced as having the highest potential exposure to cumulative impacts but are not considered further.

9.1.2.1, P562.

- In the list of 'environmental aspects' for the routes that activities might interact with the environment, no mention was made about the placement of objects in the water column – such as mooring lines, ropes, chains etc. Yet these have the potential to entangle whales. This risk has not been identified in this risk assessment.

Table 9.1, P566-578. Offshore assessment.

- Under 'large dropped objects', marine mammals have not been identified as a potential receptor. It should be noted that in other sensitive areas (e.g. the Beatrice field in the Moray Firth) then MMOs and PAM have been used during anchor-handling operations to limit impacts on cetaceans. As unlikely a risk as this might seem, it is acknowledged elsewhere and cetaceans were present in the pre-watches around the Beatrice anchor-handling tugs. Consequently, this risk could be recognised here, especially when Endangered species (sei and blue whales) might occur in the offshore oil field. It could be mitigated simply by having a dedicated crew member on the tug look for whales before deploying any large mooring anchors (or other large objects). Although that would not help if performed during the dark.
- Chemicals and drill cuttings and oil spills offshore – Section 10.6 and 10.7. If these affect plankton, fish and squid, then they should be considered to affect the species that predate those prey groups.
- Artificial lighting offshore – Marine mammals are flagged here as requiring further assessment in relation to artificial light, but then no assessment is provided in Section 10.1 beyond two sentences on P597 and one sentence in P607. It is not clear if that is the extent of the assessment.

Table 9.2, P579-582. Inshore assessment.

- Inshore physical presence is relevant to whales too – it excludes them from that area. The LTVs are around 160 m long (P172) which is large, and there will be two of them at a time. It's probably a relatively small effect alone, but in the context of all the other traffic already using Berkeley Sound then it should be acknowledged, especially if the LTVs anchor in a preferred whale foraging hotspot within Berkeley Sound.
- Artificial Light is considered to require further assessment for marine mammals in Offshore but is not flagged here for Inshore. Even though on P592 Inshore is flagged. The potential for attracting marine mammals may be higher inshore because of the specific case of foraging sei whales inside Berkeley Sound. If *Munida* is attracted to light (P596) and that sei whales use

Berkeley Sound as a foraging area with *Munida* as a key prey species (Buss et al., 2019; Jackson et al., 2022 in Weir, 2022), then it should be considered likely that sei whales may also be indirectly attracted to vessel lights in Berkeley Sound at night. Thus inadvertently increasing their potential exposure to noise (briefly acknowledged on P607) and vessel strike. This likelihood isn't highlighted anywhere in the EIS with specificity to the clear case of the sei whale–*Munida* situation within Berkeley Sound.

Table 9.3, P583-588. Onshore assessment. Use of port facilities (FIPASS/TDF).

- There is no mention of Underwater Noise or Vessel Collision associated with the FIPASS/TDF facility, even though the Table considers physical presence of vessels at those facilities and there is acceptance that vessel traffic within the port will increase in association with OGP operations. Commerson's dolphins (and pinnipeds) are very common around FIPASS and the TDF, and there is already a documented instance of a launch striking and killing a Commerson's dolphin while coming alongside at FIPASS (S. Cartwright, pers. comm). The FI Code of Conduct for Cetaceans (adopted by FIG) highlights vessel manoeuvres within ports as a clear risk for dolphin strikes. It is not clear why increase in noise and vessel strike has not been included as a risk for marine mammals here.

10.1, P591. Artificial Light.

- "*The current schedule expects that, during Stage 1, a maximum of two LTVs will be present in Berkeley Sound for only eight months (c. August-2022 to end March-2023), which supports the target of avoiding competition for sea room during the peak fishing period*" These dates have expired, and so it isn't clear what months/years the LTVs are expected to be present as part of Stage 1 now. No indicative dates are provided here for Stage 2. The stated priority for planning is to avoid the peak fishing period (P591), even though the spatial overlap with the anchoring areas used by other vessels in Berkeley Sound is minimal (Fig 11-6, P930) and March is one of the busiest months for vessel traffic in Berkeley Sound (Figure 7-118). The single best approach with regard to mitigating potential impacts on baleen whales in Berkeley Sound would be to avoid them in time (since there is clear overlap in space). The documented seasonal peaks for whales in Berkeley Sound includes Feb–Apr for sei whales and Jun–Aug for SRWs. There hasn't been any consideration presented in the EIS for timing operations around those periods to minimise impacts on two important KES species.

Table 10.1, P593. Artificial Light.

- Not clear why lighting at the TDF/FIPASS included here, when vessels used throughout the operation will visit those port facilities. Presumably lighting at those sites (at least at the TDR) will be expected to increase significantly in association with vessel visits and onshore safety requirements.

10.4.1.1.1, P650. Underwater Noise.

- "*However, despite the growing volume of research this remains an area with many uncertainties, largely due to the difficulties of observing and measuring the impact of noise on animals in the marine environment*." This is correct. Yet on P1235 the EMMP indicates that '*any adverse noise-related behaviour of marine mammals'* will be investigated. No information is provided on how that will be achieved in practice, given that the limitations of doing so are highlighted here on P650. See below comment for text on P1235 too.

10.4.1.1.1, P651. Underwater Noise.

- TTS is also an injury to a marine mammal. From Nowacek et al. (2007): "Both PTS and TTS represent actual changes in the ability of an animal to hear, usually at a particular frequency, whereby it is less sensitive at one or more frequencies as a result of exposure to sound." I.e. TTS can still compromise a cetacean's ability to navigate and find prey, so it should be included here as a potential injury. Same comment for Table 10.18 with regard to defining 'injury threshold.'
- "*it is an offence to intentionally or deliberately disturb any marine mammal in a way which is likely to…Impair its ability to…Survive, reproduce or rear / nurture their young, and / or Migrate… [or] Significantly affect the local distribution or abundance of the species to which it belongs*" With regard to noise impacts within Berkeley Sound, it will be difficult to demonstrate that noise impacts from the vessels are not affecting reproductive behaviour (singing activity) by both whale species, potentially affecting the feeding ability of sei whales, and potentially affecting local distribution by displacing whales from important habitats. Especially considering the cumulative impacts of the LTVs anchoring in a different area to all the other vessels within BS, thus causing cumulative disturbance over a wider area.

10.4.2, P651. Underwater Noise - Offshore.

- "*In general, sound from drilling has been found to be predominantly low frequency (<1,000 Hz) with relatively low source levels.* This appears to be a somewhat best-case and old (1987) example – 'in general' would imply the need for multiple examples to support the statement. There must be more recent studies published on sound levels produced by underwater drilling?
- *A study by Greene (1987) quoted in Genesis (2016) found that the sound generated by drilling activities from a semi-submersible did not exceed local ambient levels beyond 1 km*". Kyhn et al. (2014) report a drillship working in similar water depths to Sea Lion producing source levels of up to 190 dB re 1 µPa (rms) during maintenance and 184 dB re 1 µPa (rms) during drilling, with noise above ambient levels to a 38 km radius around the source.
- This section simply does not provide enough detail on the source and sound levels relevant to this specific project in order to assess likely impacts on marine mammals.

