IN THE HIGH COURT OF SOUTH AFRICA
GAUTENG DIVISION, PRETORIA

CASE NO.: 2024/029857

In the matter between:

BIRDLIFE SOUTH AFRICA	First Applicant
SOUTH AFRICAN FOUNDATION FOR THE CONSERVATION OF COASTAL BIRDS	Second Applicant

and

MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT	First Respondent
DEPUTY DIRECTOR-GENERAL: OCEANS AND COASTS, DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT	Second Respondent
DEPUTY DIRECTOR-GENERAL: FISHERIES MANAGEMENT, DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT	Third Respondent
THE SOUTH AFRICAN PELAGIC FISHING INDUSTRY ASSOCATION	Fourth Respondent
EASTERN CAPE PELAGIC ASSOCIATION	Fifth Respondent

FILING SHEET

Documents filed herewith:

1. Notice of Motion in terms of Rule 27(3).

2. Answering Affidavit of the First to Third Respondents.

3. Confirmatory Affidavit of Dr Ashley Naidoo.

4. Confirmatory Affidavit of Ms Janet Coetzee.

5. Confirmatory Affidavit of Ms Dikeledi Molepo.

DATED at **PRETORIA** on this the **19 DAY** of **SEPTEMBER 2024**.

THE STATE ATTORNEY
Per: Ms Dikeledi Molepo
Attorneys for First to Third Respondents
316 Thabo Sehume Street
Pretoria Central
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GAUTENG
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TO: **THE REGISTRAR**
High Court
PRETORIA

AND TO: **THE BIODIVERSITY LAW CENTRE**
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(Ref: PHW/ULTI298)

AND TO: **DAWSON EDWARDS & ASSOCIATES**
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THE SOUTH AFRICAN PELAGIC FISHING INDUSTRY ASSOCATION	Fourth Respondent
EASTERN CAPE PELAGIC ASSOCIATION	Fifth Respondent

NOTICE OF MOTION:

CONDONATION APPLICATION IN TERMS OF RULE 27(3)

BE PLEASED TO TAKE NOTICE that the First to Third Respondents intend applying to the above Honourable Court at the hearing of the matter for an Order in the following terms:

1. Condonation for the late filing of the Answering Affidavit and Confirmatory Affidavits.

2. Further and/or alternative relief.

TAKE NOTICE FURTHER that if you intend opposing the application, you are required to notify the First to Third Respondents' attorney in writing within five (5) days of service hereof and within ten (10) days after having given notice of your intention to oppose, file your opposing affidavit, if any.

TAKE NOTICE FURTHER that the First to Third Respondents have appointed the offices of the State Attorney, Pretoria, located at 316 Thabo Sehume Street, Pretoria Central, Pretoria, Gauteng, at which they will accept notice and service of all process in these proceedings.

TAKE NOTICE FURTHER that electronic service will be accepted at DiMolepo@justice.gov.za / GSekati@justice.gov.za

TAKE NOTICE FURTHER that the Answering Affidavit of the First Respondent, **DR DION TRAVERS GEORGE** filed herewith, together with annexures and supporting affidavits, will be used in support of the application.

KINDLY ENROL THE MATTER FOR HEARING ACCORDINGLY.

DATED at **PRETORIA** on this the **19 DAY** of **SEPTEMBER 2024**.

THE STATE ATTORNEY, PRETORIA
per: Ms Dikeledi Molepo
Attorneys for the First to
Third Respondents
316 Thabo Sehume Street
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TO: **THE REGISTRAR**
High Court
PRETORIA

AND TO: **THE BIODIVERSITY LAW CENTRE**
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(Ref: PHW/ULTI298)

AND TO: **DAWSON EDWARDS & ASSOCIATES**
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per Reinhardt Potgieter (Fourth Respondent's attorneys)
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EASTERN CAPE PELAGIC ASSOCIATION	Fifth Respondent

FIRST TO THIRD RESPONDENTS' ANSWERING AFFIDAVIT

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I, the undersigned,

DR DION TRAVERS GEORGE

do hereby make oath and state that:

1. I am the Minister of Forestry, Fisheries and the Environment for the Republic of South Africa. As such, I am the Executive Head of the Department of Forestry, Fisheries and the Environment ("the Department" or "DFFE") with offices located at Environmental House, no 473 Steve Biko Avenue, Arcadia Pretoria.

2. I was appointed as the Minister of DFFE 3 July 2024. My predecessor is Minister Barbara Dallas Creecy ("'Minister Creecy"), who previously served as Minister of DFFE from 29 May 2019 until July 2024. Where this affidavit refers to decisions and/or steps taken by Minister Creecy, I confirm the truth and correctness of the facts concerning those decisions.

3. The information concerning the various decisions relevant to the present review application, emanate from documentation under the control of the Department. Most of the documents to which I refer form part of the Rule 53 Record ("the record').

4. I am authorised, by virtue of my position as the Minister and the executive head of the Department, to oppose the relief sought by the applicants and to depose to this affidavit in furtherance thereof. This affidavit constitutes the

answering affidavit of the first to third respondents (collectively referred to as "the Department" or "the DFFE")) and is accompanied by the confirmatory affidavits of Ms Janet Coetzee, Dr Ashley Naidoo and Ms Dikeledi Molepo.

5. When I make submissions of a legal nature, I do so on the advice of the Department's legal representatives, which advice I accept as sound.

6. Before I deal with the allegations in the founding and supplementary affidavits, I outline the bases for the Department's opposition to the application which I do in the introduction below.

A. INTRODUCTION

7. Minister Creecy took a decision on 23 July 2023 to implement no-take fishing zones (also called island closures) for a period of ten years around South Africa's six African Penguin breeding colonies. These island closures were implemented as a conservation measure to mitigate the decline in the African Penguin population.

8. In this application, the applicants seek to review and set aside this decision and through the Court's intervention, effectively seek to implement more extensive island closures than those which are currently in place.

9. The island closures which are currently in place (and which is the subject of Minister Creecy's decision on 23 July 2023) already cover approximately 65% of the total geographical range of the applicants proposed closure

delineations. The applicants allege that they have adopted and implemented the recommendations of the International Review Panel, an international advisory committee which Minister Creecy had established to advise inter alia on the benefits of island closures as a meaningful conservation measure to mitigate the decline of the African Penguin population.

10. The island closures directly impact the management of fisheries and fishing rights which have been granted to Right Holders in the small pelagic (anchovy and sardine) sector pursuant to sections 13 and 18 of the Marine Living Resources Act 1998 (MLRA).

11. The island closures directly affect the small pelagic fishing industry for the reason that small pelagic fish, in particular, sardine and anchovy, are the preferred prey of the African Penguin. The small pelagic fishing industry and the African Penguin thus compete for access to small pelagic fish: the fishing industry for human and other consumption, and the African Penguin for prey. There are accordingly different interests and competing rights at stake: the rights of the applicants who represent conservation interests ("Conservation") and the rights and interests of the small pelagic fishing industry ("Industry").

12. The Minister, as the representative of the State, is politically and legislatively responsible for the administration, monitoring and oversight of both sectors often where competing rights and divergent interests play a role in decisions which must be made.

13. The decision to impose island closures on 23 July 2023 therefore involved a balancing of rights and interests.

14. I observe that:

14.1 Island closures around the 6 penguin breeding colonies have been in place since September 2022. The applicants did not seek to review this decision at that time on the basis that the decision was not authorized and therefore unlawful. This would fundamentally undermine their case should this be a basis for their review challenge.

14.2 Island closures are recognized as a meaningful conservation measure to protect the African Penguin. This is demonstrably supported by the fact that the applicants themselves seek more extensive island closures. Implicit in the relief they seek is an acceptance that island closures are a meaningful conservation measure. The applicants also hereby accept that the Minister has the power to impose island closures as a conservation measure.

14.3 There is no scientific data which conclusively proves that island closures will arrest the decline of the African Penguin and prevent its extinction. This means that the objective which the applicants ultimately seek to achieve is not capable of being met by the relief which they seek.

15. The applicants seek to challenge Minister's Creecy's decision as irrational, unlawful and unconstitutional and seek a substitution of the decision by this Court.

16. There is no merit to the application. This is so because:

16.1 The decision was properly authorized in terms of the relevant legislation.

16.2 The decision was based on the Expert Panel's Report which was the subject of extensive consultation and engagement with the relevant stakeholders including the applicants.

16.3 The decision was consistent with the purpose of the empowering legislation and the Minister's constitutional, statutory and international obligations.

16.4 The decision was neither arbitrary nor irrational and any discretion that was exercised was not exercised capriciously.

16.5 The decision was procedurally fair, and substantively and procedurally rational.

17. The application is misconceived also for the following reasons:

17.1 As a matter of law, it is well-established in review proceedings that the question is not whether the relevant decision is correct, it is whether the decision-maker exercised his/her powers properly.

17.2 The doctrine of separation of powers looms large in this application. When reviewing administrative actions, the Court is required to treat administrative decisions with appropriate deference and is required to give due weight to findings of fact and policy decisions made by those with specific functions, duties and responsibilities with a defined means of competence and jurisdiction. The decision to impose island closures around the penguin breeding colonies as an interim conservation measure is manifestly a policy driven decision which is underpinned by a balancing of rights and interests. The decision involves complex marine and biodiversity science of both a qualitative and quantitative nature. This is borne out by the fact that the applicants themselves have sought to place expert evidence before the Court in support of the relief they seek. I say respectfully that it is not for the Court to decide which scientific method and/or conservation measure ought to be preferred and to impose this upon the Department and all the stakeholders.

17.3 At the level of fact, multiple factors are responsible for the decline of the African Penguin population yet the application proceeds from the scientific premise that the major - if not the sole driver - of the African Penguin decline is commercial small pelagic fishing which, according to the applicants, is fast depleting the preferred foraging and prey of the African Penguin around the breeding colonies. They allege that the shortage of preferred prey can only be reversed and sustained by more extensive island closures which effectively means more invasive no-take fishing areas around the penguin colonies. The facts

demonstrate that whilst this is a contributing factor, it is not the only factor which has contributed to the decline of the African Penguin and that a long-term solution is substantially more complex and polycentric than what is being proposed.

18. The application is also, at best, premature, given the further scientific studies, investigations and analysis ("the further work") identified by the International Review Panel in their Report and which I deal with extensively further on in the affidavit.

19. The decision to implement island closures was made by Minister Creecy on 23 July 2023 and communicated to the public on 4 August 2023. The applicants, the fourth and fifth respondents as part of the conservation and fishing sectors respectively, were afforded an opportunity until January 2024 to engage on the issue of the island closures following the publication of the International Review Panel Report, and to approach the DFFE with a compromised position. This engagement process in the period August 2023 to January 2024 is addressed by the applicants and the fourth and fifth respondents in their respective affidavits. This approach and opportunity given to the parties is consistent with the recommendations and advice of the International Review Panel that continued communication, collaboration and transparency of research data and analyses are strongly encouraged to build trust and to strengthen progress towards seeking acceptable solutions (Paragraph 7.7 of the International Review Panel Report). The results of the further work are critical to the process which will enable me to re-assess the position on the island closures and will better enable me to implement the

necessary changes to the island closures, if necessary and if so required. Instead, the DFFE was served with this application in March 2024, which regrettably interrupted this process. For the reasons given, as extrapolated further on herein, the application is clearly premature.

20. I shall now proceed to deal with the issues arising from the application according to the following order:

20.1 First, I deal with condonation for the late filing of the answering affidavit.

20.2 Second, I set out the relevant legal and regulatory framework according to which the application should be determined.

20.3 Third, I set out the relevant background facts which underpin the application and the decision taken on 23 July 2023 (the impugned decision) which is the subject of this application.

20.4 Fourth, I deal with the grounds of review set out in the main founding affidavit and supplementary founding affidavit.

20.5 Fifth, I address the remedies sought.

20.6 Sixth, I deal with the relevant allegations in the main founding affidavit *ad seriatim* where it is necessary to do so.

20.7 Seventh, I deal with the expert affidavits of Ms Eleanor Weideman and Dr Richard Sherley.

20.8 Eighth, I deal with the allegations in the supplementary founding affidavit *ad seriatim* to the extent necessary.

20.9 Lastly, I deal with costs.

B. CONDONATION FOR THE LATE FILING OF THE ANSWERING AFFIDAVIT

21. I respectfully ask for condonation for the late filing of the DFFE's answering affidavit in accordance with the notice of motion filed herewith and based on the relevant facts set out hereunder which is confirmed by Ms Dikeledi Molepo, the DFFE's attorney of record from the office of the State Attorney.

22. The decision the applicants seek to review was taken on 23 July 2023. The applicants launched this application on 20 March 2024 - approximately 235 days after the impugned decision was taken. The application was launched on an urgent basis notwithstanding that the decision sought to be reviewed was taken 8 months prior.

23. In terms of section 7(1) of the Promotion of Administrative Justice Act 200 (PAJA), the applicant ought to have launched the application within a reasonable time and not later than 180 days after the impugned decision was taken. The applicants have failed to do so. A diligent review applicant knows that whatever engagements it may be having with a decision-maker, it must nonetheless ensure that it launches any review within a reasonable time.

24. The delay in the launch of the application has inevitably impacted the filing of the DFFE's answering affidavits.

24.1 The DFFE, like all government departments, is required to appoint its legal team through the office of the State Attorney. It is subject to the State Attorney's briefing policy when it comes to the appointment of counsel.

24.2 I am informed that counsel was only appointed and briefed on 4 June 2024 and that Senior Counsel was appointed after junior counsel. I am informed by Ms Molepo that the State Attorney's briefing policy is extremely cumbersome, which made it very difficult for her to appoint a suitable senior counsel in the matter with the result that she was only able to appoint senior counsel the first week in June 2024.

24.3 The papers in the matter are voluminous. The application itself comprises almost 1 000 pages. The papers were sent to counsel electronically. The State Attorney has had difficulty with their email and online system which is regularly offline which means that they are not able to send emails and scan documents. This disruption, needless to state, impacts the service delivery of the State Attorney, and thus the State.

24.4 Senior Counsel, Adv Golden SC, was not available for the first case management meeting which had already been scheduled by the time she was briefed.

24.5 Junior counsel, Adv Salukazana, attended the first case-management meeting before Deputy Judge President Ledwaba (DJP Ledwaba) on 10 June 2024. Although Adv Golden SC was contacted to ascertain her availability for the dates for the hearing of the application, she had no input into the timetable for the filing of papers and for the further conduct of the matter which was agreed to in the case-management meeting, nor was she able to provide any input given that she had not (just having been briefed) had any meaningful insight into the application.

24.6 The timetable for the further conduct of the matter which was agreed to in the case management meeting was then subsequently confirmed in a directive dated 10 June 2024 from the office of the DJP.

24.7 The directive, which I attach marked "**DFFE1**", required the DFFE to file the supplementary Rule 53 Record by 14 June 2024, which it did. The supplementary record comprised 4 449 pages (approximately 13 lever arch files). This was in addition to the initial record that was filed which comprised 931 pages.

24.8 The directive required the applicants to file their supplementary affidavit by 28 June 2024 and the DFFE to file its answering affidavit/s by 26 July 2024. The DFFE thus had just short of a month to file its answering papers from the time that the supplementary affidavit was filed.

24.9 The fourth and fifth respondents were required to file their answering affidavits by 5 August 2024. I am given to understand that provision

was made for the staggered filing of the answering affidavits to allow these respondents an opportunity to consider the Minister's answering affidavits first.

24.10 By the time that counsel had perused and considered the application and the initial record more fully which was done in the period between 12 June 2024 and 8 July 2024, counsel formed the considered view that the Department would not be able to meet the deadline for the filing of their answering affidavits by 28 July 2024 given the historical background to the dispute which spanned more than 10 years, the complexity of the legal issues, the extensive and complex scientific data and expert evidence and the nature of the instructions that was required to do justice to the brief and to adequately present the case for the DFFE.

24.11 The DFFE's legal team contacted the legal representatives for the applicants and fourth and fifth respondents and sought an agreement for more time to file the answering papers. The online meeting with the legal representatives was held on 15 July 2024.

24.12 I am informed that in the online meeting on 15 July 2024, the legal representatives agreed to a variation of the dates for the filing of papers and agreed that the DFFE shall file its answering affidavits by 5 August 2024 and the fourth and fifth respondents by 9 August 2024. The time was still not adequate but the parties agreed on 5 August 2024, although this was still, in the view of the Department's counsel, optimistic. The Department's legal representatives adopted the view

that notwithstanding the enormous time pressures, they will endeavour to do their best to honour this deadline as they did not wish to scupper the date for the hearing in October 2024.

24.13 Ms Molepo addressed correspondence to the office of the DJP on 18 July 2024 to inform the DJP of the agreement and the change in dates. This letter is attached marked "**DFFE2**".

24.14 However, it was not possible to meet this deadline given the amount of work that was required to prepare the DFFE's case and its answering papers. This was a mammoth task.

24.15 Given the nature and scope of the application, consultations had to be arranged and instructions obtained from different departmental officials across multiple disciplines, which included the Branches Oceans & Coasts and Fisheries Management.

24.16 By the time that the application was launched, Dr Ashley Naidoo, who facilitated the International Expert Panel review process and whose memorandum / submission is pivotal to the application, had been deployed as the CEO of CapeNature and was no longer easily accessible to the Department and its legal team for consultations and instructions. Dr Naidoo also no longer had access to his DFFE emails which made the facilitation of instructions to counsel difficult.

24.17 National government elections took place in May 2024. A new South African government of national unity (GNU) was established and new cabinet ministers were appointed.

24.18 Minister Creecy, who had been the Minister of DFFE since 2019 and who took the decision on 23 July 2023, was appointed as Minister of Transport in July 2024. I was appointed as the new Minister of DFFE. This change in government and the change in Ministers was significant. Having had no dealings with DFFE before, I am still familiarising myself with the structures, work and priorities of the Department. This includes all litigation.

24.19 I formulated the view, after I was extensively briefed on the application by the relevant departmental officials, that the matter was capable of settlement and that all efforts should be made to achieve this outcome.

24.20 On my instructions, the DFFE's legal team proposed to the parties' legal representatives the establishment of a Working Group in the online meeting on 15 July 2024. The draft terms of reference were shared with the parties for their consideration and input. The aim of the Wording Group is to inter alia address certain of the recommendations and additional scientific investigations contemplated by the International Review Panel in their Report. This is an ongoing discussion, but I remain hopeful that the parties will agree to this proposal as an opportunity to complete the outstanding areas of work which is required in order to achieve a feasible long term solution for the survival of the African Penguin.

24.21 The DFFE's counsel made contact with the legal representatives of the applicants and fourth and fifth respondents when it became clear

that the Department was not going to meet the deadline of 5 August 2024.

24.22 The State Attorney then addressed correspondence to DJP Ledwaba requesting another case management meeting. The correspondence dated 2 August 2024 is attached marked "**DFFE3**".

24.23 Correspondence was also addressed by the applicants, fourth and fifth respondents to the State Attorney and to the office of the DJP regarding the late filing of the answering papers and the DFFE's request for a case-management meeting. I attach the applicants' letter dated 5 August 2024 marked "**DFFE4**", the fourth and fifth respondents' letter marked "**DFFE5**", and the applicants two letters dated 8 August 2024 marked "**DFFE6**" and **DFFE7**.

24.24 I also attach the correspondence from Webber Wentzel Attorneys on behalf of the amicus curiae, Animal Law Reform South Africa NPC, dated 5 August 2024, marked "**DFFE8**".

24.25 I mention that the Department's Senior Counsel, Adv Golden SC, was ill from 4 to 14 August 2024 and was not at all able to work on the matter. She had informed the State Attorney and the Department of her illness and had offered to obtain a medical note from her doctor should this be necessary. The State Attorney did not require a medical certificate as Ms Molepo and the Department in good faith accepted that she was ill and was not able to attend to the matter. A medical certificate will be provided to the Court should this be required.

24.26 The applicants addressed correspondence to the State Attorney on 14 August 2024 enquiring when it's answering papers will be filed. A copy of this correspondence is attached marked "**DFFE9**".

24.27 The second online case-management meeting was held at 14h00 on Monday 19 August 2024 before DJP Ledwaba. The DFFE's counsel and Ms Molepo attended on behalf of the Department. The DJP had indicated that he did not receive the State Attorney's correspondence dated 2 August 2024. Ms Molepo confirms that Adv Golden SC had great difficulty with her online connection and had lost connection to the Teams platform for part of the discussion. By the time she was able to reconnect, the meeting had concluded, and new dates for the filing of papers had been put in place. Attempts were made to convey to the DJP the Department's position that it would not be able to file its answering affidavits within one week and that it needed more time to file. The DJP conveyed that if the Department required more time, it could file an application for an extension of time. I attach the DJP's directive following the case-management meeting on 19 August 2024, marked "**DFFE9A**".

24.28 I had in the meantime instructed the State Attorney to address correspondence to the parties to enquire about the proposed working group and to extend a request for a meeting with the parties, without legal representatives, to discuss the dispute and to try and settle the litigation. A copy of the letter dated 21 August 2024 is attached marked "**DFFE10**".

24.29 The fourth and fifth respondents' reply to the letter is attached marked "**DFFE11**" and the applicants' reply dated 23 August 2023 is attached marked "**DFFE12**".

24.30 The fourth and fifth respondents had in the meantime filed their answering affidavits on 23 August 2024 in accordance with the DJP's directive made pursuant to the online case-management meeting on 19 August 2024.

24.31 The applicants addressed correspondence dated 28 August 2024 to the office of the DJP, attached marked "**DFFE13**", requesting more time until 13 September 2024 to file their replying affidavit. I attach the fourth and fifth respondents' reply to this letter dated 2 September 2024, marked "**DFFE14**".

24.32 The DFFE was regrettably unable to file its answering affidavits within the time period provided in the DJP's subsequent directive despite its very best efforts to do so.

24.33 The DFFE has filed its answering affidavits late in circumstances where:

24.33.1 Counsel for the Department was only briefed at the beginning of June 2024; and where Senior Counsel was not able to attend the first case-management meeting given the very short notice.

24.33.2 Counsel for the Department only commenced working on the matter from about 12 June 2024 with limited papers as

not all the papers were emailed to counsel at this stage as the State Attorney had experienced constant difficulties with their email system which was regularly offline. Senior Counsel obtained the remainder of the papers from her colleagues who represent the fourth and fifth respondents and who also hold chambers at the Cape Bar. She then discovered that the application was 887 pages long and that she was missing a substantial part of the application of almost 500 pages. I mention that by this time the fourth and fifth respondents already had more than 2 months to consider the application and to prepare their answering papers.

24.33.3 The supplementary record of 4409 pages was filed on Friday 14 June 2024 which had to be perused and considered.

24.33.4 Various consultations and discussions were held online, in person and telephonically in the course of July, August and the beginning of September 2024 to obtain instructions on the issues addressed in the application which was very difficult at times as Dr Naidoo was not always available due to his professional commitments with CapeNature.

25. Since the Minister's decision of 23 July 2023 is the subject of the review application, the DFFE's answering affidavits are crucial for a proper ventilation of the issues and the just determination of the matter.

26. I say respectfully that there can be no proper determination of the matter without the DFFE's affidavits.

27. The Department will be seriously prejudiced if the affidavits are disallowed as the application will then be determined in the absence of the State who will be deprived of a fair hearing.

28. As the facts show, the DFFE was not willful in the late filing of its answering affidavits. The circumstances which I have set out above cumulatively contributed to the delay.

29. I submit that the DFFE has reasonable prospects of successfully opposing the application for the reasons set out in this affidavit.

30. In the circumstances, I respectfully request that the late filing of the answering affidavits be condoned in the interests of justice.

C. THE LEGAL AND REGULATORY FRAMEWORK

The Constitution

31. Section 24 of the Constitution of the Republic of South Africa ("the Constitution") provides for Conservation of ecosystems and biological diversity.

32. Section 24(b) provides that Conservation should be promoted, and ecological sustainable development should be secured through reasonable legislative and other measures.

33. The obligation on the Minister to protect, respect, promote and fulfil the rights in the Bill of Rights, including the rights in section 24, as provided for in section 7(2) of the Constitution, does not specify the measures through which the obligation may be fulfilled. It is left to the discretion of the state institution or in this case, the Minister of DFFE.

The National Environmental Management Act, 107 of 1998 (NEMA)

34. The National Environmental Management Act, 107 o 1998 ("NEMA") is the overarching environmental legislation which gives effect to section 24 of the Constitution.

35. The reasonableness of the Minister's actions and decision must be tested within the ambit of NEMA and other relevant legislation promulgated pursuant to section 24 of the Constitution, and not directly against section 24 of the Constitution. That is so because the Constitutional Court has repeatedly held that where legislation has been enacted to give effect to a right, a litigant should rely on that legislation to give effect to the right or alternatively challenge the legislation as being inconsistent with the Constitution.

36. Section 2 of NEMA sets out the principles that apply to actions of all organs of state that may have a significant impact on the environment. The principles

do not create specific obligations, as the applicants suggest, but instead, as set out in section 2(1)(b), (c) and (e) of NEMA, serve as guidelines which organs of state must apply in the exercise of their conduct and decisions relating to the protection of the environment; and guide the interpretation, administration and implementation of laws concerned with the protection and management of the environment.

37. The precise way in which the principles and objectives are to be balanced is a matter for the Minister to decide, as long as she/he does not do so in a way which is arbitrary or capricious or which was not rationally connected to the purpose of the statutory provisions.

38. Section 2(2) of NEMA provides that "*Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*"

39. Section 2(4) of NEMA provides that:

> *"(a) Sustainable development requires the consideration of all relevant factors including the following:*
>
> *(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
>
> *(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;"*

40. Section 2(4)(a)(vii) provides that a risk adverse and cautionary approach should be followed. This implies that the limits of current knowledge about the consequences of decisions and actions should be considered when decisions are taken. The Constitutional Court[1] has held that this precautionary approach entails taking into account the limitation on present knowledge about the consequences of an environmental decision, where due to unavailable scientific knowledge there is uncertainty as to the future impact of a proposed development.

41. The fact that the island closures implemented by the Minister as an interim conservation measure may not avoid or eliminate all the risk of the adverse impact of fishing activities on the African Penguin, does not mean there is a breach of the precautionary principle.

42. The Minister is required to consider the interests and rights of all interested parties. This may require a balancing exercise when a decision is taken which may affect divergent interests. This is provided for in section 2(4) of NEMA:

> "*(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.*

[1] *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province and Others* (CCT67/06) [2007] ZACC 13; 2007 (10) BCLR 1059 (CC); 2007 (6) SA 4 (CC) (7 June 2007).

(h) Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means."

43. In terms of section 2(4)(i), the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

44. Section 2(4)(n) states that global and international responsibilities relating to the environment must be discharged in the national interest.

45. Section 3A of NEMA empowers the Minister to establish advisory committees in the following terms:

"The Minister may by notice in the Gazette-

(a) establish any forum or advisory committee;

(b) determine its composition and functions; and

(c) determine, in consultation with the Minister of Finance, the basis and extent of the remuneration and payment of expenses of any member of such forum or committee."

46. Committees, such as the International Review Panel, are appointed to advise the Minister.

47. Any advice given or recommendations made are not binding on the Minister, who is the ultimate statutory decision-maker.

The National Environmental Management: Biodiversity Act, 10 of 2004 (NEMBA)

48. The National Management: Biodiversity Act 10 of 2004 ("NEMBA") is part of the suite of environmental management legislation to which the principles embodied in NEMA apply.

49. The objectives of NEMBA are set out in section 2. Among these are:

49.1 to provide for the management and Conservation of biological diversity within the Republic and of the components of such biological diversity (section 2(a)(i));

49.2 to give effect to ratified international agreements relating to biodiversity which are binding on South Africa (section 2(b));

49.3 to provide for co-operative governance in biodiversity management and Conservation (section 2(c)); and

49.4 to provide for a South African National Biodiversity Institute to assist in achieving the objectives of NEMBA (sections 10 to 12).

50. In terms of section 9A of NEMBA, "*The Minister may, by notice in the Gazette and subject to such conditions as the Minister may specify in the notice, prohibit any activity that may negatively impact on the wellbeing of an animal*".

International Instruments

51. Section 231 of the Constitution provides for the application of international agreements in South Africa:

> *"(1) The negotiating and signing of all international agreements is the responsibility of the national executive.*
>
> *(2) An international agreement binds the Republic only after it has been approved by resolution in both the National Assembly and the National Council of Provinces, unless it is an agreement referred to in subsection (3).*
>
> *(3) An international agreement of a technical, administrative or executive nature, or an agreement which does not require either ratification or accession, entered into by the national executive, binds the Republic without approval by the National Assembly and the National Council of Provinces, but must be tabled in the Assembly and the Council within a reasonable time.*
>
> *(4) Any international agreement becomes law in the Republic when it is enacted into law by national legislation; but a self-executing provision of an agreement that has been approved by Parliament is law in the Republic unless it is inconsistent with the Constitution or an Act of Parliament.*
>
> *(5) The Republic is bound by international agreements which were binding on the Republic when this Constitution took effect."*
>
> [Emphasis added.]

52. South Africa is a signatory to:

52.1 The African-Eurasian Migratory Waterbird Agreement (AEWA).

52.2 The Benguela Current Convention (BCC).

52.3 The Convention on Biological Diversity (CBD).

52.4 Agreement for Albatross and Petrels (ACAP).

52.5 Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

52.6 Convention on International Trade in Endangered Species (CITES).

52.7 Convention on Conservation of Migratory Species (CMS).

52.8 United Nations Framework Convention on Climate Change (UNFCCC);

52.9 The BONN Convention; and

52.10 The United Nations Convention on the Law of the Sea (UNCLOS)

53. The relevant international conventions and treaties will be addressed fully in the DFFE's heads of arguments.

The Marine Living Resources Act, 18 of 1998 (The MLRA")

54. All fisheries in South Africa are managed in terms of the Marine Living Resources Act No. 18 of 1998 ("the MLRA"). Fisheries Management of DFFE

not only deals with the administrative regulation of fisheries, but they also issue fishing permits, set permit conditions and conduct compliance monitoring of the sector.

55. The objectives and relevant principles set out in Section 2 of the MLRA, *inter alia* include:

55.1 The need to achieve optimum utilisation and ecologically sustainable development of marine living resources;

55.2 The need to conserve marine living resources for both present and future generations;

55.3 The need to apply precautionary approaches in respect of the management and development of marine living resources;

55.4 The need to utilise marine living resources to achieve economic growth, human resource development, capacity building within fisheries and mariculture branches, employment creation and a sound ecological balance consistent with the development objectives of the national government;

55.5 The need to protect the ecosystem as a whole, including species which are not targeted for exploitation;

55.6 The need to preserve marine biodiversity;

55.7 Any relevant obligation of the national government or the Republic in terms of any international agreement or applicable rule of international law; and

55.8 The need to restructure the Fishing Industry to address historical imbalances and to achieve equity within all branches of the Fishing Industry.

56. Section 8(2) provides that the Forum (established in terms of Section 5 of the Act), shall give consideration to information submitted to it by industrial bodies and interest groups recognised in terms of subsection (1).

57. Permit conditions for small pelagic fish, including anchovy and sardine fishery, are issued in terms of Section 13 of the MLRA.

58. A permit issued in terms of Section 13 of the MLRA requires the holder of the permit to comply with a number of other related laws, which includes NEMA, NEMBA and the National Environmental Management: Protected Areas Act, 2003 ("NEMPA") and the Regulations promulgated thereunder.

59. Permit Conditions for the Anchovy Fishery 2024, and in respect of subsequent fishing seasons, is issued subject to the provisions of:

59.1 General Policy on the Allocation of Long-Term Commercial Fishing Rights and the Management of Commercial Fisheries;

59.2 Small Pelagics Fishery Policy; and

59.3 Small Pelagics Fishery Manual.

60. The Minister shall determine the Total Allowable Catch (TAC), the Total Applied Effort (TAE), or a combination thereof in terms of Section 14 of the MLRA.

61. The Minister grants commercial fishing rights in terms of Section 18 of the Act, in respect of local fishing.

62. Section 18(7) provides that the Minister may determine sustainable Conservation and management measures, including the use of a particular type of vessel or gear, or area of fishing to which a right may be subject.

63. Section 19 provides for subsistence fishing and provides that the Minister may, in order to achieve the objectives contemplated in Section 9(2) of the Constitution, by notice in the Gazette.–

> *"(a) establish areas or zones where subsistence fishers may fish;*
>
> *(b) after consultation with the Forum, declare-*
>
> *(i) a specified community to be a fishing community, from which inhabitants may be declared to be subsistence fishers; or*
>
> *(ii) any other person to be a subsistence fisher; or*

(iii) any other fishing or related activity or the exercise of any other right in that area or zone to be prohibited."

64. In terms of Section 24, the Minister may in respect of any fishery, determine, after consultation with the Forum, that the portions of the TAC, the TAE, or a combination thereof allocated in any year to subsistence, local, commercial and foreign fishing, and rights granted in respect thereof, shall be reduced.

Conclusion on the Minister's obligations under the regulatory framework

65. The applicants' conclusion in paragraph 202 of the founding affidavit that the "*Minister was under an obligation to imposing fishing closures to limit purse-seine sardine and anchovy fishing activities that negatively impact the survival and well-being of the African Penguin*", is an incorrect legal proposition based on a misconception of the Minister's statutory obligations and legal duties.

66. The law is not prescriptive as to what conservation measures the Minister should implement and how it should be implemented.

67. Ultimately, the Minister's decision – and choice – must be based on fact and science and must take into account the interests and rights of all affected stakeholders.

D. THE PERMIT CONDITIONS FOR THE SMALL PELAGIC FISHERY 2024 AND THE TOTAL ALLOWABLE CATCH (TAC) FOR SARDINE AND ANCHOVY

68. Given its significance to the current application, I attach the Permit Conditions: Pelagic Fish Anchovy Fishery 2024, dated 17 January 2024, marked **"DFFE15"** and the Permit Conditions: Pelagic Fish Sardine / Pilchard Fishery 2024, marked **"DFFE16"**.

69. Of direct relevance to the application is that purse-seine fishing (the fishing method used for small pelagic fishing) is restricted in certain areas set out in paragraph 3.1 of the Permit Conditions.

70. In respect of the African Penguin breeding colonies the following restrictions apply between 15 January and 31 December 2024:

70.1 In respect of Dassen Island, interim fishing closures apply.

70.2 In respect of Robben Island, the existing MPA restrictions apply.

70.3 In respect of Stony Point (Betty's Bay), interim fishing closures apply.

70.4 In respect of Dyer Island (Gansbaai), interim fishing closures apply. All small pelagic fishing vessels are excluded from the area landward of the dashed line within the Dyer Island vicinity, but vessels with a total length less than 26m are permitted to fish offshore of the dashed line.

70.5 In the Algoa Bay area around St Croix and Bird Islands, interim fishing closures apply.

71. Areas closed to small pelagic fishing around the penguin breeding colonies are thus expressly endorsed in the anchovy and sardine permit conditions. This is the implementation of the Minister's decision taken on 23 July 2023 to implement the Interim Closure Areas around the 6 penguin colonies.

72. Thus, island closures do not refer to physical closures around the penguin breeding colonies. The closures are implemented through permit restrictions (also called no-take fishing areas) which preclude the commercial fishing of small pelagic fish within a certain geographical range of the penguin colonies.

73. The implementation of island closures is dependent on compliance by the small pelagic fishery permit holders, which is strictly monitored

74. Paragraph 6 of the Permit Conditions regulates Catch Controls and limitations. I highlight the following:

74.1 No small pelagic fish shall be dumped or discarded into the sea or deliberately freed from the net;

74.2 A Permit Holder who reaches their apportioned catch allocation shall immediately cease any further landing of that species against that Permit;

74.3 Should the Permit Holder fail to adhere to the above conditions, the Department may (with respect to paragraphs 9.1 and 9.2) confiscate

the unauthorised gear. The Department may implement the provisions of Section 28 of the MLRA and/or legal proceedings in all cases where the above conditions are believed to have been breached;

74.4 If the last set of the season (for either the normal season or the sub-season, if the latter is allocated) leads to an over-catch for a particular Permit Holder, that landing must be split and the excess amount of fish deducted from another Permit Holder's allocation, if that vessel is in possession of a Permit for more than one Permit Holder and provided that the other Permit Holder's allocation has not yet been filled. If the other Permit Holder/s allocating has been filled, then the over-catch will be automatically deducted from the following season's final allocation for the Permit Holder that has over-caught;

74.5 Should a vessel be in possession of a Permit for a single Permit Holder only, and if the last set of the season (for either the normal season or the sub-season, if the latter is allocated) results in an over-catch for that Permit Holder's allocation, then that amount of fish will automatically be deducted from the following season's final allocation for that Permit Holder.

74.6 When deliberate over-catching of a Permit Holder's allocation is suspected, the Department may institute Section 28 proceedings under the MLRA or criminal proceedings against such a Permit Holder.

75. Regarding the submission of information on the TAC, the following is required:

75.1 On completion of the offloading process, the mass of all the applicable species must be completed on the Landing Declaration, OM/EN 26/7/3, and certified as correct by both the Permit Holder or a nominated representative of the Permit Holder and the Fishery Control Officer / Marine Resources Monitor. The name of the Permit Holder must be reflected on the landing declaration.

75.2 The TAC species caught shall be deduced from the quantum allocated to the Permit Holder. All fish must be weighed in the presence of the skipper and/or a nominated representative of the Permit Holder and the Fishery Control Officer / Marine Resources Monitor.

75.3 The Permit Holder shall provide weekly summaries of catches to Fisheries Management: Marine Resource Management.

75.4 The Permit Holder shall conduct operations strictly in accordance with the attached [pilchard/anchovy] categorisation schedule (Annexure "A"). Recommendations for changes to that schedule should be forwarded to Mr J de Goede.

75.5 Should the Permit Holder fail to timeously submit the above information or submit false or incorrect information, the Department may refuse to reissue a permit under Section 13 of the MLRA for the following year until such time as the required information has been receipted; or proceed under Section 28 of the MLRA.

76. In relation to the ecosystem effects of fishing, the Permit Holder has the following obligations:

76.1 The Permit Holder must take cognisance of sustainable fishing practices and of the impacts of fishing on the ecosystem.

76.2 In this regard, steps must be taken to minimise the incidental mortality of unwanted by-catch.

76.3 Furthermore, steps must also be taken to minimise impacts of fishing on top predators, such as seabirds.

77. The following TACs have been set for sardine and anchovy for the 2024 fishing season which runs from 15 January to 31 December 2024:

77.1	Final anchovy TAC	140 137t
77.2	Directed 14cm sardine TAC West of Cape Agulhas:	27 000t
77.3	Directed 14cm sardine TAC East of Cape Agulhas:	38 000t
77.4	Total sardine TAB (juvenile and adult sardine):	24 500t

78. For the 2023 fishing season, the anchovy TAC was 247 500 tons, the total sardine TAC (west and east of Cape Agulhas) was 40 500 tons, and the total sardine TAB was 21 000 tons.

79. The anchovy TAC has decreased by 43%, the total sardine TAC has increased by 60% and the total sardine TAB has decreased by 17% since 2023.

E. THE STATUS OF THE SMALL PELAGIC FISHERY IN SOUTH AFRICA

80. Given the nature of the application and the role of small pelagic fish as the preferred prey of the African Penguin, it is necessary to provide the Court with a summary of the status of the small pelagic fishery in South Africa. The information which I provide is contained in the report titled "*Status of the South African Marine Fishery Resources 2023 (2030 NDP)*". I attach the relevant extracts of the report marked "**DFFE17**".

81. Forage fish, also referred to as small pelagic fish, exhibit schooling behaviour, have a small body size with rapid growth rates, have short lifespans and exhibit strong population responses to environmental variability which result in large natural fluctuations in abundance over space and time even in the complete absence of fishing. Abundant small pelagic forage fish off the coast of South Africa include anchovy, sardine and Redeye Round Herring, and these three species generally account for more than 95% of the total small pelagic purse-seine catch.

82. Long-term changes in the relative abundance of anchovy and sardine have been observed both locally and worldwide. Changes in the abundance of the two species are generally associated with variability in their recruitment, owing to changing environmental factors that affect, amongst others, transport of eggs and larvae and feeding conditions. These characteristics also render small pelagic fishery resources susceptible to those impacts of climate change that result in changed circulation patterns, altered composition and

productivity of lower trophic levels, and the distribution of marine organisms – all of which are likely to exacerbate recruitment variability.

83. Small pelagic fishery resources are important to the country for several reasons.

83.1 First, the purse-seine fishery in which they are caught is South Africa's largest fishery in terms of landed mass and second only to the hake fishery in terms of value.

83.2 Second, small pelagic fish are an important and high-quality source of protein. Anchovy and round herring are mostly reduced to fishmeal and oil in industrial scale factories and used as a protein supplement in agri- or aqua-feeds. Sardine is mainly canned for human and pet consumption, with a small amount packed whole for bait or as cutlets for human consumption.

83.3 Third, the small pelagic fishery employs a large workforce in fishing and related industries.

83.4 Lastly, small pelagic fish occupy a key position in the marine food web where they are the link that transfers energy produced by plankton to large-bodied predatory fish, seabirds and marine mammals. In this role, forage fish species can and do have major effects on higher trophic levels as well as on lower trophic levels, and the variability in forage fish abundance is likely to propagate throughout the entire ecosystem.

84. Because animals and humans alike depend on forage fish, it is important to manage the fishery that targets them in a manner that accounts for their high degree of variability and importance to the ecosystem. This is so because of the potentially severe risks of local depletion of forage fish for dependent species such as seabirds, particularly in years of low fish abundance in certain areas.

85. However, an often-overlooked fact is that whereas forage fish abundance influences higher trophic levels, the predation pressure exerted by these predators also has a controlling influence on the abundance of forage fish, given that they are the main food source for many predators. Estimates of forage fish losses to predation are typically much higher on average than losses to fisheries, yet the assumption is often made that fishing is the main driver of reduced forage fish biomass.

86. Although it remains difficult to disentangle the impacts of fishing and natural processes at relevant timescales in extremely complex marine ecosystems, excessive fishing is likely to disrupt important trophic interactions, particularly at low levels of forage fish abundance. Furthermore, predation pressure is likely to increase too as forage fish abundance declines, at least until a new predator-prey equilibrium is established.

87. Fisheries management responses to such declines in forage fish abundance should therefore be precautionary to limit the risk that abundance falls below levels at which future recruitment is compromised and/or the ecosystem is

markedly impacted, while at the same time having regard for the important socio-economic role of the commercial fisheries that depend on forage fish.

88. A prolonged period of low sardine recruitment since 2004 resulted in a rapid decline in the size of the sardine stock with sardine catches dropping to levels in the order of 90 000 tons between 2008 and 2014 and to less than 40 000 tons in 2017 and 2018. The sardine catch in 2019 of only 2 100 tons was the lowest recorded over the past 70 years. Sardine catches, however, recovered to 14 800 tons in 2020, 23 000 tons in 2021 and 26 000 tons in 2022, although more than 70% of catches in 2021 and 2022 were taken on the South Coast.

89. Owing to this rapid decline in sardine catches, anchovy catches again dominate the fishery, with average catches of around 220 000 tons between 2000 and 2018. The 2019 anchovy catch of around 165 000 tons was the lowest recorded since 2013 and although the 2020 anchovy catch of 285 000 tons was the highest since 2012, catches in 2021 and 2022 were only 156 000 tons and 172 000 tons, respectively.

90. The TACs for both species and the TAB for juvenile sardine are set at the beginning of the fishing season, based on results from the total biomass survey of the previous November. However, because the anchovy fishery is largely a recruit fishery, the TAC of anchovy and the juvenile sardine TAB are revised mid-year following completion of the recruitment survey in May / June.

91. Since the sardine biomass has dropped below threshold, the primary and overriding consideration becomes assisting its speedy recovery, while still

having consideration for the socio-economic implications associated with any TAC recommendation.

92. Ongoing research that has an impact on the sustainable use and management of small pelagic fisheries off the coast of South Africa includes regular monitoring of small pelagic fish abundance, development and revision of management procedures, and investigation into, amongst others, population structure, biology and ecology, catch patterns, distribution and behaviour of key species.

93. The biomass and distribution of anchovy and sardine (also other small pelagic fish species) are assessed biannually using hydro-acoustic surveys. Given the fluctuating nature of the abundance of small pelagic fish species, these surveys continue to provide estimates that are far more reliable than those that would have been obtained through mathematical estimation from commercial catch data only and have enabled optimal use of these resources at times of high biomass while offering protection to them at low biomass levels.