10.4.4.1, P654. Underwater Noise - Offshore.

- "*Recoverable injury, refers to injuries, including hair cell damage, minor internal or external bleeding. None of these injuries are likely to cause direct mortality*" No, but this is a little disingenuous because a deaf cetacean (at least odontocetes) cannot catch food or navigate, so indirect mortality is a possibility if TTS extends over days/weeks. This could be more objectively presented.

10.4.4.2, P655/656. Underwater Noise - Offshore.

- This is the first mention of 'received noise levels' which is not defined in Table on P654. Received sound levels is a fundamental concept in discussing impacts of noise on marine mammals and should be properly defined.
- "*Note however, that the audiograms for most marine species remain unknown and those that have been published are often derived from a few individuals under artificial conditions*." While it is good that this important caveat has been mentioned, more needs to be said. In particular, in the context of baleen whale sensitivities at the NBF.

Figure 1-11, P657. Underwater Noise - Offshore.

- The cetacean groups represented here comprise three odontocetes and one baleen whale. So, two cetacean hearing groups. It would be relevant to also include audiograms of beaked whales (as a marine mammal group found in the NFB and with particular sensitivities to human noise)

and of NBHF species (audiograms are available for harbour porpoises for example, as a proxy for Peale's/hourglass).

- Erbe 2002 given in this Figure is not cited in the EIS reference list. Assuming it is this one (https://cradpdf.drdc-rddc.gc.ca/PDFS/unc09/p519661.pdf), it should be noted that this is not a measured audiogram for the humpback whale – it is a predicted one by Houser et al. (2001). Another important point is that some other baleen whale species (including blue, fin and SRWs – all found in the NBHF) may be more specialised for the use of very low frequencies than the humpback whale (see P134 of Southall et al. 2019), and consequently the example of the humpback whale provided in Fig 1-11 may not adequately reflect the sensitivities of those species. It would be better to use Fig 9/10 from Southall et al. (2019) as the best available information on hearing sensitivity in the baleen whale group. No audiograms have been measured for baleen whale species and this is a significant and widely-acknowledged data gap in understanding and modelling noise impacts on baleen whale species (see P134 of Southall et al. 2019 for example). This should be mentioned at the bottom of P662 when discussing baleen whales too. It would be appropriate to label the audiograms in this Figure according to whether they are measured or estimated, to give a better indication of uncertainty.
- Given that baleen whale sensitivities in the NFB may be high (singing behaviour, conservation status etc), the data available on other baleen whale species should be included here, albeit estimated/modelled. This includes right whales, which is relevant to the NFB. See references on P130 of Southall et al. (2019).

10.4.4.3.4.1, P662. Underwater Noise - Offshore.

- "*The auditory range of species can only be determined through field observations, which are extremely difficult for free-ranging animals in the marine environment*". It can be determined through field experiments but also by experiments in captivity (for porpoises, dolphins and pinnipeds). It is not possible to 'observe' an auditory range.

Table 10.21, P663. Underwater Noise - Offshore.

- Blue whale should be added.
- Beaked whales (as a group) should be added too – its not just bottlenose whales found in the NFB but also *Mesoplodon* species etc, which are of concern with regard to noise impacts (recognised in Table 10.23).

10.4.4.3.4.4, P665. Underwater Noise - Offshore.

- "*For cetaceans, published TTS data are limited to the bottlenose dolphin and beluga whale*" Incorrect, Southall et al. (2019) state two additional NBHF species (i.e. porpoises) which should be included here as proxies for NBHF species found in the NFB (e.g. hourglass dolphins).

10.4.4.3.4.4, P666. Underwater Noise - Offshore.

- The disturbance thresholds presented in Southall et al. (2019) weren't evident.

Table 10.25, P667. Underwater Noise - Offshore.

- "*This is a realistic snapshot of the proposed project, but this could be exceeded at times if a second installation vessel or supply vessel is present*" Does two installation vessels mean two simultaneous drilling operations? If so then the cumulative noise impacts for this scenario should also be modelled as a precautionary approach?

10.4.4.4.1, P668. Underwater Noise - Offshore.

- "*The sound source levels for the Phase 1 & 2 activities were estimated using published data as shown in Figure 10-12 and described in Table 10.26*." The drilling operation is not actually shown in Figure 10-12 or in Table 10.26?
- "*The anchored drilling rig when operating has a low noise output, typically some 30 dB lower than the other marine sources present (vessels on dynamic positioning or using propulsion frequently) (DECC, 2011) and will not contribute significantly to noise in the presence of the other vessels noted*." It is not clear where is this information presented in the EIS along with the Genesis (2016) report. Relevant information should be provided in the EIS if the report is not public. It would be beneficial for calibrated sound measurements to be made in the field during drilling to verify this information.

10.4.4.4.4.3, P674/675. Underwater Noise - Offshore.

- "*Although there are sightings from various surveys and recordings from an acoustic monitoring study, there are currently no population estimates for any cetacean species in Falkland Islands waters. However, the available data do not indicate that the area surrounding the Sea Lion Field is home to resident populations of marine mammals or is a feeding area of overriding importance for any species*." As discussed earlier, the sightings surveys are very out of date and the acoustic monitoring report presents only 5% of available data and missed singing sei whales. The "available data" are therefore inappropriate for determining the importance of the Sea Lion field for cetaceans. Independent baseline surveys should be carried out prior to making statements such as this.
- "*Given the lack of population estimates, the proportion of the available habitat within the area of disturbance and avoidance / displacement could be used as a proxy to assess the potential impact on marine mammals. However, the habitat is not uniform throughout Falkland Islands waters and the available information indicates that many species show clear distribution patterns (Section 7.4.6.2)*." These sentences lack clarity. The Sea Lion field is on the upper continental slope, an area where water depths increase – slope habitats are usually associated with upwelling, currents and topography that make them some of the most important for marine mammals globally. Indeed, an IMMA is located just north-west of the Sea Lion field. It is likely that beaked whales and some other species such as sperm whales use those slope habitats year-round, and a precautionary approach (in the absence of the necessary field research data) would consider that likely. Thus we may expect behavioural disturbance in a ~20 km radius of the field. The importance of this simply cannot be ascertained, considering the absence of targeted cetacean field studies in that area and information on exact species present, their site fidelity etc (especially with regard to beaked and sperm whales, which often exhibit quite high fidelity to regions of slope).

10.4.5, P677. Underwater Noise - Offshore.

- "*This is not, as yet, an established part of marine vessel hire, but may form part of future environmental considerations*." As part of the contracting process these mitigations could clearly be requested/implemented in order to minimise noise. Same comment for the relevant text on P680.
- "*At present, it is not clear whether vessels operating offshore will be equipped with fixed or variable pitch propellors*." As above along with same comment for the relevant text on P680.
- "*Although speed restrictions are not proposed offshore, vessels operating in the vicinity of the Sea Lion Field are likely to be operating at low speed*" With regard to sperm whales and other sensitive species, speed vessels should be considered offshore as part of collision risk mitigation. Especially at night.

10.4.6.3.1, P678. Underwater Noise - Offshore.