94. Climate and the temperature of the water play an important role in the sardine population end recruitment. Sardines prefer colder, upwelled waters of the West Coast. Importantly, the results of a genomic study which was conducted confirmed the existence of two sardine stocks off South Africa that have adapted to different water temperatures and experience reduced fitness and lower survival when outside their preferred temperature ranges. The study revealed that sardines on the West Coast grew significantly slower in water

that was several degrees cooler than those from the South and East Coast. These results have important implications for management of the sardine fishery since, despite mixing between the two stocks, a single stock management strategy can result in population declines if regional stocks adapted to specific temperature ranges are over-exploited.

95. The potential impacts on the marine environment of increasing levels and anthropogenic pollutants, such as metallic elements, persistent organic pollutants and microplastics are cause for concern but information on their concentration levels and effects on marine life is limited or absent for many ecosystems, including those off South Africa.

96. The total combined catch of anchovy, sardine and round herring landed by the small pelagic fishery decreased by 45% from 396 000 tons in 2016 to just 217 000 tons in 2019, due mainly to a substantial decrease in the catch of anchovy from 262 000 tons in 2016 to only 165 000 tons in 2019.

97. The catch of anchovy subsequently rebounded in 2020, reaching 285 000 tons. Catches of anchovy were again at low levels in 2021 and 2022, despite high TACs being set for these years. The utilisation of the anchovy TAC allocated for most years since 2000 remains low, with only 56% of the TAC being caught on average since 2000.

98. The directed sardine catch fell rapidly from 63 000 tons in 2016 to an all-time low of 2 100 tons in 2019 as a result of drastically reduced TACs given the declaration of Exceptional Circumstances for sardine at the end of 2018 and

in subsequent years. Exceptional Circumstances, in this case, refers to a situation where the sardine biomass fell below levels that were projected during simulation testing of the Management Procedure. Such a situation requires immediate management intervention. The intervention was to drastically reduce the sardine TAC for 2019. In 2019, the directed sardine TAC was only 12 000 tons but has since been increased to around 33 300 tons because of a slight recovery of the resource in 2022. The landings of sardine in 2021 and 2022 averaged around 30 000 tons with most of these catches having been taken on the South Coast. The sardine resource, however, remains in a stressed state, following poor recruitment in most years since 2004.

99. Anchovy and sardine recruitment are also important overall and impact the availability of the resource. Recruitment refers to the process whereby small young fish transition to older larger fish and become part of the population.

100. Anchovy recruitment measured in 2016 was considerably lower than the long-term average and almost half that measured in 2015. This was followed by a record high anchovy recruit estimate of 830 billion fish in 2017. The decrease of close to 50% in that adult anchovy biomass from 1.5 million tons in 2018 to only 0.84 million tons in 2019 was followed by above average anchovy recruitment in 2020 giving rise to a 3-fold increase in adult biomass in that year. Recruitment of anchovy in 2021 and 2022 was again below average with the subsequent below average adult biomass of only 1 million ton measured at the end of 2022. I mention that subsequent to the publication of this report, the most recent survey estimates of anchovy from February/March

2004 indicate that the biomass has remained unchanged at around 1 million tonnes. This prompted a decrease in the anchovy TAC set for 2024.

101. Sardine recruitment has remained very low. Despite a slight increase in sardine recruitment in 2020, half of the recruitment estimates in the past ten years have been lower than 5 billion fish. By 2022, the biomass had however increased to over 560 000 tons. Despite this recent increase, the 2022 biomass estimate is still lower than the long-term average of 844 000 tons, hence the categorisation of sardine status as being between depleted and optimal and the setting of a precautionary TAC for 2023. Subsequent to this report, the sardine biomass, estimated in February/March 2024, has further increased to around 1 million tons, allowing for modest TAC increases for the 2024 fishing season. In increasing the TAC, the Department sought to reduce the projected sardine biomass for 2025 by at most 20% of the level that would be attained in the complete absence of fishing.

102. Shifts in the distribution of both anchovy and sardine adults that have previously been reported continue to be monitored.

103. The abrupt eastward shift of anchovy that occurred in 1996 persists in most years, with an average of 38% of the adult anchovy biomass observed in the area to the west of Cape Agulhas since 1996 compared to 64% on average in the years preceding the shift. The percentage of the sardine biomass found in the area to the west of Cape Agulhas remains highly variable but has decreased considerably in recent years. The percentage located to the west

of Cape Agulhas remains relatively low at 39%. This has subsequently increased slightly to 41% by February/March 2024.

104. The primary approach that has been used to limit catches of forage fish is Rights-Based Management with specific annual TACs.

105. The incorporation of ecosystem considerations and the development of ecosystem-based management is typically carried out through OMP simulation testing to ensure certain probabilities that sardine and anchovy abundances would not drop below specified thresholds when harvested. The report acknowledges that recent OMPs were also tested using parameters denoting risk to the African Penguin population, as they feed predominantly on sardine and anchovy and because of their conservation status, which is of concern due to appreciable reductions in their numbers at the major breeding colonies over recent years and their listing as endangered by the IUC.

106. Spatial management of small pelagic fishing is formally implemented to avoid high local exploitation levels and has the associated benefit of preventing local forage fish depletion and heightened competition between dependent predators and the fishing industry.

107. The Status of the South African Marine Fishery Resources 2023 Report acknowledges that the Department, through various interventions, sought to develop a compromise proposal for future fishing restrictions that would decrease the cost of closures to industry, but still maintain reasonable levels of protection of those areas where penguins prefer to forage.

108. Climate change introduces important implications for small pelagic fishing around the coast of South Africa.

109. Small pelagic fish have been characterised as excellent bio-indicators of climate-driven changes in marine systems because of their responsiveness to environmental forcing. Predicted effects of climate change include changed species distributions, and these are frequently the first effect to be observed and are driven primarily by changed temperatures.

110. The relative distributions of both anchovy and sardine have shifted eastwards over the past decades, where these shifts significantly correlated with the cross-shelf SST gradient off the South Coast. Spatial catch patterns of both species have also changed, and whereas for sardine recent catch patterns will have been affected by explicit spatial management measures, a higher proportion of annual anchovy catches (which are not spatially restricted) have been taken on the western Agulhas bank between Cape Point and Cape Agulhas, than previously.

111. Improving predictive capacity in terms of the likely responses to climate change of exploited fish has been identified as a critically needed adaptation for South African fisheries management, including the need to develop models to better understand the potential impacts of climate change on species, food webs and fisheries.

112. Given that small pelagic fish distributions are changing, a first step in developing models to improve predictive capacity is to better understand the effects of different environmental parameters on their distributions.

113. The availability of sardine and anchovy, as the preferred prey of the African Penguin, features prominently in the application.

114. It is critical to understand not only the science behind the availability of sardine and anchovy as a food source for the African Penguin, but also the importance of the fishery to commercial fishing for human consumption, job creation and income generation in the smaller coastal communities.

115. I now deal with the relevant background facts to the application.

F. THE RELEVANT BACKGROUND FACTS

Spheniscus Demersus – The African Penguin

116. The bird species, *Spheniscus Demersus*, also called the African Penguin, is one of South Africa's most iconic seabirds and is a species of penguin found off the coast of Southern Africa. The African Penguin is thought to have once been South Africa's most abundant seabird. It is endemic to the coastal areas of Southern Africa, including South Africa and Namibia.

117. The African Penguin cannot fly and has flippers suitable for a marine habitat.

118. African Penguins breed mostly on rocky, offshore islands along the coast but two mainland colonies (Boulders in Simon's Town and Stony Point in Betty's Bay) were established in recent years. Their primary diet includes small pelagic fish such as sardines, anchovies, and to a lesser extent, round herring. At times they also feed on horse mackerel and squid.

119. African Penguins usually forage at depths of < 80m and during breeding seasons, they may forage 20km to 40km away from their colony. During the non-breeding season, penguins are known to travel much further away from the colony.[2]

120. African Penguins breed with one partner for their entire life unless breeding has failed, in which case they will take another partner. They breed in colonies mostly on rocky islands and each breeding pair will return to the same breeding colony and nesting site each year. Previously, African Penguins excavated their nests in layers of guano that existed on most of the islands which they occupied, but given the global depletion through, *inter alia*, commercial exploitation and climate change, African Penguins were forced to use alternative nesting places which include sandy soils, depressions under boulders and crevices between rocks.

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[2] www.sanbi.org/animals/the-next/african-penguin. Accessed on 20 July 2024; Wolfaardt, A. African Penguins: International Penguin Conservation Work Group. www.penguins.cl/african-penguins.htm; Biodiversity Management Plan for the African Penguin, *Spheniscus Demersus*. Department of Environmental Affairs, Gazette No. 36966.

121. The peak breeding season for South African penguins is usually between March and May. Penguins have asynchronous hatching which means that the eggs do not hatch at the same time. Chicks are dependent on their parents for food and only become independent of parental care three months after hatching.[3]

122. Predators of the African Penguin at sea include Cape Fur Seals, sharks and killer whales (orcas). Land predators include mongoose, Cape Genet, domestic cats and leopard, rats, herons and African Sacred Ibises prey on eggs and chicks. African Penguins also compete on land with Cape Fur Seals, gannets and other seabirds for breeding space.

123. It is not in dispute that the fishing industry competes with the African Penguin for food resources, in particular, for sardines and anchovies.

124. In South Africa, the African Penguin is a highlight for ecotourism, education and research activities. Most of the African Penguin colonies are inaccessible to people, given that they are located on rocky offshore islands but are accessible by boat.

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[3] www.sanbi.org/animaloftheweek/african-penguin. Accessed on 20 July 2024; Wolfaardt, A. African Penguins: International Penguin Conservation Work Group. www.penguins.cl/african-penguins.htm; Biodiversity Management Plan for the African Penguin, *Spheniscus Demersus*. Department of Environmental Affairs, Gazett No. 36966.

125. The African Penguin population has undergone rapid population declines.

126. In May 2005, the International Union for Conservation of Nature (IUCN), classified the African Penguin as endangered. Currently the species is listed under Appendix II of the Convention on International Trade of Endangered Species (CITES).

127. Conservation management interventions to conserve the African Penguin include a combination of formal protection of breeding colonies with the cooperation of Conservation and Industry.

128. There is a strong conservation drive, understandably so, in order to protect the African Penguin from further population decline.

129. The protection of the African Penguin, as the application demonstrates, involves at least three parties: the State, conservation bodies such as the applicants ("Conservation") and the fishing industry ("Industry").

130. I have already pointed out that the African Penguin competes with small pelagic fishing, mostly for sardines and anchovies.

131. Small pelagic fishing is recorded as South Africa's largest fishery, with catches dominated by anchovy. As at 2019, sardine catches were at an all-

time low but as at 2023 it was acknowledged to have a slight recovery since then.[4]

132. Subsequently, the latest survey results report that the sardine biomass has increased to around 1 million tonnes, which is above the long-term average, whereas the anchovy biomass has remained at 1 million tonnes, which is below the long-term average.[5]

The African Penguin Biodiversity Management Plans

133. An African Penguin Biodiversity Management Plan (BMP) was developed that aimed to halt the decline of the African Penguin population. The Biodiversity Management Plan for the African Penguin was first *gazetted* in 2013, with aims to slow the decline of the African Penguin population in South Africa within two years of the implementation of the management plan and thereafter achieve a population growth which will result in a downlisting of the species in terms of its status in the International Union for Conservation of Nature Red List of Threatened Species.

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[4] Presentation to the Portfolio Committee on Forestry, Fisheries and the Environment, 21 March 2023 on the status of the South African marine fishery resources. www.sapfia.org.za. Accessed on 23 July 2024.

[5] FISHERIES/2024/MAR/SWG-PEL/12 ,Coetzee, JC, Phillips, M, Shabangu, F et al. Results from the February/March 2024 hydroacoustic pelagic biomass survey. DFFE document FISHERIES/2024/MAR/SWG-PEL/12.

134. The plan sets out the South African Conservation Strategy for the African Penguin and actions relating to three objectives of the plan specifically concern potential conservation translocation:

134.1 First, to secure the protected status of all extant African Penguin colonies, including those not currently formally protected, and to consider the establishment of new breeding sites;

134.2 Second, to account for and regulate all penguins kept in captivity in South Africa, and to determine guidelines for rehabilitation and release of penguins; and

134.3 Third, to halt, and if possible, reverse, further decline or loss of colonies and to prevent further fragmentation of the African Penguin population.

135. Despite the successful implementation of many of the actions listed in the plan, these aims were not attained, and African Penguins in South Africa have regrettably continued to decline. Therefore, the plan had to be revised and extended to operate over a second five-year period, from mid-2019-2024 to allow for the conclusion of the ICE.

136. To this end, a second draft African Penguin Biodiversity Management Plan was *gazetted* in October 2019 and again in 2022 for public comment. The rationale and benefits of the second draft African Penguin Biodiversity Management Plan included the continued coordination and implementation of

the various conservation initiatives of South African agencies aimed at recovery of the species.

137. The BMP 2013 highlighted that the decline of prey is the main cause of the decline of the African Penguin although this opinion was not based on any qualitative scientific assessment.

138. According to the draft plan, among the threats or issues that resulted in the population decline were:

138.1 Food shortages caused by shifts in the distributions of prey species and competition with commercial purse-seine fisheries for food. There was an eastward shift in the distribution of sardine and anchovy, with the mature biomass of these species near the breeding islands north of Cape Town decreasing in the early 2000s (Coetzee *et al* 2008). The abundance of these prey species is known to influence breeding success. In response to the threat, the second draft Plan stated that "*In order to ensure sufficient provisioning of food, it will be necessary to preclude fishing of the penguins' main prey items around all their important breeding colonies and during the non-breeding season at feeding grounds that are used for fattening before and after a moult.*"

138.2 Exploitation and human disturbance: Penguins have in the past been exploited through harvesting of their eggs for food and by the removal of guano for use as fertiliser.

138.3 Catastrophic events such as oil spills.

138.4 Predation, including at-sea predation includes that by Cape Fur Seals, feral cats preying on eggs and chicks at some colonies and scavenging on deserted and unguarded clutches and small chicks.

138.5 Interspecies competition and displacement (for food and habitat).

138.6 Environmental change has resulted in a mismatch in the distributions of breeding colonies and prey resources of African Penguins, leading to food scarcity.

138.7 A number of viruses, bacteria, fungi, protozoa and parasites that are known to causes diseases in African Penguins.

138.8 Seismic surveys taking place within < 100 km of African Penguin breeding colonies.

139. The draft Plan also noted that:

> *"Further studies provide evidence of the positive effects of experimental fishery closures on some African Penguin demographic parameters over an 8-year period (Pichegru et al. 2010, Sherley et al. 2018). While effects were not consistent across sites and years, results were obtained at the threshold considered to be biologically meaningful by fisheries management in South Arica and the study recommended that these closures continue (Sherley et al. 2018). In addition, fishing exclusion around St Croix Island, the largest remaining colony, has been shown to effectively reduce foraging effort of breeding African Penguins (Pichegru et al. 2010), if fishing pressure was not increased at the border of the exclusion zone (Pichegru et al. 2012). The reduction in energy spent foraging while breeding was consistently associated with fishing exclusion around that colony (Pichegru et al. 2012)."*

140. The draft Plan highlighted that:

> *"The scarcity of food for African Penguins makes it likely that the attainment of several of the APBMP's objectives will necessitate the effective management of local competition with the purse-seine fishing industry for sardine and anchovy, through exclusion of fishing in arees that surround South Africa's important penguin colonies and any proposed new breeding locality for the species (See Section 5.9). Although such closures would not affect allowable catches, it has been argued that they would have a cost to the purse-seine fishery (Berg et al. 2016). However, in addition to the high socio-economic value of penguins and its potential for growth, it should be borne in mind that other predators of epipelagic forage resources (e.g. gannets, cormorants, seals, cetaceans, predatory fish) also support marine ecotourism or alternative fisheries and failure to apply an ecosystem approach to fisheries may result in severe losses in ecosystem services."*

141. Given the decline in the African Penguin population, there was a need to take steps to mitigate the decline. Dialogue and stakeholder engagement took place as facilitated by the DFFE and the Minister in 2021 with the establishment of the Joint Government Forum (JGF).

142. The JGF delivered the *Synthesis Report* in August 2021 which assisted the Minister to make a decision regarding island closures around the penguin colonies consistent with the precautionary principle (The report is attached to the founding affidavit as "AM24").

143. The Report, titled "*A Synthesis of Current Scientific Information Relating to the Decline in the African Penguin Population, the Small Pelagic and Island*

Closures" (DFFE 2021), collated and reviewed the science over the last decade on penguins, small pelagic fisheries and their interactions including the Island Closure Experiment (ICE) and reviewed the knowledge relating to island closures, fisheries management relevant to African Penguins and the socio-economic impact of the closures and penguin-related tourism.

144. The Consultative Advisory Forum for Marine Living Resources (CAF) was also established in June 2021. The Terms of Reference for the CAF are attached to the main founding affidavit as "AM27". The work of the CAF was not without challenge and attracted much criticism from both Conservation and Industry. This resulted in further engagement between the Minister, Conservation and Industry which included a meeting with the Minister on 6 May 2022.

145. Both Conservation and Industry subsequently motivated to the Minister the establishment of an international review panel.

146. Discussions were held with Conservation and Industry in the course of August 2022 on the implementation of interim island closures around the penguin breeding colonies to allow for the establishment and work of the international review panel. Unsurprisingly, Conservation and Industry held vastly different views on the implementation and extent of the island closures for their own respective reasons. Needless to state, there was much debate on the issue.

147. Consequently, in September 2022, the Minister announced interim closures around the major penguin colonies along the South African coastline to

commercial fishing for anchovy and sardine between September 2022 and 31 July 2023 as a precautionary measure. It was made clear to the parties that the island closures were temporary.

148. The interim closures were not implemented in a haphazard manner as alleged by the applicants. The decision was a considered, precautionary one which resulted from extensive negotiations between Conservation and Industry.

149. Whilst both Conservation and Industry were unhappy with the decision to impose interim closures – for their respective reasons – they accepted the decision.

The International Review Panel

150. In October 2022, Minister Creecy gave notice of her intention to establish a panel of international experts in terms of Section 3A of NEMA to inter alia advise on the proposed closure of fishing areas adjacent to South African Penguin breeding colonies and to advise on the decline in the penguin population. The proposed establishment of the panel of experts ("the Expert Panel"), was published in the Government Gazette, Volume 688, No. 47373, dated 28 October 2022. The notice is attached to the founding affidavit as "AM13'.

151. The publication set out the terms of reference (TOR) for the Expert Panel regarding the fishing closures which included reviewing the recommendations from the GF and the Marine Living Resources Consultative Advisory Forum.

The TOR referred to the historical investigations, feasibility studies and studies that have been conducted in relation to the African Penguin and Island Closures. The Expert Panel had to review previous scientific studies such as the ICE, the work of the GF and the Marine Living Resources Consultative Advisory Forum.

152. Given that the scientific data and recommendations produced by the various groups remained inconclusive, Minister Creecy decided to establish the international Expert Panel to:

152.1 review the interpretation of the ICE;

152.2 explore the value of Island Closures in providing meaningful benefits to penguins;

152.3 review the processes and outcomes completed through the GF and the CAFMLR process;

152.4 make recommendations on the implementation of Island Closures, including spatial delineation, timeframes; and

152.5 advise on further science and monitoring methods.

153. The objectives of the Expert Panel were:

153.1 to review the quantitative scientific analysis of the ICE and subsequent publications to evaluate whether the scientific evidence from ICE indicates that limited small pelagic fishing around colonies provides a meaningful improvement to penguin parameters that have a known

scientific link to population demography in the context of the present rate of population decline.

153.2 Assess the cost-benefit and trade-off of (1) cost to fisheries, versus (2) the proportion of penguin foraging range protected during the breeding season, for different fisheries exclusion scenarios. The losses to the fishery should be fleshed out using available economic information, such as was used in the GF and CAF processes. The Expert Panel may also comment on the limitations of available information and methods (data collection) to improve the assessment of positive penguin outcomes as well as fishery impact. Costs to fisheries must include an assessment of replacement costs accrued during periods closed to fishing during the ICE.

153.3 within the context of an urgent need to implement timeous Conservation actions for the African Penguin and considering the information and rationale of the various scientific reviews and associated documents of the island closure experiment, evaluate the evidence supporting the benefits of fishery restrictions around African Penguin colonies, to adopt precautionary measures by implementing long-term fishery restrictions.

153.4 If closures or fishing limitations are viewed to contribute positively to the support of the African Penguin population, recommend a trade-off mechanism as a basis for setting fishing limitations and mapping. This mechanism must consider a potential positive return to penguins and the impact on fisheries (as a basis for discussion the Governance

Forum Approach and the CAF approach can be considered). Consideration must also be given to the current state of observations, data and analysis (penguin, environmental and fisheries economic data). Recommendations on these can be included under future science considerations.

153.5 Delineation of fishery no-take areas around six African Penguin colonies (Dassen Island, Robben Island, Dyer Island, Stony Point, St Croix Island and Bird Island). And the duration of the closures, considering life history traits, example, age when most birds start breeding, and associated duration required to signal potential population benefits.

153.6 Recommendations on the scientific work that is required to evaluate the effectiveness of such no-take areas.

153.7 Recommendations about what scientific work is appropriate in the short-term to determine the dominant causes of the rapid and concerning rate of decline of the penguin population, including recommendations about the use of ecosystem model approaches such as MICE (Models of Intermediate Complexity for Ecosystem Assessments).

154. Paragraph 4 of the TOR sets out the tasks of the Expert Panel.

154.1 Paragraph 4(e) provides that review documents and information pertaining to proposed island closures for penguin population recovery support must be reviewed and while these will initially be

composed of an agreed selection by local scientists and stakeholders from the extensive number of documents produced, members may request additional documents such as scientific working group documents. Documents are to be categorised to facilitate the Expert Panel dividing its focus between (i) an initial assessment of whether the analysis of ICE supports the view that Island Closures will benefit penguins, and (ii) if (i) suggests that Island Closures will benefit penguins, what closures should be implemented, or what are the trade-offs involved for such closures.

154.2 Paragraph 4(f) requires the Expert Panel to meet with Conservation and fisheries sector scientists and where each will be allowed to present their arguments / interpretation of the information.

154.3 Paragraph 4(h) requires that the Expert Panel prepare a report on the outcomes.

155. Paragraph 5 of the TOR deals with outcomes and recommendations. The Expert Panel was required to:

155.1 Recommend whether, based on the results from ICE and other evidence-based information, Island Closures are likely to benefit penguins.

155.2 Describe the scientific and evidence-based rationale for recommending implementing / not implementing fishing limitations around penguin colonies.

155.3 Make recommendations about where a percentage of penguin foraging range and other biological criteria (such as regional representation, population recovery potential, monitoring and evaluation potential), provide a basis for determining benefits from closures for penguins and assess the merits of different proposed methods to delineate important penguin foraging habitat.

155.4 Make specific recommendations on trade-off mechanisms for Island Closures in the event that the Expert Panel finds that the results of ICE and other evidence demonstrate that Island Closures are likely to benefit penguins, including specific areas and durations. In addition to recommendations on trade-off mechanisms, the Expert Panel must preferably advise on biologically meaningful penguin habitat, extents for fishery limitations per island, recommendations must be spatially and temporally explicit, and provided on a map. [DFFE will provide mapping capacity]

155.5 Provide advice and recommendations on best estimates and uncertainties of the ratio between penguins gained and losses sustained by the Industry as a result of Island Closures for future suggested closure options.

155.6 Provide advice on a well-structured analysis framework to monitor the impact of Island Closures, including what penguin and fish data needs to be collected; how benefits to penguins are to be determined; and how these will be analysed.

155.7 To recommend scientific analysis, including but not limited to MICE, to determine the reasons for the decline in the penguin population.

156. Accordingly, the task of the Expert Panel was to make recommendations on *inter alia* island closures and whether they are *likely* to benefit penguins; to recommend whether to implement or not to implement fishing limitations around penguin colonies and to make specific recommendations on trade-off mechanisms for island closures in the event that the Expert Panel finds that the results of ICE and other evidence demonstrate that island closures are likely to benefit penguins, including specific areas and durations.

157. The work of the Expert Panel was limited to providing advice and recommendations to enable the Minister to make an informed decision on further conservation measures to protect the African Penguin, in particular, whether island closures are effective and remains a meaningful conservation measure.

158. As the TOR illustrates, it was never contemplated that the Expert Panel would make the decision for the Minister, nor could this ever have been permissible as it would have resulted in an abdication of the Minister's statutory and constitutional responsibility.

159. The International Review Panel released the first draft of the Report to the Department on 6 July 2023 which was considered by the Department internally. The draft was edited by the Editor-in-Chief of the African Journal of Marine Science which is housed within the Branch: Fisheries Management of

the DFFE. The Report to which I refer and which was approved by Minister Creecy, is part of Dr Naidoo's Memo which is attached hereunder as "DFFE18".

160. Some of the Panel's observations were that:

> *"... depletion of prey, whether due to natural predation or through resource interactions with fisheries, is likely to have variable consequences depending upon the exact timing in relation to breeding, or seasonal prey movement.*
>
> *Thus, identification of how fisheries impact African penguin populations, particularly foraging, is complex, resulting from interactions between the timing and stage of moult, or breeding, at a given colony ..."*

161. In relation to the hypothesis about forage fish abundance, the Report noted that:

> *"based on counts of moulting penguins and re-sightings of tagged penguins at Robben Island (Robinson et al., 2015), found that the primary reason for the post-2003 penguin decline was an increase in adult mortality, which they attributed to reduced abundance of sardine off the South African west coast."*

162. The Report was released to the media and the public at a media briefing on Friday, 4 August 2023 after it was formally approved by Minister Creecy on 23 July 2023 when she approved Dr Naidoo's memorandum.

163. The following is noted in the Executive Summary of the Report:

163.1 Considerable effort has been made by the fishing and Conservation sectors in collaboration with government to understand the causes of the decline and how they might be mitigated.

163.2 ICE has been successful in demonstrating for the west colonies of Dassen and Robben Islands (those more intensely studied within the ICE), that excluding fishing around island breeding colonies is likely to reduce the rate of decline in the population to a small extent, mediated through improvements in reproductive success. Excluding purse-seine fishing around island breeding colonies, is also likely to have other positive benefits for penguin Conservation, such as facilitating higher adult survival, but the ICE was not designed to estimate such effects.

163.3 The Expert Panel recognised that closure of purse-seine fisheries around penguin colonies will provide only a part of the measures required to slow or reverse the population decline of African Penguins.

163.4 There is a trade-off amongst maximising benefits to penguins, minimising the costs to the Fishing Industry, and having a reliable basis to quantify the effects of closures (including no closures) on the penguin recovery rate. The trade-off among closure options is a policy decision related to conservation, economic and social goals and objectives for South Africa. This Report outlines some aspects that could form part of a decision-making framework to identify the closure options that will provide the best outcomes for penguins given some level of cost to the Fishing Industry.

163.5 The effects of alternative fishery closure designs differ amongst the island breeding colonies, in terms of reducing the rate of decline, cost to the Fishing Industry, and social impacts. Hence, advice related to the effects of possible closure options is presented by island breeding colony, and not simply at the regional or national level; decisions on closures should also be made by colony, taking account of the unique aspects of the fishery and threats at each colony.

163.6 The impacts to the Fishing Industry can be evaluated using an "*Opportunity-Based Model*" (OBM) that predicts the proportion of the catch of pelagic fish in closure areas that cannot be "*replaced*" by fishing outside these areas, together with a Social Accounting Matrix (SAM) model that converts "*lost catch*" into economic impacts (loss of GDP and jobs) on the fishery, suppliers of goods and services to the Fishing Industry, and the broader economy. The OBM and SAM model can be used to rank closure options in terms of economic effects but the OBM likely overestimates the potential lost opportunities outside the closed area on a given day. The Expert Panel remains concerned about (i) the lack of information on how the closures impact fishing costs and fishing behaviour; (ii) the ability of the SAM model to adequately attribute impacts at the scale of fishing communities; and (iii) that there are social impacts that are not estimated using the SAM but are important to consider in any trade-off analysis.

163.7 Evidence suggests that catches from within closure areas will be more difficult to replace around Dyer Island and St Croix Island than the other remaining five colonies with important breeding populations. Evidence also suggests that levels of lost catch can be reduced, if closures around penguin preferred habitats are well-designed.

163.8 The Expert Panel identified recommendations related to future monitoring of penguin colonies and research to understand the effects of closures on the change in penguin numbers and cost to the Fishing Industry and local communities.

163.9 Further attempts were made to identify consensus closure options among the fishing and Conservation sectors during the Expert Panel meeting and ongoing efforts to identify such options are encouraged, particularly as closures may need to be adjusted given the results of future monitoring.

163.10 The Expert Panel strongly encouraged continued communication, and collaboration, with transparency of research data and analyses, as a means to build trust and strengthen these discussions. Working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African Penguin.

164. The Panel addressed the effect of closures on catches, GDP and jobs in paragraph 6.1 of the Report under the heading "*Future Research Other Than Monitoring*", It records that further work is required on the long-run socio-

economic impacts to local communities due to the prospective closures and that a key part of this research would be data collection at the scale of local communities to better understand how the fishing sector (onshore and offshore) and penguin tourism contribute to the local economy, jobs and well-being.

165. It also records, given the little empirical justification for one method, alternative methods for allocating catches to regions should be used, and the results compared across the different cases, to better inform discussions on which communities are likely to be most impacted.

166. Paragraph 6.2 states that further validation of marine Important Bird Areas (mIBAs) should occur, in particular, using dive data that provide objective identification of foraging locations, rather than commuting (or travelling) locations, and that between-year variation in mIBAs should be explored.

167. Paragraph 6.3 records that there is broad agreement that the recent observed decline in African Penguin numbers both locally and regionally may be due to a number of factors.

168. The ICE was designed to quantify the impact of sardine and anchovy fishing in the vicinity of penguin breeding islands, and the body of evidence presented to the Expert Panel suggests that this is a contributing factor, but the magnitude of the impacts appears small and could only explain a small part of the recent declines in penguin numbers. It further records that plausible drivers impacting the penguin populations are likely to vary across islands and

spatial scales, plus there are variable data available to inform on different impacts, as well as the likely cumulative impacts of different drivers. Future research is needed to address each of the possible drivers.

169. The Expert Panel recognised that forage fish abundance, guano harvests, resource competition with Cape Fur Seals, noise in the marine environment, habitat degradation and climate change as possible drivers of the decline of the African Penguin.

170. The conclusions and recommendations of the Expert Panel appear at paragraphs 7 to 7.7 of the Report (pages 44-72). Although all the statements are important, I highlight the following:

170.1 Overall, the results of the ICE for Dassen and Robben Islands indicate that fishing closures around the breeding colonies are likely to have a positive impact on population growth rates, but that the impacts may be small, in the range 0.71-1.51% (expressed in units of annual population growth rate). These impacts are small relative to the estimated rates of reduction in penguin abundance for these two colonies over recent years;

170.2 Future closures of forage-fishing around penguin colonies would be likely to benefit penguin Conservation, but will need to be part of a larger package of Conservation measures as such closures alone would be unlikely to reverse the current decline in penguin population numbers;

170.3 Implementing closures will impact the Fishing Industry and local communities to some extent, but accurately quantifying this is challenging;

170.4 The OBM likely overestimates the loss in catches due to closures, to an unquantified extent, given its assumptions related to the set of opportunities that are available to replace catches in closures, particularly those considered "*irreplaceable*" because all of the catch on a given day occurred inside a particular closure;

170.5 The Expert Panel considered issues pertinent to evaluating trade-offs in paragraph 7.3 of the Report. There are three primary trade-off axes to consider when selecting closures:

170.5.1 The benefit to penguins of the closure

170.5.2 The cost (economic and social) to the Fishing Industry and the communities where the fishing and processing operations are based; and

170.5.3 The ability to evaluate the effectiveness of the closures;

170.6 Closed areas to protect penguins during breeding should be year-round, unless reasons demonstrate otherwise;

170.7 *If* designated, closed areas to protect penguins should be reviewed at a time when results are available to investigate life-history processes such as juvenile recruitment, and adult survival, and hence population

growth rates. Other reasons to review such closed areas might include major socio-economic changes in the fishery and processing, stock abundance, or similar consequences of prey resource change.

170.8 Penguin foraging areas should be quantified for trade-off analyses delineating mIBAs using ARS methods.

171. The Report recommended the following considerations relevant to designing a framework to help decision makers select closed areas, if any:

171.1 An optimal solution (or acceptable "*balance*") between competing objectives is not simply obtained by closing 50% of any given area.

171.2 One approach is to find the point at which the change in benefits to penguins (by increasing closures) matches the change in costs.

171.3 The trade-offs between costs to the fishery and benefits to penguins in terms of the size of an area closed will differ among islands and among sectors within the fishery. Consequently, the benefits to penguins and cost to Industry should be considered by island (or region) and not simply at the national level. In addition, given the heterogeneity within the Industry, expressing cost and job losses by sector would also seem appropriate.

171.4 Care should be taken when interpreting the estimated impacts to the Fishing Industry given the OBM likely provides an overestimate of uncertain magnitude of the loss in catch so the results of the OBM and

hence the SAM model should be considered primarily in a relative sense and hence used for ranking closure options. The relative ranking of a closure may, however, be sensitive to how catches are allocated to local communities.

171.5 The economic analyses are only able to quantify the social effects of closures in terms of job losses, and future work should consider broader social consequences of reduced catches, such as measures of community well-being.

171.6 The likely effectiveness of closures for mitigating the decline in penguin abundance also differs among colonies given their variable rates of declines and the presence of other factors unrelated to fishing contributing to these declines.

171.7 It is possible to design closures within the overall foraging area to minimise lost catch for any given choice of percentage of penguin foraging area to be protected.

172. Paragraph 7.4 addresses monitoring and research to determine causes for the primary reasons for the decline and addresses different monitoring techniques to continue to monitor adult survival of African Penguins and breeding success.

173. Paragraph 7.6 records that <u>if designated</u>, closed areas to protect penguins should be reviewed at a time when results are available to investigate life-history processes such as juvenile recruitment and adult survival, and hence

population growth rates. This may be at a time between 6 and 10 years after designation. Other reasons to review such closed areas might include major socio-economic changes in the fishery and processing, or stock abundance, or changes in estimates of core foraging areas, for example, due to mIBAs being based on where foraging occurs.

174. Lastly, the Report encourages continued collaboration amongst the various stakeholders to enhance effectiveness and social acceptability of the management measures and decisions aimed at mitigating the decline of the African Penguin.

175. I make the following observations in relation to the recommendations of the Expert Panel and the position adopted by the applicants in the founding affidavit in relation thereto.

176. The application has been brought to secure relief designed to prevent the imminent extinction of the African Penguin. The applicants seek an order to implement, what it believes, is the recommendation of the Expert Panel to apply a trade-off mechanism and thereby to implement the island closure delineations which they (the applicants) have calculated.

177. However, the Expert Panel found in relation to island closures, that:

(i) excluding fishing around island breeding colonies is only ***likely*** to reduce the rate of decline in the population to a small extent;

(ii) that the closure of purse-seine fisheries around penguin colonies will provide *only a part* of the measures required to slow or reverse the population decline of African Penguins;

(iii) that the impact of sardine and anchovy fishing in the vicinity of penguin breeding islands is only a contributing factor, and

(iv) that the magnitude of the impacts appears small and could only explain a small part of the recent decline in penguin numbers.

178. The Expert Panel concluded that future closures of forage-fishing around penguin colonies would be likely to benefit penguin conservation but that *such closures alone would be unlikely to reverse the current decline* in penguin population numbers.

179. Accordingly, the applicants grossly overstate the benefit that would be derived from island closures around the penguin breeding colonies.

180. Thus, the relief sought in the application may possibly contribute to a slow-down of the rate of decline in penguin population numbers but will not, as alleged, "*prevent the imminent extinction of Africa's only penguin*".

181. I pause to mention that from scientific data for Dassen and Robben Islands (which were closed for half of the time during the ICE), the calculated benefits by the Expert Panel ranged from 0.71 to 1.51%. This is marginal. However, the Expert Panel points out that these estimates pertain to a status quo of no-closure, so calculated benefits for these islands should be halved to 0.35 -

0.75% given that these two islands were closed for half of the time during the ICE.[6]

182. The Expert Panel Report states that the impact is small relative to the estimated relative reductions in penguin abundance for these two colonies over the period 2005-2022, which were estimated by the Expert Panel at -13% for Dassen Island and -10% for Robben Island, using abundance data provided to the Expert Panel. Additionally, the calculation for Dassen and Robben Islands were for these colonies only and would require extrapolation to estimate the benefit for the other penguin colonies.

183. The applicants also allege that "*it is in the face of the rapidly declining African Penguin population, and the imminent risk of extinction, that the Minister has failed to implement adequate fishing closures*". This is not correct. The Minister had implemented interim fishing closures that were a compromise of delineations proposed by the DFFE Governance Forum in 2011, the CAF in 2022 and from negotiations between Industry and Conservation sector representatives. These were in place, on a temporary basis, since 1 September 2022. The extent to which these fishing closures are adequate is presently unknown.

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[6] 5th bullet of section 2.2.3 on p.21 of IRP Report

184. Similarly, the adequacy of the fishing closures delineated by the applicants' is also unknown and can only be established after being implemented for a number of years.

185. Benefits estimated thus far (and conclusively only for Dassen and Robben Islands) have been from circular closures of a 20 km radius around the penguin islands during the period of the ICE – hence there are no estimates of benefit for any other closure delineations. There is thus no scientific-based evidence to support the applicants' claim that the current interim island closures are inadequate or that their proposed delineations are adequate.

186. The proposed mIBA-ARS (Marine Important Bird Areas – Area Restricted Research) delineations are much smaller than the previously implemented 20km closure areas around Dassen and Robben Islands and hence the benefit to penguins is likely even less than the 0.35-0.75% calculated for these colonies during the ICE experiment. The approximately 0.71 - 1.51% benefit (if extrapolated to all colonies) is a relatively small percentage of the 5-10% population decline rate across all colonies.

187. I also mention that the applicants' application of the mIBA-ARS method requires peer review through the accepted scientific principles of data sharing and reproducibility. The development of management advice is typically an iterative process whereby scientists jointly develop methods, discuss assumptions, review results (often from more than one group of scientists), suggest sensitivity to parameter choices and eventually agree on the most suitable outcome. The applicants have not followed this process.

188. Whilst the Expert Panel found that analysis delineating mIBAs using the ARS method represent the best scientific basis for delineating the preferred foraging areas of the African Penguin, this was not made without qualification.

189 The Expert Panel recommended further improvements to validate the mIBA-ARS including the use of dive data to provide objective identification of foraging areas. There is no indication in the founding affidavit or in Ms Weideman's application of the mIBA-ARS method (to which I shall revert) that this has been done. The application of the method by Ms Weideman therefore does not accord with the Expert Panel's recommendation as to how the mIBA-ARS method ought to apply and did not take into account that further validation of the method is required. I accordingly deny that the applicants' application of the mIBA-ARS and their implementation of a trade-off mechanism represents the best scientific basis for delineating closed areas.

190. In the meantime, and as the Department's Ms Janet Coetzee confirms, the interim closure areas represent close to 65% of the total area of the applicants' proposed closure areas. By inference, it can therefore be estimated that these interim closures will provide 65% of the benefits provided by the applicant's proposed closure delineations such that any relative additional benefit to penguins, if one assumes that the benefits provided by the proposed delineation is the same as for the 20 km closure imposed during the ICE, is in the order of 35% of 0.71-1.5% or 0.25-0.5%. This is a very small added benefit that is unlikely to reduce the population decline to any meaningful extent or to prevent the species from becoming extinct.

191. Pertinently, there was no support by the Expert Panel for the applicants' proposition that the current interim fishing closures are "*grossly inappropriate and is unable to meet their objectives of reducing resource competition between the African Penguin and industry and thereby improving the African Penguin's prey availability*".[7]

192. To summarise, I highlight the following arising from the Report:

192.1 Whilst island closures are recognised as a beneficial conservation measure, the Expert Panel found it was likely that the benefit is small.

192.2 There is no conclusive scientific evidence that island closures alone will prevent the decline and/or extinction of the African Penguin.

192.3 There are other material drivers of African Penguin population decline which the Expert Panel had identified (noted by Minister Creecy as early as 17 December 2020, and which is also acknowledged in the Expert Panel Report).

192.4 Further investigations and scientific studies are required before a more long-term solution can be achieved. One such investigation is the socio-economic impact of more extensive island closures on the fishing industry and coastal communities who rely on the fishing industry to earn a living and to feed their families.

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[7] Para 21, supplementary founding affidavit, Record: p 896.

G. THE DECISION OF 23 JULY 2023 (THE IMPUGNED DECISION)

193. Following receipt of the Expert Panel's Report in July 2023, Dr Ashley Naidoo ("Dr Naidoo") prepared his memorandum to formally place the Report before Minister Creecy for her acceptance and noting. Dr Naidoo's memorandum together with annexures are attached for ease of reference marked "**DFFE18**".

194. Attached to Dr Naidoo's memorandum were the following annexures:

194.1 The Expert Panel's Executive Summary (annexure **"A"**").

194.2 The Expert Panel Report (annexure **"2"**).

194.3 National Treasury approval (annexure **"3"**).

194.4 National Treasury remuneration rates for the Panel 2022-2023 (annexure **"4"**); and

194.5 The Interim Closures Maps (annexure **"5"**).

195. Although Dr Naidoo's memo refers to the draft Expert Panel Report, it was the final report that was attached to the memo and presented to Minister Creecy. The reason why Dr Naidoo had referred to the *draft* report, is because the report was submitted for editing and lay-out design in preparation for publication and the final iteration of the report was expected the week following the Minister's decision. There is no difference, in substance,

between the draft report which was attached to Dr Naidoo's memo and the final report which was published.

196. The Director-General of the DFFE approved the Report and the recommendations on 21 July 2023.

197. As her handwritten note on the memorandum illustrates, Minister Creecy had discussed the Report with Dr Naidoo on 22 July 2023.

198. Minister Creecy approved the Report on 23 July 2023 and the policy recommendations in paragraphs 5.2.1 and 5.2.2 of the memorandum:

> "5.2.1 *That the limitation of small pelagic fishing adjacent to penguin colonies will henceforth be used by the Department as an appropriate intervention in the conservation and management of the African Penguin. Whilst it is acknowledged that small pelagic fishery limitations do have a benefit to penguins, but it should be noted that these benefits are small relative to the observed decreases in the penguin populations over recent decades.*
>
> 5.2.2 *Furthermore, that fishing limitations around selected penguin colonies are established for the following penguin colonies: Dassen Island, Robben Island, Stony Point, Dyer Island, St Crois Island and Bird Island. The fishing limitations are to be implemented for a minimum of ten (10) years with a review after six (6) years of implementation and data collection. The transition to implementing fishing limitations is described in paragraph 2.10. However, in the absence of penguin colony specific agreements across the fishery and conservation stakeholders on limiting small pelagic fishing, consideration*

should be given on the current interim limitations or closures that must continue from 1 August 2023, as the interim limitations are due to end on the 31st of July 2033."

199. Minister Creecy had considered the Expert Panel's Report in full before she made her decision.

200. The decision was conveyed to the media in the media statement announcement on 4 August 2023 ("AM15").

201. Minister Creecy's decision to extend the island closures around the penguin colonies was made pursuant to section 13 of the MLRA and was endorsed as a permit condition in the small pelagic fishing permits issued to Right Holders. Section 13 (2)(b) of the MLRA provides that permits may be issued subject to conditions determined by the Minister in the permit. The island closures were implemented as an interim conservation measure to allow for the further work, as contemplated in the Expert Panel's Report, to be conducted and until a more long-term scientifically defensible and economically balanced solution could be achieved.

202. The Minister also decided that if no alternative fishing limitation proposals are concluded by the start of the 2024 small pelagic fishing season, which commenced on 15 January 2024, then the current interim fishing limitations will continue until the end of the 2033 fishing season, with a review in 2030 after 6 years of implementation from the start of the 2024 fishing season after further data collection. The Minister's decision was consistent with the International Review Panel's recommendations who recommended in

paragraph 7.3 of the Report under *Issues pertinent to evaluating trade-offs* that a period of between 6 and 10 years was required for analyses needed to determine inter alia adult penguin survival, if adequate responses are to be determined. The Panel further recommended in paragraph 7.6 of the Report that, if designated, closed areas to protect penguins should be reviewed at a time when results are available to investigate penguin life-history processes and adult growth rates which may be at a time between 6 and 10 years after designation.