- In the absence of information on the noise of the drilling being provided in the EIS, best practice mitigation could be used to check that no marine mammals are close to the source prior to its use. E.g., JNCC Guidelines, requiring a visual/acoustic monitoring period before the drilling commences. This would increase confidence that injury would not occur due to animals present close to the source prior to its initiation.

10.4.6.3.1, P678. Underwater Noise - Offshore.

- "*It is assumed that animals would move away from the source of noise before being subject to a sound exposure level that would cause injury and therefore the impact of vessel noise is assessed as disturbance (below) rather than the potential for injury*." This assumption is one often debated! For example, humans regularly undertake activities known to be dangerous, including exposure to injurious sound levels (e.g., at concerts). It is recognised elsewhere in this EIS that whales might not move away from areas where their food is concentrated (for example) even if noise is high. On that basis it would be more precautionary to also consider vessel noise in the context of potential for injury.

10.4.6.3.2, P678. Underwater Noise - Offshore.

- "*Although it is unlikely that the area under the influence of vessel noise around the Development site supports resident populations of cetaceans"* We simply cannot determine if this is correct based on the paucity of targeted cetacean surveys in the NFB (and total lack of surveys that might determine residency, such as satellite tracking or photo-identification at the Sea Lion field). In terms of likelihood, objectively one could expect beaked whale or sperm whales in particular to be resident to that region of slope, based on what we know of them elsewhere. But it is unknown and this statement is unsubstantiated. A precautionary approach would assume that resident populations might be present, and work to assess that risk.

10.4.6.3.2, P678. Underwater Noise - Offshore.

- "*In terms of species sensitivity, the low-frequency cetaceans, such as fin and sei whales (both in the LF (7 – 3,500 Hz) hearing group), are considered the most sensitive receptors*." SRWs should be added here, for reasons already explained.

10.4.6.3.2, P679. Underwater Noise - Offshore.

- "*However, if the source was located in an area that was regarded as an important feeding or breeding ground (not believed to be the case here) the impact would be more significant*" There is no data to determine that this is not the case. Or that it is the case! The data needed to support this statement simply don't exist. But what data do exist suggest is that this topic needs more attention – for example, the presence of sei whale song at the Sea Lion field in the Hipsey et al. (2013) report (see Cerchio and Weir, 2022) indicate that the region may be more sensitive than is being portrayed here. This is just one example, but the true importance of that area for marine mammals has not been properly investigated – another reason why baseline targeted marine mammal surveys at the site should have been undertaken.

10.4.10, P681. Underwater Noise - Offshore.

- A major omission here is the total lack of measured hearing range data for baleen whale species. Yet it is not mentioned? In contrast, Southall et al. (2019) repeatedly mention this, along with many other caveats in the extrapolations of TTS and PTS thresholds to LF species. These inherent uncertainties need to be highlighted.

- "*With regard to the uncertainty over marine mammal distribution, previous observational and acoustic surveys give a reasonable indication of the species present but further surveys would help to determine the inter-annual variation in marine mammal abundance in the area and help to resolve the status of rare species*" Actually, with regard to understanding the impacts of noise on cetaceans, one of the key relevant data gaps is the residency/site fidelity of cetacean individuals/populations in the NFB, and thus their exposure time? Potentially the acoustic data could inform on that for sperm whales (for the population as a whole). But otherwise, that kind of data requires telemetry or photo-identification datasets rather than SMMOs or other visual approaches.
- Same comment in Section 10.4.10.1. A programme of real-time calibrated sound measurements during drilling/production/decommissioning etc would help to validate the modelling results of this EIS.

10.5, P683. Underwater Noise - Inshore.

- The introduction focuses on the anchored LTVs but there will be additional vessel traffic introduced to the Berkeley Sound and Port William areas in relation to the offshore operations which should be considered too such as launches.

10.5.3. P684. Underwater Noise - Inshore.

- As indicated earlier in these comments, the information provided for sei whales and southern right whales in Berkeley Sound in 7.4.6.3 is outdated, non-inclusive and does not take into account the wealth of information that has been collected during 8 years of targeted whale research. In particular, it fails to recognise that:
  - Endangered sei whales use Berkeley Sound as a foraging ground, with individuals remaining for several weeks continuously and returning in different years;
  - Southern right whale aggregations utilise Berkeley Sound for breeding and socialising between mid-May and early September;
  - Berkeley Sound is the only location in the world where sei whale singing (indicative of reproductive activity) has been documented to occur (Cerchio and Weir, 2022);
  - There is already evidence for acoustic disturbance of SRWs from vessel noise inside Berkeley Sound (Cerchio et al. 2022 in Weir, 2022);
  - Berkeley Sound is included as a KBA for sei whales and as IMMAs for sei whales and southern right whales.
- The available data need to be thoroughly represented in Section 7.4.6.3 if that section is then going to be referred to here as the basis for understanding the 'receptors' for noise assessment.

10.5.4.4.1, P686-689. Underwater Noise - Inshore.

- Cerchio et al. (2022, in Weir, 2022) provide some actual measurements of vessel noise inside Berkeley Sound and in relation to some specific vessel types (although it wasn't known how far away the vessels were from the hydrophone at the time). This information is relevant to include here. They also show a decrease in SRW calls in relation to the increase in noise, which is certainly relevant to the EIS because SRWs use Berkeley Sound to breed requiring that their contact calls (upsweeps) and song (gunshots) can be heard.
- "*Greatest sound levels occur at low frequencies typically between 10 – 300 Hz with broadband sounds predominantly below 150 Hz and in some cases below 40 Hz (Ross, 1993; McKenna et al., 2012*)" Its widely documented that vessel noise swamps all of the low frequencies that baleen whales use (primarily <1000 Hz) and is loud across that range. An example of this over the 0–1000 Hz range can clearly be seen in the spectrograms in Cerchio et al. (2002).

Table 10.33, P687. Underwater Noise - Inshore.

- Interesting. Cerchio et al. (2022, in Weir, 2022) recorded actual received sound levels at a hydrophone inside Berkeley Sound peak of 130 dB RMS re: 1µPa in relation to either a reefer or a tanker and without knowing how far away from the hydrophone the vessel was. This, and lower, were sufficient to apparently impact on SRW vocal behaviour within the Sound.

Figures 10-19 and 10-20, P690-691. Underwater Noise - Inshore.

- These figures don't seem to represent the actual anchoring locations shown in Figure 5-5. It would be more useful to show the sound levels around the LTS at the actual mooring locations proposed rather than in the middle of the Sound? Does the 120 dB zone then extend to the south coast? This is relevant to understanding impacts on SRWs in particular, which often travel along the coasts quite close to shore.
- "*As can be seen from Scenario 3 below, these noise levels are within those already experienced in Berkeley Sound*." While that may be true, Figure 11-6 shows quite clearly that large portions of inner Berkeley Sound are already heavily used by anchored vessels which cumulatively probably produce noise levels that exceed the disturbance threshold (appreciating that a high-use year was shown in the Figure, but a similar pattern will be evident in other years too). The LTVs will be anchored further east, thus extending this noisy area across even more of Berkeley Sound and introducing noise into a currently less noisy area. As can be seen from the acoustic results in Cerchio et al. (2022, in Weir 2022), sei whale vocal behaviour is highest at the mouth of Berkeley Sound, medium in the central area and lowest in the innermost Berkeley Sound. This perhaps represents responses to vessel anchoring or differences in how the lobster krill are distributed, but either way then adding LTVs to that part of Berkeley Sound is not an impact that should be considered alone but rather cumulatively with all the other noise. Especially as this section clearly indicates that noise levels sufficient to exceed the disturbance threshold extend in a 0.5 km radius around the anchorage. There will be two LTVs, leading to a 2 km area of noise that exceeds the stated disturbance threshold in addition to all the existing noise from other vessels further west. Since foraging and breeding are key life cycle activities for the two LF-sensitive whale species then these noise levels have the potential to impact their behaviour inside Berkeley Sound in tandem with the noise already there, and this should be fully acknowledged.