203. The decision also required the DFFE Branches Fisheries Management, and Oceans & Coast to report annually on the implementation of these closures, the expanded science plan and to report on the progress of other non-fishery interventions in the African Penguin Biodiversity Management Plan. Her decision expressly acknowledged that fishing limitations alone will not be sufficient to help the penguins recover.

204. Minister Creecy's decision was reasonable given that it continued to provide for a reasonable beneficial conservation measure to slow the decline of the African Penguin, and at the same time balanced the rights of Industry.

205. The Minister did not immediately implement all of the Expert Panel's recommendations. She adopted a cautious approach and was mindful that the Expert Panel's recommendations were not without qualification and that it had recommended further investigations and scientific studies.

206. The Minister was mindful that the island closures which had been in place since September 2022 were about to expire and that a decision had to be made expeditiously. Not having island closures in place and leaving the breeding colonies exposed, was not an option.

207. The Minister did not apply a trade-off. The alternative would have been to wait until the necessary analyses had been conducted before imposing additional closures. The Expert Panel envisaged timeframes of between 1-2 years and 2-5 years for completing Task 2: Supporting evaluation of trade-offs, including refining estimates of foraging areas (Paragraph 7.1 of the Report). These time frames indicate that the Expert Panel clearly understands the complexity and scale of the work required if this is going to be done properly and where all relevant stakeholders are part of the process (as envisaged under item 5 of the table). It was accordingly unrealistic to think that the DFFE could determine a set of alternative closure options in line with the suggested trade-off mechanism in the space of 3 to 4 months.

208. The reasons for the Minister's decision appear from Dr Naidoo's memorandum read together with the Expert Panel Report.

209. There were a number of critical findings in the Panel's Report which underpinned the Minister's decision to extend the island closures.

    209.1 The impact of the closures on the net revenue of fishery as well as changes in catches to understand both the short-run impacts and

long-run impacts due to changes in fleet composition, shore-side infrastructure and coastal community dynamics had to be determined.

209.2 The Expert Panel recommended further investigations were required on the socio-economic impact of the island closures and that the costs to fishery associated with the closures needed to be quantified which the Expert Panel itself did not do.

209.3 Cost to the fishery industry had to be quantified. The Expert Panel cautioned against the use of the OBM and SAM models. The Expert Panel noted that care should be taken when interpreting the estimated impacts to the fishing industry given the OBM is likely to provide an overestimate of uncertain magnitude of the loss in catch so the OBM and SAM models should be considered primarily in a relative sense and that the relative ranking of closures may be sensitive to how catches are allocated to local communities.

209.4 The Expert Panel found that further validation of the mIBA-ARS delineated areas should occur, in particular, using dive data that provides objective identification of foraging rather than commuting locations.

209.5 The Expert Panel had identified that further work should consider broader social consequences of reduced catches such as community wellbeing.

209.6 The Report made clear that there was no conclusive scientific support that island closures would stop the decline of the African Penguin as there were several factors which were acknowledged to contribute to the decline. The Expert Panel had identified other drivers of the African Penguin population decline which also had to be investigated.

210. The Minister's decision sought to achieve a balance between the competing interests and rights of Conservation and Industry, which was not easy to achieve given the strong divergent interests.

211. A compelling factor for Minister Creecy was that the Expert Panel Report is not conclusive in its findings and had to this end, recommended that further investigations, analysis and science was required before the DFFE decides on a framework to assist with the selection of closed fishing areas, if any.

212. It is against the backdrop of the Expert Panel Report and the reasons for the Minister's decisions that I deal with the grounds of review.

H. THE GROUNDS OF REVIEW

213. The applicants have broadly identified two grounds of review upon which they rely for their review challenge. The first ground is that the decision is irrational, and the second, is that it is unlawful and unconstitutional. The alleged irrationality is set out in paragraphs 204 - 209 of the main founding affidavit read together with paragraphs 75 - 84 of the supplementary affidavit. The second ground of review of alleged unlawfulness is set out in paragraphs 210

– 216 of the main founding affidavit read together with paragraphs 85 – 90 of the supplementary founding affidavit. The grounds of review contained in the supplementary founding affidavit are largely a duplication of the grounds in the main founding affidavit.

First ground of review: the decision is irrational

214. The applicants allege that the decision bears no connection to the purpose for which it was ostensibly taken or the power to order fishing no-take zones. They allege in this regard that:

214.1 the Minister appointed the Expert Panel to provide recommendations, *inter alia*, regarding a trade-off mechanism as a basis for setting fishing limitations and mapping. The Minister appointed the Expert Panel for the distinct purpose of assessing the available scientific evidence to establish whether island closures are an appropriate conservation measure and for recommending an appropriate trade-off mechanism to identify which of the various potential closure delineations around each breeding colony struck an optimal trade-off between African Penguins and minimising impact to Industry.

214.2 the Expert Panel had concluded that the best available science indicated that the recommended approach to implementing island closures, an appropriate Conservation measure, was the scientifically defensible trade-off mechanism that incorporates (1) the mIBA-ARS method as the best available method for purposes of identifying the

African Penguins' preferred foraging areas; and (2) using the OBM model to compare the impact of the different delineations on Industry in light of the existing available "*costs*" data.

214.3 It is clear from the record that neither Dr Naidoo, nor any other official in DFFE, nor the Minister applied or otherwise catered for the application of the Expert Panel-recommended trade-off mechanism in determining island closures, despite that the Naidoo Memo had recognised the trade-off mechanism in its summation of the Expert Panel outcomes recorded in paragraph 2.8 of the Memo.

214.4 Instead, Dr Naidoo invoked the trade-off mechanism as an interim tool for proposing fishing limitations where there was no agreement, and not as a tool for finally determining fishing limitations in circumstances where disagreement was inevitable; and the Minister did not rely on it at all.

214.5 Having recognised the Expert Panel's findings that island closures are an effective conservation measure, the Minister and Dr Naidoo ignored the recommended trade-off mechanism for delineating appropriate island closures.

214.6 Based on the Naidoo Memo's erroneous recommendations, the Minister then decided, in the absence of an agreement between Industry and Conservation, the interim closures must be implemented for a period of ten years.

214.7 The Expert Panel Report Workflow indicate that there was no consideration given as to whether the interim closures were appropriate as long-term Conservation measures, while confirming that their temporary nature was known to the Minister.

214.8 The decision to implement these interim closures are not informed by the "*best available science*" and are accordingly, incapable of achieving the objective of science-based conservation measures to reduce competition between Industry and the African Penguins and, accordingly, failed to serve as a mitigation measure to address the adequacy of African Penguins' access to prey – ultimately – to serve as a measure to mitigate and to prevent further population decline.

215. They allege for these reasons that the decision accordingly is not rationally connected:

215.1 to the purpose for which it was taken; and

215.2 bears no connection to the purpose sought to be achieved; and

215.3 bears no connection to the powers granted to the Minister to take necessary conservation measures to protect the survival chances and well-being of the African Penguin as a threatened species, and the Minister's corresponding legal duty to do so.

216. This ground of review is premised on an incorrect understanding and interpretation of the Expert Panel's findings and recommendations, and a misconception of the Minister's legal duty in relation to conservation.

217. At the outset I say that the Minister's decision was properly authorised in terms of Section 13 of the MLRA. There can accordingly be no dispute that the Minister had the power and authority to implement island closures as a conservation measure to mitigate the decline of the African Penguin population.

218. The Expert Panel was established to, *inter alia*, review the interpretation of the ICE; to explore the value of island closures in providing meaningful benefits to penguins; to make recommendations on the implementation of island closures including spatial delineation and timeframes; and to advise on further science and monitoring methods.

219. One of the objectives of the Expert Panel was to recommend a trade-off mechanism as a basis for setting fishing limitations and mapping, if closures or fishing limitations are viewed to contribute positively to the support of the African Penguin population. It was contemplated that this mechanism must consider a potential positive return to penguins and the impact on fisheries, and that the Expert Panel was required to consider the current state of observations, data and analysis and to make recommendations on these in relation to any future science considerations. The Expert Panel was also tasked to make recommendations on the scientific work that is required to evaluate the effectiveness of such no-take fishing areas. It is important to

note that the Expert Panel was tasked to make recommendations on, *inter alia*, whether island closures are likely to benefit penguins; to recommend whether to implement or not to implement fishing limitations around penguin colonies and to make specific recommendations on a trade-off mechanism for island closures in the event that the Expert Panel finds that the results of ICE and other evidence demonstrates that island closures are likely to benefit penguins, including specific areas and durations.

220. The Expert Panel did *not* recommend that island closures were an appropriate conservation measure.

221. The Expert Panel did *not* recommend specific delineations for island closures.

222. The Expert Panel found, based on the results of ICE for Dassen Island and Robben Island, that excluding fishing around the colonies are *likely* to have a positive effect on penguin growth but that the impact will be small in the range of 0.71 – 1.51%. The Expert Panel found that excluding fishing around island breeding colonies is likely to reduce the rate of decline in the population to a small extent and that the closure of purse-seine fisheries around penguin colonies will only provide part of the measures required to slow or reverse the population decline of the African Penguin.

223. The Expert Panel expressly recognised that there were other drivers which contributed to the African Penguin population decline and that access to prey was only one of them.

224. While the Expert Panel recommended the employment of a trade-off mechanism incorporating the mlBA-ARS method and using the OBM model, this recommendation was not unqualified.

225. The Expert Panel found that there is a trade-off amongst maximising benefits to penguins, minimising the cost to the fishing industry, and having a reliable basis to quantify the effects of closures (including no closures) on the penguin recovery rate. The Expert Panel pertinently acknowledged that the trade-off among closure options is a policy decision related to conservation, economic and social goals and objectives for South Africa. While it recommended the application of a trade-off mechanism using the mlBA-ARS method, it remained concerned about:

(i) the lack of information on how the closures impact fishing costs and fishing behaviour;

(ii) the ability of the OBM and SAM models to adequately attribute impacts at the scale of fishing communities; and

(iii) that there are social impacts that are not estimated using the SAM, but are important to consider in any trade-off analysis.

226. The Minister did not ignore the findings in relation to the trade-off mechanism. She chose not to apply it immediately in determining the island closures because the application of the method, at that stage, was clearly premature given the concerns that were expressed by the Panel and that the Panel itself

had recommended further investigations and analysis to ascertain the trade-offs between cost to fishery and benefits to penguins.

227. The impact of the social effects of the closures in terms of job losses, reduced catches and the broader socio-economic consequences of island closures is a critical consideration for the State and directly impacts the Minister's legal duties and statutory obligations provided for in the MLRA.

228. The Minister also considered that although the Expert Panel had recommended a trade-off analyses using the mIBA-ARS method, this recommendation must be seen in the context that island closures was only *likely to reduce the rate of decline* in the population to a *small extent* and further that island closures around the penguin colonies will only provide part of the measures required to slow or reverse the population decline.

229. Thus, the benefits to the African Penguin versus the costs to the fishing industry and the socio-economic impact of island closures is a necessary analysis that must be performed on both a quantitative and qualitative level before any long-term decision can be made on the most appropriate penguin conservation measures.

230. The Minister concluded, based on the Report, that the application of a trade-off mechanism was premature given the concerns of the Expert Panel, and that it would be irresponsible to apply the trade-off mechanism in the absence of the further work that was required.

231. There is accordingly no merit in the allegation that the Minister had disregarded and/or ignored the recommendation relating to the trade-off mechanism. She decided not to apply the trade-off mechanism for good reason.

232. There is also no merit to the allegation that the island closures were not informed by the best available science.

233. The Expert Panel found that excluding fishing around island breeding colonies is: (i) only likely to reduce the rate of decline in the population to a small extent, and (ii) that the closure of purse-seine fisheries around the penguin colonies will provide only a part of the measures required to slow or reverse the population decline of the African Penguin. This suggests that there is no conclusive scientific evidence that applying the trade-off mechanism to delineate island closures, and that island closures itself, will achieve the objective of preventing the decline and extinction of the African Penguin.

234. The applicants have also not demonstrated that *their* proposed island closure delineations will achieve this objective, or to what extent at least, the proposed delineations will contribute to slowing the decline in the penguin population.

235. Given that island closures have been recognised as a reasonable conservation measure that is likely to mitigate the decline of the population albeit to a small extent, the decision to extend the island closures was reasonable and rational. The decision was clearly directed at implementing

island closures as a reasonable conservation measure and was rationally connected to the purpose for which it was taken.

236. This application is aimed at avoiding the extinction of the African Penguin. Island closures alone will not achieve this objective as there are other important drivers of penguin population decline.

237. The extension of the island closures on 23 July 2023 was implemented as a legitimate and meaningful conservation measure to slow down the rate of decline in the African Penguin population. The decision taken, is plainly rationally connected to the purpose for which it was taken. The decision was not taken - and could not have been taken – to prevent the extinction of the African Penguin. This is not possible.

238. Second, the applicants allege that the impugned decision is not supported by the evidence and information procured by the Minister for purposes of rendering her decision. They allege that the Minister's decision bears no relation to the expert recommendations from the Panel because:

(i) the decision reflects certain of the Expert Panel's recommendations regarding the need and duration of island closures, not the basis for determining their delineation. There is no point in adopting the former recommendation without adopting the latter, nor is there any basis for doing so;

(ii) there are indications that the Department and the Minister may not have considered accurate and complete information prior to taking the decision; and

(iii) in the result, the decision is inconsistent with the evidence and information that served before the Minister; suffers from a failure to consider a relevant material factor; and is both irrational and potentially unreasonable.

239. In support of this, the applicants allege in the supplementary founding affidavit that the Minister's decision appears to be based on material factual errors regarding the scope, content and import of the Expert Panel's recommendations.

240. The crux of this complaint is essentially that the Minister ought to have applied and implemented the Expert Panel's recommendations relating to the trade-off mechanism as a basis for determining the delineation of the island closures.

241. I have already explained why the Minister did not immediately apply the trade-off mechanism that was recommended by the Expert Panel. She clearly had legitimate and rational reasons for not doing so.

242. The applicants allege that key considerations regarding the appropriateness of particular island closure delineations were not considered while there is evidence of information and recommendations regarding future

determinations of fish biomass that reflect no clear origin in the Expert Panel's Report.

243. Nowhere in the findings of the Expert Panel, did the Panel unequivocally recommend that closures *should* be implemented.

244. The Expert Panel recommended under paragraph 7.1 of the Report, that future closures of forage-fishing around penguin colonies would *likely* benefit penguin conservation but will need to be part of a larger package of conservation measures as closures alone would be unlikely to reverse the current decline in penguin population numbers.

245. I have already dealt with the trade-off mechanism and why the Minister elected not to accept and apply the mechanism now. The fact that Dr Naidoo's Memo did not in detail deal with the trade-off mechanism or did not recommend the application of the trade-off mechanism, does not detract from the fact that the Minister had independently considered the trade-off mechanism. This was not a material error and/or key omission the Naidoo Memorandum. Even if it was, the Minister had independently considered the need for a trade-off mechanism which was addressed in the Expert Panel's Report and decided, for good reason, that it was premature to apply it at this stage. However, the Naidoo Memo did not reject the trade-off mechanism, nor did the Minister. Dr Naidoo's Memo proposed a process to allow for the further work as recommended by the Panel to proceed while maintaining the interim closures so that any benefit to the penguins which is achieved may continue. Any immediate material change or restructuring of fishing

restrictions would also have had serious implications for the DFFE and the small pelagic fishing sector.

246. Whilst it is correct that the Minister had regard to the Naidoo Memo in taking her decision, she considered the full Expert Panel Report and exercised her independent judgement when she made the decision to impose island closures on 23 July 2023. She did not rubberstamp the recommendations in the Naidoo Memo. It was in any event not the purpose of the memo to provide a detailed scientific application of the trade-off mechanism. The trade-off mechanism was dealt with in the Report.

247. There is accordingly no merit in the allegation that the Minister could not have considered the accurate and complete information regarding the closures to be imposed prior to taking the decision. This complaint is speculative and devoid of fact.

248. I am informed that the relevant departmental officials and scientists had considered the Expert Panel's Report by the time that Dr Naidoo's Memo was approved by the Minister. This is confirmed by both Dr Naidoo and Ms Janet Coetzee.

249. Both Conservation and Industry had fully participated in the Expert Panel process and their respective positions were referenced in the Report. This was also noted in paragraph 2.6 of Dr Naidoo's Memo that the Expert Panel had requested information from both the fisheries and conservation sectors before, during and after engagements in March and June 2023, and that these

requests were made based on a substantial amount of pre-reading and preparation before each engagement. Dr Naidoo's Memo also noted that the Expert Panel had engaged with analysts from the Department, Fisheries and the Conservation sectors to clarify analysis that were needed.

250. The Naidoo Memo does not contain a material error in terms of how fish stocks are currently managed. Even if it did, it had no bearing on the Minister's decision as the main issue was the imposition of island closures as a beneficial and reasonable conservation measure, while affording the Department and the relevant stakeholders the opportunity, in line with the recommendations made by the Expert Panel, to conduct the further work that was required.

251. Third, the applicants allege that the impugned decision is not capable of advancing the purpose for which it was taken. The applicants allege in this regard that it is evident from the Expert Panel's TOR that it was specifically contemplated by the Minister that the Expert Panel's recommendations were sought to advise the Minister on how to resolve the impasse between penguin scientists and conservationists on the one hand, and fisheries scientists and Industry on the other. They allege that the Expert Panel was required to do so by presenting a clear set of recommendations to enable the Minister to make a final decision regarding the imposition of island closures which benefitted African Penguins at the least cost to Industry. They allege that to leave the decision regarding island closures to an agreement between Conservation and Industry is irrational given the longstanding debate and

dichotomous views which have persisted for a long period of time between Conservation and Industry.

252. The Expert Panel was not only established to make recommendations to advise the Minister on how to resolve the impasse between Conservation and Industry. The Expert Panel had a number of objectives including that it was required to evaluate the evidence supporting the benefits of fishery restrictions around the African Penguin colonies, and if closures or fishing limitations are viewed to contribute positively to support the African Penguin population, then to recommend a trade-off mechanism as a basis for setting fishing limitations and mapping. The Expert Panel was required to make recommendations on *inter alia* island closures and whether they are likely to benefit penguins.

253. The Minister considered the Expert Panel's Report and recommendations in full and decided to implement island closures for a period of 10 years with a review after 6 years. She did not apply the trade-off mechanism, for reasons already explained.

254. The Minister did not subordinate this decision to an agreement between Conservation and Industry. She made the decision to impose the island closures as a beneficial conservation measure.

255. The decision is therefore not irrational for this reason.

256. The Minister imposed fishing limitations around Dassen Island, Robben Island, Stony Point, Dyer Island, St Croix Island and Bird Island and, at the same time made provision for island closure delineations to be implemented by agreement between Conservation and Industry. This approach aligned with the recommendations of the Expert Panel, who strongly encouraged continued communication, collaboration and transparency of research data and analyses to build trust and to strengthen progress towards seeking acceptable solutions. Paragraph 7.7 of the Report notes that working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African Penguin. The Expert Panel itself had identified further attempts that were made to identify consensus closure options among the fishing and conservation sectors during the Expert Panel meetings and that ongoing attempts to identify such options are encouraged, particularly as closures may need to be adjusted given the results of future monitoring.

257. There was accordingly nothing untoward, irregular, unfair or irrational about the approach adopted by the Minister to encourage the parties to continue to find a consensus position on the future of island closures.

258. Fourth, the applicants allege that the record contains no reasons for the Minister's decision, and that the Minister's failure to provide reasons for the decision, despite having been called upon to do so, itself renders her decision irrational. I deny this.

259. The reasons for the Minister's decision appear from Dr Naidoo's Memo and the Expert Panel Report.

260. I have explained in detail the reasons for the Minister's decision.

261. The reasons demonstrate that the Minister's decision was manifestly reasonable and rational and that she had extended the island closures as a meaningful conservation measure. The applicants have not at all demonstrated why the island closures are inadequate, and why *their* proposed delineations are adequate.

262. The applicants have not demonstrated that their proposed delineations will prevent the decline and extinction of the African Penguin. Ms Weideman's application of the trade-off mechanism is unreliable and does not assist the applicants.

263. I deny that the decision is both substantively and procedurally irrational. I have pointed out that the Minister did not disregard the advice and recommendations of the Expert Panel, but instead, adopted a cautious approach to implement island closures as a continued conservation benefit to allow for the further work contemplated by the Expert Panel.

264. The Minister's decision expressly contemplated that the decision could be reviewed and that a further decision in respect of island closures could be made sooner than the six-year review period.

265. The applicants have provided no basis to challenge the decision in terms of principle of legality on the basis that the decision is substantively and procedurally irrational.

266. I maintain that the Minister's decision was, in all respects, reasonable and rational.

Second ground of review: unlawfulness and unconstitutionality

267. If I am to understand the applicants' correctly, they contend that the Minister has breached her constitutional, statutory and international obligations because she failed to prevent the extinction of the African Penguin. Underlying this contention is that the Minister did not implement adequate conservation measures to protect the African Penguin population.

268. This challenge is premised on a misconception of the Minister's statutory duties.

269. The State's constitutional obligations in respect of the environment and conservation is contained in Section 24 of the Constitution:

> *"Everyone has the right-*
>
> *(a) to an environment that is not harmful to their health or well-being;*
>
> *(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-*

(i) *prevent pollution and ecological degradation;*

(ii) *promote conservation;*

(iii) *secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."*

270. Section 2 of NEMBA, sets out the objectives of the Act which provides *inter alia* for the management and conservation of biological diversity within the Republic and the components of such biological diversity; to give effect to ratified international agreements relating to biodiversity which are binding on the Republic; and to provide for cooperative governance in biodiversity management and Conservation.

271. Section 3 of NEMBA provides that in fulfilling the rights contained in Section 24 of the Constitution:

"*The State through its organs that implement legislation applicable to biodiversity, must-*

(a) manage, conserve and sustain South Africa's biodiversity and its components and genetic resources; and

(b) implement this Act to achieve the progressive realisation of those rights,"

272. Section 2 of the MLRA sets out the objectives and principles of the Act. It provides that the Minister and any organ of State shall in exercising any power under this Act, have regard to *inter alia*:

272.1 the need to conserve marine living resources for both present and future generations;

272.2 the need to apply precautionary approaches in respect of the management and development of marine living resources;

272.3 the need to utilise marine living resources to achieve economic growth, human resource development, capacity building within fisheries and mariculture branches, employment creation and a sound ecological balance consistent with the development objectives of the national government;

272.4 the need to protect the ecosystem as a whole, including species which are not targeted for exploitation;

272.5 the need to preserve marine biodiversity;

272.6 any relevant obligation of the national government or the Republic in terms of any international agreement or applicable rule of international law; and

272.7 the need to restructure the Fishing Industry to address historical imbalances and to achieve equity within all branches of the Fishing Industry.

273. The Constitution and the suite of environmental legislation do not prescribe to the Minister what steps should be taken and what measures should be implemented in the fulfilment of the State's obligations relating to biodiversity and conservation.

274. There is no legal obligation on the Minister to do more than what is reasonably necessary given the balance of rights and interests.

275. Insofar as the Minister's international law obligations are concerned, the applicants provide no basis upon which to impugn the decision based on the Minister's alleged breach of South Africa's international conservation law obligations.

276. South Africa is a signatory to a number of international conventions and treaties including the Convention on the Conservation of Migratory Species of Wild Animals ("the Bonn Convention"). An obligation under the Bonn Convention, is that the parties shall endeavour to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction.

277. The Agreement on the Conservation of African-Eurasian Migratory Water Birds ("AEWA") is an intergovernmental treaty dedicated to the Conservation of migratory water birds and their habitats across the world. The African Penguin is one of the species of birds which is covered by AEWA. Article III of AEWA sets out the general conservation measures which the State parties are obliged to take and which includes, *inter alia*, the implementation of remedial measures, for habitat rehabilitation and restoration.

278. The United Nations Convention on the Law of the Sea ("UNCLOS") is an international agreement that regulates various aspects of ocean use and conservation. UNCLOS provides the legal framework for all activities in the

oceans and seas, including the conservation and sustainable use of marine biodiversity. UNCLOS obliges States to protect and preserve the marine environment and recognises that the creation of marine protected areas ("MPAs"), in particular, areas closed to fishing activities could constitute valuable means to reduce the impact of fishing on vulnerable marine habitats and species. State parties to UNCLOS have an obligation to protect and preserve the marine environment and to protect and preserve rare and fragile species as well as the habitat of depleted, threatened or endangered species and other forms of marine life. UNCLOS acknowledges the precautionary approach: where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. Part XII of UNCLOS outlines provisions for the protection and preservation of marine ecosystems, which are broad and applicable to fishery on a global scale. UNCLOS states that all States have the right for their nationals to engage in fishing provided that States do not contravene the UNCLOS objectives.

279. The Convention on Biological Diversity ("CBD") is an international framework for the conservation and ecologically sustainable development and use of biodiversity. Measures for conserving biodiversity include, *in situ* and *ex situ* conservation measures. Parties are obliged to regulate and manage threatening processes affecting or likely to affect biodiversity in an adverse manner.

280. Island Closures were first temporarily implemented in September 2022. Following the work of the Expert Panel and the release of the Expert Panel

Report, the Minister extended these island closures as a conservation measure to mitigate the decline in the African Penguin population. This was consistent with her constitutional obligations in Section 24 of the Constitution and her statutory obligations contained in NEMBA and the MLRA.

281. In implementing the island closures as a conservation measure, the Minister acted in accordance with her statutory and constitutional obligations and duties.

282. The Minister also acted in accordance with South Africa's international law obligations.

283. The Minister did not abdicate her responsibility to an agreement between Conservation and Industry.

284. The applicants allege that it was incumbent on the Minister to implement timeous island closures that are biologically meaningful to African Penguins and that such an approach would be consistent with the precautionary principle. The Minister's decision was consistent with the precautionary principle when she extended the island closures.

285. The biological meaningfulness of the applicant's proposed closures has not been scientifically demonstrated.

286. The only conclusive quantitative assessments conducted to date indicate that closure of a 20 km radius around Dassen and Robben Islands (as

implemented during the ICE) result in biologically meaningful (>1%) change in penguin population growth rate. No other closure options have been evaluated as there is no data available to do such evaluations.

287. There is accordingly no merit in the contention that the Minister's decision was unlawful and unconstitutional for the reasons alleged.

F. THE REMEDY SOUGHT

288. If the application fails, then no question of remedy arises.

289. But if the Court finds that the applicants have established a basis for this Court to review and set aside the impugned decision, I submit that it would be just and equitable for this Court to remit the matter to the Minister for a decision.

290. This Court is not in as good a position as the Minister and the Department to make a decision about what would be best to protect the endangered African Penguin. It simply does not have the expertise to do so. What would be reasonable, appropriate or effective is not a foregone conclusion given the different scientific studies and different expert positions on the efficacy of island closures and whether they will achieve what the applicants allege they will achieve.

291. There is longstanding authority that courts should be slow to deprive administrators of the opportunity to determine matters within their area of statutorily ordained expertise.

292. This is clearly a matter in which a remittal is justified. The applicants have not fulfilled any of the requirements for exceptional circumstances that justify a substitution.

293. I mention that the Department has proposed the establishment of a Working Group to deal with the outstanding issues and further work which is required as contemplated by the Expert Panel. I remain hopeful that both Conservation and Industry will participate in this process so that they are part of the solution.

294. To the extent necessary, I shall now address the allegations in the main founding affidavit *ad seriatim*.

G. *AD SERIATIM* REPLY TO THE MAIN FOUNDING AFFIDAVIT

295. I have set out the basis of the Department's case and its opposition to the application. For the sake of brevity, I shall not address each and every allegation with a full response, except where it is warranted. To the extent that any allegation is not addressed specifically or is inconsistent with what I have stated in the preceding sections of this affidavit, it must be taken as denied.

296. I deal with the allegations in the main founding affidavit below.

297. **Ad paragraphs 1 - 3:**

The content hereof is admitted.

298. **Ad paragraphs 4 & 5:**

The content hereof is noted.

299. **Ad paragraph 6:**

The content hereof is noted.

300. **Ad paragraphs 7 - 9:**

The content hereof is admitted.

301. **Ad paragraph 10:**

The content hereof is noted.

302. **Ad paragraphs 11 - 13:**

The content hereof is admitted.

303. **Ad paragraphs 14 – 15.4:**

The content hereof is noted in respect of the fourth and the fifth respondents.

304. **Ad paragraph 16:**

304.1 I note that the application is brought on an expedited basis.

304.2 However, as the facts and scientific data will demonstrate, the relief sought in the application is unlikely to prevent the imminent extinction of the African Penguin. I have addressed the issue of island closures

fully in my affidavit. Suffice it to state, that island closures, which is sought as a solution by the applicants, is a recognised beneficial conservation measure, but will not on its own, prevent the decline and/or possible extinction of the African Penguin.

304.3 Accordingly, the expedition in respect of which the application has been brought, will not seek to secure the solution which the applicants seek.

305. **Ad paragraphs 17 - 20:**

305.1 I note the concession that population declines may only be *partly arrested* by optimising the availability of the African Penguins' preferred prey of sardine and anchovy around the largest breeding colonies.

305.2 Despite the applicants' motivation for the immediate need for long-term closures of the African Penguin's preferred foraging areas to commercial sardine and anchovy small pelagic purse-seine fishing, it is not clear then on what basis they choose to criticise the Department's decision to implement interim fishing closures in September 2022, and the extension of these closures on 23 July 2023 when they themselves motivate for long-term closures.

305.3 The science which the applicants refer to is highly contested (section 2.2 of the Expert Panel's Report). Any implementation of the precautionary approach also requires consideration of trade-offs.

305.4 I deny that the Minister has "*consistently failed to implement appropriate and effective measures*". Closures with a radius of 20 km have already been in place for 50% of the time around 4 breeding colonies since 2008 as part of the ICE.

305.5 The rounds of scientific review were necessary, as the facts will show, given the complexity of the problem, the different interests between Conservation and Industry, and the competing rights and interests which must be balanced to enable the Minister and the Department to fulfil their constitutional and international environmental protection obligations, which I maintain, has been fulfilled.

305.6 Save as aforesaid, the content hereof is admitted.

306. **Ad paragraphs 21 - 24:**

306.1 It was not specifically contemplated that the International Review Expert Panel's main purpose was to break the deadlock between Conservation and Industry. The Expert Panel, as the TOR will confirm, was established *inter alia* to review the interpretation of the ICE, explore the value of Island Closures in providing meaningful benefits to penguins, to review the processes and outcomes contemplated through the GF and the CAFMLR process, to make recommendations on the implementation of Island Closures, including spatial delineation and timeframes; and to advise on further science and monitoring methods.

306.2 The findings and recommendations of the Expert Panel would have enabled the Minister to make an informed decision regarding appropriate conservation measures and methods to protect the Africen Penguin.

306.3 The island closures which were implemented from September 2022, were intended at the time to be temporary until a longer term, effective solution could be investigated.

306.4 I deny that these temporary closures were highly compromised and largely ineffective in stemming the decline of the African Penguin population.

306.5 At the time, both Conservation and Industry were unhappy with the temporary island closures for their own respective reasons, given their conflicting interests. However, there was sufficient scientific data which suggested that island closures presented some benefit to the protection of the African Penguin.

306.6 I deny that the Expert Panel endorsed the need for fishing closures. The Expert Panel did not recommend island closures, nor did they propose specific closure delineations.

306.7 The Expert Panel expressly found that a recommendation of a specific outcome lies outside of the scope of the Panel.

306.8 Whereas the Expert Panel expressly concluded that the results of the ICE for Dassen and Robben Islands indicate that fishing closures around the breeding colonies are likely to have a positive impact on

population growth rates, they noted that those impacts may be small in the range of 0.71-1.51% and, that future closures of forage-fishing around penguin colonies would *likely* benefit penguin conservation, but will need to be part of a larger package of conservation measures as such closures alone would be unlikely to reverse the current decline in penguin population numbers.

306.9 I have addressed the trade-off mechanism, on which the applicants rely for the delineation of the island closures.

306.10 Save as aforesaid, the content hereof is noted.

307. **Ad paragraphs 25 - 28:**

307.1 Whilst the media statement records that the interim closures (which had already been in existence since September 2022) would become "*permanent*", this must obviously be seen in its proper context where the closures were implemented for a period of 10 years, with a review after 6 years. This is clearly not permanent. The Minister had clearly contemplated and made provision for an earlier revision of the period should circumstances require a change in the decision or should the parties reach agreement on the closures.

307.2 I note the map which illustrates interim closures based on certain trade-off curves and the proposed foraging range for African Penguins but deny that the maps apply the Expert Panel's recommendations for determining closure delineations (as before, the closure delineations

mapped by the applicants pertain to their interpretation of the Expert Panel suggestions for evaluating trade-offs).

307.3 The existing interim closures already cover a total area that is approximately 65% of what the applicants propose the delineation for the interim closures should be. Simply put, the applicants seek the application of the trade-off mechanism to cover a greater extent of the area used by the African Penguin for foraging in circumstances when this trade-off mechanism (according to the applicants) and the greater extent of coverage has not conclusively been found on its own to prevent the decline in the African Penguin population.

307.4 Although the decision was that the interim island closures will remain in place until 31 December 2033, a review is to take place after 6 years from the start of the 10-year period. This does not mean that the Minister is precluded from revisiting the decision sooner.

308. **Ad paragraphs 29 – 30.6:**

308.1 I have dealt with the grounds of review to which I refer the Court.

308.2 I deny that the decision was irrational, unlawful and unconstitutional on the grounds relied upon by the applicants.

308.3 I deny that the decision is reviewable in terms of PAJA, alternatively the principle of legality.

308.4 I deny that the decision was unconstitutional.

308.5 Whilst the interim closures were intended at first to be of a temporary nature, it was not unlikely that they could have been extended.

308.6 I note that these closure delineations were at no time accepted as fit-for-purpose by the conservation sector. This view is not shared by the Department.

308.7 The applicants must surely accept that a decision cannot be made based only on the views of the conservation sector, as the decision to impose interim closures involves the rights of the small pelagic fishing industry. I also have other statutory obligations in terms of the MLRA which impact the issuing of fishing permits and the imposition of permit conditions.

308.8 As I have previously stated, whilst island closures have been accepted as a beneficial conservation measure which provides some protection to the African Penguin, it is not the only solution.

308.9 The decision to implement island closures is a balanced polycentric decision to a complex problem, where there are legitimate competing interests and rights at play.

308.10 I have dealt with the trade-off mechanism and the mIBA-ARS method at some length. The Expert Panel recommended the mIBA-ARS method to define the preferred foraging habitats of the African Penguin for the implementation of a trade-off mechanism to select

between different closure area options.[8] However, the application of the method, results, conclusions and the proposed closed areas which the applicants propose (and motivated for by Ms Eleanor Weideman), do not accord with the guidelines suggested by the Expert Panel for evaluating different closure options. Additionally, both the "*assessment*" and the proposal contained in the founding affidavit have not been subjected to thorough peer review and it is therefore not appropriate to expect the Department to put in place closures based on untested scientific work.

308.11 Added to this, by using the mIBA-ARS method does not suggest that the results obtained by the applicants is the only possible solution. The Expert Panel also recommended that "*further validation of mIBAs should occur, in particular using dive data that provide objective identification of foraging locations, rather than commuting (or travelling) locations*".[9]

308.12 I deny that the interim closures lack a clear relationship with the objective of improving African Penguins' access to prey, through reduction in competition over sardine and anchovy between the African Penguins and Industry.

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[8] IRP Report, section 7.3; Record, p 47.

[9] IRP Report, section 4.3 & section 5.9.

308.13 It was not the objective of the decision that agreement should be reached between Industry and Conservation in respect of the island closure delineations. The conflicting views and the impasse which has prevailed between the stakeholders is well documented and remains unresolved. However, the Minister's approach was that the parties should be able to find common ground as a compromised or consensus-based solution is naturally more credible and would avoid further conflict and unnecessary litigation. This approach was also consistent with the Expert Panel's recommendations.

308.14 Notwithstanding this approach, the Minister certainly did not shy away from robust decision-making nor did she "*defer*" her statutory obligation to any one stakeholder.

309. **Ad paragraphs 31 - 33:**

309.1 I deny that the decision was unlawful and unconstitutional on the grounds set out herein.

309.2 I deny that the Minister failed to take the necessary action to protect the African Penguin species.

309.3 The decision was taken pursuant to section 13 of the MLRA by imposing fishing restrictions around the penguin colonies.

309.4 The applicants did not challenge the decision to impose island closures in September 2022.

309.5 There is no basis upon which to review the decision and there certainly is no basis for substitution.

309.6 I have dealt with the remedy of substitution to which I refer the Court.

309.7 Save as aforesaid, the content hereof is denied.

310. **Ad paragraphs 30 – 34.7:**

The content hereof is noted.

311. **Ad paragraphs 35 - 56:**

311.1 These allegations address the decline in the number of African Penguin breeding pairs, the conservation status of the African Penguin in South Africa and globally in terms of the relevant international instruments.

311.2 It is not disputed that the African Penguin is in need of protection and that it is an endangered species. Legal protection, however, requires that all factors contributing to the decline are identified and ameliorated.

311.3 I admit that the African Penguin is listed as an endangered species in terms of Section 56(1) of NEMBA and the Marine Threatened or Protected Species Regulations, listed in May 2017.

311.4 I note the assessment which was prepared by Dr Richard Sherley which is also attached to his expert affidavit. I admit that penguin scientists indicated in 2018 that small pelagic purse-seine fishing

closures around breeding colonies may have positive impacts on arresting African Penguin population declines. Those scientists, however, also noted that the impacts are "subtle", and that the penguin population would continue to decline. I note too that those 2018 findings were contested.

311.5 I deny that the Minister has failed to implement adequate fishing closures.

311.6 The relief sought by the applicants on an urgent basis will not alone prevent the decline of the African Penguin population, nor will it singularly prevent its possible extinction.

312. **Ad paragraphs 57 – 59.3:**

Save to deny the alleged irrationality of the interim closures and the application of the Expert Panel's recommendations, the content hereof is admitted.

313. **Ad paragraphs 60 & 61:**

313.1 I was unable to ascertain why it is that there was no response by the Department to the applicants' letters attached as "AM19".

313.2 Save as aforesaid, the content hereof is admitted.

314. **Ad paragraph 62:**

314.1 I deny that the Minister had "*persistently*" failed to take decisive action. Island closures were imposed in September 2022 shortly after the ICE had completed its experimental closures to small pelagic fishing.

314.2 Minister Creecy did not ignore the precautionary principle. The decision to impose temporary island closures in September 2022 was taken as a precautionary measure in accordance with the precautionary principle.

314.3 There are scientific indications that the biomass of sardine has increased markedly in recent years.

314.4 Save as aforesaid, the content hereof is denied.

315. **Ad paragraphs 63 – 71 (the Joint Government Forum):**

315.1 I admit the correspondence which BLSA had addressed to the Minister's office on 10 February 2021. The correspondence also motivated a decision to impose island closures, which was subsequently imposed from September 2022.

315.2 The applicants correctly note that the minutes of the meeting on 19 April 2021 records that the Minister had highlighted the importance of having the scientific evidence to back up decisions and thus to resolve differences in scientific outputs to motivate for a management decision on island closures.

315.3 It is correct that Minister Creecy had in correspondence dated 22 July 2021 to BLSA indicated that although the African Penguin population is exposed to a multitude of stressors, the technical task team had identified food availability, and habitat degradation as a result of increased anthropogenic activity around breeding colonies and oil pollution as the main reasons for the continuing decline of the species.

315.4 It is correct – and a point which I must emphasise – that the *Synthesis Report* had recognised that there was disagreement between seabird scientists and marine ecologists on the one hand, and fisheries' scientists on the other, as to whether prey availability was the primary driver of African Penguin population declines.

315.5 I deny that the Minister had failed to take a decision regarding island closures.

315.6 Save as aforesaid, the content hereof is admitted.

316. **Ad paragraphs 72 – 74 (the Extended Task Team):**

316.1 The Extended Task Team (ETT) involved SAPFIA (the fourth respondent) who was (and remains) an important stakeholder in the conservation efforts relating to the African Penguin. The process also impacts the rights of their members.

316.2 It would not have been responsible and fair of the Minister to implement a review agreed between Conservation and the DFFE in

April 2021, when Conservation is not the only affected party for African Penguin conservation.

316.3 This process highlighted the difference of opinion between Conservation and Industry relating to the impact of island closures around the African Penguin colonies. As the applicants themselves acknowledge, the DFFE had contemplated and proposed island closures as early as 2021.

316.4 It is correct that on 1 September 2022, the DFFE imposed interim island closures around Dassen Island, Robben Island and Dyer Island, with a modification around Dyer Island.

316.5 Save as aforesaid, the content hereof is admitted.

317. **Ad paragraphs 75 - 77:**

317.1 Despite the DFFE's good intentions in relation to the CAF, it only served to highlight the conflicting views between Industry and Conservation.

317.2 I deny that the CAF stood as an "*avoidance*" of decisive ministerial action.

317.3 Save as aforesaid, the content hereof is admitted.

318. **Ad paragraphs 78 – 88 (March-August 2022):**

318.1 I admit that there was continued engagement between the DFFE, Conservation and Industry to explore solutions to the African Penguin population decline.

318.2 It is correct that Conservation had motivated island closures, which the DFFE imposed in September 2022.

318.3 Although Minister Creecy strongly encouraged a consensus-driven approach to the delineations for the proposed island closures, she did not insist upon it.

318.4 I do not view the interim closures as inadequate. I deny this.

318.5 The International Review Panel was not established to "*finally break the impasse*" between Industry and Conservation. I have addressed the TOR of the Expert Panel at some length and refer the Court thereto.

318.6 Save as aforesaid, the content hereof is admitted.

319. **Ad paragraphs 80 - 88:**

319.1 These allegations must be seen in the light of the fact that Conservation (including the applicants), were very unhappy with the CAF process and the fact that Industry had presented their strong opposing view on the impact and efficacy of island closures.

Conservation was very critical of the process and the Minister's involvement therein.

319.2 Further engagement and meetings took place between the Department, Conservation and Industry, including a meeting on 28 March 2022.

319.3 I have no personal knowledge of the meeting which took place on 5 and 13 April 2022 between Messrs Anderson, Copeland and de Maine.

319.4 I have no personal knowledge of the meetings which took place in the course of May 2022 between Industry and Conservation, although I admit the subsequent correspondence supporting the need for an International Review Panel.

319.5 Save as aforesaid, the content hereof is admitted.

320. **Ad paragraphs 89 – 92 (proposing an International Review to break the stalemate):**

320.1 Both Conservation and Industry, including the fourth respondent, had addressed correspondence to Minister Creecy in support of the International Review Panel.

320.2 I note that Minister Creecy had a meeting with Mr Anderson on 6 July 2022.

320.3 I note the series of meetings and exchange of emails between Conservation and Industry in the period 12 July 2022 to 12 August 2022 and that these engagements focused on compiling terms of reference and the composition of the proposed expert review panel.

320.4 It is correct that Dr Naidoo circulated the final version of the TOR of the proposed Expert Panel to the relevant stakeholders.

321. **Ad paragraphs 93 – 101 (alleged "*arbitrary Interim Closures to facilitate the Panel process)*:**

321.1 It is correct that Conservation was prepared at this stage to accept temporary closures around the six major African Penguin colonies based on delineations presented at the end of the JGF process.

321.2 I admit that Industry was unhappy with the proposed island closure delineations.

321.3 As previously stated, the DFFE had imposed interim island closures as of 1 September 2022 based on a combination of the delineations presented at the end of the JGF process, the CAF in 2022 and from negotiations between Industry and Conservation sector representatives. Dr Naidoo facilitated the discussions between the relevant stakeholders on the proposed temporary closures in August 2022.

321.4 Given that no consensus and/or compromise could be reached between Conservation and Industry, the Department decided to impose temporary closure delineations as a precautionary interim conservation measure while the further work contemplated by the Expert Panel is performed.

321.5 There was engagement between Industry and Conservation, facilitated by Dr Naidoo, as to the proposed island closure delineations. There was a deep divide on the issue between Conservation and Industry.

321.6 It is correct that on 18 August 2022, following the ongoing debate and difference of opinion between the stakeholders, that Dr Fikizolo (the Chief Director: Specialist Monitoring Services, DFFE: Oceans and Coasts), circulated an email announcing the temporary closures.

321.7 I do not agree that the interim closures acceded to Industry in relation to four of the six breeding colonies. It was clear from the outset that Industry was fully opposed to any island closures. Ultimately, the decision to impose island closures was more favourable to Conservation than Industry.

321.8 From 1 September 2022 to 31 July 2023, the DFFE declared certain areas around the six major African Penguin colonies closed to commercial fishing for anchovy and sardine and the fishing permit conditions were amended accordingly.

321.9 Whilst it is correct that the island closures were envisaged at the time to be temporary, it was not unlikely or unexpected that they would be extended.

321.10 I deny that the interim closures were determined in a haphazard manner because they do not align with the preferred foraging range of African Penguins.

321.11 As previously noted, the interim closures resulted from negotiations between Conservation and Industry. This required modification, in some respects, of the interim closures proposed by DFFE in 2021. Whereas the Expert Panel since recommended a basis for optimising the selection of closed areas, they also recommended further investigation and analysis before such optimisation can be done. The DFFE has shared with the applicants their intention to form a dedicated penguin scientific working group where these Expert Panel recommendations can be progressed.

321.12 Save as aforesaid, the content hereof is noted.

322. **Ad paragraphs 102 – 108 (October 2022: the Minister formally convenes the Panel):**

322.1 I have dealt with the establishment of the International Review Panel, the Expert Panel's TOR, its findings and recommendations.

322.2 I emphasise that the Expert Panel was established to make recommendations to the Minister to enable the Minister to make an

informed decision on island closures. It was not the purpose of the Expert Panel to make the decision for the Minister nor would this have been permissible.

322.3 It is admitted that the Expert Panel determined that island closures were *likely* to benefit African Penguins and that it endorsed the mIBA-ARS method, in principle, as appropriate for delineating penguin foraging habitat. I, however, disagree that the Expert Panel provided a clear trade-off mechanism which would have enabled the Minister to determine biologically meaningful African Penguin habitat for fishery limitations per island.

322.4 The Expert Panel had recommended further improvements to the mIBA-ARS method. Thus, it is not correct, that the Expert Panel had without more, recommended definitively the use of the mIBA-ARS method as implemented by the applicant. In future (so it found), additional analyses would further improve understanding, especially with respect to how the spatial scale of any given mIBA might vary by year.

322.5 The Expert Panel concluded that such between-year variation is likely to be important, as the years of the ICE (during which most of the telemetry data was collected), have been years of relatively low prey resource abundance. The Expert Panel recommended that further validation of mIBAs should occur, in particular, using dive data that provide objective identification of foraging locations (see paragraph 4.3 and 5.9 of the Report).

322.6 It was for this reason, that the Minister declined to include in her decision the use of the mIBA-ARS statistical method because further scientific consideration and analysis was required. This approach was perfectly reasonable and rational.

322.7 Save as aforesaid, the content hereof is noted.

323. **Ad paragraphs 109 – 112 (March-July 2023: the Panel Process and attempted Eastern Cape Agreement):**

323.1 I have already dealt with the Minister's efforts to encourage the stakeholders to reach consensus, and if not consensus, at least an acceptable and reasonable compromise.

323.2 It is unsurprising that the Expert Panel process also sought to find common ground.

323.3 Save as aforesaid, the content hereof is noted.

324. **Ad paragraphs 113 – 113.5.3 (July-August 2023, the Panel's Recommendations):**

324.1 Minister Creecy was provided with the Expert Panel's draft Report before the final Report was released.

324.2 I have dealt at length with the Expert Panel's TOR, its findings and the recommendations made therein, and shall not repeat them.

324.3 I admit the summary provided of the key findings and recommendations set out herein to the extent that they are

paraphrased directly from the Report. However, I note the following key omissions from the paraphrased text of the Report: "*The Panel recommended that, **if designated**, closed areas to protect penguins during breeding, should be year-round...*" and "*The Panel further recommended that, **if designated**, closed areas to protect penguins should be reviewed at a time...*". The Expert Panel did not recommend the implementation of closures.

324.4 I have addressed the mIBA-ARS method and the trade-off mechanism.

324.5 The decision to extend the interim closures for a 10-year period, aligns with the Expert Panel's recommendations that closures, if designated, should be year-round and reviewed after a period corresponding with African Penguin life histories, i.e. between 6 and 10 years after designation of closures.

324.6 Save as aforesaid, the content hereof is noted.

325. **Ad paragraphs 114 & 115:**

325.1 The Expert Panel did not recommend that island closures were an appropriate conservation intervention.

325.2 The Department implemented island closures in September 2022 which Minister Creecy extended on 23 July 2023.

325.3 Whether or not closures should be implemented is very much the subject of the dispute.

325.4 As noted previously, the Expert Panel explicitly stated that a recommendation of a specific outcome lies outside the scope of the Panel.

325.5 Although the Expert Panel recommended the mIBA-ARS method for delineating important penguin foraging habitat, this recommendation was not made without qualification. Minister Creecy had considered the Expert Panel's recommendations in relation to the mIBA-ARS and decided not to implement the method immediately, given the Expert Panel's recommendations that further science was required. This was not omitted from the Minister's considerations when she made her decision on 23 July 2023.

325.6 I have explained why the Minister did not implement the trade-off mechanism.

325.7 The extension of the closures was a reasonable and meaningful conservation measure.

325.8 I emphasise that the current island closures already cover approximately 65% of the applicants' proposed island closure delineation. I again note that the "biological meaningfulness" of neither the applicant's proposed closure delineation nor the interim closures has yet been established. Thus, the applicants seek more extended coverage based on inconclusive scientific data and where further science is required, as proposed by the Expert Panel.

325.9 Accordingly, the allegation in paragraph 115 must be seen in its proper context.

325.10 The Expert Panel Report contains no support for "the immediate imposition" of closures.

325.11 Save as aforesaid, the content hereof is noted.

326. **Ad paragraphs 116 – 121 (4 August 2023: the Impugned Decision):**

326.1 That the decision was made "*in light of the report*", does not suggest that the Report was approved in the manner suggested by the applicants.

326.2 The Minister had approved the work of the Expert Panel and in terms of Dr Naidoo's memo, noted the Report. Apparent from Dr Naidoo's memo, Minister Creecy approved:

326.2.1 the implementation of the recommendations for future science, which will be implemented in a phased approach;

326.2.2 that DFFE branches Fisheries Management and Oceans and Coasts develop a communications and stakeholder engagement plan to report to stakeholders on an annual basis on the implementation of fishing limitations and other measures, and other actions in the African Penguin Biodiversity Management Plan;

326.2.3 approved that the Expert Panel work is now concluded and approved the remuneration; and

326.2.4 approved the distribution of the Report to all stakeholders and that it is made publicly available.

326.3 Minister Creecy made her decision on 23 July 2023 when she approved Dr Naidoo's memo. The media statement ("AM15") conveyed the decision to the media and the public.

326.4 I deny that Minister Creecy had imposed delineations at odds with the Expert Panel's recommendations regarding its recommended trade-off mechanism and the application of the mIBA-ARS method.

326.5 Minister Creecy did not ignore the Expert Panel's recommendations, and had considered the full Report, the Expert Panel's findings and their recommendations as the record will show. Her decision was based on the findings of the Report.

326.6 I am surprised by the applicants' stance given that the existing interim closures already cover approximately 65% of the total area which the applicants seek to delineate.

326.7 The only disagreement is the range or boundaries of the fishing limitations and island closures: the applicants seek by way of this application to adjust the boundaries of the fishing closures to align with their proposed closure delineations. They seek this adjustment, in circumstances where the scientific data does not conclusively support

such closures as a solution to prevent the decline of the African Penguin population.

326.8 The interim closures are not permanent. Although it was implemented for 10 years with a review after the first 6 years, nothing precludes the Minister from reviewing the decision sooner.

326.9 There is no basis to allege that the interim closures would sound the "*death knell*" of the African Penguin, in circumstances when the Expert Panel itself had highlighted the limited benefit of closures to the penguin population and identified other contributing factors to the penguin decline.

327. **Ad paragraph 121:**

There was no need for the applicants to "*mitigate*" the decision. I deny that there were fundamental flaws in the decision and that the decision had disregarded the Expert Panel's recommendations and its central rationale.

328. **Ad paragraphs 122 – 125 (the Eastern Cape Non-Agreement):**

328.1 As Dr Naidoo will confirm, I admit that discussions took place between the respective parties regarding the Eastern Cape closures with the focus on St Croix.

328.2 As Dr Naidoo will confirm, agreement was reached between Conservation, Industry and the DFFE regarding the delineation island closure map for St Croix.

328.3 However, subsequently Mr de Maine had called Dr Naidoo and Prof Pichegru and indicated that there was an error in the amended permit conditions based on the fact, according to Mr de Maine, that the island delineation for St Croix was incorrectly determined. Dr Naidoo viewed this as one of the parties now resiling from what he accepted was an agreement on St Croix.

328.4 Pursuant to the agreement reached, the Department had adjusted the permit conditions with the Branch: Fisheries Management for immediate implementation and distribution. Dr Naidoo had discussed the issue of the error within the Branch: Oceans & Coast, the Deputy Director-General and the relevant management team.

328.5 The Department accepted Mr de Maine's submission that a *bona fide* error was made on their part when the agreement was concluded.

328.6 The result was that the agreement fell away, and the interim closures continued.

328.7 Save as aforesaid, the content hereof is noted.

329. **Ad paragraphs 126 – 133 (the DFFE fails to appreciate the Panel's recommendations):**

329.1 I refer to Dr Naidoo's confirmatory affidavit, filed herewith, who confirms the allegations contained below.

329.2 The correspondence exchanged between 13 September 2023 and 22 September 2023 is admitted.

329.3 I deny the allegation in paragraph 126 which alleges that Dr Naidoo had facilitated a process which had ignored and/or which bore little relationship with the Expert Panel's work and outcomes.

329.4 I deny that Dr Naidoo had not properly appreciated the Expert Panel's recommendations regarding closure delineations, the trade-off mechanism and the use of mIBA-ARS.

329.5 Dr Naidoo did not at all misinterpret the Expert Panel's recommendations.

329.6 I deny that Minister Creecy had subordinated her duty to intervene and the Panel's scientifically informed recommendations to the "*negotiating foibles*" of Industry and Conservation.

329.7 There was no need for the applicants to bring these issues to the Department's attention. The Department was fully aware of the issues.

329.8 The Minister had considered the issues independently and made a balanced decision within the parameters of her statutory powers.

329.9 Save as aforesaid, the content hereof is noted.

330. **Ad paragraphs 134 – 136 (attempting to persuade Oceana):**

330.1 I have no personal knowledge of the engagement between Conservation and the CEO of the Oceana Group and note the content thereof.

330.2 Save as aforesaid, the content hereof is noted.

331. **Ad paragraphs 137 – 142 (attempts to engage smaller industry players):**

331.1 The DFFE was aware of the attempts by the applicants to engage the smaller industry players.

331.2 According to the DFFE's records, the applicants did not submit a formal PAIA request for this information.

331.3 I deny the allegation in paragraph 142, that the Minister's insistence on agreement was a continued unlawful abrogation of her responsibilities. This criticism is without foundation given that interim island closures were in place since September 2022 which the applicants accepted.

331.4 Save as aforesaid, the content hereof is noted.

332. **Ad paragraphs 143 – 150 (the Conservation sector applies the Panel's recommended trade-off mechanism while the DFFE and Minister fail to do so):**

332.1 I note the independent assessment conducted by the applicants and the conservation sector.

332.2 I note the position in relation to St Croix and Bird Islands. It is correct that these islands were subject to island closures which had been agreed with ECSPA, the fifth respondent. I deal with Ms Weideman's expert affidavit further on herein.

332.3 It is correct that at this time, in October 2023, that the DFFE had not completed its own analysis of the Expert Panel's recommendations. This is an ongoing exercise for the Department while there is protection in place for the African Penguin.

332.4 The DFFE was not required to conduct a separate assessment of the Expert Panel's recommendations prior to Minister Creecy's decision. Minister Creecy had sufficient information before her to make an informed and rational decision.

332.5 Save as aforesaid, the content hereof is noted.

333. **Ad paragraphs 151 – 157 (November 2023: SAPFIA rejects the need for Island Closures):**

333.1 Dr Naidoo recalls that there may have been one or two meetings with Industry regarding the Eastern Cape Closures following the error that was brought to the Department's attention by Mr de Maine. There was engagement on how to rectify the island closure delineation in the maps.

333.2 The position adopted by SAPFIA was unsurprising, given Industry's views regarding island closures and their opposition thereto.

333.3 I do not agree that this was contrary to the Expert Panel's recommendations.

333.4 It is correct that Dr Naidoo had cancelled the meeting which was scheduled to take place on 16 November 2023. Dr Naidoo recalls that

the meeting was cancelled because Birdlife indicated that it would not attend the meeting.

333.5 Save as aforesaid, the content hereof is noted.

334. **Ad paragraphs 158 – 163 (December 2023: the end of the road):**

334.1 I admit that there was further correspondence from the Conservation sector on the implernentation of island closures, in particular, relating to the Eastern Cape closures involving Bird and St Croix Island.

334.2 The discord between Industry and Conservation on the issue of island closures is not new. Their continued disagreement on the issue is unsurprising given that they have different interests and seek to achieve different objectives. This is not a criticism, but merely seeks to state the reality of a complex situation where different stakeholders are involved with competing interests.

334.3 Save as aforesaid, the content hereof is noted.

335. **Ad paragraph 164 (January 2024 – 31 December 2033):**

335.1 I deny that the decision to extend the island closures for a period of 10 years is irregular.

335.2 The interim closures are an appropriate conservation measure, given the small benefit of island closures in stemming the decline in the African Penguin population.

335.3 There is no conclusive scientific evidence or data, that the delineation of the island closures as proposed by the applicants will seek to prevent the decline and/or possible extinction of the species.

335.4 I deal with Ms Weideman's expert affidavit further on herein.

336. **Ad paragraphs 165 – 168 (Dassen Island):**

336.1 It is correct that the interim closures were based on the DFFE's 2021 proposal presented in August 2021.

336.2 There is clearly a difference in opinion as to whether the closures adequately represent the preferred foraging areas of African Penguins.

336.3 The importance of the northern area has not been established.

336.4 It is correct that the DFFE2021 delineation was based on trade-off considerations using the 50% and 75% foraging kernel. That was the only penguin foraging data made available to the DFFE GF by Mr McInnes at that time. However, during the Extended Task Team discussions, the trade-off calculations were updated to reflect the percentage coverage of the mIBA areas. These mIBAs were again revised by the applicants to mIBA-ARS, which are smaller than the original mIBAs and hence the DFFE trade-off evaluations remain appropriate. Furthermore, the applicants themselves now advocate for the DFFE2021 closure delineations for Dyer and St Croix Islands, which were based on the same "best available science" at that time.

337. **Ad paragraphs 169 – 171 (Robben Island):**

337.1 The applicants argue that only 43 % of the mIBA-ARS area is contained within the DFFE2021 interim closure area. They further argue that because the interim closure area overlaps entirely with the existing no-take fish zone of the existing Robben Island MPA, this interim closure is not a closure at all.

337.2 The applicants have overlooked the fact that the port of Cape Town, one of the busiest ports along South Africa's coastline, is in close proximity to Robben Island. In fact, 17.7% of the port limits fall within the mIBA-ARS area and whereas this is not strictly a no-take area, it encompasses two traffic separation zones and a large anchorage area that hampers any fishing. Only one purse-seine set has been made within this area since 2011. Effectively therefore 61% of the mIBA-ARS delineated area is closed to fishing.

337.3 Furthermore, the no-take fishing zone of the Robben Island MPA, while not declared an MPA exclusively to benefit African Penguins, did consider African Penguin foraging data in its design and includes in its purpose "*to contribute to the Conservation and protection of threatened seabird and shorebird species including African penguin, Bank and Cape cormorants*;" [Government Gazette 23 May 2019, No.42478].

337.4 Despite being aware of other threats to the African Penguin, including noise generated by vessels, predation on penguins, oiling (both catastrophic and chronic), severe weather events (flooding/heat

stress), etc., the applicants fail to note the small deferential benefit to penguins that would be derived by closing the mIBA-ARS determined area relative to the current interim closure area.

337.5 There is a critical need to assess the importance of other factors contributing to the decline in penguin numbers.

338. **Ad paragraphs 172 – 174 (Dyer Island):**

338.1 This is the closure that resulted from extensive discussions between the conservation sector and the local Gans Bay Fishing Industry whereby vessels with a length of less than 26 m are permitted to continue fishing in the offshore area of the DFFE2021 proposed area. The applicants fail to recognise that of the 45 vessels that caught anchovy or sardine in the vicinity of Gans Bay in 2020 16 had a length > 26 m. In recent years (2011-2020), vessels with a length > 26 m, accounted for 35% of the total anchovy and sardine catch taken in this area.

338.2 Effectively therefore any competition that may have existed between African Penguins and the fishery in the Gans Bay area has been reduced by 35%. Calculations performed by the GF indicated that 33% of the regional sardine catch and 12 % of the regional anchovy catch were caught on average within the mIBA delineation.

338.3 The applicants ignore the Expert Panel's recommendations that "*It is possible to design closures within the overall foraging area to minimise lost catch for any given choice of percentage of penguin foraging area*

to be protected" and that "*It is desirable to identify a solution that minimizes societal costs and maximizes benefits to penguins*".

338.4 In any event, as previously noted, more work is required to validate the mIBA-ARS delineated areas.

339. **Ad paragraphs 175 – 176 (Stony Point):**

339.1 The applicants argue that the interim closure around the Stony Point penguin colony has no scientific basis and represents only 30% of the penguin's preferred foraging area. I disagree that this closure "*cannot possibly help conserve these African Penguins*". Any existing competition for resources will be reduced to some extent.

339.2 In the time available, between the International Review Panel process and the end of 2023, it was not possible for DFFE to carry out all the required analyses for implementing a closure in line with the Expert Panel's recommendations. The Expert Panel made specific recommendations, which they prioritised in Table 7.1 [Expert Panel Report p.45]. These included the need to refine the estimates of effects of closures on catches, GDP, and jobs and the evaluation of trade-offs including refining estimates of foraging areas. For these tasks they suggested time frames for completion ranging from short-term (1-2 years) to medium term (2-5 years). It is obvious that the Expert Panel recognised the complexity of the tasks that needed to be completed before a rigorous trade-off evaluation could be applied to determine new closure areas, that met their criteria.

339.3 The DFFE, having previously recommended that only the existing MPA at Stony Point be closed to fishing (DFFE2021 recommendation), internally discussed the option of extending the closure area slightly to that proposed by Industry during the CAF process. This is the closure area currently implemented.

339.4 Given that Stony Point was not included in the ICE, it is impossible to estimate the relative benefits of any closure for this colony, but by inference from results at Dassen and Robben Islands, closures are likely to have a small benefit relative to other factors that negatively impact African penguins.

340. **Ad paragraphs 177 – 178 (St Croix Island):**

340.1 The applicants question the scientific basis for selection of the interim closure area and note that only 50% of the mIBA-ARS area is included in the interim closure. The interim closure is indeed smaller than the area originally proposed by DFFE in 2021.

340.2 The reduction in the size of the interim closure resulted from discussions between Conservation and the local Industry and aimed to reduce the costs to Industry. Whereas 33% of the average regional catch of sardine was previously taken in the DFFE 2021 area, the interim closure area overlaps with 24% of the regional sardine catch.

340.3 Again, the Expert Panel's recommendations regarding the selection of closure areas needs to be implemented once validation of the mIBA-ARS has been completed and a trade-off framework has been

developed. I refer specifically to the statements of the IRP that: "*It is possible to design closures within the overall foraging area to minimise lost catch for any given choice of percentage of penguin foraging area to be protected*" [IRP report Section 7.3 p.46] and, "*It is desirable to identify a solution that minimizes societal costs and maximizes benefits to penguins*" [IRP report Section 4.4 first bullet p.36].

340.4 Given the importance of this area to sardine fishing, it is necessary to evaluate the costs and benefits of different closure options as recommended by the Expert Panel.

340.5 The applicants note that the interim closure is smaller than the 20 km closure area implemented during the ICE and which was, according to them, shown to be inadequate. Hence, they argue that it is "entirely questionable whether this "closure" can possibly achieve its objective of conserving St Croix's African Penguins by reducing their competition with industry and taking account of their valuable foraging areas."

340.6 With regard to St Croix, the Expert Panel noted that it will be difficult to replace lost catches from within this closure area, but that lost catch can be reduced if closures are well designed [IRP report executive summary on page 8]. The mIBA-ARS is not a well-designed area that takes account of the costs to the fishery.

340.7 The Expert Panel also suggested that other factors such as increased shipping traffic and associated noise as well as the increased number of bunkering operations in Algoa Bay since 2016 may have contributed

to the decline in penguin numbers at this colony [Section 1.3.2.4. of the IRP Report, p.18]

340.8 The Expert Panel questioned the reliability of foraging metrics as indicators of the impact of fishing on the breeding success of penguins and did not consider the results from the ICE for the east colonies to be reliable [Section 2.3.1.2 of the IRP report, p.22/23]. This contrasts with the applicant's assertions.

340.9 The Expert Panel noted that increased foraging distances, reported for the ICE, of penguins breeding during years when this Island was open to fishing were not reflected in estimated poorer chick condition.

340.10 Clearly negative impacts of fishing on the penguin population at St Croix have not been demonstrated and the Expert Panel suggests that other factors are more important. These include bunkering, ship noise, oiling, etc.

340.11 The rate of decline in number of pairs of penguins breeding at St Croix in recent years (2013-2022), based on data presented to the Expert Panel, is 18%.

340.12 If by inference, one reduces that rate of decline by the Expert Panel-calculated impact of fishing at Dassen and Robben Islands of 0.71-1.5%, closure to fishing around St Croix will not stem the decline. Other urgent interventions are required.

341. **Ad paragraphs 179 – 183 (Bird Island):**

341.1 Given the distance from Bird Island to the harbour at Gqeberha, very little fishing takes place around Bird Island and hence negative impacts from fishing have not been observed and quantified.

341.2 The applicants note that the interim closure is "arbitrary". Obviously, if no fishing takes place in the vicinity of Bird Island, the implementation of a closed area is unnecessary, yet the applicants very arbitrarily propose closure of an area not based on the Expert Panel's recommended mIBA-ARS method.

341.3 Despite very little fishing occurring in the vicinity of Bird Island, the penguin population has more than halved since 1999, bringing into question the impacts of fishing.

342. **Ad paragraphs 184 – 195 (the applicable legal framework):**

342.1 The relevant provisions of the Constitution, NEMA and NEMBA, are admitted.

343. **Ad paragraphs 196 – 197.3 (relevant international obligations):**

343.1 I do not dispute South Africa's international obligations as a signatory State to the Convention on Biological Diversity ("CBD"), the Convention on Conversation of Migratory Species of Wild Animals ("the BONN Convention") and the Agreement on the Conservation of African-Eurasian Migratory Water Birds ("AEWA").

344. **Ad paragraphs 198 – 202.4:**

344.1 I do not dispute the Minister's obligation to protect threatened species in terms of Section 24(b) of the Constitution and the relevant provisions of NEMBA and NEMA.

344.2 The international instruments to which South Africa is a signatory are not prescriptive as to the nature and form of the conservation measures which signatory states are required to implement.

344.3 I deny the allegation at the conclusion of paragraph 202 that the Minister was obliged to impose fishing closures to limit purse-seine sardine and anchovy fishing activities.

344.4 In any event, fishing closures have been in place since September 2022 (and before then during the ICE) and will continue to remain in place for a period of ten years if they are no revised before then.

344.5 Save as aforesaid, the interpretation of the domestic statutory laws and relevant international instruments, is a matter for legal argument which will be dealt with at the hearing of this matter.

345. **Ad paragraphs 203 – 209 (first ground of review: the decision is irrational):**

345.1 I refer the Court to the relevant paragraphs where I deal with the first ground of review.

345.2 I deny, for the reasons set out herein, that the decision was irrational and that it falls to be reviewed in terms of PAJA.

345.3 I also deny that the decision stands to be reviewed and set aside in terms of the principle of legality.

346. **Ad paragraphs 210 – 216 (second ground of review: unlawfulness and unconstitutionality):**

346.1 I refer the Court to the allegations where I deal with this ground of review.

346.2 I deny that Minister's Creecy's decision was unlawful and unconstitutional for the reasons set out herein.

346.3 I deny that the decision falls to be reviewed and set aside in terms of the relevant provisions of PAJA or in terms of the principle of legality.

347. **Ad paragraphs 217 – 219.4 (relief):**

347.1 I have dealt with the relief and the remedies sought by the applicants.

347.2 I have explained why substitution is inappropriate in the circumstances of this case. I deny that the circumstances of this case are sufficiently exceptional to warrant substituted relief.

347.3 It is not for the Court to usurp the powers of the State and to impose the delineation of island closures in accordance with the Expert Panel's recommendations.

347.4 I have explained why the trade-off mechanism was not applied. Importantly, there are island closures in place for all the major penguin colonies which is already of some benefit to the African Penguin.

347.5 The decline in the African Penguin population off the coast of Southern Africa is not due to the alleged delay on the part of the Minister and/or the Department. The facts show that the Minister and the DFFE have taken the issue of the African Penguin population decline very seriously and have dedicated substantial resources to find a feasible solution.

347.6 If the Court is of the view that the decision was irrational and unlawful, then the decision ought to be remitted to the Minister for reconsideration. In this instance, the Department would propose that the Minister reconsiders the decision within a certain period of time and which would allow for the completion of further work identified by the Expert Panel.

347.7 The Court is not well placed to take a decision on the matter. First, it is not for the Court to usurp the function of the State and to substitute a decision which the applicants, as part of the conservation sector, have advocated for a number of years. This is a polycentric decision which is underpinned by complex scientific data and competing rights and interests. Fishing permits will have to be considered and adapted, if necessary, which should be done through engagement with the fishing industry.

347.8 Accordingly, substitution is a remedy which does not avail the applicants.

347.9 I note that the proposed terms of a possible remittal to the Minister, set out in paragraphs 219.1 to 219.4 requires the terms of the remittal to be based solely on the applicants analysis and that the Minister shall be required to implement fishing closures around the breeding colonies in accordance with the maps as attached as "AM16", which is the delineation of the fishing closures advocated by the applicants and the Conservation sector. This excludes the input from Industry. The DFFE does not support a remittal on these terms.

347.10 A referral of the specific closure delineations for each island to the International Review Panel to confirm the accuracy of the application of the trade-off mechanism would not be possible, as the work of the Expert Panel is complete, and the Panel has been dissolved. Any further or additional work by the Expert Panel, would have to be fiscally approved internally and would, needless to say, also be subject to the availability of the Expert Panel members. For obvious reasons, this is not a feasible and realistic option.

348. **Ad paragraphs 220 – 227 (extension or condonation):**

348.1 I do not take issue with an application for extension and/or condonation for the late filing of the review application.

348.2 However, I point out that the decision was made on 23 July 2023 and the application was launched on 20 March 2024, approximately eight months after the decision was taken.

348.3 The concession in paragraph 224 that it was not "*at all times apparent to us that this translated into a reviewable irregularity*" is of course not a basis for the delay in reviewing the decision.

348.4 I do however respectfully request the Court to take into consideration the fact that the delay in the launch of the application impacted the DFFE's ability to prepare its answering papers within the required timeframes.

348.5 I do not dispute that the protection and survival of the African Penguin, is a matter of public interest.

349. **Ad paragraphs 228 – 230 (costs):**

349.1 The content hereof is noted.

H. <u>THE EXPERT AFFIDAVIT: DR RICHARD BRIAN SHERLEY:</u>

350. I admit the qualifications, experience and credentials of Mr Sherley.

351. I admit that Mr Sherley has previously advised the South African Government as a member of the Seabird Technical Team of the Top Predator Working Group convened by the DFFE since 2020.

352. I note the uplisting submission, authored by Mr Sherley where he concludes that the African Penguin faces an extremely high risk of extinction in the wild by 2035. I also note that the uplisting submission and that the method and calculations contained therein will be incorporated in a submission to the International Union for Conservation of Nature ("IUCN") to motivate why the African Penguin should be listed as "*critically endangered*" and placed on the IUCN Red List of Threatened Species.

353. I do not dispute, for reasons that are well-documented and for reasons addressed herein, that the African Penguin population has experienced a rapid decline, regrettably so, over the last 30 years. However, as I have repeatedly stated, there are a number of factors which impact the African Penguin population decline.

354. The uplisting submission, and the contents of Mr Sherley's affidavit, is his opinion as a marine biologist. As he points out, his submission is subject to review by Bird Life International on behalf of the International Union for Conservation of Nature (IUCN).

I. THE EXPERT AFFIDAVIT: MS ELEANOR ASHLEY WEIDEMAN:

355. I admit Ms Weideman's qualifications, experience and credentials.

356. Ms Weideman's affidavit was carefully considered by Ms Janet Coetzee, an expert Fisheries Scientist, in the DFFE's Branch: Fisheries Management. I

refer to Ms Coetzee's confirmatory affidavit filed herewith where she confirms the allegations in response to Ms Weideman's affidavit set out hereunder.

357. The central focus of Ms Weideman's affidavit is the application of the trade-off mechanism. Ms Weideman's affidavit seeks to place the applicants' results of their application of the trade-off mechanism before Court, illustrated in "EW2", to demonstrate the alleged inadequacy of the current island closures.

358. The DFFE did not conduct a statistical exercise for the reason that more science is required, including a further investigation on the socio-economic impacts of more extensive island closures and the costs to fishery. These are critical issues without which a decision on further island closures cannot be made.

359. Before I deal more fully with Ms Weideman's affidavit, I observe the following:

359.1 Ms Weideman's application of the mIBA-ARS method was applied to indicate the preferred foraging areas around the six breeding colonies.

359.2 The results which she has provided are not the results of the Expert Panel's application of the method.

359.3 Whilst the Expert Panel recommended the development of a trade-off mechanism, it also identified several issues pertinent to evaluating trade-offs which they deal with in section 7.3 of their Report. One such issue, was that there are three primary trade-off axes to consider

when selecting closures: (a) the benefit to penguins; (b) the cost (economic and social) to the fishing industry and the communities where fishing and processing operations are based; and (c) the ability to evaluate the effectiveness of the closures.

359.4 The Expert Panel identified that penguin foraging areas should be quantified for trade-off analyses delineating mIBA using the ARS method but qualified this statement.

359.5 The Expert Panel identified certain considerations which are relevant to designing a framework to help decision-makers select closed areas. One such consideration was that an optimal solution or acceptable "*balance*" between competing objectives is not simply obtained by closing 50% of any given area and, another, is that one approach is to find the point at which the change in benefit to penguins (by increasing closures) matches the change in costs. In addition, expressing costs and job losses by sector (example small scale operators) would also seem appropriate. Pertinently, the Expert Panel pointed out that future work should consider broader social consequences of reduced catches, such as measures of well-being.

359.6 The Expert Panel recorded that one way to explore trade-off between expected benefits to penguins and impacts on fishing is via trade-off plots, and that a trade-off curve could demonstrate, for example, that the benefits to penguins (as quantified by the proportion of the foraging area that is protected) likely increases rapidly when small areas most used are closed, with relative benefits to penguins

declining as an increased proportion of the foraging area is closed to fishing.

359.7 The Expert Panel remained concerned about (i) the lack of information on how the closures impact fishing costs and fishing behaviour and that there are social impacts that are not estimated using the SAM model, but which are important to consider in any trade-off analysis.

359.8 The Expert Panel ultimately noted that the decision to impose/not impose island closures is a trade-off policy decision and did not undertake any trade-off analyses themselves.

359.9 The fact that the Expert Panel concluded that island closures may contribute in some small way to slowing the decline in the penguin population does not lead to the conclusion that closures must be imposed. This is a trade-off decision for which the costs must be justified.

360. Ms Weideman applied the trade-off mechanism which, according to her, was the trade-off mechanism recommended by the Expert Panel.

361. Ms Weideman's application of the mIBA-ARS method and her trade-off evaluation is flawed.

362. Although the Expert Panel recommended a trade-off framework be developed "*to help decision makers select closed areas (if any)*", they recommended that penguin foraging areas should be quantified for trade-off analyses delineating

mIBAs using ARS methods.[10] This was not done. Ms Weideman developed a trade-off framework but evaluated only one mIBA-ARS delineated closure option against closure options that were not delineated using the mIBA-ARS method.

363. The *application* of the method, results, conclusions and the proposed closed areas illustrated in "AM5" and "EW3" do therefore not accord with the guidelines suggested by the Expert Panel for evaluating different closure options.

364. Even if the closure options that Ms Weideman evaluates are accepted, the ultimate preferred selection of some closure options proposed by her are clearly subjective.

365. Furthermore, both the "*assessment*" referred to and the proposal contained in the founding affidavit have not been subjected to thorough peer review, let alone discussed in appropriate departmental Scientific Working Groups, and it is therefore not appropriate to expect the Department to put in place closures based on untested scientific work of only one stakeholder.

366. It is important to note that using the mIBA-ARS method as a statistical tool does not suggest that there is only one possible solution. The estimation of mIBA-ARS can be very sensitive to the choice of the scale at which the

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[10] Report, section 7.3.

analyses are performed and the smoothing parameter used, and Ms Weideman fails to specify how this parameter was objectively chosen, nor does she demonstrate any sensitivity to this choice or to the choice of any of the other metrics used in defining the mIBAs.

367. Application of the mIBA-ARS method involves several steps, including initial data inspection and cleaning (e.g., removal of tracking positions on land, interpolation of positions between GPS fixes, removal of erroneous data, the setting up of buffer zones around Islands where data are ignored etc). Apart from choices made during this initial cleaning of data and the smoothing parameter, further choices involve the selection of an optimum percentage of the forage area (or kernel utilization distribution, referred to as UD) to be used as the Core Usage Area, and the setting of thresholds to identify high intensity use areas.

368. Finally, the delineation of the mIBAs requires the aggregation of such high intensity usage areas in some way to form a continuous area that can be implemented in a management context. None of these steps were pre-specified by the Expert Panel and thus require independent choices. It is therefore conceivable that another group of scientists might have selected different mIBA-ARS delineations.

369. The application of the method known as mIBA using Area Restricted Search is therefore in no way simply an application of what the Expert Panel recommended. Neither can it be claimed to be the only reasonable outcome.

The robustness of the applicants' mIBA-ARS delineations to alternative choices require proper demonstration.

370. Furthermore, the Expert Panel specifically recommended that interannual variability in the size / spatial scale of preferred foraging habitats are investigated.[11]

371. Put differently, during periods of increased prey abundance the currently estimated preferred foraging habitats may be smaller. Ms Weideman does not make mention of whether interannual variability in her application of the mIBA-ARS delineation has been considered nor presents any findings in that regard.

372. The Expert Panel recommended that further validation of mIBAs should occur, in particular, using dive data that provide objective identification of foraging locations, rather than commuting locations. This issue has not at all been addressed by Ms Weideman.

373. Unfortunately, it has not been possible for the Department to independently verify the mIBA-ARS delineations in the available time, given the further work that is required.

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[11] Report, section 4.3.

374. Attempts to verify the mIBA delineations by Dr Mike Bergh failed as requests for access to the penguin tracking data were denied. It should be noted that Dr Bergh, an independent scientist who also does work for Industry, is an observer to the Small Pelagic Scientific Working Group (SWG-PEL) of the DFFE Branch: Fisheries Management. The work that he conducts on behalf of Industry, or on request of the SWG-PEL, is often used after careful consideration in the formulation of scientific advice provided by the SWG-PEL. The DFFE does not have sufficient capacity to undertake all required analyses and hence observers to the SWG-PEL play an important supporting role. I should hasten to add that Dr McInnes is also an observer to the SWG-PEL and has also made important contributions to the work of the SWG-PEL.

375. Denying Dr Bergh access to the data and computer code underlying these calculations has therefore also scuppered the work of the DFFE. This was regrettable and is inconsistent with accepted scientific principles which requires reproducibility of scientific results. It is also inconsistent with accepted practice in scientific working groups of the Department that data on which recommendations are based, must be made available to the scientific working group. I refer, in this regard, to the SWG's Code of Conduct.

376. I also refer to email correspondence dated 5 February 2023 from Dr McInnes to Dr Makhado, a DFFE scientist from the Branch: Oceans & Coasts, and to whom Dr Bergh had sent the request for access to the data and computer code. I attach a copy of the email correspondence marked **"DFFE19".** In this correspondence Dr McInnes informed the Department that they (the applicants) are not in a position to provide the data outside of a formal review

process which includes seabird biologists. He also recorded that the purpose of the data request was not clear to them and that they are reluctant to share data which is currently the subject of imminent peer review and publication.

377. I attach a copy of the Code of Conduct for Scientific Working Groups marked **"DFFE20"**. I point out that the terms of reference of the SWG makes provision for temporary confidentiality of data.

378. The applicants have proposed new delineations that they argue must be implemented immediately to save the African Penguin. They argue that these mIBA-ARS delineated areas are superior to those of the currently implemented interim closures, yet they provide no justification for their arguments. No quantification of the alleged additional benefits, over and above those of the interim closures, have been placed before the Court.

379. As I will demonstrate, the total percentage overlap between the interim closures and the applicants' proposed mIBA-ARS delineations is in the order of 65%. By extension of the impact of fishing on penguin population growth rate, calculated by the Expert Panel of between 0.71 and 1.5% for Robben and Dassen Islands to the other four penguin colonies, the additional benefit of the mIBA-ARS is only 35% of 0.71 and 1.5%. In other words, the additional benefit is in the order of 0.25% to 0.5%. Unfortunately, the estimated benefits apply only to the Robben and Dassen Island closures that were implemented during the ICE and no estimates are available for the other 4 colonies of Stony Point, Dyer Island, St Croix Island and Bird Island. Estimates for these Islands

must be approximated and assumed to be similar to those of Robben and Dassen Islands.

380. I have already pointed out that the Expert Panel was not prescriptive on the use of a particular trade-off mechanism but rather provided guidelines for designing a framework for evaluating trade-offs.[12]

381. Hence, the applicant's application of a trade-off is not necessarily the only, or even the most appropriate method, for selecting the optimal closure area. The Expert Panel certainly did not recommend a trade-off mechanism that can simply be implemented, without more.

382. Ms Weideman also failed to discuss any alternatives to the mIBA-ARS selections and has not attempted to minimise lost catch through modification of their mIBA-ARS selected closure delineations. Clearly, in recommending the use of mIBA-ARS for delineating closure options that can be used in a trade-off analyses, the Expert Panel contemplated that several iterations of mIBA-ARS delineations should be produced. The Expert Panel specifically mentioned that software tools such as Marxan could be considered.[13] Ms Weideman is therefore incorrect when she states that *"the panel*

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[12] Panel Report, section 7.3.

[13] Panel Report, p 34.

recommended a clear mechanism for identifying optimal no-take zone delineations ..."

383. Ms Weideman identifies two areas for the purpose of discussing delineations, namely, (i) the full foraging range (which she refers to as UD90) and, (ii) the "*core*" or "*preferred*" foraging area (which she refers to as mIBA-ARS). However, she fails to mention what percentage of the UD this is based on.

384. Ms Weideman applied the following closure delineations in her trade-off analysis: the UD90, mIBA-ARS, 20km, the CAF, DFFE 2021 and Industry. However, as previously explained, she failed to produce mIBA-ARS variants and failed to consider the interim closures currently in place. The inclusion of only these few delineations has a bearing on any trade-off selection. The nature of the trade-off curve, and hence the so-called balance point, will depend on which data are included/excluded in the trade-off plots. Again, I re-iterate, the Expert Panel identified that "penguin foraging areas should be quantified for trade-off analyses delineating mIBAs using the ARS method" and not the various closure options that Ms Weideman has used.

385. Her statement that "*in the case of each colony, the balance point is determined by having regard to all these closure options and their positions once plotted on the graphs*", is vague. The most scientifically defensibly option would have been to fit various functional curves to the data (the closure options) and to select the curve that best fits the data. The position of the balance point could then have been mathematically determined.

386. The curves fitted to the closure options for the various penguin colonies, as illustrated by Ms Weideman, appear to be an arbitrary selection of lines that join the points depicting closure options – sometimes straight lines, sometimes convex lines and sometimes the lines completely ignore some of the points. For each of these graphs, several different curves could feasibly be fitted "*by eye*" or mathematically, and each of these curves would result in a different "*balance point*" or position of the yellow dot on her maps. No information on the curve-fitting procedure is provided, making it impossible to judge the appropriateness of the fitted curves. Similarly, no statistics related to how well the curves fit the data have been provided. Accordingly, it is uncertain whether this modelling is scientifically as defensible as Ms Weideman proposes it to be.

387. Had Ms Weideman followed the recommendations of the Expert Panel, she would have produced many variants of the mIBA-ARS delineations, where different grid cells are incorporated to fulfil the core foraging UD requirement (whatever that may be), possibly using a tool such as Marxan (suggested by the Expert Panel). This would have resulted in closure options based on the mIBA-ARS method, that varied in size and shape and each with their own Penguin Utility Score (UR) and cost to Industry. One would then typically fit a function that intercepts each UR when its cost is smallest. That fitted curve could then be used to estimate the point on the curve where increases in penguin utility score matches the change in cost (as suggested by the Expert Panel). I note that other methods of choosing the optimal trade-off point could also be considered.

388. As regards penguin benefits and fishing costs, she alleges "*our graphs plotted penguin benefits using a penguin utility index on the x-axis and fishery costs on the y-axis*". Further, that "*the penguin utility index (UR) is a measure of the estimated number of individual penguins that regularly forage in a particular cell on a grid which we overlay onto penguin foraging tracks. One cell measures 0.5km^2 in extent and the grid system allows us to more accurately identity the use of space by African Penguins around a particular colony*". Ms Weideman does not indicate how the estimated number is derived. Is it simply the number of tracks that intersect a cell or a ratio of that number to tracks intercepting a larger area? A number of other questions arise from this vague statement. How does one interpret "*regularly*"? Is there a threshold value to differentiate between "*regularly*" and "*irregularly*"? How was the extent of the cell chosen and how does the choice of its arial extent influence results? How is the UR aggregated over the mIBA? Given the same data and the explanation which Ms Weideman provides, an independent scientist is unlikely to arrive at the same result. Furthermore, the extent to which this index captures the true benefit to penguins is unknown.

389. The "*assessment*" referred to in paragraph 21.1 of Ms Weideman's founding affidavit uses a different metric for the "*benefit to penguins*" axis of proportion foraging range (UD90) whereas Ms Weideman uses a penguin utility score. Both methods claim to have used the "*panel recommended trade-off mechanism*". Both the "*assessment*" and Ms Weideman's affidavit claim to have evaluated the cost to Industry and the benefits to penguins based on the Expert Panel's "*recommended trade-off mechanism*", yet the curves fitted to

the various closure options and the metrics used as proxies for costs to Industry and benefit to penguins are different between the two applications (by the same scientists). This clearly demonstrates that the "*recommended trade-off mechanism*" is open to interpretation and does not, as claimed by Ms Weideman, represent a clear mechanism to be applied. She alleges that "*the panel recommended a clear mechanism for identifying optimal no-take zone delineations*".

390. Other trade-off metrics could be considered such as number of penguins, or lost revenue or lost jobs. These are discussions that need to be had within a structured SWG process and in consultation with all relevant stakeholders. The Expert Panel clearly did not anticipate that one group of stakeholders would attempt to dictate the terms of further work when they advised that "Continued communication, collaboration, and transparency of research data and analyses, are strongly encouraged to build trust and strengthen progress towards seeking acceptable solutions."[section 7.7 of the IRP report].

391. I also point out that the resultant "*curves*" fitted by simply joining closure option points have different characteristics. While the relative position of closure options is maintained, the slopes that join the points of the closure options clearly differ markedly between the two applications, and it is this slope that has a bearing on the Expert Panel's suggested approach for optimising the choice of a closure delineation. The Expert Panel concluded that "*one approach is to find the point at which the change in benefits to penguins (by increasing closures) matches the change in costs*". Clearly, the slopes of these two applications will give different answers. Whereas the "*assessment*"

also claimed to have been based on the recommended trade-off mechanism, it does not even consider a so-called "*balance point*" and appears to disregard the Expert Panel's one suggested approach to select closure options where "*the change in benefits to penguins matches the change in costs*", and offers no alternative method for objective selection of a trade-off point. This is therefore not aligned with the trade-off framework which the Expert Panel suggested to help decision-makers select closed areas, if any.