10.5.4.4.2.3, P692 Underwater Noise - Inshore.

- "*An example, based on the worst-case scenario (Scenario 1), of received SEL(cum) for marine mammals and fish moving away from the sound source at 1 m/s over a 14 hour period is presented in Figure 10-22*" A more realistic 'worst case' scenario modelling exercise might be a sei whale that remains inside Berkeley Sound for several weeks continuously and doesn't move away at all, as has been shown by satellite tracking data (links to tracking data are in Annex 1). It would be desirable to see this modelled and presented in the EIS for transparency. Another very plausible worst-case scenario that should be investigated would be that whales are already feeding west of the mooring area when the LTV arrives, and so they cannot move out to sea for 14 hr in response to the sound levels but rather, given the semi-enclosed nature of Berkeley Sound, would actually have to travel towards it first (increasing their exposure) before they can get past and move away. The fact that whale calls from the same animals were heard simultaneously on FC hydrophones (placed 7 km apart) indicates that LF noise within Berkeley Sound does carry over considerable distance despite the properties of inshore coastal environments. This scenario should also be modelled with regard to SEL(cum), as it is something highly likely to happen in practice.

Figure 10-22, P693 Underwater Noise - Inshore.

- The legend says a 14-hr period but the x-axis only goes to 1000 m. Over 14 hr a sei whale could be 50 km away. This figure legend needs a bit of clarification as it appears to relate to distance rather than time.

10.5.4.4.3.3, P694. Underwater Noise - Inshore.

- See comment above. These are not the realistic worst-case scenarios for whales, and this section should be revised accordingly.

10.5.4.4.4.3, P695. Underwater Noise - Inshore.

Same comment here as provided above to Figures 10-19 and 10-20 (P690-691). The concern is the cumulative impact and the location of the LTVs in a more sensitive part of Berkeley Sound for sei whales. Presumably Table 10.34 is for one LTV (the figure legend should be amended to make this clear). It would be relevant to have data added to this Table to show the realistic scenario of two LTVs at the same time – what is the cumulative area disturbance impact.

10.5.6.1.3, P697. Underwater Noise - Inshore.

- "*This is similar in extent to the current level of disturbance, (estimated to be 594 m for a mid-size tanker), caused by existing shipping in the area*" It's actually 65% higher.

10.5.6.1.3 and 10.5.9, P697. Underwater Noise - Inshore.

- "*Importantly however, noise from transiting vessels will be intermittent and very short duration (Section 10.5.2) and once the vessels have stopped, noise levels will reduce to background levels such that any additional disturbance impacts will quickly return to existing background levels*." Here, and throughout this Section of the EIS, the noise introduced into Berkeley Sound by the LTVs has been repeatedly justified using the fact that other vessels in Berkeley Sound are also noisy. There is little acknowledgement that this is two more noisy vessels in an area of Berkeley Sound that other vessels haven't been using much (but whales do). Stating that the LTV noise levels are similar to other vessels misses the point that the introduction of the one or two LTVs is cumulative – its additional noise, it lasts continuously for consecutive months, and it extends the existing area of noise in Berkeley Sound over an increased area. There isn't a lot that can be done to mitigate that, but not to fully acknowledge it when Berkeley Sound is a high-use habitat for two acoustically sensitive whales that have both been regularly recorded singing and calling in the area seems inappropriate. And also the fact that the LTVs will (presumably) also be present in months that have historically been quieter with regard to vessels within Berkeley Sound such as the winter months when SRWs sing and call within the Sound as part of their mating behaviour. The final sentence in 10.5.9. is the only real acknowledgement of the bigger picture in this whole section, but is not expanded upon regarding the IMMA/KBA/acoustic data/behaviour for the two whale species that emphasise the importance of Berkeley Sound as habitat for them.

10.5.10, P698. Underwater Noise - Inshore.

- "*The status of the potential receptors in Berkeley Sound is relatively well understood, although the influx of southern right whales in the winter of 2017 (Section 7.4.6.3.1.1) highlights that unusual years do occur and long-term trends can change*" As per earlier comments, the importance of Berkeley Sound for whales has not been fully represented by Section 7. The influx of SRWs in 2017 was not unusual – it only appeared so in 2017, but has since been shown to be a predictable and repeated annual occurrence that is very well-documented by both FC research and the local community.

- "*The inter-annual distribution and abundance of marine mammals are acknowledged as a data gap*" This neglects seven seasons of whale work inside Berkeley Sound (every year since 2017 except 2018) which has also routinely recorded dolphins – the inter-annual distribution of cetaceans inside Berkeley Sound is better known than anywhere else in the Falklands and is very well-documented. That information wasn't represented in Section 7.

10.5.10.1, P698. Underwater Noise - Inshore.

- "*Navitas will deploy hydrophones in the Sound to record marine mammal vocalisations for 1-2 years to establish the baseline*." FC has already collected three years of acoustic data inside Berkeley Sound and published initial results (Cerchio et al. 2022, in Weir 2022; Cerchio and Weir 2022). The baseline is well documented but not represented in the EIS. Additionally, only 5% of the one year of acoustic data collected as a baseline at Sea Lion (Hipsey et al., 2013) has been analysed and actually used to inform this EIS. This doesn't provide high confidence in an additional Berkeley Sound dataset being used to its full potential.
- "*Marine Mammal Observers (MMOs) will be placed on the OCVs … a review of the MMO reports will be conducted after five years and used to improve knowledge of locations and behaviour of marine mammals*." The data from MMOs on OCVs occasionally visiting Berkeley Sound will be used, but the 7 years of targeted research (including satellite-tracking, acoustics, photo-ID etc) inside Berkeley Sound is largely omitted from Section 7.
- "*Two projects studying the inshore cetaceans of the Falklands, with a focus on Berkeley Sound, have recently concluded (Weir, 2020 and 2021)*." The extensive work published in Weir (2022) would be the most relevant and substantial information on whales in Berkeley Sound available to date but has been omitted from this EIS.

10.10.4.1.2.1, P834. Waste Generation and Management.