392. Despite the DFFE (2021) closure option coinciding with the balance point for all three species, Ms Weideman selects the mIBA-ARS closure as the best closure option for Dassen Island, rather than the DFFE 2021 option. The applicants are not adopting a consistent approach for the selection of the optimal closure options and disregard "*the balance point*", this despite having a so-called "mechanism" to optimise selection.

393. Ms Weideman also argues that it is necessary "*to have regard to the purpose of the closures in having real life impacts on reducing competition between African Penguins and industry*". She goes on to say that when matching the various closure options to their location on the map around Dassen Island, it soon becomes clear that DFFE 2021 will not in fact meet these purposes. She alleges that this is because 8% of the northern portion of the preferred foraging area is omitted from the DFFE 2021 closure. She alleges that the preferred foraging area is shown in dark green while the DFFE 2021 closure (and Interim Closure) is shown using a dark blue and orange dashed line. She asserts that the density of the grey foraging tracks reflects the importance of this area for African Penguins, relative to the areas covered by DFFE 2021 where the grey

lines appear "*thinner*" or less dense. This is hardly a clear and evidence-based argument for not selecting the DFFE 2021 option as it has a higher penguin utility score ("Ur"). It includes no scientific evaluation of the frequency of use in this northern 8% of the mIBA-ARS area and relies on the qualitative evaluation of the colour and thickness of tracks plotted on a map.

394. Ms Weideman also disregards the fact that the metric for measuring benefit to penguins, i.e. the penguin utility score is higher for the DFFE 2021 option than the for the mIBA-ARS option. From this it must be concluded that there are doubts as to whether this metric is a robust measure of benefit to penguins "*or real life impacts*".

395. Ms Weideman claims that there is a clear ecological explanation for the importance of the northern area of the mIBA-ARS for African Penguins. In this regard, she alleges anchovy recruits migrate southward during the autumn / winter months and become available to African Penguins who are engaged in breeding during this time. She alleges that continued fishing in these northern areas is likely to result in fisheries-African Penguin competition over important anchovy biomass which will have downstream effects on prey availability in the preferred foraging areas of African Penguins south of this area. This is speculative and appears to contradict the applicants' findings as DFFE 2021 has a higher penguin utility score. Dr McInnes and colleagues have repeatedly made these claims, but have failed to demonstrate, based on available scientific data, that fishing to the north of Dassen Island *significantly* reduces prey availability to African Penguins breeding at Dassen Island.

396. There is no doubt that fishing does decrease the total amount of prey, but what is important is the relative size of the catch and relative reduction in amount of prey available.

397. If catches to the north of Dassen Island were having such a large impact on availability of anchovy within the foraging range of penguins breeding at Dassen Island, then why are most of the penguins foraging to the east and south-east of the island? Similarly, if catches to the north of Dassen Island were depleting anchovy biomass to any great extent, there would be no viable fishery around Dassen Island, Robben Island or further south.

398. There is no evidence to suggest that the number of anchovy schools, their size or their density decreases from north to south along the west coast in response to fishery catches further to the north. This argument has no scientific merit until such claims can be substantiated.

399. Ms Weideman then defends the choice of the mIBA-ARS closure option by stating that this option has a relatively low cost to Industry. She alleges "*given the above importance of the northern region of the mIBA-ARS and given that the mIBA-ARS had relatively high penguin utility scores and relatively low cost to industry, this is the preferred closure delineation for this colony. The preferred closure reflected in Figure A of EW2 thus corresponds with the mIBA-ARS delineation*". This is a misrepresentation of the importance of this northern part of the mIBA to the anchovy fishery.

400. The DFFE Governance Forum in 2021 had already recognised the importance of this area to the small pelagic fishery in selecting the DFFE 2021 option. The "*trade-off curve*" presented in the Dassen Island graph (Figure 5 of AM5), shows a two-fold increase in lost catch for anchovy between the DFFE 2021 and mIBA-ARS option and a decrease in penguin utility score. This has to be seen in light of the high volume, low profit nature of the anchovy fishery.

401. Having chosen the mIBA-ARS closure option instead of the DFFE 2021 option as the preferred closure option, despite it having a smaller benefit to penguins, Ms Weideman disregards the suggestion by the Expert Panel in their guidelines for developing a trade-off mechanism where they record that it is possible to design closures within the overall foraging area to minimise lost catch for any given choice of percentage of penguin foraging area to be protected and that software tools such as Marxan "*may provide a way to select areas given constraints on either the desired amount of closure by island or the cost to industry*". This suggests that some form of manipulation of the mIBA-ARS closure delineation should be conducted so that the final closure option is closer to the balance point (otherwise you would not be selecting a closure option aligned with the suggested trade-off considerations recommended by the Expert Panel), and there is no utility in having a balance point.

402. I also point out that the approach followed by Ms Weideman completely disregards the differential value of lost anchovy and sardine catch. Directed sardine is at least five times more valuable compared to anchovy / Red Eye, yet trade-off curves are all scaled to a maximum of one. An alternative and

simpler evaluation would have been to estimate the total relative lost revenue (rather than lost catch) between closure options where lost catch for each species is multiplied by its economic value and then summed across the sector to derive a total cost for each closure option. These can then be evaluated in a relative sense across the closure options. So, for example, when one considers Figure 9 of Ms Weideman's proposal for Dyer Island (an area important for both anchovy and sardine fishing), the relative cost (in terms of lost catch) is similar between anchovy and directed sardine for the DFFE 2021 option and the balance point, yet had the y-axis instead been scaled to lost revenue, the shape of the curves would have been very different.

403. As pointed out earlier, the applicants fail to quantify the additional benefits for penguins of their preferred closure delineation over the interim closure (DFFE 2021) currently implemented. This can readily be quantified for Dassen and Robben Islands.

404. For Dassen Island, the interim closure area already covers 92% of the mIBA-ARS. A further 0.9% of the mIBA-ARS falls within the permanently closed 16 mile beach MPA and hence effectively 93% of the mIBA is closed to fishing. If one assumes that the benefits calculated for the 20 km closure around Dassen Island apply to the mIBA-ARS, then the difference in benefits between the mIBA-ARS and interim closure ranges between 0.05 and 0.1%. This should be seen in the context of the Expert Panel calculated rate of decline for Dassen Island of 13% over the period 2005 to 2022.

405. If, however, one assumes that the benefits to penguins of the mIBA-ARS and interim closures around Dassen Island are scaled according to the area of each relative to the 20 km closure area (49% overlap between mIBA-ARS and 20 km closure, 60% overlap between interim closure and 20 km closure), then the interim closure actually provides between 0.08 and 0.17% more benefit than the mIBA-ARS. Whereas this scaling is likely questionable, it offers some support for preferring the interim closure, which covers a larger area (and has a higher penguin utility score and lower cost to industry).

406. As previously mentioned, 61% of the proposed Robben Island mIBA-ARS is already effectively closed to fishing. This includes the interim closure plus an additional area of 80 km^2 that falls within the port limits, wherein apart from one set, no small pelagic catches have occurred since 2011. A similar quantification of the increased benefit provided by the mIBA-ARS delineation vs the interim closure around Robben Island will show that by extending the calculations of benefit obtained by the Expert Panel, the mIBA-ARS can be expected to benefit penguins by between 0.71 and 1.51% if one assumes that the mIBA-ARS is equivalent to that of the 20 km closure imposed during the ICE. The interim closure is expected to achieve 61% of that benefit or 0.43 to 0.92%. The increased benefit of the mIBA-ARS delineation is therefore only between 0.28 and 0.59%.

407. If, however, one assumes that the benefits to penguins of the mIBA-ARS and interim closures around Robben Island are scaled according to the area of each relative to the 20 km closure area (55% overlap between mIBA-ARS and 20 km closure, 41% overlap between interim closure and 20 km closure), then

the mIBA-ARS provides a benefit of between 0.4 to 0.8% and the interim closure provides a benefit of between 0.3 and 0.6%. The increased benefit attributable to the mIBA-ARS is therefore only between 0.1% and 0.2%. Again, this should be considered in the light of the estimated 10% decline rate for this colony.

408. In her assessment of the "*trade-off curve*" for Robben Island depicted in Figure 7, Ms Weideman again indicates a relatively small cost to Industry when selecting the mIBA-ARS option rather than the DFFE 2021 option. She alleges that the additional cost to Industry between the DFFE 2021 closure and a delineation based on mIBA-ARS indicated an increase in costs that was relatively small when measured against the significant increase in African Penguin Benefits. And further, she alleges the balance point for sardine was, similarly, aligned with mIBA-ARS while it lay in the space between DFFE 2021 and mIBA-ARS in the case of Red Eye. Based on her metric for cost to Industry, Figure 7 suggests a threefold increase for anchovy and a sevenfold increase for Red Eye. These are clearly not "*relatively low*" increases. These increases should also be seen in the light of the very small additional increase in benefit to penguins calculated above (between 0.1% and 0.2%).

409. However, once again, if the metric for cost to Industry had been scaled to lost revenue instead, it would have become apparent that these losses are far less than, for example, Dyer Island and would have allowed for more objective evaluation in the context of the entire fishery. Such a metric where all species are combined would have also helped to deal with the differences evident in

Figure 7 where the position of the balance point varies substantially between anchovy, directed sardine and Red Eye.

410. Based on Ms Weideman's implementation of a trade-off, the DFFE 2021 closure area is indeed the preferred option for Dyer Island. This despite Mr McInnes's earlier allegations (paragraph 101 of the founding affidavit) that the interim closures were delineated using a "*confusing mix of different delineation methods*". Apparently in selecting this preferred closure option it now passes the test even though it is not "*based on the latest scientific data and methods for determining African Penguins' preferred foraging ranges*".

411. The interim closure at Dyer includes an inshore area that is closed to all vessels and an offshore area where only vessels with a length < 26 m may fish. Given that 35 % of the total catch in the vicinity of Dyer Island in recent years has been taken by vessels ≥ 26 m, one can further assume that 35% of the larger offshore area, is also effectively closed to fishing. Ms Weideman ignores the additional benefits to penguins of the further 35% reduction in potential competition for resources. Having considered that 100% of the inshore area and 35% of the offshore area is effectively closed to fishing, the interim closure of both the inshore and offshore areas around Dyer Island already provides 48% of the benefits (in terms of the total area closed) of the DFFE2021 area proposed by the Applicants.

412. The applicants argue for the complete closure of the offshore zone as well but have not assessed the cost to industry of their proposal, and incorrectly assume the increased cost to be negligible. Had the costs associated with

complete closure of the offshore zone been considered, the position of the DFFE2021 point on the trade-off curve would have been far above its current location.

413. The interim closure around St Croix Island overlaps with 72.8% of the Applicant's proposed closure delineation (DFFE2021). As before, one can therefore assume that the interim closure provides 72.8% of the benefit provided by the Applicant's proposed closure delineation. Furthermore, if one assumed the same benefit for the Applicant's proposed closure delineation as that calculated for the 20 km closure around Dassen and Robben Islands of 0.71 to 1.51%, then the additional benefit is only between 0.2 and 0.4%. The rate of decline in number of pairs of penguins breeding at St Croix in recent years (2013-2022), based on data presented to the Expert Panel, is 18%. The penguin population will therefore continue declining at an alarming rate, which is only marginally lower for the Applicant's proposed closure area.

414. The applicant's do not include the interim closure option on the trade-off curve for St Croix and hence the increased cost of imposing the DFFE2021 closure relative to the interim closure has not been considered at all.

415. Again, inconsistencies in the application of the trade-off mechanism and subjectivity in the choice of closure areas is apparent in Ms Weideman's preferred option for closures around Bird Island, which is depicted in Figure 13 of AM5. In this graph, there is an arbitrary convex curve which connects

the Industry point to the 20km closure option, giving absolutely no consideration to the three other points, namely, DFFE 2021, mIBA-ARS and CAF, in the fitting of the curve. This is unlikely to pass any scientific scrutiny and reflects the subjectivity of the results and conclusions presented by Ms Weideman. The estimated smaller costs for the 20 km closure area relative to the other delineations (that are smaller than the 20 km closure area) is also questionable.

416. Despite the choice of closure option for Bird Island not really having any consequence, I refer to this example to emphasise the subjectivity of Ms Weideman's approach and proposal, which will not withstand scientific scrutiny.

417. In conclusion, whilst the DFFE is not dismissive of the efforts made by the applicants to statistically model their interpretation of the trade-off mechanism through Ms Weideman's affidavit, her opinion and conclusions are unreliable especially in relation to the arbitrary application of the metrics modelled on the various penguin colonies.

418. Notably, some of the results of Ms Weideman's modelling suggests that the various balance points are often aligned with the DFFE 2021 delineation (Dyer Island and St Croix) and in respect of Bird Island, the balance point aligned with the 20km closure previously imposed by the Department.

419. For the reasons contained herein, Ms Weidman's application of the trade-off mechanism and application of the mIBA-ARS method is unreliable and inconclusive.

I. THE SUPPLEMENTARY FOUNDING AFFIDAVIT, DATED 27 JUNE 2024

420. I reply to the allegations in the supplementary founding affidavit only to the extent that it is necessary to do so.

421. **Ad paragraph 7**

421.1 Appropriate action has been taken to mitigate the decline of the African Penguin population.

421.2 There is no scientific proof that the relief sought in the application will prevent the imminent extinction of the African Penguin as the species regrettably continues to decline.

422. **Ad paragraphs 8 to 8.3**

422.1 I note the content of paragraph 8.

422.2 Access to prey and foraging grounds are not the only causes of the decline of the African Penguin. This is acknowledged by the applicants who allege that the submission makes clear that access to prey and foraging grounds remains a driver of such decline. There are a number of factors that have contributed to the decline, including a high pathogenic avian influenza ("HPAI") strain, oil spills, climate

change, altered distribution of prey and reduced food availability due to fisheries as set out in the various scientific studies including the African Penguin Biodiversity Management Plans and the Report of the International Review Panel.

422.3 The Expert Panel has recognised that closure of purse-seine fisheries around penguin colonies will provide *only a part of the measures required* to slow/reverse the population decline of African penguins.

422.4 It is correct that there is a need to address all impacts on the ability of the African Penguin to access prey, but this cannot be done by a mechanical application of the trade-off mechanism. The Expert Panel recommended that further analysis and science was required to design an acceptable framework in which to assess the efficacy of island closures and an appropriate trade-off mechanism.

423. **Ad paragraph 9**

423.1 The ICE results did not confirm that island closures had a positive impact on the African Penguin population.

423.2 Although it was identified as an example of best practice, the Expert Panel itself recognised the weakness of the design and implementation.

423.3 The Expert Panel found that overall the results of the ICE on Dassen and Robben Islands indicate that fishing closures around the

breeding colonies are likely to have a positive impact on population growth rates, but that the impact may be small, in the range of 0.71 to 1.51% (Report: paragraph 7.1, bullet point 4).

424. **Ad paragraphs 10 and 11**

I have addressed the establishment, role and objectives of the Expert Panel to which I refer the Court.

425. **Ad paragraph 12**

425.1 While the Minister accepted the Panel's finding that island closures are an appropriate conservation measure, this is qualified by the fact that the efficacy of the island closures in relation to an appropriate trade-off mechanism still had to be established.

425.2 While the Expert Panel proposed a method for a trade-off mechanism (it also addressed other methods), this proposal was qualified.

425.3 The Expert Panel did not propose any island closure delineations.

425.4 I deny that the Minister accepted the premise but ignored the conclusion. I have addressed the basis for the Minister's decision.

425.5 The Expert Panel had a number of tasks and objectives to fulfil. One such objective was to consider:

> *If closures or fishing limitations are viewed to contribute positively to the support of the African Penguin population, recommend a trade-off mechanism as a basis for setting*

fishing limitations and mapping. This mechanism must consider a potential positive return to penguins and the impact on fisheries. (As a basis for discussion the Governance Forum Approach and the CAF approach can be considered.) Consideration must also be given to the current state of observations, data and analyses (Penguin, Environmental and Fisheries Economic data). Recommendations on these can be included under future science considerations."

425.6 It is therefore denied that the Expert Panel was only appointed to consider the issue of the trade-off mechanism.

426. **Ad paragraph 13**

426.1 The Expert Panel did not recommend a specific trade-off mechanism.

426.2 The criticism of the Minister for encouraging stakeholder engagement is misplaced. The Expert Panel itself highlighted the importance of stakeholder engagement and a comprised position between Conservation and Industry:

"The Panel strongly encouraged continued communication, and collaboration, with transparency of research data and analyses, as means to build trust and strengthen these discussions. Working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African penguin." (Annexure "SFA4")

426.3 Paragraph 7.7 of the Expert Panel's Report recommended:

"Continued communication, collaboration, and transparency of research data and analyses, are strongly encouraged to build trust and strengthen progress towards seeking acceptable solutions. Working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African penguin.

Clear, fair and objective communication around this controversial issue is important to ensure the best possible outcomes for penguins whilst respecting that conservation decisions may impact to varying extents on livelihoods and community well-being."

426.4 I have addressed the Minister's reasons.

426.2 I deny that the Minister's decision is irrational and unlawful on the basis alleged.

427. **Ad paragraph 14**

I have dealt with the Minister's decision and the reasons for the decision. The Minister did not ignore the recommendations made by the Expert Panel in relation to the trade-off mechanism.

428. **Ad paragraphs 15 and 16**

428.1 The Expert Panel did not recommend a specific trade-off mechanism.

428.2 The Minister did not ignore the recommendations made by the Expert Panel in relation to a trade-off mechanism.

428.3 There is nothing irrational about extending the island closures for 10 years. As I have previously stated, the decision can be revisited should further investigation and scientific study require variation of the decision.

428.4 I have addressed the issue of seeking a compromised or consensus position.

429. **Ad paragraph 18**

429.1 The first sentence of this paragraph is not clear.

429.2 The island closures were extended as a beneficial conservation measure to mitigate the decline in the African Penguin population. The island closures were extended until a long-term considered solution is found or agreed to.

429.3 I deny that the island closures were implemented without sufficient scientific input and that it was determined through an unscientific process. Island closures were first conducted as part of ICE which included a feasibility study and an experimental phase. Island closures were then implemented around the 6 breeding colonies for the first time in September 2022 (which the applicants did not legally challenge). The Expert Panel found that overall the results for ICE at Dassen and Robben Islands indicate that fishing closures around

the breeding colonies are likely to have a positive impact on population growth rates, but that the impacts may be small.

429.4 Island closures are thus considered to be a beneficial conservation measure.

429.5 The application itself is predicated on more extensive island closures which the applicants have endeavoured to motivate scientifically.

430. **Ad paragraph 19**

430.1 The Minister did not disregard the recommendations of the Expert Panel.

430.2 Although island closures have been implemented for 10 years with a review after 6 years, this can be reviewed sooner if circumstances so require.

430.3 The Minister is not constitutionally obliged to implement specific conservation measures. It is the Minister's prerogative to determine which measures are appropriate and reasonable.

430.4 There is no conclusive scientific proof that island closures as a conservation measure will prevent the decline or extinction of the African Penguin. Notably, this finding was not made by the Expert Panel.

431. **Ad paragraph 20**

This is denied.

432. **Ad paragraph 21**

432.1 It is not for this Court to determine whether the interim closures are appropriate or to determine the degree of the effectiveness of the closures. If this Court were to do so it would be violating the constitutional principle of separation of powers.

432.2 The island closures are not permanent. They are in place for 10 years with a review after 6 years.

432.3 This allows for the further investigations and scientific studies as recommended by the Expert Panel.

432.4 This Minister's approach - and the decision – was clearly sensible.

433. **Ad paragraph 22**

There is no basis to grant the relief sought in the amended notice of motion.

434. **Ad paragraph 25**

434.1 The Minister considered the full Expert Panel Report which she had regard to. This was sufficient for the Minister to make a considered decision, given that she had already considered the first draft of the Panel's Report after it was released to the Department on 6 July 2023.

434.2 The workflows do not indicate anything other than the route flow of documents. The workflow certainly does not reflect all the internal departmental discussions.

435. **Ad paragraphs 26 - 29**

435.1 I refer to what I have said above about the workflows which the applicants identify as playing a prominent role in the decision-making process of the Minister. The workflows do not demonstrate any irrationality in the Minister's decision.

435.2 The Minister considered Dr Naidoo's memo and the full Expert Panel Report and exercised her independent judgment when she made the decision on 23 July 2023. The workflows played no role in her decision.

435.3 The reasons for the decision appear from Dr Naidoo's memo and the Expert Panel Report.

436. **Ad paragraphs 30 – 36**

436.1 As the applicants correctly point out, the workflow details describe the sequence of events following the production of the first draft of the Expert Panel's Report on 6 July 2023. The workflow details do not reflect the full extent of the internal departmental discussions. Rigorous discussions took place internally between the departmental scientists on the content of the draft Report.

436.2 The draft Report was edited by the Editor-in-Chief of the African Journal of Marine Science and was prepared for publication by the DFFE Publications unit. An edited and proof version of the Draft Report was sent to the Panel on 18 July 2023 for their final comments before the Report was finalised for publication.

436.3 Dr Naidoo's Memo (which included a copy of the full Draft Expert Panel Report) was considered and approved by the Director-General on 21 July 2023. I deny that the Memo was given little to no consideration by the DG. The Draft Report which was annexed to Dr Naidoo's Memo did not differ in substance to the final Report which was published.

436.4 Minister Creecy made her decision on 23 July 2023 after she had fully considered the Report, the findings and recommendations. The Minister had been involved in the debate and stakeholder engagements on the African Penguin for several years prior. She was fully familiar with the contentious issues and the scientific studies [albeit at a high level] by the time that she made her decision.

436.5 It is correct that Minister Creecy had a discussion with Dr Naidoo on 22 July 2023 about the content of the Report before she made her decision on 23 July 2023. This discussion was not minuted.

436.6 While the Minister had two days to consider the Report before she made the decision there is no basis to suggest that she did not have the time to properly apply her mind to the Report because of what the applicants refer to as "*an extremely tight turnaround*". This

allegation is speculative and based on the misconception that the Minister lacked the time and ability to attend to the Report within a tight timeframe.

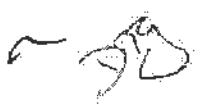
436.7 I also point out that the Draft Report was distributed and discussed internally.

436.8 The Expert Panel also discussed their progress and work to date with the Minister in a short briefing in July 2023. Dr Naidoo attended this meeting.

436.9 The Court is also reminded that the island closures which were implemented at the time were about to expire which necessitated an expeditious decision so that the penguin colonies were not left vulnerable.

436.10 In relation to the allegation in paragraph 33, it was not necessary for the Department to conduct a detailed analysis of the Report given the findings and recommendations that further investigation and scientific studies were required which would influence the design for a framework for a more long-term conservation solution.

436.11 The allegation in paragraph 35 is clearly premised on a misconception of Dr Naidoo's role and the purpose of his submission to the Minister. The purpose of the Memo was not to discuss the scientific findings or the merits and demerits of the Expert Panel's recommendations. I deny that his memo contains "*key errors and omissions*" which in turn led to material errors by the Minister.



436.12 I have explained the basis and reasons for the Minister's decision in full, to which I refer the Court. Even if there were errors or omissions (which is denied), they were not in any way material where they had influenced the Minister to make an irrational decision.

436.13 As regards the trade-off mechanism, no firm decision had been made in relation to the appropriate trade-off mechanism as a method/tool to determine island closures. The findings of the Expert Panel made it clear that further work was required in relation to an appropriate trade-off mechanism. It was not possible, nor would it have been responsible for the Minister, to mechanically implement a trade-off mechanism in complete disregard of the recommendations made by the Expert Panel that further work was required.

436.14 The allegations in paragraph 36 once again demonstrates the applicants' misunderstanding of the Expert Panel's findings and recommendations.

437. **Ad paragraphs 37 – 49**

437.1 These paragraphs attempt to demonstrate why Dr Naidoo's memo was flawed in relation to the content of the Expert Panel's Report.

437.2 The applicants allege that the Memo failed to acknowledge certain objectives that the Expert Panel was required to deliver upon and allege that the memo does not cover the totality of core issues with which the Expert Panel was tasked. They highlight these alleged

shortcomings with reference to the Expert Panel's TOR and key findings.

437.3 They allege that the memo entirely ignored the fact that the TOR required the Expert Panel to recommend a trade-off mechanism; delineation of no-take fishing areas around the breeding colonies and the appropriate basis for determining benefits to the African Penguin and areas of important foraging habitat.

437.4 It is important to place the objectives, findings and recommendations of the Expert Panel in its proper context.

437.5 The Expert Panel found, based on the outcome of ICE, that fishing closures are likely to have a positive impact on African Penguin growth rate but that the benefits may be *small* and that future closures of forage fish fishing around penguin colonies would *likely* benefit penguin conservation but that it will need to be part of a larger package of conservation measures as such closures alone would be unlikely to reverse the current decline in penguin population numbers.

437.6 Thus, the Expert Panel found that island closures may have very small benefits as a conservation measure. This is the important premise.

437.7 The Expert Panel found that there is a trade-off to be applied amongst between maximising benefits to penguins, minimising the costs to the fishing industry and having a reliable basis to quantify

the effects of the closures (including no closures) on the penguin recovery rate. The Expert Panel expressly acknowledged that the trade-off among closure options is a policy decision related to Conservation, economic and social goals and objectives for South Africa.

437.8 Thus, the Expert Panel expressly recognised that an appropriate trade-off (being the "*how*"), is a policy decision by the State.

437.9 While the Expert Panel did recommend a trade-off mechanism, it did so with certain caveats when it recommended the design of an appropriate framework which could be used to decide on island closures. The concerns of the Expert Panel are set out in paragraphs 7.2 and 7.3 of Section 7 of the Expert Panel's Report (Summary, Conclusion and Recommendations). The diamond bullet points in paragraph 7.3 makes it clear that the application of a trade-off cannot be mechanical; the trade-offs will differ among the breeding colony islands and among sectors with fishery; that job losses by sector and fishery costs must be quantified; care should be taken when applying the OBM and SAM statistical models to the impact on the Fishing Industry and they should be considered in a relative sense and that future work should consider broader social consequences of reduced catches, such as measures of community wellbeing.

437.10 The Expert Panel did not recommend delineations for the individual breeding colonies.

437.11 The Minister carefully considered these findings which resonated with her that an appropriate trade-off mechanism had to be very carefully considered and could not be applied mechanically as the applicants seem to suggest.

437.12 Give this context, it is not correct that the Minister accepted the "*premise*" (that island closures were an appropriate conservation measure) but then ignored the "*conclusion*" (the application of a trade-off mechanism). This proposition is premised on an incorrect understanding and interpretation of the Expert Panel's Report.

437.13 Dr Naidoo's memo must also be understood in this context. I point out that his Memo did not disregard the trade-off mechanism. He referred to the trade-off mechanism in his memo.

437.14 The Minister had regard to Dr Naidoo's memo and the full Expert Panel Report (which was attached to the memo) and exercised her independent judgment when she made her decision to extend the island closures.

437.15 Whether the Naidoo memo allegedly contained material omissions (which is denied) is ultimately irrelevant and had no bearing on the rationality of the Minister's decision.

437.16 For the reasons set out above, I deny that the decision was irrational and unlawful as alleged.

438. **Ad paragraphs 50 to 57**

438.1 The applicants allege that there appears to have been no consideration as to whether or not the interim island closures were appropriate, which they say is irrational. They refer to certain paragraphs in Dr Naidoo's memo which they say addresses the approach to island closures.

438.2 I deny that the Minister's decision was irrational for this reason.

438.3 First, there are no material inconsistencies in the Naidoo Memo relative to the Expert Panel's recommendations.

438.4 Second, the content of Dr Naidoo's Memo and the recommendations made must be understood in relation to the Minister's decision and the reasons for her decision.

438.5 The Report itself dealt extensively with the appropriateness of island closures as a conservation measure.

438.6 The decision to implement the island closures for a period of 10 years effectively extended the existing island closures which had been in place since September 2022 – which the applicants did not challenge.

438.7 The further implementation and/or extension of the island closures were necessary until a more scientifically defensible and equitable closure solution could be achieved. The extension of the island closures is supported by the Expert Panel's findings that island closures would likely benefit penguin Conservation.

438.8 The Minister did not disregard the Expert Panel's recommendations regarding the approach to delineation of fishing closures. I have explained the Minister's decision in detail.

438.9 Dr Fikizolo's email dated 18 August 2022 does not say that the interim closures were unsatisfactory for conservation purposes.

438.10 I deny the allegations in paragraph 55.

438.11 I deny that the decision was flawed for the reason that it sought reliance on consensus. I have addressed why it was important for the Minister to seek consensus and compromise between Conservation and Industry. This is also consistent with the Expert Panel's recommendations.

438.12 The imposition of fishing permit conditions is subject to the provisions of the MLRA. It will be argued on behalf of the Department that the Court does not have the power to impose fishing permit conditions as a conservation measure in disregard of the provisions of the MLRA and in the absence of the Right Holders who have been granted fishing permits.

438.13 I respectfully submit that the Court should adopt a cautious approach should it be of the view that the imposition of permit conditions is a realistic and equitable remedy.

439. **Ad paragraphs 58 to 65.6**

439.1 These paragraphs deal with historical events which pre-date the Expert Panel Report.

439.2 The divergent interests and views on penguin conservation between Conservation and Industry is well known.

439.3 There is nothing irrational or flawed in the approach adopted by the Minister in seeking compromise and/or consensus between Conservation and Industry. This approach is also consistent with the approach recommended by the Expert Panel.

440. **Ad paragraphs 66 to 70**

440.1 The reasons for the Minister's decision appear from Dr Naidoo's Memo and the Expert Panel Report as extrapolated herein.

440.2 I have explained the Minister's decision, how she arrived at the decision and the reasons for the decision.

440.3 I deny that there was no substantive engagement by the Minister on the content of the Expert Panel's Report and their recommendations.

440.4 I have dealt with the Expert Panel's TOR and their recommendations and have highlighted that the Expert Panel was not able to complete all their objectives. By way of example, the Expert Panel did not recommend island closure delineations for the respective penguin breeding colonies. The Expert Panel acknowledged and recommended further investigations and scientific studies.

440.5 I deny that the Minister did not properly apply her mind to the Report.

440.6 I deny that the Minister rubberstamped Dr Naidoo's Memo and that she failed to apply her mind to the Expert Panel's recommendations.

441. **Ad paragraphs 71 – 90 (Confirmation of Grounds of Review)**

441.1 I have dealt with the grounds of review in my answer to the main founding affidavit to which I refer the Court.

441.2 I emphasise that it is important to first understand the findings and recommendations of the Expert Panel in order to deal with the grounds of review.

441.3 The grounds of review are predicated on an incorrect understanding and interpretation of the findings and the recommendations of the Expert Panel. Secondly, the grounds of review are also predicated on a misinterpretation of Dr Naidoo's Memo relative to the Expert Panel's Report.

441.4 The Expert Panel did not recommend the "*necessity*" of implementing island closures.

441.5 Both Conservation and Industry supported the need for the establishment of the Expert Panel and participated in the Expert Panel stakeholder engagement process. I do not dispute that significant public funds were spent on the establishment of the Expert Panal. This was necessary given the scale and complexity of the issues.

441.6 The Minister did not ignore the findings and key recommendations made by the Expert Panel. She could not simply rubberstamp the recommendations of the Expert Panel.

441.7 The Minister had the power to make the decision and was duly authorised to do so in terms of the MLRA.

441.8 Her decision is supported by the findings of the Expert Panel and is reasonable and rational.

441.9 The decision manifestly advances the purpose for which it was made – the decision was implemented as a beneficial conservation measure to mitigate the decline of the African Penguin population until a more long-term conservation solution is achieved. The Minister adopted a precautionary approach by implementing the interim island closures.

441.10 The Minister's reasons appear from Dr Naidoo's Memo and the Expert Panel Report as extrapolated herein.

441.11 The Minister's decision was both substantively and procedurally rational.

441.12 I deny that the decision falls to be reviewed and set aside in terms of the identified grounds of PAJA.

442. **Ad paragraphs 91 - 103**

442.1 I refer the Court to the condonation application which is dealt with upfront in the affidavit. I address the challenges which the Department had encountered in meeting its obligations in terms of the Rules, the timeframes set out in the Notice of Motion and the terms of the directives issued by the DJP.

442.2 The Department had great difficulty in collating the record given the history of the matter, the extensive stakeholder engagement and the voluminous documentation and scientific studies which underpin the dispute. Several departmental officials across the various disciplines had to assist the State Attorney in collating the record which was a time-consuming task. It was impossible to collate and deliver the record within 10 days provided for in the Notice of Motion.

442.3 Although the initial record was filed outside of the time period provided for in the Notice of Motion, the supplementary record (which was far more extensive than the first record) was delivered on 14 June 2024 in accordance with the DJP's Directive dated 10 June 2024.

442.4 I deny that the record bolsters the grounds of review.

443. For the reasons set out herein, the first to third respondents ask for a dismissal of the application.

DJG

DION TRAVERS GEORGE

I hereby certify that the deponent knows and understands the contents of this affidavit and that it is to the best of the deponent's knowledge both true and correct. This affidavit was signed and sworn to before me at CAPE TOWN on this the 18 day of **SEPTEMBER 2024**, and that the Regulations contained in Government Notice R.1258 of 21 July 1972, as amended by R1648 of 19 August 1977, and as further amended by R1428 of 11 July 1989, having been complied with.

COMMISSIONER OF OATHS

Full names:

Address:

Capacity:

NTUTHUKO MSOMI
Commissioner of Oaths
Practising Attorney RSA
2 Oakdale Road
Cnr of Oakdale & Kildare Road
CLAREMONT

DFFE1

OFFICE OF THE DEPUTY JUDGE PRESIDENT A P LEDWABA
HIGH COURT OF SOUTH AFRICA, GAUTENG PROVINCIAL DIVISION, PRETORIA

Gauteng High Court Building, Cnr. Madiba (Vermeulen) & Paul Kruger Str, Room 7.15, Seventh Floor
Tel. (012) 315 - 7571 - E-mail: AnNieuwoudt@judiciary.org.za

10 June 2024

TO:	**BIODIVERSITY LAW CENTRE**
Tel:	(079) 248 5663
Email:	kate@biodiversitylaw.org / nina@biodiversitylaw.co.za
Our Ref:	029857/2024/DJP LEDWABA/AN

TO:	**THE STATE ATTORNEY**
Tel:	(012) 309 - 1630
Email:	DiMolepo@justice.gov.za
Your Ref:	1122/2024/Z52
Our Ref:	029857/2024/DJP LEDWABA/AN

TO:	**DAWSON EDWARDS & ASSOCIATES**
Email:	Marius.Diemont@dawsons.co.za / charlotte@dawsons.co.za
Our Ref:	029857/2024/DJP LEDWABA/AN

Dear Madam/Sir

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS
CASE NO.: 029857/2024

1. The above matter as well as the case-management meeting on 6 June 2024 refer.

2. The matter is hereby set down as a special motion on **22 to 24 OCTOBER 2024.** You are directed to file and upload unto CaseLines and send via email (AnNieuwoudt@judiciary.org.za) to my office a notice of set down with a copy of this letter attached to it **within 7 (seven) days** after receipt hereof, failing which the allocated date(s) of hearing will lapse and the date may be allocated to other litigants who applied for a special motion date.

3. You are directed to serve and file by uploading unto CaseLines as follows:

   3.1 First respondents supplementary Rule 53 record by no later than **14 JUNE 2024.**

   3.2 Applicant's supplementary founding affidavit by no later than **28 JUNE 2024.**

   3.3 First, second and third respondent's answering affidavit by no later than **26 JULY 2024.**

   3.4 Fourth and Fifth respondent's answering affidavit by no later than **5 AUGUST 2024.**

   3.5 Applicant's replying affidavit by no later than **23 AUGUST 2024.**

   3.6 Applicant's heads of argument by no later than **6 SEPTEMBER 2024.**

   3.7 Respondent's heads of argument by no later than **20 SEPTEMBER 2024.**

4. The parties should file and upload unto CaseLines and send via email (AnNieuwoudt@judiciary.org.za) to my office a **Joint Practice Note, Chronology of events and Joint list of authorities** by no later than **27 SEPTEMBER 2024** containing the following:

   - Names of the parties and the case number

- Names and telephone numbers of all counsel in the Motion
- Nature of the Motion
- Issues to be determined in the application
- Relief sought at the hearing by the party on whose behalf counsel is appearing
- An estimate of the probable duration of the application
- Number of pages in the application and whether or not all papers need to be read and if not, which portion need not be read

5. Should it, for any reason(s), transpire that this matter will not proceed on the allocated date/s, you are directed to inform the office of the Deputy Judge President via email to AnNieuwoudt@judiciary.org.za immediately.

6. None availability of counsel representing any of the parties shall simply not be allowed as a reason for the matter not to proceed on the date of hearing arranged with my office.

7. **Should the above directive not be complied with, the matter may not be allocated to a Judge and the allocated date(s) will be utilized for other deserving cases.**

Regards

ELECTRONICALLY GENERATED (NOT SIGNED)

A LEDWABA
DEPUTY JUDGE PRESIDENT
NORTH GAUTENG HIGH COURT
CASE NUMBER 029857/2024

Tanya Golden

DFFE2

From:	Mabhena Nthabiseng <NMabhena@justice.gov.za>
Sent:	Thursday, 18 July 2024 14:07
To:	AnNiewoudt@judiciary.org.za
Cc:	nina@biodiversitylaw.org; marius.diemont@dawsons.co.za; charlotte@dawsons.co.za; kate@biodiversitylaw.org; office@schabortpotgieter.co.za; pieterh@nienabertattorneys.co.za; renee@nieberattorneys.co.za; caroline@nieberattorneys.co.za; reinhardt@schabortpotgieter.co.za; Tanya Golden; Salukazana@thulamelachambers.co.za; Molepo Dikeledi; Sekati Gopolang
Subject:	FW: Message from KM_750i
Attachments:	SKM_750i24071813430.pdf

OUR REF: 1122/2024/252
CASE NO: 2024-029857

Good day,

The above matter refers.

Attached hereto, please find a copy of our letter dated the 18th July 2024 for your urgent attention.

Kind Regards
Ms D Molepo

Office of the State Attorney
Pretoria

Private Bag X 91
PRETORIA
0001

SALU Building
19th Floor
316 Thabo Sehume Street

Tel: (Switchboard): (012) 309 1500
(Direct Line): (012) 309 1569
(Secretary): (012) 309 1622

Fax/Faks: (086) 644 7766

Docex: 298

18 July 2024

Enquiries: Ms. D Molepo **My Ref: 1122/2024/Z52**

Email: DIMolepo@justice.gov.za **Your Ref: CASE NO: 2024-029857**

PER E-MAIL: AnNiewoudt@judiciary.judiciary.org.za

CC: nina@biodiversitylaw.org; marius.diemont@dawsons.co.za; charlotte@dawsons.co.za ; kate@biodiversitylaw.org; office@schabortpotgieter.co.za ; pieterh@nienaberattorneys.co.za ; renee@nieberattorneys.co.za ; caroline@nienaberattorneys.co.za ; reinhardt@schabortpotgieter.co.za tanyagolden@capebar.co.za ; Salukazana@thulamelachambers.co.za

MR JUSTICE LEDWABA DJP
THE HONOURABLE DEPUTY JUDGE PRESIDENT
GAUTENG DIVISION OF THE HIGH COURT
PRETORIA

Dear Justice Ledwaba

RE: BIRDLIFE SOUTH AFRICA & ANOTHER / THE MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT
(CASE NO: 2024-029857)

1. We refer to the above-mentioned matter wherein we act on behalf of the First to the Third Respondents.

2. The purpose of this letter is to bring to your Lordship's attention the latest developments regarding this matter.

3. The parties have met and agreed on a variation of the timetable for the filing of papers but the hearing for the application remains in place for the 22nd to the 24th October 2024. The agreement is as follows:

   - The 1st to 3rd Respondents shall file their answering affidavit by 5 August 2024;
   - The 4th and 5th Respondents shall their answering affidavits by 9 August 2024;
   - The Applicants shall file their heads of argument by 13 September 2024;
   - The Respondents shall file their heads of argument by 20 September 2024 (this date remains unchanged) and
   - The hearing is set down for 22 – 24 October 2024 as agreed and previously directed by the Office of the Office of the DJP on 10 June 2024.

4. Trust the Lordship finds the above to be in order.

Yours faithfully,

D MOLEPO
For: STATE ATTORNEY (PRETORIA)

Office of the State Attorney
Pretoria

Private Bag X 91
PRETORIA
0001

SALU Building
19th Floor
316 Thabo Sehume Street

Tel: (Switchboard): (012) 309 1500
(Direct Line): (012) 309 1569
(Secretary): (012) 309 1622

Fax/Faks: (086) 644 7768

Docex: 298

02 August 2024

Enquires: Ms. D Molepo **My Ref: 1122/2024/Z52**

Email: DiMolepo@justice.gov.za **Your Ref: CASE NO: 2024-029857**

PER E-MAIL: AnNiewoudt@judiciary.judiciary.org.za

CC: nina@biodiversitylaw.org; marius.diemont@dawsons.co.za; charlotte@dawsons.co.za ; kate@biodiversitylaw.org; office@schabortpotgieter.co.za ; pieterh@nienaberattorneys.co.za ; renee@nieberattorneys.co.za ; caroline@nienaberattorneys.co.za ; reinhardt@schabortpotgieter.co.za; tanyagolden@capebar.co.za ; Salukazana@thulamelachambers.co.za

MR JUSTICE LEDWABA DJP
THE HONOURABLE DEPUTY JUDGE PRESIDENT
GAUTENG DIVISION OF THE HIGH COURT
PRETORIA

Dear Justice Ledwaba

RE: BIRDLIFE SOUTH AFRICA & ANOTHER / THE MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT
(CASE NO: 2024-029857)

1. We refer to the above-mentioned matter set down for hearing as a special motion on 22 – 24 October 2024.

2. At a case management meeting before the Honourable Deputy Judge President on 6 June 2024, the parties agreed to a timeline for filling the supplementary Rule 53 Record, the subsequent affidavits and heads of argument; and the matter was allocated for hearing on 22 – 24 October 2024. The Deputy Judge President issued a directive in this regard.

3. However, despite their best efforts, the state respondents and their legal representatives have not been able to finalise the answering affidavit within the agreed timeline. We regret this delay and understand the inconvenience it may cause. The delay is a result of various factors including that:

    a. The founding papers and the annexures are voluminous and contain a significant amount of intricate scientific data, formulae and calculations and which includes expert evidence. The founding papers alone comprise approximately 1 000 pages and the Supplementary Record more than 4 000 pages. The extensive historical allegations and scientific data in the application require meticulous consideration and processing to ensure that the answering affidavit is comprehensive and all the necessary information for the Court's determination is presented.

    b. There is a need to consult with several departmental officials across disciplines in order to understand and answer the applicant's expert evidence, which is ongoing, but requires more time.

4. Our clients appreciate the interests of the parties involved but also point out that the decision which is the subject of the review application was taken on 4 August 2023 already and there have been changes in the

Department since then including the appointment of a new Minister for Environmental Affairs, Forestry and Fisheries.

5. In light of the difficulties which are set out herein, the Department and its legal representatives will not be able to complete and file the answering affidavit by Monday 5 August 2024 as subsequently agreed between the parties. The Minister and the Department require more time to place its position as the State before the Court so that the issues are properly and fully ventilated.

6. Our clients do not wish to comprise the allocated hearing dates and will do their best to ensure that the matter is still capable of being heard on these dates. However, given that the State requires more time to file their papers, we will be guided by the DJP as to the suitability of the hearing date.

7. We respectfully request that another case management meeting be convened for the state respondents to explain their position and for a date to be set for filing their answering papers and further management of the matter.

Yours faithfully,

D MOLEPO
For: STATE ATTORNEY (PRETORIA)

Tanya Golden

From: Molepo Dikeledi <DiMolepo@justice.gov.za>
Sent: Friday, 02 August 2024 16:16
To: 'Anna-Marie A. Nieuwoudt'
Cc: Nina Braude; Marius Diemont; Charlotte Ducommun; Kate Handley; office@schabortpotgieter.co.za; Pieter-Hendrik White; Renée Nienaber; Caroline Deyzel; reinhardt@schabortpotgieter.co.za; Tanya Golden; Mfundo Salukazana
Subject: FW: BIRDLIFE SOUTH AFRICA & ANOTHER / THE MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT (CASE NO: 2024-029857)
Attachments: SKM_750i24080216000.pdf

Importance: High

OUR REF: 1122/2024/ZSZ
CASE NO: 2024-029857

Good afternoon,

Attached hereto, please find a copy of our letter dated the 02 August 2024 for the kind attention of Honourable Deputy Judge President.

Kind Regards,
Ms D Molepo

DFFE4

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

5 August 2024

TO:	**The Honourable Deputy Judge President, A Ledwaba** **High Court of South Africa, Gauteng Division**	
ATT:	Ms Avela Mbelani / Ms Anna-Marie Nieuwoudt	AMbelani@judiciary.org.za AnNieuwoudt@judiciary.org.za
COPY TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Therna@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE Attorneys for the First and Second Applicants	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	2	Our Ref: BLC/Penguins2 Your Ref: Case No: 2024-029857

Dear Honourable Judge Ledwaba

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMELINE

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

1. We refer to the letter addressed by the offices of the State Attorney to your office dated 2 August 2024 indicating the inability of the first to third respondents to deliver their answering affidavit by 5 August 2024.

2. Today, we have written to the State Attorney expressing our surprise and concern at their request for further extensions of time. We have enclosed this correspondence marked "1" and draw your particular attention to the history of delays caused by the first to third respondents which is set out in paragraph 3 as well as our position with respect to their request for an amended directive which is set out in paragraphs 5 to 7.

3. We humbly request that you take these factors into consideration in relation to the first to third respondents' request.

4. We note the e-mail received from your offices this morning requesting that the State Attorney's 2 August 2024 letter is hand-delivered, we will make arrangements that this letter is delivered by hand to your offices tomorrow morning.

Yours faithfully,

BIODIVERSITY LAW CENTRE NPC
***Per* Kate Handley and Nina Braude**

"1"

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

		Date:	5 August 2024
TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo		DiMolepo@justice.gov.za
COPY TO:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont		Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter		Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Thema@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE		kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	4	Our ref: Your ref:	BLC/Penguins2 1122/2024/Z52

Dear Ms Molepo

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMETABLE

1. We refer to your letter addressed to the Honourable Deputy Judge President dated 2 August 2024 indicating your clients' inability to deliver their answering affidavit on 5 August 2024.

2. It is with enormous concern that we have read this correspondence which fails to provide a firm deadline for delivery, which invokes questionable reasons for non-delivery and which perpetuates the pattern of delay by your clients' that is becoming a feature of this case.

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

3. Before responding to the contents of your letter, we outline the history of this matter and your clients' persistent delays:

   3.1. The founding affidavit and notice of motion (**the application**) were served on your clients on 20 March 2024. Your clients have thus been in possession of the application for more than four months.

   3.2. The notice of motion required the record to be dispatched within 10 days of this date, namely by 8 April 2024. The notice of motion also made it clear that the application had been brought on an expedited basis.

   3.3. Despite this, your client only delivered the record on 25 April 2024 (**the purported record**). What is more, it did so with significant omissions, without any reasons for the impugned decision and only after our client had been required to deliver a rule 30A notice. Moreover, the purported record was delivered three weeks after the initial deadline of 8 April 2024, 10 days after an extended deadline agreed to by our clients and after the date of 22 April 2024 initially mooted in your request for an indulgence. In other words, despite our clients' application having been brought on an expedited basis, your clients took longer to file the purported record than if the application had been brought under ordinary time periods.

   3.4. Our clients were required to serve a further notice in terms of rule 30A in view of your clients' failure to deliver a complete record.

   3.5. On 28 May 2024, the matter had been referred to case management, with the first case management meeting scheduled for 6 June 2024. Accordingly, in our correspondence dated 3 June 2024, we noted, *inter alia*, that your client had failed to supplement the record within the period required in our clients' further rule 30A notice and indicated that this default would be addressed during the first case management meeting.

   3.6. During the meeting of 6 June 2024, your clients' legal representative indicated that there was no in-principle objection to supplementing the record. Moreover, and critically, your clients' legal representative agreed to a timetable, confirmed by way of a Directive of the Deputy Judge President, requiring supplementation of the record by no later than 14 June 2024, the filing of the applicants' supplementary affidavit by no later than 28 June 2024, and your clients' answering affidavit to be filed by no later than 26 July 2024. It was also indicated at the meeting that your clients had by that point retained the counsel presently on brief for them in this matter.

   3.7. On 14 June 2024, your clients eventually delivered the supplementary record including 203 printed items and five recordings.

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

3.8. On 26 June 2024, our clients duly supplemented their affidavit as required by the Directive and the Rules of Court.

3.9. Notwithstanding your clients having agreed to the timeline, subsequently directed by the Deputy Judge President, on 15 July 2024, your clients' senior counsel engaged with the advocate teams representing our clients as well as the fourth and fifth respondents to, *inter alia*, seek an extension of the date for the filing of the state parties' answering papers citing the scope of the application and volume of the record.

3.10. At the request of the state parties' legal team, a meeting of all the parties was held on 17 July 2024. At that meeting, senior counsel for the state indicated that the state would not be in a position to file its answering affidavit within the timeline provided for in the Directive. She accordingly requested an extension within which to file. In response, the firm stance taken by the applicants was that it would not oppose the extension requested, provided that this did not disrupt the date for the hearing of the matter. On this basis, the parties agreed to a revised timetable to accommodate your clients. Your legal team undertook that your clients' answering affidavit would be filed by no later than 5 August 2024. You confirmed this to the Deputy Judge President by way of correspondence dated 18 July 2024.

3.11. On 19 July 2024, we noted that in your correspondence, you had failed to express the basis on which your clients sought an amended timetable and, also failed to correct certain omissions to the timetable you had provided. You, further, failed to seek the approval of the Deputy Judge President for the revisions conditionally agreed between the parties. We reminded you of this once again, via e-mail, on 29 July 2024. Despite this, no correspondence addressing these issues has been forthcoming.

4. It is against this background that, after the close of business on 2 August 2024, you have once again sought an indulgence regarding your clients' non-compliance with the requirements of the Rules, our clients' notice of motion, a Directive of the Deputy Judge President and subsequently an agreement between the parties.

5. The reasons provided for seeking this indulgence, namely, the volume of the application and the supplementary affidavit are questionable.

5.1. Your clients have been in possession of the application since 20 March 2024. It therefore does not avail your clients to rely on the volume or complexity of the matter as a reason for their delay. Both your clients and their legal representatives have had months to come to grips with the application.

5.2. The contents of the purported record and supplementary record have been provided by your clients and are thus presumed to be within their (and your) knowledge by the time they were produced. If the applicants were able to digest these records in the limited time they had to compile their supplementary affidavit, there can be no

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

reason why your clients should require longer to do the same – especially when they ought already to be familiar with the documents and issues in question.

5.3. Moreover, as we indicated in our letter of 21 June 2024, the main contents of the supplementary record were likely entirely irrelevant.

5.4. The need for your clients to consult with several departments, which we do not concede, also offers no explanation for your clients' ongoing delays. The need for any such consultation ought to have been apparent from the very moment our clients' application was launched and was catered for in the timeline to which your clients agreed at the case management meeting.

5.5. Your clients have been in possession of the supplementary record since 26 June 2024.

5.6. We note further that we were contacted during the week commencing 29 July 2024 by representatives of your clients and legal team requesting clear copies of certain of the maps and diagrams included in the founding affidavit. It is concerning that clear copies of these documents were only being sought at this stage, months after the application was served. It is difficult to resist the conclusion that the matter is only now being given proper attention.

6. Moreover, you have not properly sought amendment of the time-periods (despite our having indicated that you should do so).

7. Your clients' continued delays have frustrated the expeditious hearing of this matter and continue to cause prejudice to our clients, African penguins and all stakeholders who have an interest in having the matter in dispute resolved as quickly as possible. We remind you that the courts have repeatedly emphasised the higher standard to which your clients, as state parties, should conduct themselves as litigants. Their historical and ongoing conduct in these proceedings falls woefully short of this standard. We have sought to accommodate your clients and your legal team as far as possible, however, the court's reading time cannot be prejudiced – nor can the time-periods available for our clients' reply and the preparation of written and oral argument.

8. We will place this correspondence before the Deputy Judge President as a direct response to your request for an amended directive.

Yours sincerely,

BIODIVERSITY LAW CENTRE NPC
***Per* Nina Braude**

DAWSON : EDWARDS & ASSOCIATES

a Guiding Light since

MARITIME COMMERCIAL & ENVIRONMENTAL ATTORNEYS

DFFE5

TO: The Honourable Deputy Judge President, A Ledwaba
High Court of South Africa, Gauteng Division
ATT: Ms Avela Mbelani
AMbelani@judiciary.org.za
Ms Anna-Marie Nieuwoudt
AnNieuwoudt@judiciary.org.za

COPY TO: The State Attorney
Attorneys for the First, Second and Third
Respondents per Ms D Molepo
DiMolepo@justice.gov.za

COPY TO: BIODIVERSITY LAW CENTRE NPC
Kate Handley and Nina Braude
Handley and Nina Braude
kate@biodiveristylaw.org.za
nina@biodiversitylaw.org.za

COPY TO: Webber Wentzel
Attorneys for the amicus curiae
Ms O Geldenhuys / Mr J Venter
Odette.Geldenhuys@webberwentzel.com
Jos.Venter@webberwentzel.com
Nkosinathi.Thema@webberwentzel.com
Dinendri.Pillay@webberwentzel.com

Dear Honourable Judge Ledwaba

Birdlife South Africa and Others / The Minister of Forestry, Fisheries and the Environment and Others (Case Number 2024-02029857)

1. We refer to the letter from the State Attorney dated 2 August 2024 addressed to the Honourable Deputy Judge-President requesting an urgent case management meeting to consider a request for an extension for the State (the first, second and third respondents) to file its answering affidavit.

2. In terms of the directive following the case management meeting held on 17 July 2024, the State was required to file its answering affidavit by 5 August 2024 and the fourth and fifth respondent were required to file its answering affidavit by 9 August 2024. The State has failed to file its answering affidavit.

3. The timetable set originally, which was then later revised to accommodate the State, (by agreement between the parties), always provided that the fourth and fifth respondent would file its answering affidavit *after* the State.

4. As a result of the fact that the State has not met the agreed deadline of 5 August 2024 for filing its answering affidavit, we also request the convening of a case management meeting to understand, *inter alia* (a) when the State will be required to file its answering affidavit and (b) the date whereafter the enswering affidavit is required to be filed on behalf of the fourth and fifth respondent.

Marius Diemont
Senior Consultant
Dawson Edwards and Associates

DFFE6

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

8 August 2024

To:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Thema@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE Attorneys for the First and Second Applicants	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	2	Our Ref: BLC/Penguins2 Case No: 2024-029857

Dear Marius

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMELINE

1. We refer to the letter addressed by yourselves to the office of the Honourable Deputy Judge President and dated 7 August 2024 and which indicates, in conclusion that "*As a result of the fact thet the State has not met the agreed deadline of 5 August 2024 for filing its answering affidavit, we also request the convening of a case management meeting to understand, inter alia (a) when the State will be required to file its answering affidavit and (b) the date whereafter the answering affidavit is required to be filed on behalf of the fourth and fifth respondent*".

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

2. We note that during the case management meeting held on 6 June 2024, your clients requested that they be permitted to file their answering affidavit after the State Parties to avoid duplication of arguments. This request was indulged within the context of the timeline permitted by the hearing date of 22 October 2024 and confirmed in the Directive issued by the Deputy Judge President on 10 June 2024.

3. During the meeting called by the State Parties' legal representatives on 17 June 2024, your clients again sought to maintain a staggered timeline for the filing of the respondents' answering affidavits. While we agreed to such indulgence on behalf of our clients, we did so only insofar as it did not interfere with the hearing dates; the need to resolve the matter expeditiously; and the court's ability to properly consider the parties' papers before the hearing date.

4. Such indulgence at no time contemplated that the filing of your clients' affidavit would be contingent on the filing of affidavits by the first to third respondents. This is especially so in circumstances where our clients' application was brought on an expedited basis and where any such contemplation would have the effect of causing a stalemate in the progress of the matter, as it threatens to in the present instance. This would impermissibly defeat our clients' ability to have the dispute resolved fairly and expeditiously, as contemplated by the Rules and as facilitated by the mechanism of case-management, and would, moreover, be clearly contrary to the interests of justice.

5. Any conceivable benefit arising from the staggered filing of your clients' answering affidavit cannot trump the overriding imperative of ensuring the matter is ripe for hearing by the allocated hearing date, which must inform the timeline as a whole. The first to third respondents' failure to file their answering affidavit in time, and the position now adopted by your clients, risk compromising this imperative. In the circumstances, we will be forwarding this correspondence to the Deputy Judge President, calling for his urgent intervention and the necessary directives.

6. In the interim, our clients maintain that your clients are required to deliver their affidavit tomorrow, 9 August 2024, in accordance with the agreed timeline.

Yours sincerely,

BIODIVERSITY LAW CENTRE NPC
***Per* Kate Handley and Nina Braude**

DFFE7

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

8 August 2024

TO:	**The Honourable Deputy Judge President, A Ledwaba** **High Court of South Africa, Gauteng Division**	
ATT:	Ms Avela Mbelani / Ms Anna-Marie Nieuwoudt	AMbelani@judiciary.org.za AnNieuwoudt@judiciary.org.za
COPY TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Theme@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE Attorneys for the First and Second Applicants	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	2 [4 including enclosure]	Our Ref: BLC/Penguins2 Your Ref: Case No: 2024-029857

Dear Honourable Judge Ledwaba

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMELINE

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

1. We refer to the letters addressed to your office dated 2 August 2024 by the State Attorney on behalf of the first to third respondents and on 7 August 2024 by Dawson, Edwards & Associates on behalf of the fourth and fifth respondents.

2. We note with concern that following the indication from the State Attorney that the first to third respondents needed more time to file their answering affidavit, the fourth and fifth respondents have now indicated that their own filing is contingent on the prior filing of the first to third respondents' answering affidavit.

3. We clarified our position regarding the first to third respondents' request for additional time in our correspondence addressed to the State Attorney and forwarded to your office on 5 August 2024. We now enclose our letter addressed to the attorneys for the fourth and fifth respondents, as sent earlier today, concerning the position adopted by their clients (marked "1").

4. We greatly regret the inconvenience caused to your Lordship's office by these developments, given the clear timeline that had been established to ensure the expeditious hearing of this matter.

5. However, as a result of the position taken initially by the first to third respondents, and now by the fourth to fifth respondents, it appears necessary for a further case management meeting to be convened urgently.

6. Accordingly, we request that you convene such meeting as soon as reasonably possible to ensure the matter is able to proceed to conclusion.

7. We are indebted to your Lordship for your consideration of this request.

Yours faithfully,

BIODIVERSITY LAW CENTRE NPC
***Per* Kate Handley and Nina Braude**

"1"

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

8 August 2024

To:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Thema@webberwentzel.com Dipendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE Attorneys for the First and Second Applicants	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	2	Our Ref: BLC/Penguins2 Case No: 2024-029857

Dear Marius

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMELINE

1. We refer to the letter addressed by yourselves to the office of the Honourable Deputy Judge President and dated 7 August 2024 and which indicates, in conclusion that "*As a result of the fact that the State has not met the agreed deadline of 5 August 2024 for filing its answering affidavit, we also request the convening of a case management meeting to understand, inter alia (a) when the State will be required to file its answering affidavit and (b) the date whereafter the answering affidavit is required to be filed on behalf of the fourth and fifth respondent*".

biodiversitylaw.org
18A Ascot Road, Kenilworth 7708
www.biodiversitylaw.org

Biodiversity Law Centre NPC
Reg No. 2021/631341/08
NPO No. 264 246 NPO
PBO No. 930072892
Law Clinic registered with the Legal Practice Council

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

2. We note that during the case management meeting held on 6 June 2024, your clients requested that they be permitted to file their answering affidavit after the State Parties to avoid duplication of arguments. This request was indulged within the context of the timeline permitted by the hearing date of 22 October 2024 and confirmed in the Directive issued by the Deputy Judge President on 10 June 2024.

3. During the meeting called by the State Parties' legal repreeentatives on 17 June 2024, your clients again sought to maintain a staggered timeline for the filing of the respondents' enswering affidavits. While we agreed to such indulgence on behalf of our clients, we did so only insofar as it did not interfere with the hearing dates; the need to resolve the matter expeditiously; and the court's ability to properly consider the parties' papers before the hearing date.

4. Such indulgence at no time contemplated that the filing of your clients' affidavit would be contingent on the filing of affidavits by the first to third respondents. This is especially so in circumstances where our clients' application was brought on an expedited basis and where any such contemplation would have the effect of causing a stalemate in the progress of the matter, as it threatens to in the present instance. This would impermissibly defeat our clients' ability to have the dispute resolved fairly and expeditiously, as contemplated by the Rules and as facilitated by the mechanism of case-management, and would, moreover, be clearly contrary to the interests of justice.

5. Any conceivable benefit arising from the staggered filing of your clients' answering affidavit cannot trump the overriding imperative of ensuring the matter is ripe for hearing by the allocated hearing date, which must inform the timeline as a whole. The first to third respondents' failure to file their answering affidavit in time, and the position now adopted by your clients, risk compromising this imperative. In the circumstances, we will be forwarding this correspondence to the Deputy Judge President, calling for his urgent intervention and the necessary directives.

6. In the interim, our clients maintain that your clients are required to deliver their affidavit tomorrow, 9 August 2024, in accordance with the agreed timeline.

Yours sincerely,

BIODIVERSITY LAW CENTRE NPC
***Per* Kate Handley and Nina Braude**

WEBBER WENTZEL
in alliance with > Linklaters

DEPUTY JUDGE PRESIDENT LEDWABA
Gauteng Division of the High Court, Pretoria
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By hand AND email

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COPY TO:

BIODIVERSITY LAW CENTRE
Attorneys for the applicants
By email: kate@biodiversitylaw.org;
nina@biodiversitylaw.co.za

STATE ATTORNEY, PRETORIA
Attorneys for the first to third respondents
By email: DiMolepo@justice.gov.za;
GSekati@justice.gov.za

DAWSON EDWARDS & ASSOCIATES
Attorneys for the fourth and fifth respondents
By email: marius.diemont@dawsons.co.za;
charlotte@dawsons.co.za

Your reference	Our reference	Date
Case no: 2024 – 029857	O Geldenhuys / N Thema / J Venter / 4010229	5 August 2024

Dear Deputy Judge President Ledwaba,

BIRDLIFE SOUTH AFRICA & ANOTHER // THE MINISTER OF FORESTRY FISHERIES AND EBVIRONMENT (CASE NO. 2024 – 029857)

1. We act on behalf of Animal Law Reform South Africa NPC ("**our client**").

2. We refer to the above matter which is under case management before your Lordship. The matter has been set down for hearing as a special motion from 22 to 24 October 2024.

3. On 30 July 2024, we duly served on the parties to the proceedings our client's application in terms of Rule 16A for leave to be admitted as *amicus curiae* in this matter. Prior consent was obtained from the applicants and the first respondent in the main application. The second to fifth respondents did not respond to our request for consent.

4. It was agreed with the consenting parties that our client's heads of argument would be filed before 6 September 2024 to avoid any disturbance to the hearing date.

5. We understand that on 2 August 2024, the legal representatives of the first to third respondents requested that a further case management meeting be convened for the setting of revised timelines for the filing of answering papers in the main application.

6. We humbly request your Lordship to permit our counsel to attend the proposed case management in order to obtain directives in respect of the future conduct of our client's *amicus* application. This letter has been sent to the legal representatives of the parties to the proceedings.

7. Our client's *amicus* application has been uploaded to Court Online and is currently pending approval by the Registrar.

8. We trust that the above is in order. We await your further directive with regard to our clients' *amicus* application.

Yours faithfully

WEBBER WENTZEL
Odette Geldenhuys
Partner
Direct tel: +27 21 431 7290
Email: odette.geldenhuys@webberwentzel.com

DFFE9

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

Date: 14 August 2024

TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Thema@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	2	Our ref: BLC/Penguins2 Your ref: 1122/2024/Z52

Dear Ms Molepo

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FDRESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMETABLE

1. We refer to the Directive of the Honourable Deputy Judge President dated 10 June 2024 (**the Directive**) and subsequent engagements between the parties regarding the filing of your clients' answering affidavit, including your letter addressed to the Honourable Deputy Judge President dated 2 August 2024 and our further correspondence dated 5 August 2024.

2. As recorded in our correspondence:

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

2.1. The Directive required that your clients deliver their answering affidavit by no later than 26 July 2024. This date was determined with the agreement of your legal team. However, your clients failed to deliver their answering affidavit by this deadline.

2.2. Rather, and in anticipation of this deadline, your clients' senior counsel engaged with the parties' legal teams to seek a filing extension on 15 July 2024. At the all-parties meeting, subsequently convened on 17 July 2024, your legal team undertook that your clients' answering affidavit would be provided by no later than 5 August 2024. This was confirmed by yourself in your correspondence to the Deputy Judge President dated 18 July 2024.

2.3. Notwithstanding such undertaking, your clients again expressed their intention not to meet the deadline for filing of their answering affidavit when addressing its correspondence dated 2 August 2024 to the Deputy Judge President. We note that such correspondence provided no indication of a deadline for delivery.

3. On each of these occasions, your clients have indicated that the volume of the papers has warranted delay. We refer to our response to this complaint in our letter of 4 August 2024 to avoid repetition here.

4. However, from engagements between representatives of your clients and both ourselves and our clients, we now understand that an affidavit has been prepared.

4.1. As noted in our letter dated 5 August 2024, during the course of the week of 29 July 2024, engagements between ourselves and your clients' legal team suggested that your clients' answering affidavit was in progress – if not already drafted.

4.2. Further, we are instructed that during engagements between our respective clients during the week of 5 August 2024 (which was unrelated to the present litigation), some indication was provided that your clients' affidavit had in fact been prepared.

5. In the circumstances, we request that you urgently indicate when your clients answering affidavit will be filed.

6. Please note that we intend to furnish the DJP with a copy of all correspondence between the parties so that he is apprised of developments in this matter.

Yours sincerely,

BIODIVERSITY LAW CENTRE NPC

***Per* Nina Braude**

OFFICE OF THE DEPUTY JUDGE PRESIDENT A P LEDWABA
HIGH COURT OF SOUTH AFRICA, GAUTENG PROVINCIAL DIVISION, PRETORIA

Gauteng High Court Building, Cnr. Madiba (Vermeulen) & Paul Kruger Str, Room 7.15, Seventh Floor
Tel. (012) 315 - 7571 - E-mail: AnNieuwoudt@judiciary.org.za

2 September 2024

TO:	**BIODIVERSITY LAW CENTRE**
Tel:	(079) 248 5663
Email:	kate@biodiversitylaw.org / nina@biodiversitylaw.co.za
Our Ref:	029857/2024/DJP LEDWABA/AN

TO:	**THE STATE ATTORNEY**
Tel:	(012) 309 - 1630
Email:	DiMolepo@justice.gov.za
Your Ref:	1122/2024/Z52
Our Ref:	029857/2024/DJP LEDWABA/AN

TO:	**DAWSON EDWARDS & ASSOCIATES**
Email:	Marius.Diemont@dawsons.co.za / charlotte@dawsons.co.za
Our Ref:	029857/2024/DJP LEDWABA/AN

Dear Madam/Sir

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS
CASE NO.: 029857/2024

1. The above matter as well as the case-management meeting on 6 June 2024 refer.

2. The matter is hereby set down as a special motion on **22 to 24 OCTOBER 2024**. You are directed to file and upload unto CaseLines and send via email (AnNieuwoudt@judiciary.org.za) to my office a notice of set down with a copy of this letter attached to it **within 7 (seven) days** after receipt hereof, failing which the allocated date(s) of hearing will lapse and the date may be allocated to other litigants who applied for a special motion date.

3. You are directed to serve and file by uploading unto CaseLines as follows:

   3.1 Industry Respondent's answering affidavit by no later than **23 AUGUST 2024**.

   3.2 Applicant's replying affidavit by no later than **13 SEPTEMBER 2024.**

   3.3 Amicus curiae heads of argument by no later than **20 SEPTEMBER 2024**.

   3.4 Applicant's heads of argument by no later than **23 SEPTEMBER 2024**.

   3.5 Industry Respondent's heads of argument by no later than **30 SEPTEMBER 2024**.

4. The parties should file and upload unto CaseLines and send via email (AnNieuwoudt@judiciary.org.za) to my office a **Joint Practice Note, Chronology of events and Joint list of authorities** by no later than **4 OCTOBER 2024** containing the following:

   - Names of the parties and the case number
   - Names and telephone numbers of all counsel in the Motion
   - Nature of the Motion
   - Issues to be determined in the application
   - Relief sought at the hearing by the party on whose behalf counsel is appearing
   - An estimate of the probable duration of the application

- Number of pages in the application and whether or not all papers need to be read and if not, which portion need not be read

5. Should it, for any reason(s), transpire that this matter will not proceed on the allocated date/s, you are directed to inform the office of the Deputy Judge President via email to AnNieuwoudt@judiciary.org.za immediately.

6. None availability of counsel representing any of the parties shall simply not be allowed as a reason for the matter not to proceed on the date of hearing arranged with my office.

7. **Should the above directive not be complied with, the matter may not be allocated to a Judge and the allocated date(s) will be utilized for other deserving cases.**

Regards

ELECTRONICALLY GENERATED (NOT SIGNED)

A LEDWABA
DEPUTY JUDGE PRESIDENT
NORTH GAUTENG HIGH COURT
CASE NUMBER 029857/2024

DFFE10

Office of the State Attorney
Pretoria

Private Bag X 91
PRETORIA
0001

SALU Building
19th Floor
316 Thabo Sehume Street

Tel: (Switchboard): (012) 309 1500
(Direct Line): (012) 309 1569
(Secretary): (012) 309 1622

Fax/Faks: (086) 644 7766

Docex: 298

21 August 2024

Enquires: Ms. D Molepo **My Ref: 1122/2024/Z52**

Email: DiMolepo@justice.gov.za **Your Ref: CASE NO: 2024-029857**

PER E-MAIL: nina@biodiversitylaw.org; marius.diemont@dawsons.co.za; charlotte@dawsons.co.za ; Odette.Geldenhuys@webberwentzel.com; Jos.Venter@webberwentzel.com; Nkosinathi.Thema@webberwentzel.com ; Dinendri.Pillay@webberwentzel.com ; Lauren.Jimmy@webberwentzel.com; kate@biodiversitylaw.org; nina@biodiversitylaw.org office@schabortpotgieter.co.za ; pieterh@nienaberattorneys.co.za ; renee@nieberattorneys.co.za ; caroline@nienaberattorneys.co.za ; reinhardt@schabortpotgieter.co.za

Dear All, **URGENT**

RE: BIRDLIFE SOUTH AFRICA & ANOTHER / THE MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT
(CASE NO: 2024-029857)

1. At the request of our client, the Minister of Forestry, Fisheries and the Environment, Dr Dion George, we ask that you bring this letter to the attention of your clients for their urgent attention.

2. We refer to prior engagement and email correspondence wherein we have, on behalf of the Minister and the Department, proposed the establishment of a Working Group comprising the representatives of the relevant parties and affected stakeholders in order to resolve the litigation, alternatively, to suspend the litigation, pending the outcome of the work of the Working Group. We have received no response from the applicants, fourth and fifth respondents.

3. The Minister hereby requests a meeting with the parties involved (Birdlife SA, SANCCOB and SA Pelagic Fishing Industry), without legal representatives, to discuss the litigation and to try and find common ground with a view to settling the matter. The Minister is strongly of the view that the litigation is capable of settlement and that it should settle, given the different interests and rights of the parties and stakeholders involved. Protracted litigation will not serve the interests of any of the parties given that it is not unlikely that the litigation could continue for a number of years at great cost to all involved.

4. Could your respective clients kindly respond urgently if they are willing to meet so that logistical arrangements can be made for the meeting including the date, place and time. The Minister proposes that the meeting should take place without delay and within the course of next week, if possible.

5. We await your urgent response by close of business on 23 August 2023.

Yours faithfully,

O MOLEPO
For: STATE ATTORNEY (PRETORIA)

DFFE11

DAWSON · EDWARDS & ASSOCIATES

In the Right

MARITIME COMMERCIAL & ENVIRONMENTAL ATTORNEYS

TO: **The State Attorney**

Attorneys for the First, Second and Third Respondents

Per: Ms D Molepo

Email: DiMolepo@justice.gov.za

AND TO: **Biodiversity Law Centre**

Attorneys for the First and Second Applicants

Per: Kate Handley / Nina Braude

Email: kate@biodiversitylaw.org

nina@biodiversitylaw.org

COPY TO: **Webber Wentzel**

Attorneys for the *Amicus Curiae*

Per: Ms O Geldenuys / Mr J Venter

Email: Odette.Geldenhuys@webberwentzel.com

Jos.Venter@webberwentzel.com

Dear Ms Molepo

Birdlife South Africa and others // Minister of Forestry, Fisheries and the Environment (Case Number: 2024-029857)

1. We are instructed by our clients, the fourth and fifth respondents (the industry respondents) to reply to your letter dated 21 August 2024, requesting a meeting with the Minister, "without legal representatives, to discuss the litigation and to try and find common ground with a view to settling the matter".

2. The industry respondents remain commit to fully co-operating and participating in any settlement negotiations with a view to finding common ground but have a number of concerns which need to be addressed prior to any such meeting.

3. First, is that no settlement proposal has been put forward for consideration by the industry respondents.

4. Second, is that the meeting is to take place without legal representatives. This is problematic as proper consideration of any proposals will require legal advice.

5. Third, the Minister has met with representatives of the applicant and also had WhatsApp exchanges with representatives of the applicant. As we have pointed out before, this interaction with the Minister and his office is highly irregular without the involvement and participation of the industry respondents. For this reason, we request that the Minister will afford the industry respondents the same opportunity for an in-person engagement with the Minister, prior to the proposed meeting next week with all parties.

Yours sincerely,

Marius Diemont

Senior Consultant

Dawson Edwards and Associates

DFFE12

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

Date: 23 August 2024

TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Thema@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	2	Our ref: BLC/Penguins2 Your ref: 1122/2024/252

Dear Ms Molepo

RE: BIRDLIFE SOUTH AFRICA & OTHERS/ MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | RESPONSE TO URGENT CORRESPONDENCE

1. We refer to your correspondence marked "urgent" and dated 21 August 2024.

2. We are surprised by your suggestion that no response was received from our clients or the fourth and fifth respondents **(Industry parties)** to the correspondence in which you proposed the establishment of a Working Group. That is not correct. We draw your attention to the correspondence sent on behalf our clients as well as the Industry parties on 21 August 2024, prior to the delivery of your letter, as well as our e-mail query to

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

yourself, sent yesterday, asking whether this correspondence had been brought to the attention of your clients.

3. Our clients are amenable to engaging with the Minister and the Industry parties to explore a resolution which gives meaningful effect to the recommendation of the international expert panel regarding delineation of island closures using a specific trade-off mechanism (**the island closure issue**). However, no concrete proposal has been mooted for discussion, let alone any which immediately addresses the island closure issue. Accordingly, it would be helpful to receive clarity, in advance of the proposed meeting, regarding what the Minister proposes to discuss.

4. Furthermore, our clients' instructions are that they would be more comfortable meeting in the presence of their legal team.

5. Any participation by our clients in the Minister's proposed engagement with the parties is done without prejudice to our clients' rights in relation to the pending litigation, which our clients will persist with unless and until a resolution, which meaningfully addresses the island closure issue, is achieved.

Yours sincerely,

BIODIVERSITY LAW CENTRE NPC
***Per* Nina Braude**

DFFE13

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

28 August 2024

TO:	**The Honourable Deputy Judge President, A Ledwaba** **High Court of South Africa, Gauteng Division**	
ATT:	Ms Avela Mbelani / Ms Anna-Marie Nieuwoudt	AMbelani@judiciary.org.za AnNieuwoudt@judiciary.org.za
COPY TO:	**The State Attorney** Attorneys for the First, Second and Third Respondents *per* Ms D Molepo	DiMolepo@justice.gov.za
COPY TO:	**Dawson Edwards & Associates** Attorneys for the Fourth and Fifth Respondents *per* Mr M Diemont	Marius.Diemont@dawsons.co.za charlotte@dawsons.co.za
COPY TO:	**Webber Wentzel** Attorneys for the *amicus curiae per* Ms O Geldenhuys / Mr J Venter	Odette.Geldenhuys@webberwentzel.com Jos.Venter@webberwentzel.com Nkosinathi.Thema@webberwentzel.com Dinendri.Pillay@webberwentzel.com Lauren.Jimmy@webberwentzel.com
FROM:	BIODIVERSITY LAW CENTRE Attorneys for the First and Second Applicants	kate@biodiversitylaw.org nina@biodiversitylaw.org
Total pages:	3	Our Ref: BLC/Penguins2 Your Ref: Case No: 2024-029857

Dear Honourable Judge Ledwaba

RE: BIRDLIFE SOUTH AFRICA & OTHERS / MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT & OTHERS (Case Number: 2024-029857) | AMENDED TIMELINE

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LAW FOR NATURE

1. We refer to the second case management meeting presided over by your Lordship on Monday 15 August 2024 during which you determined a revised timeline (**Amended Timeline**). We write to you requesting confirmation of the Amended Timeline, in the form of a directive to be circulated to all parties.

2. The Amended Timeline requires:

   2.1. the fourth and fifth respondents (**Industry Respondents**) to file their answering affidavit by Friday 23 August 2024;

   2.2. the applicants to file their replying affidavit by 3 September 2024;

   2.3. the *amicus curiae* to file its heads of argument by 13 September 2024;

   2.4. the applicants to file their heads of argument by 23 September 2024;

   2.5. the Industry Respondents to file their heads of argument by 30 September 2024;

   2.6. the parties to file a joint chronology, practice note and authorities by 4 October 2024; and

   2.7. the hearing to proceed on 22 to 24 October 2024.

3. On 23 August 2024, the Industry Respondents duly filed their answering affidavit which runs to over 100 pages without annexures and is accompanied by a detailed, 82-page expert affidavit. The first to third respondents (**State Respondents**) have not filed any answering affidavit/s.

4. The applicants have conducted a preliminary review of the Industry Respondents' answering affidavit. It is immediately apparent that digesting and replying to the Industry Respondents' evidence, and particularly that of their expert witness, will be a tedious and time-consuming exercise. In addition, it appears that it may be necessary for the applicants to engage their own experts (some of whom are outside South Africa and/or engaged in field work) to provide a proper reply.

5. While we had committed at the meeting before your Lordship to file the applicants' replying affidavit by 3 September 2024, it is not possible to reply to the Industry Respondents' answering affidavit and expert evidence by then. Indeed, in the light of the Industry Respondents' evidence, the applicants would be prejudiced were they required to do so.

6. In the circumstances, we seek your indulgence to afford the applicants until 13 September 2024 to file their answering affidavit. We have engaged with the *amicus curiae*, who were to file their heads of argument by that date, and they have agreed – subject to your Lordship's confirmation – to file their Heads of Argument on 20 September 2024. Were your Lordship to allow that, the remainder of the Amended Timeline would be able to proceed undisturbed, thereby preserving the opportunity for the court to read into the matter.

BIODIVERSITY LAW CENTRE
LAW FOR NATURE

7. We submit that the indulgence sought is appropriate, bearing in mind the complexity of the matter and that the Industry Respondents had five months from receiving the application and almost two months from receiving the applicants' supplementary founding affidavit to file their answer. We also submit that no material prejudice will result to the respondents by receiving the applicants' replying affidavit on 13 September 2024, as they will have until 30 September to digest the applicants' reply for purposes of their heads of argument.

8. Accordingly, we request that your Lordship confirms the following timeline in a written directive (of which only paragraphs 8.2 and 8.3 are a variation of the Amended Timeline):

   8.1. Industry Respondents' answering affidavit – 23 August 2024;

   8.2. applicants' replying affidavit – 13 September 2024;

   8.3. *amicus curiae* heads of argument – 20 September 2024;

   8.4. applicants' heads of argument – 23 September 2024;

   8.5. Industry Respondents' heads of argument – 30 September 2024;

   8.6. joint practice note, chronology and authorities – 4 October 2024; and

   8.7. directions applicable to the first to third respondents should they wish to file further papers.

9. We remain indebted to your Lordship for your consideration of our request.

Yours faithfully,

BIODIVERSITY LAW CENTRE NPC
***Per* Nina Braude**

DFFE14

DAWSON · EDWARDS & ASSOCIATES

MARITIME COMMERCIAL & ENVIRONMENTAL ATTORNEYS

TO: **A Ledwaba**
Deputy Judge-President
North Gauteng High Court
Email: AnNieuwoudt@judiciary.org.za

AND TO: **Biodiversity Law Centre**
Attorneys for the First and Second Applicants
Per: Kate Handley / Nina Braude
Email: kate@biodiversitylaw.org
nina@biodiversitylaw.org

AND TO: **The State Attorney**
Attorneys for the First, Second and Third Respondents
Per: Ms D Molepo
Email: DiMolepo@justice.gov.za

COPY TO: **Webber Wentzel**
Attorneys for the *Amicus Curiae*
Per: Ms O Geldenuys / Mr J Venter
Email: Odette.Geldenhuys@webberwentzel.com
Jos.Venter@webberwentzel.com

Dear Hon Judge Ledwaba

Birdlife South Africa and others // Minister of Forestry, Fisheries and the Environment (Case Number: 2024-029857)

1. We act on the instructions of the fourth and fifth respondents (the industry respondents).
2. In terms of the second case management meeting held on Monday 19 August 2024, the directive issued required that the fourth and fifth respondent would have received the applicants' replying affidavit on 3 September, and would have had a proper opportunity (between 3 September and 30 September) to consider their reply to our evidence and to prepare heads of argument for the fourth and fifth reepondant before filing its heads of argument ton 30 September 2024:
3. On Wednesday 28 August 2024, the legal representatives for the applicant addressed correspondence to the parties requesting an adjustment to the timetable to allow more time for the applicant to file its replying affidavit, in terms of which it would now file its

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Peter Anthony Edwards BA LLB LLM DIP TAX – Director | Grant Clark BA LLB LLM – Director | Alistair Dowsing B.Proc LLM – Director | Nicholas Britz B.Soc.Sci LLB LLM – Director
Marius Diemont BA LLB LLM (Marine Law) – Senior Consultant
P Dawson & Associates Incorporated Reg No. 97/15847/21

heads of argument on 20 September 2024 (previously 3 September 2024). This was agreed to by the *amicus* curiae. The date for the hearing would remain the same, being 2024 October 2024 (the new proposal).

4. We refer to the amended directive issued today, Monday 2 September 2024 (the amended directive) which requires the following:
   a. Industry respondents (fourth and fifth respondents) answering affidavit – 23 August 2024;
   b. Applicants replying affidavit – **13 September 2024** (previously 3 September 2024);
   c. *Amicus curiae* heads of argument – 20 September 2024 (previously 13 September 2024);
   d. Applicants' heads of argument – 23 September 2024;
   e. Industry respondents' heads of argument – **30 September 2024**;
   f. Joint practice note, chronology and authorities – 4 October 2024.
5. On 28 Wednesday 2024, we addressed correspondence to the applicants' legal representatives pointing out that in terms of the applicant's new proposal, the fourth and fifth respondents would now be left with very little time to consider the replying affidavit of the applicant and to prepare heads of argument for the fourth and fifth respondent.
6. In terms of the new proposal, (and as recorded in the amended directive issued today) the fourth and fifth respondents would now only see the replying affidavit a full ten days later than in terms of the previous directive, being 13 September. Given how extensive the answering affidavit of the fourth and fifth respondent is, we can fairly assume that the replying affidavit of the applicant will be equally complex and extensive.
7. Consequently, we requested that the applicant agree to the fourth and fifth respondent being able to file its heads of argument on **3 October** (and not 23 September 2024) to provide proper time for the fourth and fifth respondent to consider the applicants' replying affidavit and heads of argument before filing the heads of argument on behalf of the fourth and fifth respondent, with the joint practice note to be filed in on 4 October 2024.
8. On 28 August 2024, the applicants' legal representatives agreed to our request for the timetable to be adjusted so that the heads of argument of the fourth and fifth respondent

be filed on 3 October 2024 (and not 30 September 2024). See the attached email confirmation, marked as annexure "A".

9. We accordingly request that the amended timetable issued today (2 September 2024) be revised to incorporate this arrangement, as agreed between the parties, that the heads of argument for the industry respondents be filed on 3 October 2024 with all other dates to remain the same.

Yours sincerely,

Marius Diemont
Senior Consultant
Dawson Edwards and Associates

2 September 2024

"A"

From: Kate Handley <kate@biodiversitylaw.org>
Sent: Wednesday, 28 August 2024 15:38
To: Marius Diemont <marius.diemont@dawsons.co.za>; Nina Braude <nina@biodiversitylaw.org>
Cc: DiMolepo@justice.gov.za; Odette Geldenhuys <Odette.Geldenhuys@webberwentzel.com>; Jos Venter <jos.venter@webberwentzel.com>; Nkosinathi Thema <Nkosinathi.Thema@webberwentzel.com>; Dinendri Pillay <Dinendri.Pillay@webberwentzel.com>
Subject: RE: Birdlife South Africa and Others // The Minister of Forestry, Fisheries and Environment and Others (Case No: 2024-029857)

Dear Marius

We have looked at the timeline and agree that your team may file heads of argument on 3 October 2024, with the joint practice note to be filed on 4 October 2024. Kindly address correspondence to this effect to the DJP.

Regards,
Kate

DFFE15

PERMIT CONDITIONS: PELAGIC FISH ANCHOVY FISHERY: 2024

Fishing season: 2024

DA[illegible] APPROVAL: 17 [illegible] 2024

environment, forestry & fisheries

Department: Environment, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

TABLE OF CONTENTS

SECTION B

1. APPLICABLE ACTS, POLICIES AND DELEGATIONS

1.1 This permit is issued in terms of section 13 of the Marine Living Resources Act, 1998 (Act No. 18 of 1998).

1.2 The permit does not absolve the permit holder from complying with all other applicable laws, including but not limited to:

(a) The Marine Living Resources Act, 1998 (Act No. 18 of 1998) ("the MLRA") and the Regulations promulgated thereunder;

(b) The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Regulations promulgated thereunder;

(c) The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and the Regulations promulgated thereunder;

(d) The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPA) and the Regulations promulgated thereunder;

(e) The Sea Birds and Seals Protection Act, 1973 (Act No. 46 of 1973) (SBSPA) and the Regulations promulgated thereunder;

(f) Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (ICMA) and the Regulations promulgated thereunder;

(g) The International Convention for the Prevention of Pollution from Ships Act, 1986 (Act No. 2 of 1986) (ICPPSA) and the Regulations promulgated thereunder.

(h) The Fire Arms Control Act, 2000 (Act No. 60 of 2000) (FACA) and the Regulations promulgated thereunder;

(i) South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998) (SAMSA) and the Regulations promulgated thereunder;

(j) The Animals Protection Act, 1962 (Act No. 71 of 1962) (APA) and the Regulations promulgated thereunder;

(k) The Standards Act, 2008 (Act No. 8 of 2008) (SA) and the Regulations promulgated thereunder;

(l) The National Regulator for Compulsory Specifications Act, 2008 (Act No. 5 of 2008) (NRCSA) and the Regulations promulgated thereunder;

(m) National Ports Authority Act, 2005 (Act No. 12 of 2005) (NPA) and the Regulations promulgated thereunder; and

(n) The Companies Act, 2008 (Act No. 71 of 2008) (CA) and the Regulations promulgated thereunder; and

(o) The Conservation Measures and Resolutions for the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

1.3 For the 2024 (15 January 2024 to 31 December 2024) and subsequent fishing seasons, permits / permits in this fishery shall be issued subject to the further provisions of the –

(a) General Policy on the Allocation of Long Term Commercial Fishing Rights and the Management of Commercial Fisheries;
(b) Small Pelagics Fishery Policy; and
(c) Small Pelagics Fishery Manual (to be developed).