- In 'Impacts on wildlife' pinnipeds are given as the only marine mammal example. It should be added that cetaceans are also vulnerable to entanglement in, and ingestion of, waste materials, including the whole range of species from small porpoises/dolphins to large baleen whales. From Weir and Prieto (In Press, available on request) – "*From 2013 to 2020, three instances of live entangled sei whales were reported off the eastern USA seaboard, including one animal with plastic strapping around its rostrum … In cases where entanglements limit the mouth opening to feed, or are sufficiently severe to limit mobility, they are highly likely to cause mortality. Sei whale feeding methods are non-selective, and lunge-feeding in particular can result in the accidental ingestion of non-target items including plastics and other debris. Additionally, microplastics may occur within sei whale prey species, particularly when they are feeding coastally on shoaling fish (e.g. Scombridae, Clupeidae and Engraulidae) which have high potential for ingesting microplastics via their own prey (Burkhardt-Holm and N'Guyen 2019). Plastic ingestion may be an increasing threat, with plastic debris being recently identified in a sei whale faecal sample in Chile (Buchan et al. 2021). Stranded sei whales have been found with plastic in their stomachs in the UK (Baulch and Perry 2014) and in the USA (Henry et al. 2020), with the ingestion directly contributing to mortality in the latter case. Additionally, microplastics are readily trapped within baleen plates and where they are a fouling risk that prevents whales feeding efficiently (Werth et al. 2019)*." While this text refers specifically to sei whales, literature searches will reveal extensive documentation of cetaceans with plastic ingestion – offshore species including beaked whales and sperm whales also appear particularly prone to this.

10.11, P854. Vessel Collisions.

- "*Most publication however focus in the larger whales. Schoeman et al., (2020) found that smaller animals are also affected and recommend the establishment of a species-specific necropsy protocol and a database for smaller species as well as the larger animals*." This isn't correct there is a lot of information on smaller cetaceans too (a literature search reveals many papers). A

key reference that should be included here would be Van Waerebeek et al. (2007) who completed a review of vessel collisions on small cetaceans worldwide, as well on baleen whales in the Southern Hemisphere.

- "*Few vessels will visit other inshore waters e.g. Berkeley Sound*" This is likely over-simplistic because no doubt there will at least be tankers, and likely regular launches attending the LTVs from Stanley for a variety of reasons (supplies, customs, maintenance, crew changes, medical visits etc) as do the other vessels in Berkeley Sound. For example, project use of launches hasn't been mentioned in this EIS.

10.11.1.1, P854. Vessel Collisions.

- While there isn't legislation, there are guidelines. A Code of Conduct for Cetaceans has existed in the Falkland Islands since 2020 and has been adopted by FIG. This should be included in the EIS.

10.11.3, P855. Vessel Collisions.

- "*The receptors that may be subject to the risk of collision during the Phase 1 & 2 Development include a wide range of large cetacean species that are known to occur within Falkland Islands waters (Section 7.4.6). Small cetaceans (dolphins) are fast moving and agile enough to avoid vessels travelling at moderate speed and are likely to be at greater risk from small fast-moving craft rather than those associated with the Development…For these reasons, small cetaceans are not considered further in this assessment, which explores only the risk of collisions between Phase 1 & 2 vessels and large cetaceans (whales).*" We strongly disagree with these sentiments. There is a large amount of published information worldwide showing small cetaceans being injured and/or killed by vessels, including very large vessels such as ferries. We would be happy to provide a list of applicable information on request. Small cetaceans are not agile enough to avoid vessels moving at moderate speed – this is a very misleading statement, and fails to account for the fact that calves or compromised animals may not be as responsive, or that much depends on the behaviour/responsiveness of individual animals and on what the platform is doing – erratic changes in direction or speed are especially an issue, given that dolphins in the Falklands are interested in propellers and often in close proximity to them. Indeed, as an example, a Commerson's dolphin was struck and killed by a launch coming alongside at FIPASS (see below), and we are also aware of an incident with Concordia Bay. Porpoises, dolphins and whales should all be included in a Vessel Collision assessment for the Falklands, especially since all of the offshore vessels will be coming into Stanley/Port William for crew changes and supplies and so it's not only offshore waters that need to be considered. Vessel strike was in fact identified in the draft cetacean Species Action Plan (SAP) by SAERI/DOKE as a likely threat to Commerson's dolphins.
- "*Indeed, some species, such as Peale's dolphin (Lagenorhynchus australis), are attracted to large vessels to bow-ride. For these reasons, small cetaceans are not considered further*." Most experts agree that this behaviour increases their risk, not eliminates it. See Van Waerebeek et al. (2007).

10.11.4.1., P855. Vessel Collisions.

- There is no "*current Falkland Islands Species Action Plan for Cetaceans (FIG, 2008c)*" - it expired in 2018.
- "*…identifies a number of potential threats to cetaceans but does not regard ship-strike to be a problem in the Falklands."* The 2008-2018 SAP expired and not including vessel strike was an oversight by those authors and does not reflect best available evidence. Any SAP proposed now would include vessel strike – see the draft SAP for all cetaceans by SAERI/DOKE, and the sei whale SAP that is currently in preparation by FC (to be completed before December 2024, but current draft available on request).

- *"Indeed, there are no known records of collisions between vessels and cetaceans in the Falkland Islands."* And similar on P864 and P867. This is incorrect and demonstrates a lack of familiarity with available information which includes:
    - A launch reporting a 'bang' as it made physical contact with a sei whale in 2017 in Berkeley Sound (Weir, 2017; draft cetacean SAP, SAERI);
    - A near-miss between Concordia Bay and a sei whale in Falkland Sound in 2017 (Weir, 2017; draft cetacean SAP, SAERI);
    - A 'bang' on the hull of Golden Fleece from an interaction with a sei whale on the west coast of the Falklands in 2018 (Weir, 2018; draft cetacean SAP, SAERI);
    - A Commerson's dolphin killed by a launch manoeuvring at FIPASS in the mid-1990s (S. Cartwright, pers.comm.; draft cetacean SAP, SAERI);
    - An anecdotal account of a Commerson's dolphin being fatally injured by Concordia Bay while manoeuvring at the jetty at Port Howard;
    - An anecdotal account of a launch hitting a right whale on the south coast of Berkeley Sound (no damage to the launch, no certainty on injury to the whale); and
    - Propeller wounds on the bodies of southern right whales photographed in the Falklands (available from FC), which could have occurred anywhere in the SW Atlantic but clearly demonstrate risk.

  In most of these cases, vessels were actually going slow <10 knots or manoeuvring at the time of the incident. Regardless of the above evidence, it is clear from the published literature that all of the cetacean species occurring in coastal waters around the FI (and many of the offshore ones) have documented injuries or mortalities from vessel strikes (see Van Waerebeek et al., 2007), and that local cetacean experts (Costa, Weir) that have worked in the FI understand the risk to be real for all species not just whales.

10.11.43, P857. Vessel Collisions.

- "*Therefore, when assessing the impact and the likelihood of cetacean collisions it is important to consider…The known behaviour of different species which can make individuals of a particular species more likely to be involved in a collision*". This has not happened in the EIS. There is little recognition that: (1) both coastal dolphin species are attracted to propellers and mill around boats while they are manoeuvring alongside at jetties; (2) sei whales are feeding in the Falklands during which they can become oblivious to boats; and (3) SRWs engaged in socialising and mating are largely oblivious to boats, and *Eubalaena* whales are anyway particularly vulnerable to vessel strike due to their buoyancy.

10.11.4.3.1, P857-858. Vessel Collisions.

- "*The size of the southern right whale population that breeds off the Argentine coast is well studied and tripled since 1999 to 2006*." The most relevant information is related to the Falklands to assess collision risk. Again, there is a failure to cite appropriate sources here (e.g. Weir and Stanworth, 2019). Once more, the misleading statement about the 2017 'influx' appears. The list is ambiguous. SRWs do not "*tend toward a coastal distribution*" – they occur in 5000 m water depth offshore in the Argentine Basin and all over the SW Atlantic (see many satellite telemetry papers). Their coastal occurrence is linked with wintering grounds, for the remainder of the year they are pelagic. A better representation of SRW vulnerability to collision would be:
    - Are particularly buoyant and slow moving, so can be slower to react to approaching vessels than many other whales;
    - Aggregate in nearshore waters around the Falklands coast during winter (but occur offshore year-round), where high densities overlap with vessel traffic (especially Berkeley Sound and Port William);
    - When engaged in some behaviours (especially mating and socialising winter aggregations) can become oblivious to boats;

- Spend prolonged periods at, or near, the surface when engaged in social/breeding behaviour, or when resting between foraging dives.

10.11.4.3.2, P858-859. Vessel Collisions.

- "*While the results of photo-identification are emerging (Weir, 2022) there is not sufficient survey data to determine an accurate population estimate, although there is anecdotal evidence that the number within Falklands' waters, and more generally within the south-west Atlantic, is increasing (Iñíguez et al., 2010)*." There is an abundance estimate published for sei whales in one part of the Falklands (Weir et al., 2020), and also minimum population sizes (from photo-ID) provided for Berkeley Sound and other areas in published reports (Weir, 2017, 2018, 2022). These have been assessed in a global context (Weir, 2021) to support the fact that FI waters support a globally significant sei whale population. In lieu of all the targeted whale work carried out on sei whales in the Islands, a paper (Iñíguez et al) has been cited that refers to only 3 sightings in the FI between 2004 and 2008 as evidence that the species is increasing here.
- "*With regard to their behaviour, while there are records from around the world of collisions between sei whales and vessels (IWC database, 2014) they are considered to be at lower risk than most other large whale species (Vanderlaan and Taggart, 2007). This is primarily because they: Appear to respond to approaching vessels, Are relatively fast swimmers, and Tend to swim just below the surface leaving a clear trail of 'fluke prints' in their wake (Sea Watch Foundation, 2012). It should be noted that elsewhere in the world sei whales are considered to be an offshore species; however, in the Falklands this species is associated with relatively shallow inshore waters*." We strongly disagree with most of these statements, which are outdated and relate to sei whales in other regions rather than in the Falklands. It should be realised that the work in the Falklands (and a couple of other geographic locations) is some of the first extensive field research carried out on sei whales anywhere globally, and lots of these misconceptions will be rectified in the coming years. Reviews of sei whale collisions can be found in Prieto and Weir (2022) and Weir and Prieto (In Press, available on request). The fact that there are documented vessel strikes both globally and in the FI means that they don't always respond to vessels. While they can be fast swimmers, they can also be very slow. See Segre et al. (2021) for examples of slow skim-feeding in the FI. It is not clear what relevance the 'fluke prints' have, but they often appear at the surface 100s of metres away from where the animal actually is. There is little point in comparing sei whale behaviour in the North Atlantic and North Pacific (where many of these perceptions come from) with that in the FI, because sei whales in those areas generally use pelagic offshore habitats. Whereas sei whales in the FI also intensively use nearshore areas, where overlap with human activities is far higher. A better representation of sei whale vulnerability to collision would be:
    - Occur in high densities in nearshore waters during summer and autumn, including in Berkeley Sound;
    - Use nearshore waters as a foraging habitat, where their focus on feeding may make them less responsive to vessels;
    - Are especially vulnerable when surface skim- and lunge-feeding (Segre et al., 2021) when they spend prolonged periods moving slowly near the surface;
    - Often behave unpredictably, making them difficult to spot and avoid by vessel crews.

10.11.4.4.2, P860. Vessel Collisions.

- "*While there are limited data regarding cetacean distributions around the Falkland Islands, there is some very detailed information regarding shipping movements, although this has only been recorded since June 2014*." Limited information offshore, but there is now a wealth of information in the nearshore waters…including in the shipping routes. See published literature.

10.11.4.5, P862. Vessel Collisions.

- "*With regard to the overlap in vessel activity and cetacean distribution, the distribution of right and sei whales in particular is not well understood (Section 10.11.4.3). However, the fact that both are sighted within the NFB, Berkeley Sound and near Stanley Harbour year-round suggests that these species have spatial and temporal patterns of distribution, which overlap with shipping activity*." Those are two species for which the distributions (at least coastally, but also some offshore data from telemetry) are actually particularly well understood. Their overlap with shipping is a fact, not a suggestion. See published literature.

Table 10.83, P862. Vessel Collisions.

- This again overlooks support/supply vessels such as launches used during this project for moving supplies etc between Stanley Harbour and the LTVs.

10.11.5, P862. Vessel Collisions.

- The existence of Falkland Islands-specific guidelines (adopted by FIG) since 2020 has been omitted here.

10.11.5, P863. Vessel Collisions.

- "*As part of Navitas's operating procedures, speed restrictions will be applied to vessels entering the boundary of the inshore proposed Marine Managed Area (pMMA); as vessels approach the inshore pMMA boundary line the maximum speed permitted will be ≤10 knots. Additionally, vessels generally will only transit the Sound during daylight hours, with daylight-only berthing and night-time departure by exception only*." 10 knots is fine to reduce collision risk, but the EIS also refers to 8 knots in places e.g. P865. For clarity please can you confirm – is it ≤10 knots at the pMMA line but then further reduced to ≤8 knots in Berkeley Sound (defined as west of the Vol Pt-Mengeary Pt line). Ideally, it would be desirable to maintain speeds of ≤10 knots in Port William too between (at least) 1 June to the end of August in order to reduce the likelihood of injurious SRW strike (sei whales are uncommon inside Port William) – perhaps this is already covered in the areas above?

10.11.6.1, P863. Vessel Collisions.

- "*With regard to the sensitivity of each receptor, southern right whales are considered to be susceptible due to their behaviour (Section 10.11.4.3.1)*." Both species are susceptible due to their behaviour – surface feeding sei whales are just as susceptible as SRWs.
- "*This species is listed as 'Least Concern' by IUCN*." Yes but the SW Atlantic population is of regional conservation concern (see earlier comments re. IWC-CMP).
- "*However, vessel speed will decrease and watch-keeper vigilance will be heightened as vessels approach land in response to the increased risks of navigating in coastal waters, which increases the likelihood of detecting and avoiding cetaceans*" Even the most vigilant of watch-keepers cannot see at night. It should be noted that inshore SRW aggregations form in winter when daylight hours are the least and it will be too dark to detect whales visually for 16 hrs in each day. The reduction in vessel speed is the main thing.
- This section omits any consideration of sperm whales. Sperm whales are regular in offshore waters of the FI, are an IUCN Vulnerable species, and are another species whose behaviour (long periods of logging at the surface between deep foraging dives) makes them particularly vulnerable to ship strike. See for example https://journal.iwc.int/index.php/jcrm/article/view/446

10.11.6.2, P864. Vessel Collisions.