1.4 The Directors: Offshore and High Seas Fisheries Management and Inshore Fisheries Management shall be entitled to amend these permit conditions.

1.5 Any reference to the Right Holder in these permit conditions includes the entity or person in whose name the commercial fishing right was allocated ("the Permit Holder"), its employees (whether permanent, full-time or part-time), its contractors, agents or advisers and the skipper of the vessel.

2. VALIDITY OF PERMIT

2.1 This permit shall be valid for the period indicated in Section A the permit ("the Permit").

2.2 This permit shall automatically expire and be invalid should:
(a) the right be cancelled or revoked in terms of Section 28 of the MLRA,
(b) the quantum allocated to the Permit Holder is caught;
(c) the fishing season is terminated or ends; and
(d) the permit be revoked, cancelled or suspended in terms of section 28 of the MLRA.
(e) In these cases the original permit shall be returned to the Department (Attn: Qayiso Mketsu / Johan De Goede/).

3. FISHING AREAS

3.1 No person shall use any purse-seine net for fishing or any other purpose in the following areas:

(i) In Walker Bay landwards of imaginary lines drawn from:

a) "Voorsteklip" on the Plaat (34° 31.1'S 19° 22.3' E) to the beacon marked M1 at Mudge Point (34° 24.0' S 19° 07.3' E), near Hawston; and
b) The lighthouse on the southern breakwater in the fishing harbour of Gansbaai (34° 35.0' S 19° 20.7 E) and a beacon marked M1 at Mudge Point, during the period 1 December to 31 January.

(ii) landward from a straight line joining
a) Cape Vacca (34° 20.3' S 21° 55.0'E) and the lighthouse at Cape St Blaize (34° 11.2' S 22° 09.'E); and

b) The lighthouse at Cape St Blaize and Gericke Point (34° 02.3' S 22° 45.9' E).

(iii) All Marine Protected Areas as declared under section 43 of the MLRA and all closed areas as declared under section 77 of the MLRA. Phakisa MPAs declared 23 May 2019: https://www.environment.gov.za/legislation/actsregulations

Alternatively, please use: http://www.gpwonline.co.za/Gazettes/Pages/Published-Separate-Gazettes.aspx and download 42478 and 42479.

(iv) Within the following areas around African penguin breeding colonies between 15 January and 31 December 2024:

a) Dassen Island and Robben Island (existing MPA restrictions only). See map with coordinates in Figure 1.

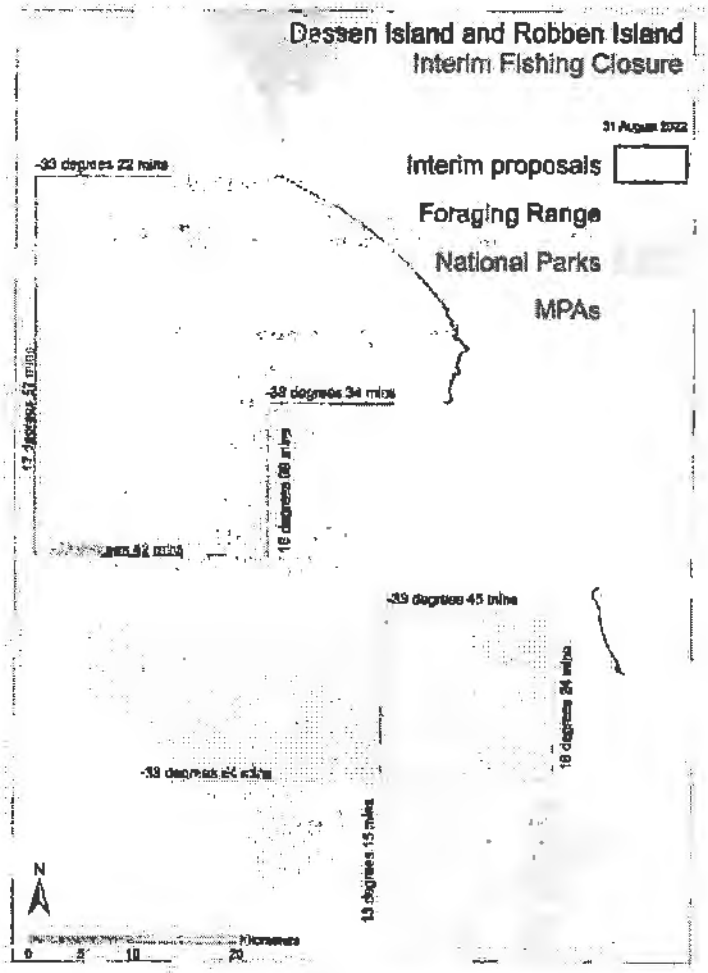


Figure 1: Closures from 15 January to 31 December 2024 in the vicinity of Dassen and Robben Islands

b) In the Stony Point (Betty's Bay) area and Dyer Island (Gansbaai) area, see Figure 2. Note that all vessels are excluded from the area landward of the dashed line within the Dyer Island vicinity, but that vessels with a total length less than 26 m are permitted to fish offshore of the dashed line.

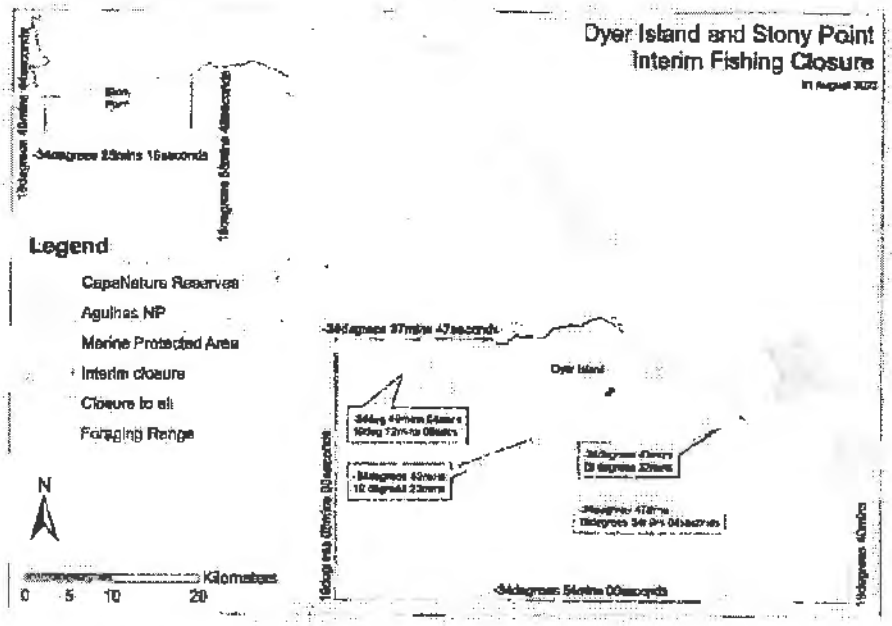


Figure 2: Closures from 15 January to 31 December 2024 in the vicinity of Stony Point and Dyer Island.

c) In the Algoa Bay area around St Croix and Bird Islands, see Figure 3.

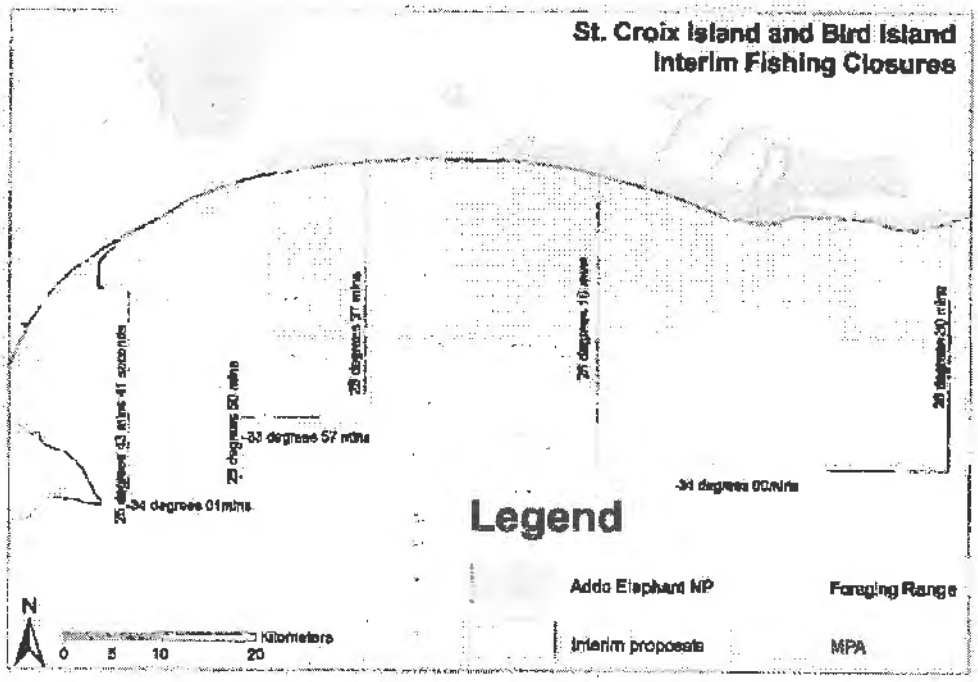


Figure 3: Closures from 15 January to 31 December 2024 in the vicinity of St Croix and Bird Islands.

4. NOTIFICATIONS

4.1 The Permit Holder shall inform the local Fishery Control Officer/ Marine Resources Monitor in writing (as per Annexure C) at least 2 (two) hours prior to the intended time of landing of the following:

(a) The vessel details;
(b) Which Permit Holder(s) the catch is to be allocated/apportioned to;
(c) The estimated catch on board;
(d) The species of fish harvested;
(e) The estimated time of arrival; and
(f) The port of arrival and landing point

If the Permit Holder / Vessel Owner wishes to fish in the Exclusive Economic Zones (EEZ) of another country (.e.g. Namibia) for part of the year, the Permit Holder / Vessel Owner is required to follow procedures as stipulated in **Annexure D** of these permit conditions. Any fish caught under this charter agreement will not accrue to South Africa. Furthermore, this performance will not be considered in any fishery performance reviews

4.2 If circumstances render it impossible to land fish to the prescribed factory, immediate notification must be given to the local Fishery Control Officer within 2 (two) hours prior to the intended time of landing. Fish shall only be landed after written approval by the local Fishery Control Officer has been granted. Written notification must be given to the local Fishery Control Officer within 48 (forty-eight) hours of the landing and particulars of the catch and reasons why the prescribed factory was not utilised must be provided. A copy of such notification must be attached to the relevant landing sheet. The Permit Holder shall then apply to have the non-prescribed factory named on the catch permit within 7 working days after the landing.

4.3 Skippers are to report any accidental spillage or sightings/evidence of dead fish due to, but not limited to fishing operations, e.g. predator interference, net recovery, net damage (tearing), not in the proper, mechanical or hydraulic failures impacting the vessel's manoeuvrability and/or navigation problems, etc.

4.4 Reports, which should include the navigational position as well as the pelagic block number, should be forwarded via email or WhatsApp to the Area Controller and nearest local Fishery Compliance Office as per contact details provided for the landing sites in Annexure C (page 30) of these conditions.

5. EFFORT LIMITATIONS AND GEAR RESTRICTIONS

5.1 Whilst operating in terms of the provisions of this permit, the Permit Holder shall not activate any other fishing right allocated to it.

5.2 The Permit Holder shall only utilise a purse-seine net, which shall also be the only fishing gear on board the vessel

6. CATCH CONTROLS AND LIMITATIONS

6.1 No fish except Anchovy, red eye (limited to approved industry upper catch limit) or lanternfish and lightfish (limited to industry combined species approved limit) shall be targeted.

6.2 No pelagic fish shall be dumped or discarded into the sea or deliberately freed from the net.

6.3 All linefish species or any other incidental catches landed shall be forfeited to the State and must be handed to the Fishery Control Officer/ Marine Resources Monitor at the landing site upon landing or when inspected.

6.4 By-catch of chub mackerel and horse mackerel (maasbanker) should be managed as per the attached by-catch management plan (Annexure B).

6.5 A Permit Holder who reaches their apportioned catch allocation shall immediately cease any further landing of that species against that Permit.

6.6 Should the Permit Holder fail to adhere to the above conditions, the Department may (with respect to paragraphs 9.1 and 9.2) confiscate the unauthorised gear. The Department may implement the provisions of section 28 of the MLRA and/or legal proceeding in all cases where the above conditions are believed to have been breached.

6.7 If the last set of the season (for either the normal season or the sub-season, if the latter is allocated) leads to an over-catch for a particular Permit Holder, that landing must be split and the excess amount of fish deducted from another Permit Holder's allocation, if that vessel is in possession of an permit for more than one Permit Holder and provided that the other Permit Holder's allocation has not yet been filled. If the other Permit Holder/s allocation has been filled then the over catch will be automatically deducted from the following season's final allocation for the Permit Holder that has over-caught.

6.8 Should a vessel be in possession of a permit for a single Permit Holder only, and if the last set of the season (for either the normal season or the sub-season, if the latter is allocated) results in an over-catch for that Permit Holder's allocation, then that amount of fish will automatically be deducted from the following season's final allocation for that Permit Holder.

6.9 When deliberate over-catching of a Permit Holder's allocation is suspected, the Department may institute Section 28 proceedings under the MLRA or criminal proceedings against such a Permit Holder. For example, if a skipper makes two consecutive sets and the initial set caught sufficient fish to fill an Permit Holder's allocation, then the last set will be considered to be a deliberate over-catch. That over-catch will automatically be deducted from the following season's final allocation for that Permit Holder, and in addition possible proceedings under Section 28 of the MLRA.

Sub-Season:

Definition: The "sub-season" refers to the additional allocation and/or allowance associated with the allocation, after the final allocation for the year, with special reference made to the anchovy directed fishery in the small pelagic sector.

7. VESSEL SPECIFICATIONS

7.1 The letter "**P**" must be displayed as stipulated in terms of regulation 78 promulgated under the MLRA.

7.2 The Permit Holder shall not use any fishing vessel unless it bears the registration letters and numbers assigned thereto by the Director-General. Such letters and numbers shall be displayed in white on a black background or in black on a white background on both bows in characters not less than 15 cm in height, 10 cm in breadth (figure "1" excepted) and 2 cm in thickness (width of stroke). The space between adjacent letters and figures shall be between 2 cm and 5 cm.

7.3 Radio call signs must be clearly visible and displayed as stipulated in terms of regulation 78 promulgated under the MLRA.

8. VESSEL MONITORING SYSTEM (VMS)

8.1 The Permit Holder shall ensure that the fishing vessel is fitted with a functioning vessel monitoring system ("VMS"), which is approved by the Department.

8.2 It is the responsibility of the Permit Holder/ Permit Holder/ Vessel Owner/ Skipper to ensure that the VMS is fully operational and that the VMS continues to transmit to the Department's Operations Room prior to sailing and throughout whilst at sea.

8.3 The Permit Holder shall establish that the VMS unit is functional by contacting the Operations Room on telephone numbers 021 - 402 3076 or 021 - 402 3077, prior to sailing. Should the power supply be interrupted or the equipment become non-functional (for whatever reason) and the problem persists, the vessel shall return to port within two hours of being informed of the problem.

8.4 Vessels fitted with Inmarsat C VMS units, wishing to switch their units off whilst alongside in port, shall only do so a minimum of six hours after berthing, and the units shall be switched on a minimum of six hours prior to their estimated time of departure from port. Should the power supply be interrupted or the equipment become non-functional (for whatever reason), and the problem persists, the vessel shall return to port within twenty-four hours of being informed of the problem, unless special arrangements have been made with the Department's Operations Room to allow the vessel to continue fishing. Such special arrangements shall include:

(a) 3- hourly reporting of the vessel's positions faxed to 021 -4256497;
(b) Notice of estimated time of arrival;
(c) Notice of port arrival;
(d) Inspection of the catch by a Fishery Control Officer/Monitor; and

(e) A copy of the vessel track for the voyage for verification purpose.

The Department will keep a record of the frequency of VMS breakdowns in order to discourage repeated use/abuse of this special arrangements dispensation.

8.5 Should the Permit Holder not adhere to the provisions of the above paragraphs, the Department will detain the vessel once in port and may implement legal proceedings.

8.6 In cases where VMS units are non-functional due to "technical" problems, and such Permit Holders, Vessel Owners/ Skippers wish to proceed to sea without a VMS unit onboard, an "Application for an permit to undertake fishing without a VMS" form must be completed.
This form, together with a letter from the Company undertaking the repairs (which must include the fishing vessel's name, area number and estimated time that it will take to repair and re-install the unit), must be faxed to the Department's Customer Care Services, fax number 021- 402 336.
Only once written permission has been received from the Department, may the vessel proceed to sea. The VMS permit permission must be kept onboard the vessel for the duration of each trip undertaken within the period of validity of the permit.
For each fishing trip undertaken during the permit validity period, the Permit Holders/ Permits Holders, Vessel Owner/ Skipper of such vessels shall notify the Department's Operations Room on telephone numbers 021 – 402 3076 or 021 – 402 3077 or email VMSops VMSops@dffe.gov.za that they are proceeding to sea, and upon arrival back in port or launching site for the duration of the permit.

8.7 In cases of emergency, the Permit Holder must obtain written authorisation before the fishing vessel enters or intends to enter into a Marine Protected Area or any other area closed for fishing. The request must clearly set out the nature of the emergency and motivate why the request should be granted. Such request shall be sent via e-mail to: VMSops VMSops@dffe.gov.za or faxed to 021 - 425 6497.

9. LANDING OF FISH

9.1 The Permit Holder shall ensure that all fish is discharged from the vessel in accordance with the reasonable instructions of the Fishery Control Officer/ Marine Resources Monitor.

9.2 No Permit Holder shall discharge fish until it has notified the Department as stipulated above. Catches may only be discharged in the presence of a Fishery Control Officer/ Marine Resources Monitor. Catches shall be discharged only at landing points approved by the Department. The entire catch (including any by-catch) must be discharged at one landing point only.

9.3 Before the commencement of offloading of any fish, the duly completed **Pelagic Catch Report (Skipper form)**, which must be accurately filled in by the skipper, must be handed to the Fishery Control Officer/Marine Resources Monitor, monitoring the offloading process.

9.4 An accurate latitude, longitude (i.e. degrees, minutes, seconds and direction e.g. 34°03'660 S; 018°20'252 E) and time at start of each set made must be recorded when the net enters the water. This information shall be recorded by the Skipper on the Pelagic Catch Report. NIL return required in the event that no fish were caught.

9.5 The **Pelagic Catch Report** (skipper form) shall be completed to provide an estimated mass (in tons) per species per haul. This ratio may be used as the species composition of a catch, should the Fishery Control Officer/ Marine Resources Monitor not be able to identify species during normal sampling procedures, due to decomposed state of fish.

9.6 The total estimated mass of the **Pelagic Catch Report** (skipper form) should correspond within 10% accuracy of that of the total mass as determined by a scale and of the applicable landing.

9.7 Should a Permit Holder fail to adhere to the above requirements, the Department may confiscate all fish being landed and may implement proceedings under Section 28 of the MLRA

10. SUBMISSION OF INFORMATION

10.1 The Permit Holder must submit to the Department:

(a) Notification (Permit Holder Information; Attention: Deputy Director: Pelagic and High Seas Fisheries Management, Customer Services Centre, Ground Floor, Foretrust Building, Martin Hammerschlag Way, Foreshore, Cape Town or Private Bag X2, Vlaeberg, 8012) notification of any change of contact details within 30 days of such change by completing the application form available at the Customer Services Centre;

(b) performance statistics as stipulated in paragraph 17.

10.2 Catch Statistics

(a) On completion of the offloading process, the mass of all the applicable species must be completed on the **Landing Declaration, OM/EN 26/7/3,** and certified as correct by both the Permit Holder or a nominated representative of the Permit Holder and the Fishery Control Officer/ Marine Resources Monitor. The name of the Permit Holder must be reflected on the landing declaration.

(b) The TAC species caught shall be deducted from the quantum allocated to the Permit Holder. All fish must be weighed in the presence of the skipper and/or a nominated representative of the Permit Holder and a Fishery Control Officer/Marine Resources Monitor.

(c) The Permit Holder shall provide weekly summaries of catches to Mr Johan de Goede (Fisheries Management: Marine Resource Management), JdeGoede@dffe.gov.za , Tel No.: **(022) 714 1880.**

(d) The Permit Holder shall conduct operations strictly in accordance with the attached pilchard categorisation schedule (Annexure A). Recommendations for changes to that schedule should be forwarded to Mr J de Goede.

(e) Should the Permit Holder fail to timeously submit the above information or submit false or incorrect information, the Department may-

(f) refuse to re-issue a permit under section 13 of the MLRA for the following year until such time as the required information has been receipted; or proceed under section 28 of the MLRA

10.3 Socio-Economic Information

The Permit Holder must provide any other economic, socio economic or financial information in the format as and when requested by the Department.

10.4 Should the Permit Holder fail to timeously submit the above information or submit false or incorrect information, the Department may-

(a) refuse to issue a permit or an permit under Section 13 of the MLRA for the following year until such time as the required information has been receipted; or
(b) proceed under Section 28 of the MLRA.

11. RECORD KEEPING

11.1 The Permit Holder shall hold at its registered place of business the original permit issued for the current fishing season. The Permit Holder shall at all times over the duration of the permit have available a certified copy of this permit on board each vessel utilised to harvest Anchovy.

11.2 The Permit Holder shall keep the second copy of all landings for a minimum period of sixty (60) months

12. LEVIES

12.1 The Permit Holder must pay the prescribed levies for the fish landed for prescribed species as stipulated in the Government Gazette (Gazette No. 33518, dated 10 September 2010).

12.2 All levies and fees must be paid monthly in arrears and by the last working day of the month following the month in which fish was harvested. Non-compliance will result in a 10% penalty being charged.

12.3 The Permit holder must submit together with all levy payments a levy declaration form.

12.4 The Department may refuse to issue fishing permits to Permit Holders who have any levies or fees outstanding for a period in excess of 30 days, or may suspend

the Permit Holder's fishing permit until all outstanding levies have been paid to the Department.

12.5 A nil return must be submitted for every month where no fish has been harvested.

12.6 All returns must be submitted to the Directorate: Revenue Management via fax number 086 613 6256 or email to revenue@dffe.gov.za or post per address:

Fisheries Management
Customer Service Centre
Ground Floor, Foretrust Building
Martin Hammerschlag Way
Foreshore, Cape Town, 8001

12.7 The information required in 12.3 must be submitted when paying levies to the cashier at the Fisheries Management Customer Service Centre, Ground Floor, Foretrust Building, Martin Hammerschlag Way, Foreshore, Cape Town. Alternatively payment may be made via direct deposit at any First National Bank (FNB) branch or Electronic Funds Transfer (EFT) to the following banking details:

Bank: First National Bank
Branch code: 210554
Account name: Marine Living Resources Fund Deposit Account
Account number: 62123256382
Deposit reference: To be supplied by Foretrust office on receipt of fish levy declaration.

Kindly contact the Directorate: Revenue Management at revenue@dffe.gov.za or facsimile 086 613 6256 or 021 402 3016 (Ms S Baartman).

12.8 Failure to comply with 12.1 – 12.7 may result in proceedings in terms of section 28 of the Act.

13. VIOLATIONS

13.1 A breach of the provisions of the MLRA or these permit conditions by the Permit Holder will result in the initiation of legal proceedings under section 28 of the MLRA. A breach includes:

(a) furnishing information to which the Department of Environment, Forestry and Fisheries ("the Department") is entitled to, which is not true or complete;
(b) contravening or failing to comply with a permit condition imposed or with the provisions of the MLRA;
(c) being convicted of an offence in terms of this MLRA; or
(d) failing to effectively utilise the permit.

13.2 The Department may refuse to re-issue a subsequent permit / permit should the conditions stipulated in this permit not be adhered to.

13.3 The Permit Holder shall not land, sell, receive or process any fish taken by any means in contravention of the MLRA.

13.4 The Permit Holder shall safely store all inorganic waste material, garbage and pollutants on board the vessel. Should the Permit Holder discard any waste material, garbage or pollutants into the sea or landing site or harbour, this permit will be suspended for a period determined by the Department and the Permit Holder shall take those steps considered necessary in terms of NEMA to remedy any pollution caused.

13.5 There shall be no transhipment or transferral of fish without written authorisation from the Department. Should the Permit Holder tranship or transfer any catches without the written authorisation of the Department, the Permit Holder shall have its commercial fishing permit revoked. The transfer of "bolyn" (pelagic fish netted in excess of the vessel's maximum hold capacity) from one vessel to another is strongly encouraged in this sector. "Bolyn" is therefore not regarded as transhipment or transferral of fish for the purposes of the small pelagic sector.

13.6 The Permit Holder shall only harvest the amount of fish allocated to it in terms of the total allowable catch ("TAC") allocated to it under Section A. Fishing over or under these limits may result in the initiation of legal proceedings.

13.7 In terms of the MLRA, the Permit Holder is obliged to report to the Minister any contravention of the provisions of the MLRA by any other person. Any such contravention must be reported to the Department in writing and should be faxed to (021) 402-3663, Attention: The Chief Director: Monitoring, Control and Surveillance.

13.8 At any time during the course of the fishing trip or discharging, a Fishery Control Officer can request the skipper of the vessel to provide the cargo manifest or any other documents relating to fishing operations. The skipper must comply with this request.

14. CONSULTATION AND COMMUNICATION

14.1 The Permit Holder may contact the Department in one of the following ways (all correspondence must be clearly marked as to **subject matter**):

By mail	By Hand	By Email
Subject: Customer Services Centre, Private Bag X2, Vlaeberg, 8018 Attn: Qayiso Miketsu/ Johan De Goede	Subject: Customer Services Centre, Ground Floor, Foretrust Building, Martin Hammerschlag Way, Foreshore, Cape Town Attn: Johan De Goede	MMaqai@dffe.gov.za, JDeGoede@dffe.gov.za **By telephone** 022 7141880 **By cellphone** 083 461 4522

14.2 The Department will prefer to consult and communicate with the Recognised Industrial Body (Bodies) representative of Permit Holders in this fishery.

14.3 Communication regarding all permits and licences must be addressed to the Department and clearly marked *Permits and Licences*.

15. OBSERVER PROGRAMME

15.1 Department will require the Permit Holder to carry one or more Observers on board its vessel at times during the fishing season.

15.2 The Observer shall be fully accommodated on board the vessel and provided with food and facilities reserved for officers.

15.3 The Permit Holder shall proportionately bear the costs of the Department's Observer programme.

15.4 The Permit Holder (as identified in paragraph 1.4) must notify the Observer coordinator of the sailing time of the vessel, not less than 2 (two) hours prior to sailing.

15.5 The Permit Holder shall allow the Observer unrestricted access to monitor fishing activity and compliance with permit conditions and all applicable laws.

15.6 Should the Department reasonably believe that an Observer is being prevented from carrying on his/her obligations in any way or threatened in any way while on board, the Department will call the vessel into Port and may take steps to immediately suspend fishing activities by the Permit Holder(s).

16 TRANSFER OF FISHING RIGHTS

16.1 The Permit Holder may only transfer the long-term commercial fishing right allocated to it in terms of section 21 of the MLRA read together with the Policy for the Transfer of Commercial Fishing Rights (Gazette No 32449).

16.2 Any transfer of shares or sale of shares and/or a membership interest that results in a change in control or ownership of the Permit Holder must be approved by the Department in terms of section 21.

16.3 Failing to comply with 16.1 and/or 16.2 may lead to the initiation of further legal proceedings including but not limited to proceedings in terms of section 28 of the MLRA.

17 FISHING PERFORMANCE MEASURING

17.1 The Permit Holder shall be obliged to provide the Department with information required to carry out a performance measuring exercise, which information may include but not limited to:

(a) Data regarding transformation levels;
(b) Sustainable fishing practices;

(c) Data regarding investments made in the fishery and jobs created and sustained; and
(d) Data regarding compliance initiatives.

18 ECOSYSTEM EFFECTS OF FISHING

18.1 The Permit Holder must take cognisance of sustainable fishing practices and of the impacts of fishing on the ecosystem (also see **Section C**).

18.2 In this regard steps must be taken to minimise the incidental mortality of unwanted by-catch. By-catch of chub mackerel and horse mackeral (maasbanker) should be managed as per the attached proposed by-catch management plan (Annexure B) (also see **paragraph 9.6**).

18.3 Furthermore, steps must also be taken to minimise impacts of fishing on top predators, such as seabirds (see paragraph **6.1 (iv) and (v)**).

19. SECTION C - MANAGEMENT MEASURES

PELAGIC FISH (ANCHOVY): 2024

1. GENERAL

1.1 This permit is issued subject to the further provisions of the following once finalised and/or promulgated (See also Paragraph 2.1 of Section B):

a) Pelagic (Anchovy-Anchovy) Fishery Management Plan (to be developed), and;

b) National Plans of Action for the Conservation and Management of Sharks (NPOA-sharks) and Seabirds (NPOA-seabirds).

2. OBSERVERS

2.1 The Department wishes to achieve coverage of at least 10% of the annual catch per Permit Holder and 25% during the B-Season (should a B-season exist). The cost of Observer coverage for the B-Season shall be borne by the Permit Holder.

2.2 The requirement to carry an Observer in accordance with the requirements of the Department's Observer programme (**Section B, paragraph 13.1**) is a simple approach to achieve this goal. However, if this approach does not achieve the desired goal (e.g. through Permit Holders shortening trips when Observers are on board) then a more onerous approach may become necessary.

2.3 The onus is on the Permit Holder to ensure that one or more Observers are carried on a minimum of trips (10% of total number of annual trips).

2.4 It is the Department's intention to introduce a cost-recovery framework for the Observer programme and costs may be borne proportionately by all Permit Holders in the sector.

3. ECOSYSTEM EFFECTS OF FISHING

3.1 The Permit Holder must take cognisance of sustainable fishing practices and of the impacts of fishing on the ecosystem (see also **Section B paragraph 11.1**).

3.2 In this regard steps must be taken to minimise the incidental mortality of unwanted by-catch. By-catch of chub mackerel and horse mackerel (maasbanker) should be managed as per the attached by-catch management plan (Annexure B) (also see paragraphs 9.6 and 11.2).

3.3 Furthermore, steps must also be taken to minimise impacts of fishing on top predators, such as seabirds (see also **Section B paragraph 6.1 (iv) and (v)**).

4. CONSOLIDATION

4.1 The Policy on the Allocation and Management of Small Pelagic Commercial Fishing Rights, 2021 states that following the allocation of 15-year commercial fishing rights in this sector, the Department will facilitate the consolidation of the number of RHs active in the sector, if necessary.

DIRECTOR: OFFSHORE & HIGH SEAS FISHERIES MANAGEMENT
DATE: 17 JANUARY 2024

Department of Forestry Fisheries and the Environment
Forestry Building,
Martin Hammerschlag Way,
Foreshore,
Cape Town,
8000
Offshore & High Seas Fisheries Management

ANNEXURE A

SCHEDULE: PILCHARD CATEGORISATION

Notes:

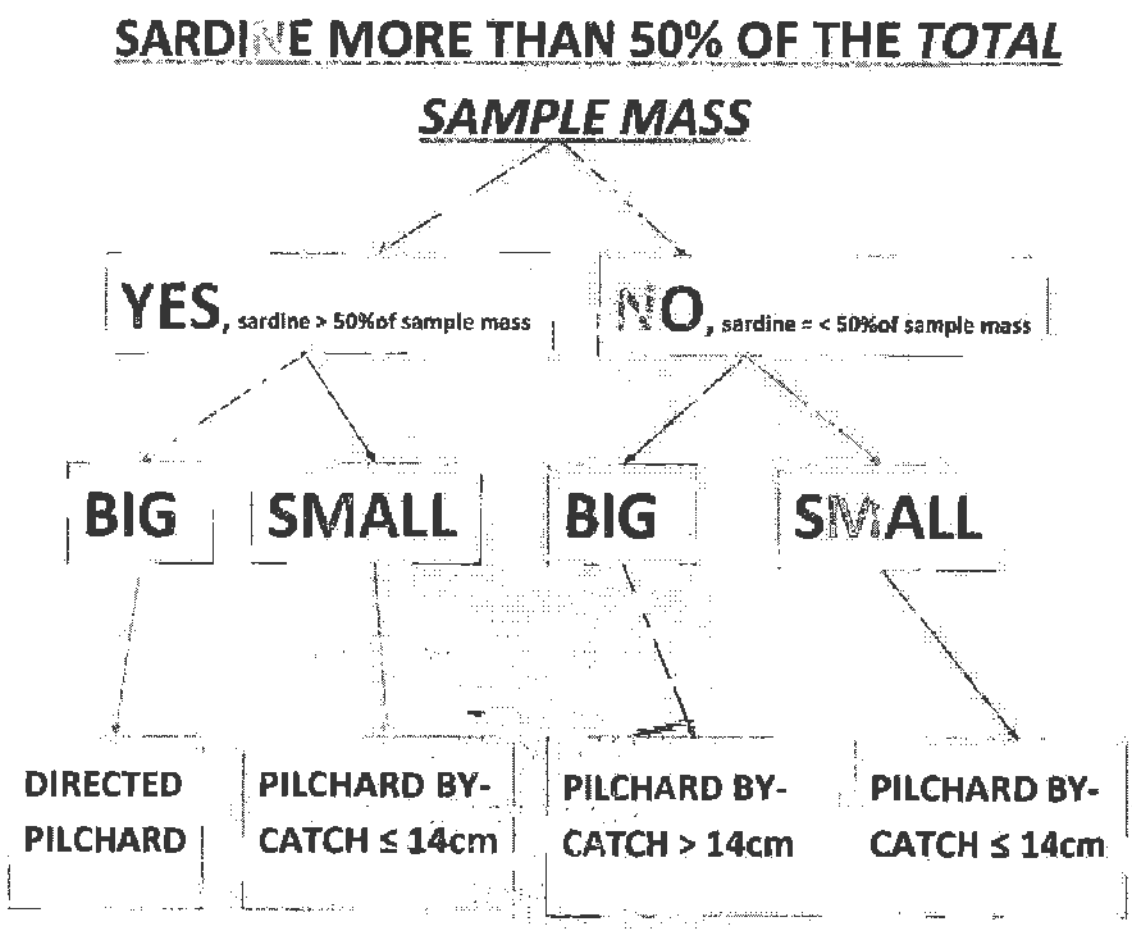
1. Distinguishing between large and small pilchard:
   - **LARGE** = greater than (>) 14.0 cm Total length (*LT*); and
   - **SMALL** = less than or equal to (≤) 14.0 cm (*LT*).

- ALL juvenile pilchard (14cm and smaller) will **ALWAYS** be categorized to "**PILCHARD BY-CATCH ≤ 14CM**"
- Adult (larger than 14cm) pilchard reflecting **more** than **50%** in **ANY** sample as part of the **ENTIRE** sample will ALWAYS be categorized as "**DIRECTED PILCHARD**"
- Adult (larger than 14cm) pilchard **less** than 50% in **ANY** sample as part of the **ENTIRE** sample will ALWAYS be categorized as "**PILCHARD BY-CATCH > 14CM**"
- For the purposes of pilchard categorization, ICE / WATER and JELLY will **NOT** be taken into account!

2. Whether fish is cooled or not is of no significance for categorisation purposes.

3. Examples of how to determine allocations based on the revised pilchard Categorisation Flowchart are given below

SARDINE CATEGORIZATION FLOWCHART (OCTOBER 2010)



Notes:

1) Small sardine always "PILCHARD BY-CATCH ≤ 14CM"
2) Big Sardine forming part of more than 50% of the sample (thus targeted) always "DIRECTED PILCHARD"
3) Big Sardine forming part of [illegible] less than 50% of the sample (thus not targeted) always "PILCHARD BY-CATCH > 14CM"

BIG > 14cm Total Length **SMALL ≤ 14cm Total Length**

EXAMPLES

Monitors take samples of ±5kg at regular intervals then sort the sample into the different species. Pilchard are further sorted into large (>14.0 cm total length) and small (≤14.0 cm total length) categories by measuring (cm) the fish. The mass (kg) per species, and that per size category of pilchard, are then recorded in the appropriate column on the **OM/EN 26/7/3** (inspectors form).

A. **ANCHOVY - the PRIMARY species (50% and more of the ENTIRE SAMPLE – regardless of what was ESTIMATED by skipper)**

Anchovy Small pilchard	Only small pilchard in sample: **ALL** pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"
Anchovy Small pilchard Other Species	Only small Anchovy in sample: **ALL** pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"
Anchovy Large pilchard	Only large pilchard in sample: DETERMINE pilchard **percentage** of the ENTIRE SAMPLE, i.e. ALL inclusive, i.e. total added samples mass: Example 1 Anchovy 3.001kg and 3.234kg large pilchard, THUS pilchard portion of the sample: 3.234 / (3.001+3.234) = 51.8% pilchard in this example is **more than 50%** of the sample thus **ALL** pilchard booked to "**DIRECTED PILCHARD**" Example 2 Anchovy 3.562kg and 1.234kg [illegible] pilchard portion of the sample. 1.234 / (3.562+1.234) = 25.7 pilchard in this example is **less than 50%** of the sample thus **ALL** pilchard booked to "**PILCHARD BY-CATCH > 14CM**"
Anchovy Large pilchard Other Species	Anchovy, large pilchard and other species in sample: DETERMINE pilchard percentage of the ENTIRE SAMPLE, i.e. ALL inclusive, e.g. total added samples mass: Example 1 Anchovy 3.001kg, 3.234kg large pilchard, 0.123kg maasbanker and 0.050kg mackerel, THUS pilchard portion of the sample: 3.234 / (3.001+3.234+0.123+0.050) = 50.4% pilchard in this example is **more than 50%** of the sample thus **ALL** pilchard booked to "**DIRECTED PILCHARD**"

When Pilchard is the PRIMARY species (50% and more of the ENTIRE SAMPLE – regardless of what was ESTIMATED by skipper) then this is applicable

B. PILCHARD

Large Pilchard	Only large Pilchard in the sample: **ALL** Pilchard booked to **"DIRECTED PILCHARD"**
Small Pilchard	Only small Pilchard in the sample: **ALL** Pilchard booked to **"PILCHARD BY-CATCH ≤ 14CM"**
Large Pilchard Small Pilchard	Only large Pilchard **AND** small Pilchard in the sample: Examples: 1 3.978kg large Pilchard and 0.325kg small Pilchard THUS: 3.978 / (3.978+0.325) = 92.4% large Pilchard and 0.325 / (3.978+0.325) = 7.6% small Pilchard Large Pilchard is **more than 50%, thus** large Pilchard portion booked to **"DIRECTED PILCHARD"** Small Pilchard is **less than 50%, thus** small Pilchard portion booked to **"PILCHARD BY-CATCH ≤ 14CM"** 2. 1.978kg large Pilchard and 4.325kg small Pilchard THUS: 1.978 / (1.978+4.325) = 31.4% large Pilchard and 4.325/ (1.978+4.325) = 68.6% small Pilchard Large Pilchard is **less than 50%, thus** large Pilchard portion booked to **"PILCHARD BY-CATCH > 14CM"** Small Pilchard is booked to **"PILCHARD BY-CATCH ≤ 14CM"**
Large Pilchard Other Species	Only large Pilchard in the sa[illegible] Examples: 1 3.978kg large Pilchard and 0.325kg lantern fish THUS: 3.978 / (3.978+0.325) = 92.4% large Pilchard Large Pilchard is **more than 50%, thus** large Pilchard portion booked to **"DIRECTED PILCHARD"** Examples: 2. 1.978kg large Pilchard and 2.325kg lantern fish THUS: 1.978 / (1.978+2.325) = 46.1% large Pilchard Large Pilchard is **less than 50%, thus** large Pilchard portion booked to **"PILCHARD BY-CATCH > 14CM"**

Example 2
Anchovy 3.501kg, 2.234kg large pilchard, 0.012kg maasbanker and 0.150kg mackerel, THUS pilchard portion of the sample: 2.234 / (3.501+2.234+0.012+0.150) = 37.8%
pilchard in this example is **less than 50%** of the sample thus **ALL** pilchard booked to "**PILCHARD BY-CATCH > 14CM**"

Anchovy
Small pilchard
Large pilchard

Anchovy, small **AND** large pilchard in sample:
DETERMINE pilchard **percentage** of the ENTIRE SAMPLE by size.

Note: ANCHOVY is the PRIMARY species!
Example
Anchovy 3.001kg, 1.634kg large pilchard and 1,231kg small pilchard, THUS:
Large pilchard portion of the ENTIRE sample: 1.634 / (3.001+1.634+1.231) = 27.8%
AND
Small pilchard portion of the ENTIRE sample: 1.231 / (3.001+1.634+1.231) = 20.9%

Small pilchard in this example is booked to "**PILCHARD BY-CATCH ≤ 14CM**"

Large pilchard in this example is **less than 50%** of the sample thus **THIS PORTION OF LARGE pilchard** booked to "**PILCHARD BY-CATCH > 14CM**"

Anchovy
Small pilchard
Large pilchard
Other Species

Anchovy, small pilchard, large pilchard **AND** other species in sample:
DETERMINE Anchovy **percentage** of the ENTIRE SAMPLE by size.

Note: ANCHOVY is the PRIMARY species!

Example
Anchovy 4.021kg, 0.634kg large pilchard, 0.131kg small pilchard, 0.03kg maasbanker and 0.112kg mackerel THUS:
Large pilchard portion of the ENTIRE sample: 0.634 / (4.021+0.634+0.131+0.03) = 13.1% AND
Small pilchard portion of the ENTIRE sample: 0.131 / (4.021+0.634+0.131+0.03) = 2.7%

Small pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"

Large pilchard in this example is **less than 50%** of the sample thus **THIS PORTION OF LARGE pilchard** booked to "**PILCHARD BY-CATCH > 14CM**"

Small Pilchard Other Species	Only small Pilchard in the sample: ALL Pilchard booked to **"PILCHARD BY-CATCH ≤ 14CM"**
Large Pilchard Small Pilchard Other Species	Only large Pilchard, small Pilchard **AND** other species in the sample: Examples: 1. 3.978kg large Pilchard, 0.325kg small Pilchard and 0.023kg anchovy, ADD THUS: 3.978 / (3.978+0.325+0.023) = 91.9% large Pilchard and 0.325 / (3.978+0.325+0.023) = 7.5% small Pilchard Large Pilchard is **more than 50%, thus** large Pilchard portion booked to **"DIRECTED PILCHARD"** Small Pilchard is booked to **"PILCHARD BY-CATCH ≤ 14CM"** 2. 1.978kg large Pilchard, 2.325kg small Pilchard and 2.523kg anchovy THUS: 1.978 / (1.978+2.325+2.523) = 28.9% large Pilchard and 2.325/ (1.978+2.325+2.523) = 34% small Pilchard Large Pilchard is **less than 50%, thus** large Pilchard portion booked to **"PILCHARD BY-CATCH > 14CM"** Small Pilchard booked to **"PILCHARD BY-CATCH ≤ 14CM"**

C. RED EYE

Rationale: When RED EYE is the PRIMARY species (50% and more of the ENTIRE SAMPLE – regardless of what was ESTIMATED by skipper) then this is applicable.

RED EYE Small Pilchard	Only small Pilchard in sample: ALL Pilchard booked to **"PILCHARD BY-CATCH ≤ 14CM"**
RED EYE Small Pilchard Other Species	Only small Pilchard in sample: ALL Pilchard booked to **"PILCHARD BY-CATCH ≤ 14CM"**
RED EYE Large Pilchard	Only large Pilchard in sample: DETERMINE Pilchard **percentage** of the ENTIRE SAMPLE, i.e. ALL inclusive, i.e. total added samples mass: Example 1 RED EYE 3.001kg and 3.234kg large Pilchard, THUS Pilchard portion of the sample: 3.234 / (3.001+3.234) = 51.8% Pilchard in this example is **more than 50%** of the sample thus **ALL** Pilchard booked to **"DIRECTED PILCHARD"**

Example 2
RED EYE 3.562kg and 1.234kg large Pilchard, THUS Pilchard portion of the sample: 1.234 / (3.562+1.234) = 25.7%
Pilchard in this example is **less than 50%** of the sample thus ALL Pilchard booked to **"PILCHARD BY-CATCH > 14CM"**

RED EYE
Large Pilchard
Other Species

RED EYE, large Pilchard and other species in sample:
DETERMINE Pilchard percentage of the ENTIRE SAMPLE, i.e. ALL inclusive, e.g. total added samples mass:

Example 1
RED EYE 3.001kg, 3.234kg large Pilchard, 0.123kg maasbanker and 0.050kg mackerel, THUS Pilchard portion of the sample: 3.234 / (3.001+3.234+0.123+0.050) = 50.4%
Pilchard in this example is **more than 50%** of the sample thus ALL Pilchard booked to **"DIRECTED PILCHARD"**

Example 2
RED EYE 3.501kg, 2.234kg large Pilchard, 0.012kg maasbanker and 0.150kg mackerel, THUS Pilchard portion of the sample: 2.234 / (3.501+2.234+0.012+0.150) = 37.8%
Pilchard in this example is **less than 50%** of the sample thus ALL Pilchard booked to **"PILCHARD BY-CATCH > 14CM"**

Red Eye
Small Pilchard
Large Pilchard

RED EYE, small **AND** large Pilchard in sample:

DETERMINE Pilchard **percentage** of the ENTIRE SAMPLE by size.