- "*In addition to the lookouts posted on the forecastle of the vessels as already referred to in Section 10.11.5*" There is no mention of this in Section 10.11.5? Was it deleted? Is it still happening?

10.11.7, P864. Vessel Collisions.

- It is not clear on what basis 'unlikely' has been determined for collisions in offshore waters. The data on offshore cetaceans don't exist to support that. And there has been no consideration of sperm whales, which were the most common species acoustically detected at the Sea Lion field suggesting they are relatively common there (acoustic findings in Hipsey et al. 2013) and are also vulnerable to ship strike due to their behaviour? This should be amended to 'Possible.'
- "*The introduction of a 10 knot speed limit for the Falklands pMMA, in line with NOAA guidelines, is already considered as industry standard mitigation (Section 10.11.5)"* Section 10.11.5 actually said that there wasn't any industry-standard mitigation?

10.11.7, P865. Vessel Collisions.

- "*Additionally, during transit in Berkeley Sound, there will be two qualified Seabird and Marine Mammal Observers (SMMOs), most likely posted to the OSVs and they will advise the Ship's Master on the bridge of the need for evasive action. The OSVs are the most common vessels transiting Berkeley Sound to pick up equipment from the LTVs*." Again, this doesn't take into account other vessels like launches that might be running to/from the LTVs, and it doesn't help at night. As stated above, vulnerable inshore aggregations of SRW occur in winter when night comprises two-thirds of a 24 hr period and MMOs will only be effective for the other third. These extra efforts are appreciated, but the reductions in vessel speed are the single most effective method especially in winter.
- "*Mariners should be made aware of the issue and how it relates to the Falkland Islands, educational materials, such as posters, will be produced to be displayed on the bridge of contracted vessels (see IFAW (2013) see Figure 10-50 below for example)*" FC has already produced a poster (in Spanish and English) in liaison with Fortuna that outlines the Code of Conduct for FI waters and is available for use for awareness etc. Please contact us if you would like a PDF or to modify that to suit.
- "*On all vessels a lookout should be posted while transiting areas of high cetacean abundance*" This is rather ambiguous. How are areas of high cetacean abundance going to be determined in real-time, and who is going to be the lookout? And of course this is no use at night.
- "*If whales are spotted, speed should be reduced and animals given a wide berth*." FI guidance should be followed to specify these distances. See the FI Code of Conduct.
- "*In addition to Navitas incident reporting and investigation, any incidents of collisions with marine mammals will be reported to FIG and the IWC*" It would be nice if FC could be included in this loop, as the main organisation working with whales in the FI and producing Code of Conduct guidance. Near-misses (i.e. where whales pass <50 m from a ship, or where ships make diversions to avoid them) should also be logged/reported, in order to better understand risk. Same comment for P868. Additionally, FC may be able to attend dead whales floating at sea in the Berkeley Sound area (or subsequently washed up) and properly assess the nature of the injury, which could be useful to inform future risk assessments for industry.

10.11.8.2, P867. Vessel Collisions.

- "*SMMOs coupled with the reduction to 8 knots within Berkeley Sound will reduce the likelihood of collisions between cetaceans and vessels from 'Possible' to 'Unlikely'*." Most of the collisions evidenced in the inshore FI to date have been at low speed or while vessels are manoeuvring (see previous list). So the likelihood of contact is probably slightly decreased by reducing speed, but the chances of that contact then resulting in serious injury/death is what is significantly reduced.

As such, this should probably remain 'Possible' (it makes no real difference to the assessment outcome anyway). As mentioned before, SMMOs might be reasonably useful in summer when daylight is long, but in winter their effectiveness is greatly limited by darkness.

10.11.10, P867. Vessel Collisions.

- "*Sei and right whales are a common sight throughout the inshore waters of the Falklands during the summer and autumn but a complete survey is yet to be undertaken*." Again, omission of eight years of data in inshore waters, including Berkeley Sound. Inshore SRWs are in winter, not summer. And again, what about sperm whales in the Sea Lion area, whose vessel collision assessment has not been mentioned.

Table 10.84, P869. Vessel Collisions.

- Small cetaceans and vessel collision risk inside Stanley Harbour at FIPASS/TDF both need to be considered in this Table, since dolphin mortality from vessel strike has been documented within Stanley Harbour.

Table 12.1, P1042. Oil Pollution – Offshore.

- Since fur and feathers were tested here, it could have been possible to also include baleen plates testing here, as mentioned on P1057. See Werth et al. (2019) for experiments with oil on whale baleen.

12.1.4.2.6, P1058. Oil Pollution – Offshore.

- The sei whale KBA is mentioned here, but the IMMAs are not.

12.1.4.4.6. P1078. Oil Pollution – Offshore.

- "*Each recovery unit would have a boom encounter width of 15 m and a single skimmer capable of recovering 30 tonnes per hour (if that much oil is encountered by the boom) and could operate at a wave height of up to 2 m*" Perhaps some information should be added here to clarify what proportion of time at the Sea Lion Field over a year has wave heights less than 2 m where recovering spilt oil would be plausible. Is there a Plan B for when it isn't? Would the incoming recovery vessels from South America/Africa have capacity to operate in higher sea states?

12.1.4.4.6. P1079. Oil Pollution – Offshore.

- "*Although the assumed response has a very modest effect and recovers 6.3 % (2,231 tonnes) of the oil…*" At only 6.3% recovered, 'low/poor' might be a more realistic description.

Table 12.9, P1114. Oil Pollution – Offshore.

- Endangered blue whales are forgotten again.
- "*…marine mammals are not considered significantly at risk due to the semi-solid nature of the waxy crude…*" Not sure why this makes them not at risk, since lunge- or skim-feeding baleen whales could presumably ingest such matter due to their indiscriminate feeding techniques.
- The areas mentioned in 'Coastal' are also part of a KBA, and two IMMAs for whales which is not acknowledged. In particular, this area is used heavily by SRWs during winter.

Table 12.9 (P1112-1115) and Table 12.10 (P1118-1119. Oil Pollution – Offshore.

- The colour coding and overall risk assessment values used in these Tables is very confusing because it isn't clear why the final column has completely different verdicts to the descriptive text. Presumably this has been described somewhere in the preceding 1100+ pages, but it's not reasonable to have expected people to memorise it. The Table legends should make it clear why this is or refer the reader back to the relevant section with the explanation. As it stands, it is very difficult to comprehend

Table 12.11, P1122. Oil Pollution – Offshore.

- How is it possible that terrestrial tourists possibly noticing a small amount of oil on the coast (described as being '*very unlikely to come to their attention*') is deemed to be of 'Moderate risk significance', but marine mammals that live in the immediate area of a spill are deemed 'Very Low risk significance'. This allocation of relevant importance should be reconsidered.

Table 12.12, P1126. Oil Pollution – Offshore.

- "*Cetaceans are more vulnerable to inhaling toxic vapour and are less affected by contact with the skin (Section 12.1.4.2.5)*." The text in Section 12.1.4.2.5 does not support this statement – it merely describes both possibilities and does not assign relative importance. Recent papers from the Deepwater Horizon spill show that oil can adhere to cetacean skin, with unknown effects. Same comment as Table 12.11 re. how the overall risk significance can be deemed higher for land-based tourists than it is for Endangered marine mammals at the actual spill site.

Table 12.13, P1129. Oil Pollution – Offshore.

- "*There is no indication that the presence of a rig attracts associating marine mammals, although they could be attracted by potential prey species that may shelter near the rig*." Incorrect, evidence is available online, for example:
    - Delefosse M, Rahbek ML, Roesen L, Clausen KT. Marine mammal sightings around oil and gas installations in the central North Sea. Journal of the Marine Biological Association of the United Kingdom. 2018;98(5):993-1001. doi:10.1017/S0025315417000406
    - https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.16134
    - https://periodicos.ufsc.br/index.php/biotemas/article/view/2175-7925.2009v22n3p247

12.1.7., P1132. Oil Pollution – Offshore.

- "*While Oil Spill Response (OSR) equipment will be carried on the ERRV / MRSV and AHTS / ERRV offshore …in reality it is unlikely to be effective in the prevailing offshore weather conditions of the Sea Lion Field…oil spill response is not considered effective in respect of the largest events*" Much of the discussion of OSR earlier can be negated by this statement that it would be ineffective.

Table 12.14, P1132. Oil Pollution – Offshore.

- Same comment about terrestrial tourists being categorised of higher residual risk significance than Endangered marine mammals that are present at the immediate site of the spill.

12.1.10., P1133. Oil Pollution – Offshore.

- "*The seasonal distribution of potential receptors in the NFB is reasonably well understood but further research is required to improve our knowledge of species distributions, and these are acknowledged as data gaps*" We disagree, the seasonality of cetacean receptors at the NFB is not well understood.

12.2, P1143 to 1164. Oil Pollution – Inshore.

- Apart from marine mammals being listed as a potential receptor in the list in 12.2.3, and the summary in Table 12.23, there seems to be no actual detailed consideration of the potential impacts of a marine diesel spill on marine mammals in Berkeley Sound. In Section 12.2.4.2 then it states that the majority of receptors have been considered in the offshore oil spill section (12.1), but this isn't adequate for marine mammals because the sensitivity in Berkeley Sound is significantly higher. The Sound is both a KBA and an IMMA based on its whale sensitivities, and foraging Endangered sei whales would be directly exposed and also indirectly exposed because oils accumulate within prey species (Werth et al. 2019). The modelled spill areas in Figs 12-45 and 12-46 overlap with whale foraging areas.

Table 12.23, P1162. Oil Pollution – Inshore.

- The fin whale hotspot fallacy in Berkeley Sound is repeated again here. However, southern right whales need to be added here as a KES in Berkeley Sound, as a species of regional conservation concern.
- "*Although it is possible that MGO from a spill of this size will not come into direct contact with any marine mammals, which occur in relatively low densities, this is not certain*" This is incorrect. Berkeley Sound supports high densities of sei whales and SRWs. It would be surprising if a MGO spill inside Berkeley Sound did not come into direct contact with a marine mammal.
- "*Given the modest volatility of MGO, marine mammals could be susceptible to inhaling hydrocarbons upon surfacing to breath*" In fact one of the most likely impacts would be accidental ingestion while sei whales are lunging or skimming to capture prey, both at the surface and subsurface. Same comment for Table 12.2.4 (P1166).

15.1, P 1214. Outline EMMP.

"*Should the monitoring of impacts indicate that the significance of the impacts and risks predicted in the EIS are not appropriate, and / or that mitigation is not effective, a revised mitigation measure and / or monitoring regime will be required*." This may not be realistic. It is not clear how quickly monitoring would show impacts and how quickly after that would something change to address those impacts.

Table 15.2, P 1218. Outline EMMP.

- It is not clear how seabirds have ended up being rated as higher sensitivity to underwater noise than marine mammals. This doesn't make logical sense.

15.6.2, P1232. Outline EMMP.

- "*Marine mammal observations prior to and during operations at the Sea Lion location and on Transits*" Is the 'prior to' going to involve some targeted marine mammal surveys before anything happens? The data gap regarding offshore cetacean occurrence at the Sea Lion field is a quite considerable one, and the little data that does exist is old.

15.6.2.1.1, P1235. Outline EMMP – Underwater noise.

- The information in this Table is rather vague and it isn't easy to understand what is being proposed. But some of these are over-ambitious and unlikely to actually be achievable in practice. For example, "*Investigate - Any adverse noise-related behaviour of marine mammals*". There should be a plan/idea as to how that will be assessed before the surveys start, so that data collection can be steered accordingly. Identifying cetacean behavioural changes and linking them to an activity is extremely difficult and even dedicated research studies with ample resources and personnel often don't manage to do it (see all of the conflicting literature on marine mammals and noise impacts). And it takes a lot of time (several years) because of the need for adequate sample sizes to prove cause-effect. The likelihood of a behavioural response being identified by two SMMOs who aren't located on the noise-generating platform is virtually negligible. Also, the stated management action of "*Scale back noisy activity*" isn't viable – as part of the environmental approach then the project should already have scaled back noisy activities to the lowest levels needed to achieve the project goals, as that is standard industry best practice (and the ALARP approach stated in this EIS). "*Adjust timing of operations"* is also likely to be unrealistic in practice because industrial operations are constrained by weather and availability of platforms (and associated costs). We don't have better suggestions for handling this, the fact that offshore marine mammals will be disturbed by noise is probably a given side-effect of the project. But we do think that the stated Management Thresholds and Actions won't be achievable in practice with the resources that are being applied.
- This table relates to 10.4 Offshore underwater noise. Where is the table for Inshore underwater noise and consideration of impacts in the sei whale foraging ground in Berkeley Sound? Especially the cumulative impacts? Why isn't this in the EMMP?

15.6.2.1.2, P1236. Outline EMMP – Vessel Collision.

- "*SMMOs on board vessels periodically covering all seasons with particular focus at the time of year when animals are concentrated in the area of ship movements*." It is not clear what this means. There are few data available for the NFB to show when animals would be concentrated in the area of ship movements.
- "*Reaction - Reduce vessel speed near marine mammals not attracted to the vessel"* This is not clear. Presumably, if they are attracted to the vessel then they would be at higher risk of collision not lower. It would be better to simply commit to following the existing FI Code of Conduct which makes these things much clearer – dolphins approaching the vessel do not result in a reduction of speed but it is requested that vessels maintain their heading (or amend it only slowly) while there are dolphins around the vessel so that the animals have time to respond and maintain distance from the propellers. Also, something needs to be added here regarding vessels coming alongside at FIPASS/TDF with regard to dolphins, because there will be Commerson's dolphins in that area likely to approach the vessels while they manoeuvre alongside and already a documented example of a dolphin being killed during one such manoeuvre.
- "*Adaptation - Add marine mammal detection systems (e.g. infra-red camera systems); adjust timing of operations; consider use of deterrents"* This would need to be tested on higher whale densities in Berkeley Sound probably before accepted as viable offshore. Reliable mitigation for vessel collision is currently to reduce overall speed and avoid sudden changes in both heading and speed. A commitment for project vessels to follow the existing Code of Conduct would address a lot of this.

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