Note: RED EYE is the PRIMARY species!
Example 1
RED EYE 3.001kg, 1.634kg large Pilchard and 1.231kg small Pilchard, THUS:
Large Pilchard portion of the **ENTIRE** sample: 1.634 / (3.001+1.634+1.231) = 27.8%
AND
Small Pilchard portion of the ENTIRE sample: 1.231 / (3.001+1.634+1.231) = 20.9%

Small Pilchard booked to **"PILCHARD BY-CATCH ≤ 14CM"**

Large Pilchard in this example is **less than 50%** of the sample thus **THIS PORTION OF LARGE PILCHARD** booked to **"PILCHARD BY-CATCH > 14CM"**

RED EYE
Small Pilchard
Large Pilchard
Other Species

RED EYE, small Pilchard, large Pilchard **AND** other species in sample:

DETERMINE Pilchard **percentage** of the ENTIRE SAMPLE by size.

Note: RED EYE is the PRIMARY species!

Example 1
RED EYE 4.021kg, 0.634kg large Pilchard, 0,131kg small Pilchard, 0.03kg maasbanker and 0.112kg mackerel THUS:
Large Pilchard portion of the **ENTIRE** sample: 0.634 / (4.021+0.634+0.131+0.03) = 13.1% AND
Small Pilchard portion of the **ENTIRE** sample: 0.131 / (4.021+0.634+0.131+0.03) = 2.7%

Small Pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"

Large Pilchard in this example is **less than 50%** of the sample thus **THIS PORTION OF LARGE PILCHARD** booked to "**PILCHARD BY-CATCH > 14CM**"

D. LANTERN

Rationale: When LANTERN is the PRIMARY species (50% and more of the ENTIRE SAMPLE – regardless of what was ESTIMATED by skipper) then this is applicable.

LANTERN Small Pilchard	Only small Pilchard in sample: **ALL** Pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"
LANTERN Small Pilchard Other Species	Only small Pilchard in sample: **ALL** Pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"
LANTERN Large Pilchard	Only large Pilchard in sample: DETERMINE Pilchard **percentage** of the ENTIRE SAMPLE, i.e. ALL inclusive, i.e. total added samples mass: Example 1 LANTERN 3.001kg and [illegible] large Pilchard [illegible] Pilchard portion of the sample: 3.234 / (3.001+3.234) = 51.[illegible]% Pilchard in this example is more than 50% [illegible] sample thus **ALL** Pilchard booked to "**DIRECTED PILCHARD**" Example 2 LANTERN 3.562kg and 1.234kg large Pilchard, THUS Pilchard portion of the sample; 1.234 / (3.562+1.234) = 25.7% Pilchard in this example is **less than 50%** of the sample thus **ALL** Pilchard booked to "**PILCHARD BY-CATCH > 14CM**"
LANTERN Large Pilchard Other Species	LANTERN, large Pilchard and other species in sample: DETERMINE Pilchard percentage of the ENTIRE SAMPLE, i.e. ALL inclusive, e.g. total added samples mass:

Example 1
LANTERN 3.001kg, 3.234kg large Pilchard, 0.123kg maasbanker and 0.050kg mackerel, THUS Pilchard portion of the sample: 3.234 / (3.001+3.234+0.123+0.050) = 50.4%
Pilchard in this example is **more than 50%** of the sample thus **ALL** Pilchard booked to "**DIRECTED PILCHARD**"

Example 2
LANTERN 3.501kg, 2.234kg large Pilchard, 0.012kg maasbanker and 0.150kg mackerel, THUS Pilchard portion of the sample: 2.234 / (3.501+2.234+0.012+0.150) = 37.8%
Pilchard in this example is **less than 50%** of the sample thus **ALL** Pilchard booked to "**PILCHARD BY-CATCH > 14CM**"

LANTERN
Small Pilchard
Large Pilchard

LANTERN, small **AND** large Pilchard in sample:

DETERMINE Pilchard percentage of the ENTIRE SAMPLE, i.e. ALL inclusive, e.g. total added samples mass.

Note: LANTERN is the **PRIMARY** species!
Example 1
LANTERN 3.001kg, 1.634kg large Pilchard and 1.231kg small Pilchard, THUS:
Large Pilchard portion of the **ENTIRE** sample: 1.634 / (3.001+1.634+1.231) = 27.8% AND
Small Pilchard portion of the **ENTIRE** sample: 1.231 / (3.001+1.634+1.231) = 20.9%

Small Pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"

Large Pilchard in this example is **less than 50%** of the sample thus **THIS PORTION OF LARGE PILCHARD** booked to "**PILCHARD BY-CATCH > 14CM**"

LANTERN
Small Pilchard
Large Pilchard
Other Species

LANTERN, small Pilchard large Pilchard **AND** other species in sample:

DETERMINE Pilchard percentage of the ENTIRE SAMPLE, i.e. ALL inclusive, e.g. total added samples mass.

Note: LANTERN is the PRIMARY species!
Example 1
LANTERN 4.021kg, 0.634kg large Pilchard, 0.131kg small Pilchard, 0.03kg maasbanker and 0.112kg mackerel THUS:
Large Pilchard portion of the **ENTIRE** sample: 0.634 / (4.021+0.634+0.131+0.03) = 13.1% AND
Small Pilchard portion of the **ENTIRE** sample: 0.131 / (4.021+0.634+0.131+0.03) = 17.1%

Small Pilchard booked to "**PILCHARD BY-CATCH ≤ 14CM**"

Large Pilchard in this example is **less than 50%** of the sample thus **THIS PORTION OF LARGE PILCHARD** booked to "**PILCHARD BY-CATCH > 14CM**"

ANNEXURE B

By-catch management for Chub Mackerel and Horse Mackerel

The targeting of species, other than anchovy, pilchard, lanternfish and red eye is not permitted in the small pelagic sector. However, occasionally species such as horse mackerel and chub mackerel are caught as incidental by-catch.

The following steps must be followed with regard to managing the incidental by-catch of horse mackerel and chub mackerel:

1) If horse mackerel exceeds 40% of the total landing, then that particular fishing block in which the fish was caught should be closed to purse-seine fishing for a period of 7 (seven) days. Once 4000t of horse mackerel has been landed the horse mackerel by-catch threshold shall be reduced to 20%.

2) If chub mackerel exceeds 40% of the total landing, then that particular fishing block in which the fish was caught should be closed to purse-seine fishing for a period of 7 (seven) days.

3) If there is a possibility that the percentage by-catch in a particularly set has exceeded the relevant by-catch threshold, the skipper should immediately (i.e. before steaming) notify the relevant area controller to temporarily close the relevant block where the set was made. In addition, the skipper should also inform other skippers immediately (i.e. before steaming) of the possible high by-catch in the block by broadcasting on a general radio channel which will be heard by all fishers. A record of time of broadcast must be kept in the ships log. Section 28 proceedings may be instituted against a Skipper if established that this condition might have been contravened.

4) Blocks refer to the 10 x 20 mile blocks as indicated in the skipper's Daily Pelagic Catch Statistics. Blocks and areas refer to areas a to f as follows:
   a. Area 1 = North of Lambert's Bay
   b. Area 2 = Lambert's Bay to St Helena Bay;
   c. Area 3 = St Helena Bay to Dassen Island;
   d. Area 4 = Dassen Island to Cape Point;
   e. Area 5 = Cape Point to Knysna;
   f. Area 6 = North of Knysna

5) If the catch limit in paragraph 1 and 2 above has been exceeded, then the responsible offloading official (Marine Resources Monitor) must confirm this with the local responsible Fishery Control Officer (FCO), as well as the nominated area controller after offloading the entire catch.

6) The designated area controller should inform the Chief Area Controller of the by-catch limit being exceeded in writing. The Chief Area Controller should in turn inform all area controllers (i.e. the rest of the industry), as well as the FCO of the specific fishing block which should temporarily be closed for purse seine fishing.

7) The Chief Area Controller will declare a block open once the "voorloper" vessel's horse by-catch is less than 40% (or 20% when more than 4000t horse mackerel has been landed). This should be done in writing to the relevant area controllers, Mr. J. De Goede, local Marine Resources Monitor and the local FCO.

8) The Chief Area Controller will declare a block open once the "voorloper" vessel's chub by-catch is less than 40%. This should be done in writing to the relevant area controllers, Mr. J. De Goede, local Marine Resources Monitor and the local FCO.

9) The Permit Holder/s that was/were responsible for closing a block while having oversubscribed the by-catch rule will also be responsible for the cost of re-opening that block after the seven day closure (weather permitting) to ensure that other Permit Holders are not restricted in their ability to fish the closed block. Should the landing have been a split between more than one Permit Holder, then the cost should be shared pro-rata by those Permit Holders.

10) Any Permit Holder who wishes to operate within a closed area following the 7-day closure may request the area controller that the area be tested and to nominate a "voorloper" vessel.

11) Closed blocks which have not been tested subsequent a 7-day closed period will automatically be declared open 14 days after the 7-day closed period.

12) All pelagic blocks are open by default at the start of a pelagic season.

13) The species composition of the landing should be confirmed by the offloading official only.

14) A "voorloper" vessel must be nominated, in writing, by the local area controller, and forwarded to the local FCO, the Chief Area Controller and Mr. J. De Goede. The letter should include the time of departure subsequent to the 7 (seven) day closed period, the vessel name, the areas (blocks) to be fished and the name of the observer.

15) A nominated "voorloper" vessel must carry an Observer at all times.

16) A maximum of 4 (four) "voorloper" vessels per area may be nominated and only one vessel allowed to test a block.

17) The nominated "voorloper" vessel will be exempted from the 40% by-catch limit

18) Section 28 proceedings may be instituted against an Permit Holder if a vessel fishes in a closed block.

19) A by-catch management team consisting of J. De Goede (MCM – Marine Resource Management), the local FCO (MCS – Monitoring, Control And

Surveillance) of the area, the Chief Area Controller (Industry) and the Area controller will take responsibility for the implementation of the by-catch management plan. All correspondence should be emailed through to J. De Goede at JdeGoede@dffe.gov.za and the nominated Chief Area Controller (to be nominated by industry).

20) Copies of letters to indicate "voorloper" vessels should be attached to the landing declaration.

ANNEXURE C

Designated landing sites for the landing of catches made by small pelagic Permit Holders

LANDING SITES: SMALL PELAGIC

Designated Landing Sites	Addresses for FCO Offices	RESPONSIBLE OFFICER
Cape Town Harbour	Fisheries Management Foretrust Building Cape Town	Ms B. Mamaila 073 323 2384 / 021 402 3275 / 3427 Fax: 021 402 3113 Email: Buyekezwa Mamaila <BMamaila@dffe.gov.za>
Hout Bay Harbour	Harbour Road M&CM office Hout Bay	073 660 6280/ 021 790 2930 / Fax: 021 790 2806
Mossel Bay Harbour	Aqua Plaza Mars Street Office 104, Mossel Bay	Mr. S. Titus 083 663 9155/ 044 691 2939 Fax: 044 691 2939 Email: Shamley Titus <STitus@dffe.gov.za>
Saldanha Bay Harbour	Saldanha Bay Harbour President Street Saldanha	Mr. W. Theron 082 771 9910/ 022 714 1710 Fax:022 714 3997 Email: Wade Theron <WTheron@dffe.gov.za>
St Helena Bay	Sandy Point Harbour St Helena Bay	Mr W. Basson 078 714 7422/ 022 736 1188 / 022 736 1125 Fax: 022 736 1530 Email: Willem Basson <WBasson@dffe.gov.za>
Hermanus Harbour		Ms G. Barlow 073 264 5953 / 028 312 2609 Fax: 028 313 0902 Email: Gail Marcia Barlow <GBarlow@dffe.gov.za>
Gansbaai Harbour	Gansbaai Harbour Office	Siseko Ndesha 083 465 6025 / 028 384 0921 Fax: 028 384 1546 Email: Siseko Ndesha <SNdesha@dffe.gov.za>
Port Elizabeth Harbour	21 Stanley Street Central P.E	Mr. D. W. Mostert 041 586 4051/ 082 771 9906 Fax: 041 585 0369 Email: Dennis William Mostert <DMostert@dffe.gov.za>
Lamberts Bay Harbour	Lamberts Bay Harbour Lamberts Bay	Mr. W. Cockrill 082 3212 381/ 027 432 1303/027 432 1831 Fax: 027 432 1228 Email: Waldemar Jeques Cockrill <WCockrill@dffe.gov.za>
Laaiplek Harbour	Laaiplek Harbour Laaiplek	Mr. William Shilubane 082 784 6970/ 022 783 0447 / 022 783 1035 Fax: 022 783 0407 Email: William Mbhahlesi Shilubane <WShilubane@dffe.gov.za>
St. Francis Bay	Fisheries Management Plettenberg Bay	Mr. M. Mazilo 084 607 1783/ 042 293 1329 Fax: 042 293 1757 Email: Mthuthuzeli Mazilo <MMazilo@dffe.gov.za>

ANNEXURE D

PROCEDURES FOR CHARTERING OF SOUTH AFRICAN VESSEL BY OTHER COUNTRIES

The following procedures shall apply:

1. It is the Permit Holder's responsibility to return the original catch permit to the Department (Attention: Assistant Director: Demersal Fisheries Management) for cancellation. Upon cancellation of the permit the Department will provide written authorization for the vessel to be chartered. It should be noted that the fish hold is to be cleared before departure and no fishing may take place on route to the chartering country (fishing gear to be stowed). Similarly, before returning to South African all fish caught under charter agreement must be discharged in the ports of the chartering country. No fishing is to take place while vessel is on route to South African ports (all fishing gear to be stowed).

2. Should the charter period straddle two fishing seasons then the Permit Holder shall notify the Department of the vessels intention to fish in the South African fishery later in the new fishing season by submitting relevant permit applications prior to 1 January of the new season. (On the application the Permit Holder should inform the Department that the vessel is currently chartered in a foreign country and will only collect the permit upon the vessel's return to South Africa).

3. Prior the issuing of the South African catch permit / permit, the Permit Holder would need to demonstrate that the vessel's VMS is reporting to Department's base. In addition, a FCO has to inspect the vessel on departure to ensure that no fish is on board. Lastly, the Permit Holder shall provide an electronic overall catch summary by species in an Excel format to the Department of catches made under charter. These catch statistics have to indicate that the fish was caught under charter so as to avoid duplication of reporting.

   Catches made while chartering for another country will not be accepted by the Department when conducting the sector-specific performance reviews. Moreover, Permit holders who primarily fish for other countries may have their South African fishing rights / permits revoked.

DFFE16

PERMIT CONDITIONS: PELAGIC FISH SARDINE/PILCHARD FISHERY: 2024

Fishing season: 2024

DATE OF APPROVAL: 17 JANUARY 2024

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

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SECTION B

1. APPLICABLE ACTS, POLICIES AND DELEGATIONS

1.1 This permit is issued in terms of section 13 of the Marine Living Resources Act, 1998 (Act No. 18 of 1998).

1.2 The permit does not absolve the permit holder from complying with all other applicable laws, including but not limited to:

(a) The Marine Living Resources Act, 1998 (Act No. 18 of 1998) ("the MLRA") and the Regulations promulgated thereunder;

(b) The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Regulations promulgated thereunder;

(c) The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and the Regulations promulgated thereunder;

(d) The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPA) and the Regulations promulgated thereunder;

(e) The Sea Birds and Seals Protection Act, 1973 (Act No. 46 of 1973) (SBSPA) and the Regulations promulgated thereunder;

(f) Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (ICMA) and the Regulations promulgated thereunder;

(g) The International Convention for the Prevention of Pollution from Ships Act, 1986 (Act No. 2 of 1986) (ICPPSA) and the Regulations promulgated thereunder.

(h) The Fire Arms Control Act, 2000 (Act No. 60 of 2000) (FACA) and the Regulations promulgated thereunder;

(i) South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998) (SAMSA) and the Regulations promulgated thereunder;

(j) The Animals Protection Act, 1962 (Act No. 71 of 1962) (APA) and the Regulations promulgated thereunder;

(k) The Standards Act, 2008 (Act No. 8 of 2008) (SA) and the Regulations promulgated thereunder;

(l) The National Regulator for Compulsory Specifications Act. 2008 (Act No. 5 of 2008) (NRCSA) and the Regulations promulgated thereunder;

(m) National Ports Authority Act, 2005 (Act No. 12 of 2005) (NPA) and the Regulations promulgated thereunder; and

(n) The Companies Act, 2008 (Act No. 71 of 2008) (CA) and the Regulations promulgated thereunder; and

(o) The Conservation Measures and Resolutions for the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

1.3 For the 2024 (15 January 2024 to 31 December 2024) and subsequent fishing seasons, permits in this fishery shall be issued subject to the further provisions of the –

(a) General Policy on the Allocation of Long Term Commercial Fishing Rights and the Management of Commercial Fisheries;
(b) Small Pelagics Fishery Policy; and
(c) Small Pelagics Fishery Manual (to be developed).

1.4 The Directors: Offshore and High Seas Fisheries Management and Inshore Fisheries Management shall be entitled to amend these permit conditions.

1.5 Any reference to the Permit Holder in these permit conditions includes the entity or person in whose name the commercial fishing right was allocated ("the Permit Holder"), its employees (whether permanent, full-time or part-time), its contractors, agents or advisers and the skipper of the vessel.

2. VALIDITY OF PERMIT

2.1 This permit shall be valid for the period indicated in Section A of the permit ("the permit").

2.2 This permit shall automatically expire and be invalid should:
(a) the permit be cancelled or revoked in terms of Section 28 of the MLRA;
(b) the quantum allocated to the Permit Holder is caught;
(c) the fishing season is terminated or ends; and
(d) the permit be revoked, cancelled or suspended in terms of section 28 of the MLRA.
(e) In these cases the original permit shall be returned to the Department (Attn: Qayiso Mketsu / Johan De Goede/).

3. FISHING AREAS

3.1 No person shall use any purse-seine [illegible] fishing or any other purpose in the following areas:

(i) in Walker Bay landwards of imaginary lines drawn from:

a) "Voorsteklip" on the Plaat (34° 31.1'S 19° 22.3' E) to the beacon marked M1 at Mudge Point (34° 24.0' S 19° 07.3' E), near Hawston; and
b) The lighthouse on the southern breakwater in the fishing harbour of Gansbaai (34° 35.0' S 19° 20.7 E) and a beacon marked M1 at Mudge Point, during the period 1 December to 31 January.

(ii) landward from a straight line joining
a) Cape Vacca (34° 20.3' S 21° 55.0'E) and the lighthouse at Cape St Blaize (34° 11.2' S 22° 09.'E); and

b) The lighthouse at Cape St Blaize and Gericke Point (34° 02.3' S 22° 45.9' E).

(iii) All Marine Protected Areas as declared under section 43 of the MLRA and all closed areas as declared under section 77 of the MLRA. Phaklsa MPAs declared 23 May 2019: https://www.environment.gov.za/legislation/actsregulations

Alternatively, please use: http://www.gpwonline.co.za/Gazettes/Pages/Published-Separate-Gazettes.aspx and download 42478 and 42479

(iv) Within the following areas around African penguin breeding colonies between 15 January and 31 December 2024:

a) Dassen Island and Robben Island (existing MPA restrictions only). See map with coordinates in Figure 1.

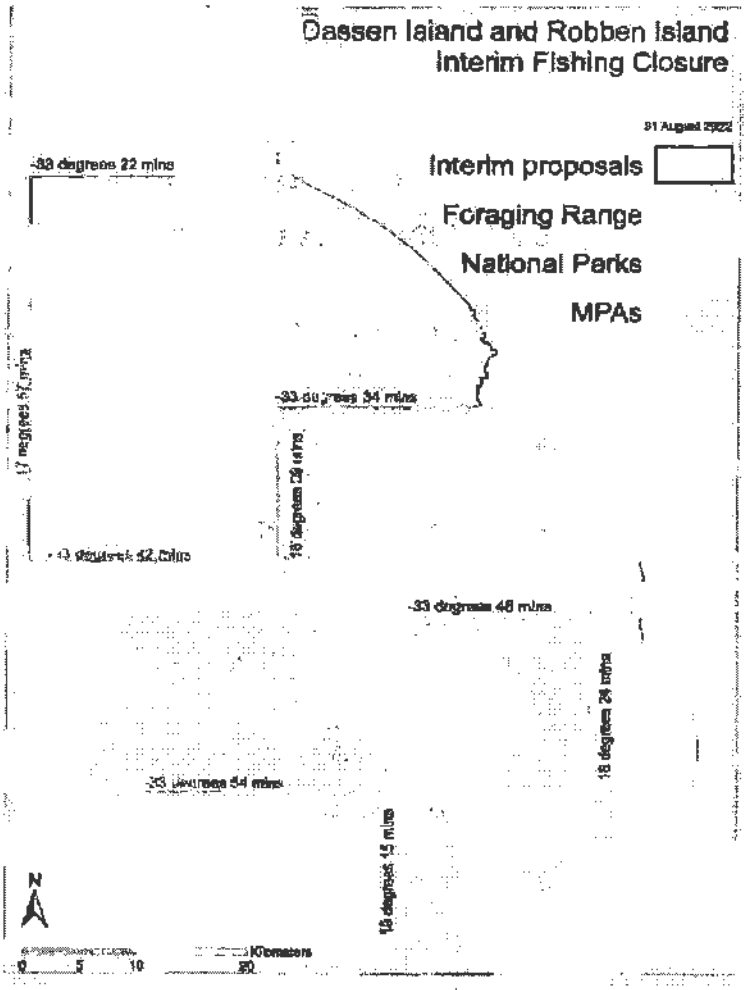

Figure 1: Closures from 15 January and 31 December 2024 in the vicinity of Dassen and Robben Islands

b) In the Stony Point (Betty's Bay) area and Dyer Island (Gansbaai) area, see Figure 2. Note that all vessels are excluded from the area landward of the dashed line within the Dyer Island vicinity, but that vessels with a total length less than 26 m are permitted to fish offshore of the dashed line.

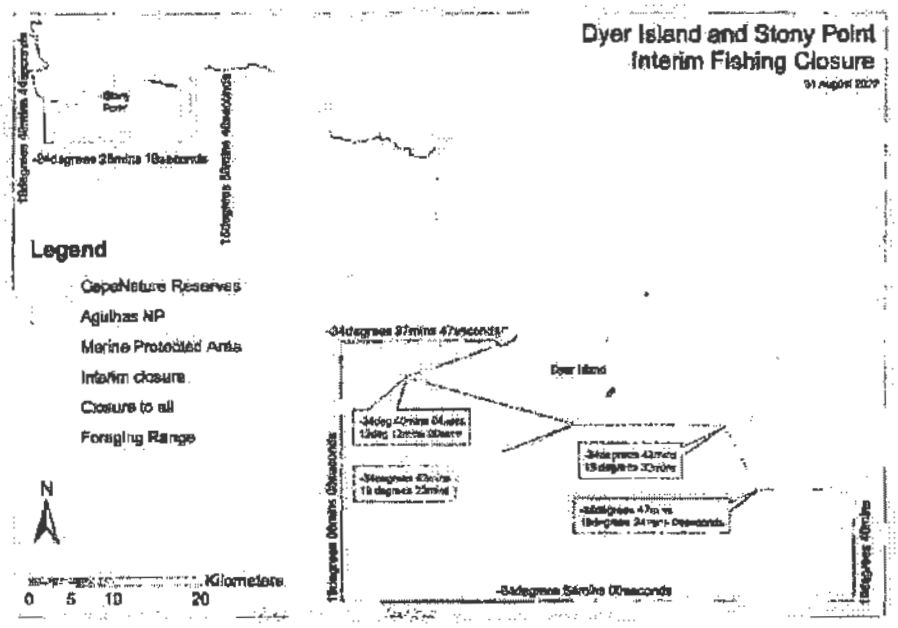

Figure 2: Closures from 15 January and 31 December 2024 in the vicinity of Stony Point and Dyer Island.

c) In the Algoa Bay area around St Croix and Bird Islands, see Figure 3.

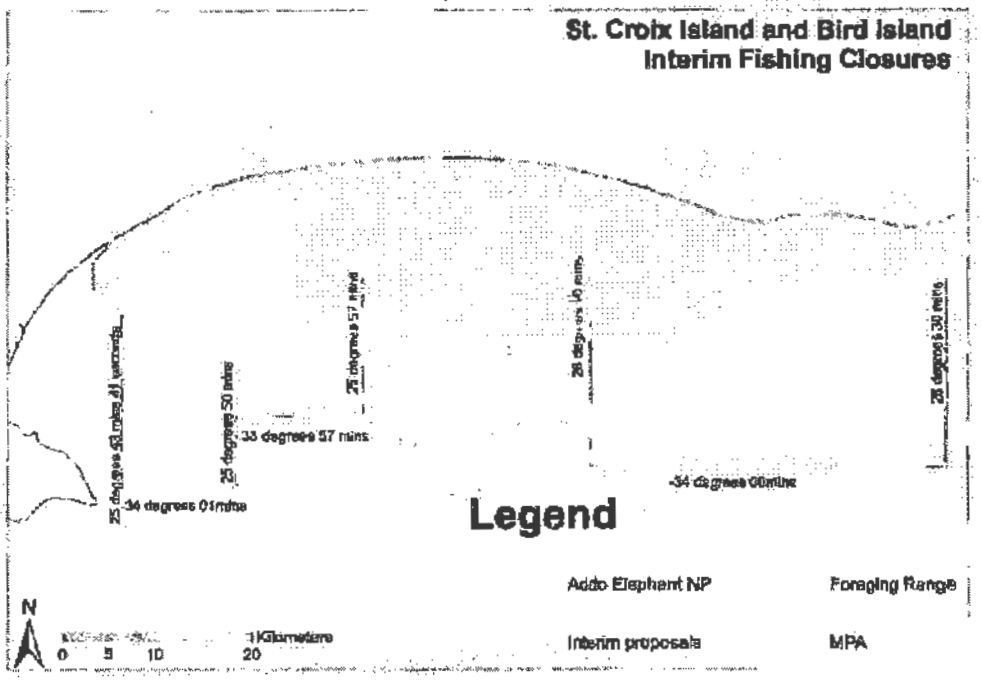

Figure 3: Closures from 15 January and 31 December 2024 in the vicinity of St Croix and Bird Islands.

4. NOTIFICATIONS

4.1 The Permit Holder shall inform the local Fishery Control Officer/ Marine Resources Monitor in writing (as per Annexure C) at least 2 (two) hours prior to the intended time of landing of the following:

(a) The vessel details;
(b) Which Permit Holder(s) the catch is to be allocated/apportioned to;
(c) The estimated catch on board;
(d) The species of fish harvested;
(e) The estimated time of arrival; and
(f) The port of arrival and landing point

If the Permit Holder / Vessel Owner wishes to fish in the Exclusive Economic Zones (EEZ) of another country (.e.g. Namibia) for part of the year, the Permit Holder / Vessel Owner is required to follow procedures as stipulated in **Annexure D** of these permit conditions. Any fish caught under this charter agreement will not accrue to South Africa. Furthermore, this performance will not be considered in any fishery performance reviews

4.2 If circumstances render it impossible to land fish to the prescribed factory, immediate notification must be given to the local Fishery Control Officer within 2 (two) hours prior to the intended time of landing. Fish shall only be landed after written approval by the local Fishery Control Officer has been granted. Written notification must be given to the local Fishery Control Officer within 48 (forty-eight) hours of the landing and particulars of the catch and reasons why the prescribed factory was not utilised must be provided. A copy of such notification must be attached to the relevant landing sheet. The Permit Holder shall then apply to have the non-prescribed factory named on the catch permit within 7 working days after the landing.

4.3 Skippers are to report any accidental spillage or sightings/evidence of dead fish due to, but not limited to, fishing operations, e.g. predator interference, net recovery, net damage (tears, etc.) in the process, mechanical or hydraulic failures impacting the vessel's navigation, safety or navigation problems, etc.

4.4 Reports, which should include the navigational position as well as the pelagic block number, should be forwarded via email or WhatsApp to the Area Controller and nearest local Fishery Compliance Office as per contact details provided for the landing sites in Annexure C (page 30) of these conditions.

5. EFFORT LIMITATIONS AND GEAR RESTRICTIONS

5.1 Whilst operating in terms of the provisions of this permit, the Permit Holder shall not activate any other fishing right / permit allocated to it.

5.2 The Permit Holder shall only utilise a purse-seine net, which shall also be the only fishing gear on board the vessel.

6. CATCH CONTROLS AND LIMITATIONS

6.1 No fish except adult Sardine/Pilchard, red eye (limited to approved industry upper catch limit) or lanternfish and lightfish (limited to industry combined species approved limit) shall be targeted.

6.2 No pelagic fish shall be dumped or discarded into the sea or deliberately freed from the net.

6.3 All linefish species or any other incidental catches landed shall be forfeited to the State and must be handed to the Fishery Control Officer/ Marine Resources Monitor at the landing site upon landing or when inspected.

6.4 By-catch of chub mackerel and horse mackerel (maasbanker) should be managed as per the attached by-catch management plan (Annexure B).

6.5 A Permit Holder who reaches their apportioned catch allocation shall immediately cease any further landing of that species against that Permit.

6.6 Should the Permit Holder fail to adhere to the above conditions, the Department may (with respect to paragraphs 9.1 and 9.2) confiscate the unauthorised gear. The Department may implement the provisions of section 28 of the MLRA and/or legal proceeding in all cases where the above conditions are believed to have been breached.

6.7 If the last set of the season (for either the normal season or the sub-season, if the latter is allocated) leads to an over-catch for a particular Permit Holder, that landing must be split and the excess amount of fish deducted from another Permit Holder's allocation, if that vessel is in possession of a permit for more than one Permit Holder and provided that the other Permit Holder's allocation has not yet been filled. If the other Permit Holder/s allocation has been filled then the over catch will be automatically deducted from the following season's final allocation for the Permit Holder that has over-caught.

6.8 Should a vessel be in possession of a permit for a single Permit Holder only, and if the last set of the season (for either the normal season or the sub-season, if the latter is allocated) results in an over-catch for that Permit Holder's allocation, then that amount of fish will automatically be deducted from the following season's final allocation for that Permit Holder.

6.9 When deliberate over-catching of an Permit Holder's allocation is suspected, the Department may institute Section 28 proceedings under the MLRA or criminal proceedings against such an Permit Holder. For example, if a skipper makes two consecutive sets and the initial set caught sufficient fish to fill a Permit Holder's allocation, then the last set will be considered to be a deliberate over-catch. That over-catch will automatically be deducted from the following season's final allocation for that Permit Holder, and in addition possible proceedings under Section 26 of the MLRA.

Sub-Season:

Definition: The "sub-season" refers to the additional allocation and/or allowance associated with the allocation, after the final allocation for the year, with special reference made to the anchovy directed fishery in the small pelagic sector.

7. VESSEL SPECIFICATIONS

7.1 The letter "P" must be displayed as stipulated in terms of regulation 78 promulgated under the MLRA.

7.2 The Permit Holder shall not use any fishing vessel unless it bears the registration letters and numbers assigned thereto by the Director-General. Such letters and numbers shall be displayed in white on a black background or in black on a white background on both bows in characters not less than 15 cm in height, 10 cm in breadth (figure "1" excepted) and 2 cm in thickness (width of stroke). The space between adjacent letters and figures shall be between 2 cm and 5 cm.

7.3 Radio call signs must be clearly visible and displayed as stipulated in terms of regulation 78 promulgated under the MLRA.

8. VESSEL MONITORING SYSTEM (VMS)

8.1 The Permit Holder shall ensure that the fishing vessel is fitted with a functioning vessel monitoring system ("VMS"), which is approved by the Department.

8.2. It is the responsibility of the Permit Holder/ Permits Holder/ Vessel Owner/ Skipper to ensure that the VMS is fully operational and that the VMS continues to transmit to the Department's Operations Room prior to sailing and throughout whilst at sea.

8.3 The Permit Holder shall establish that the VMS unit is functional by contacting the Operations Room on telephone numbers 021 - 402 3076 or 021 - 402 3077, prior to sailing. Should the power supply be interrupted or the equipment become non-functional (for whatever reason), and the problem persists, the vessel shall return to port within two hours of being informed of the problem.

8.4 Vessels fitted with Inmarsat C VMS units, wishing to switch their units off whilst alongside in port, shall only do so a minimum of six hours after berthing, and the units shall be switched on a minimum of six hours prior to their estimated time of departure from port. Should the power supply be interrupted or the equipment become non-functional (for whatever reason), and the problem persists, the vessel shall return to port within twenty-four hours of being informed of the problem, unless special arrangements have been made with the Department's Operations Room to allow the vessel to continue fishing. Such special arrangements shall include:

(a) 3- hourly reporting of the vessel's positions faxed to 021 -4256497;
(b) Notice of estimated time of arrival;
(c) Notice of port arrival;
(d) Inspection of the catch by a Fishery Control Officer/Monitor; and

(e) A copy of the vessel track for the voyage for verification purpose.

The Department will keep a record of the frequency of VMS breakdowns in order to discourage repeated use/abuse of this special arrangements dispensation.

8.5 Should the Permit Holder not adhere to the provisions of the above paragraphs, the Department will detain the vessel once in port and may implement legal proceedings.

8.6 In cases where VMS units are non-functional due to "technical" problems, and such Permit Holders'/ Permits Holders', Vessel Owners/ Skippers wish to proceed to sea without a VMS unit onboard, an "Application for an exemption to undertake fishing without a VMS" form must be completed.
This form, together with a letter from the Company undertaking the repairs (which must include the fishing vessel's name, area number and estimated time that it will take to repair and re-install the unit), must be faxed to the Department's Customer Care Services, fax number 021- 402 336.
Only once written permission has been received from the Department (i.e. an exemption has been granted), may the vessel proceed to sea. The VMS exemption must be kept onboard the vessel for the duration of each trip undertaken within the period of validity of the permit.
For each fishing trip undertaken during the permit validity period, the Permit Holders/ Permits Holders, Vessel Owner/ Skipper of such vessels shall notify the Department's Operations Room on telephone numbers 021 – 402 3076 or 021 – 402 3077 or email VMSops VMSops@dffe.gov.za that they are proceeding to sea, and upon arrival back in port or launching site for the duration of the permit.

8.7 In cases of emergency, the Permit Holder must obtain written authorisation before the fishing vessel enters or intends to enter into a Marine Protected Area or any other area closed for fishing. The request must clearly set out the nature of the emergency and motivate why the request should be granted. Such request shall be sent via e-mail to: VMSops VMSops@dffe.gov.za or faxed to 021 - 425 6497.

9. LANDING OF FISH

9.1 The Permit Holder shall ensure that all fish is discharged from the vessel in accordance with the reasonable instructions of the Fishery Control Officer/ Marine Resources Monitor.

9.2 No Permit Holder shall discharge fish until it has notified the Department as stipulated above. Catches may only be discharged in the presence of a Fishery Control Officer/ Marine Resources Monitor. Catches shall be discharged only at landing points approved by the Department. The entire catch (including any by-catch) must be discharged at one landing point only.

9.3 Before the commencement of offloading of any fish, the duly completed **Pelagic Catch Report (Skipper form)**, which must be accurately filled in by the skipper,

must be handed to the Fishery Control Officer/Marine Resources Monitor, monitoring the offloading process.

9.4 An accurate latitude, longitude (i.e. degrees, minutes, seconds and direction e.g. 34°03'660 S; 018°20'252 E) and time at start of each set made must be recorded when the net enters the water. This information shall be recorded by the Skipper on the Pelagic Catch Report. NIL return required in the event that no fish were caught.

9.5 The **Pelagic Catch Report** (skipper form) shall be completed to provide an estimated mass (in tons) per species per haul. This ratio may be used as the species composition of a catch, should the Fishery Control Officer/ Marine Resources Monitor not be able to identify species during normal sampling procedures, due to decomposed state of fish.

9.6 The total estimated mass of the **Pelagic Catch Report** (skipper form) should correspond within 10% accuracy of that of the total mass as determined by a scale and of the applicable landing.

9.7 Should a Permit Holder fail to adhere to the above requirements, the Department may confiscate all fish being landed and may implement proceedings under Section 28 of the MLRA.

10. SUBMISSION OF INFORMATION

10.1 The Permit Holder must submit to the Department:

(a) Notification (Permit Holder Information, Attention: Deputy Director: Pelagic and High Seas Fisheries Management, Customer Services Centre, Ground Floor, Foretrust Building, Martin Hammerschlag Way, Foreshore, Cape Town or Private Bag X2, Vlaeberg, 8012) notification of any change of contact details within 30 days of such change by completing the application form available at the Customer Services Centre;

(b) performance statistics as stipulated in paragraph **17.**

10.2 Catch Statistics

(a) On completion of the offloading process, the mass of all the applicable species must be completed on the **Landing Declaration, OM/EN 26/7/3**, and certified as correct by both the Permit Holder or a nominated representative of the Permit Holder and the Fishery Control Officer/ Marine Resources Monitor. The name of the Permit Holder must be reflected on the landing declaration.

(b) The TAC species caught shall be deducted from the quantum allocated to the Permit Holder. All fish must be weighed in the presence of the skipper and/or a nominated representative of the Permit Holder and a Fishery Control Officer/Marine Resources Monitor.

(c) The Permit Holder shall provide weekly summaries of catches to Mr Johan de Goede (Fisheries Management: Marine Resource Management), JdeGoede@dffe.gov.za , Tel No.: **(022) 714 1880.**

(d) The Permit Holder shall conduct operations strictly in accordance with the attached pilchard categorisation schedule (Annexure A). Recommendations for changes to that schedule should be forwarded to Mr J de Goede.

(e) Should the Permit Holder fail to timeously submit the above information or submit false or incorrect information, the Department may-

(f) refuse to re-issue a Permit under section 13 of the MLRA for the following year until such time as the required information has been receipted; or proceed under section 28 of the MLRA

10.3 Socio-Economic Information

The Permit Holder must provide any other economic, socio economic or financial information in the format as and when requested by the Department.

10.4 Should the Permit Holder fail to timeously submit the above information or submit false or incorrect information, the Department may-

(a) refuse to issue a permit / permit under Section 13 of the MLRA for the following year until such time as the required information has been receipted; or
(b) proceed under Section 28 of the MLRA.

11. RECORD KEEPING

11.1 The Permit Holder shall hold at its registered place of business the original Permit issued for the current fishing season. The Permit Holder shall at all times over the duration of the permit have available a certified copy of this permit on board each vessel utilised to harvest Sardine Pilchard.

11.2 The Permit Holder shall keep the [illegible] copy of [illegible] landings for a minimum period of sixty (60) months

12. LEVIES

12.1 The Permit Holder must pay the prescribed levies for the fish landed for prescribed species as stipulated in the Government Gazette (Gazette No. 33518, dated 10 September 2010).

12.2 All levies and fees must be paid monthly in arrears and by the last working day of the month following the month in which fish was harvested. Non-compliance will result in a 10% penalty being charged.

12.3 The Permit holder must submit together with all levy payments a levy declaration form.

12.4 The Department may refuse to issue fishing permits / permits to Permit Holders who have any levies or fees outstanding for a period in excess of 30 days, or may suspend the Permit Holder's fishing permit / permit until all outstanding levies have been paid to the Department.

12.5 A nil return must be submitted for every month where no fish has been harvested.

12.6 All returns must be submitted to the Directorate: Revenue Management via fax number 086 613 6256 or email to revenue@dffe.gov.za or post per address.

Fisheries Management
Customer Service Centre
Ground Floor, Foretrust Building
Martin Hammerschlag Way
Foreshore, Cape Town, 8001

12.7 The information required in 12.3 must be submitted when paying levies to the cashier at the Fisheries Management Customer Service Centre, Ground Floor, Foretrust Building, Martin Hammerschlag Way, Foreshore, Cape Town. Alternatively payment may be made via direct deposit at any First National Bank (FNB) branch or Electronic Funds Transfer (EFT) to the following banking details:

Bank: First National Bank
Branch code: 210554
Account name: Marine Living Resources Fund Deposit Account
Account number: 62123256382
Deposit reference: To be supplied by Foretrust office on receipt of fish levy declaration.

Kindly contact the Directorate: Revenue Management at revenue@dffe.gov.za or facsimile 086 613 6256 or 021 402 3016 (Ms S Baartman).

12.8 Failure to comply with 12.1 – 12.7 may result in proceedings in terms of section 28 of the Act.

13. VIOLATIONS

13.1 A breach of the provisions of the MLRA or these permit conditions by the Permit Holder will result in the initiation of legal proceedings under section 28 of the MLRA. A breach includes:

(a) furnishing information to which the Department of Agriculture Forestry and Fisheries ("the Department") is entitled to, which is not true or complete;
(b) contravening or failing to comply with a permit / permit condition imposed or with the provisions of the MLRA;
(c) being convicted of an offence in terms of this MLRA; or
(d) failing to effectively utilise the permit / permit.

13.2 The Department may refuse to re-issue a subsequent permit / permit should the conditions stipulated in this permit not be adhered to.

13.3 The Permit Holder shall not land, sell, receive or process any fish taken by any means in contravention of the MLRA.

13.4 The Permit Holder shall safely store all inorganic waste material, garbage and pollutants on board the vessel. Should the Permit Holder discard any waste material, garbage or pollutants into the sea or landing site or harbour, this permit will be suspended for a period determined by the Department and the Permit Holder shall take those steps considered necessary in terms of NEMA to remedy any pollution caused.

13.5 There shall be no transhipment or transferral of fish without written authorisation from the Department. Should the Permit Holder tranship or transfer any catches without the written authorisation of the Department, the Permit Holder shall have its commercial fishing permit revoked. The transfer of "bolyn" (pelagic fish netted in excess of the vessel's maximum hold capacity) from one vessel to another is strongly encouraged in this sector. "Bolyn" is therefore not regarded as transhipment or transferral of fish for the purposes of the small pelagic sector.

13.6 The Permit Holder shall only harvest the amount of fish allocated to it in terms of the total allowable catch ("TAC") allocated to it under Section A. Fishing over or under these limits may result in the initiation of legal proceedings.

13.7 In terms of the MLRA, the Permit Holder is obliged to report to the Minister any contravention of the provisions of the MLRA by any other person. Any such contravention must be reported to the Department in writing and should be faxed to (021) 402-3663, Attention: The Chief Director: Monitoring, Control and Surveillance.

13.8 At any time during the course of the fishing trip or discharging, a Fishery Control Officer can request the skipper of the vessel to provide the cargo manifest or any other documents relating to fishing operations. The skipper must comply with this request.

14. CONSULTATION AND COMMUNICATION

14.1 The Permit Holder may contact the Department in one of the following ways (all correspondence must be clearly marked as to **subject matter**):

By mail	By Hand	By Email
Subject: Customer Services Centre, Private Bag X2, Vlaeberg, 8018	Subject: Customer Services Centre, Ground Floor, Foretrust Building,	MMgoqi@dffe.gov.za , JDeGoede@dffe.gov.za **By telephone** 022 7141880

	Martin Hammerschlag Way, Foreshore, Cape Town Attn: Johan De Goede	By cellphone 083 461 4522

14.2 The Department will prefer to consult and communicate with the Recognised Industrial Body (Bodies) representative of Permit Holders in this fishery.

14.3 Communication regarding all permits and licences must be addressed to the Department and clearly marked *Permits and Licences*.

15. OBSERVER PROGRAMME

15.1 Department will require the Permit Holder to carry one or more Observers on board its vessel at times during the fishing season.

15.2 The Observer shall be fully accommodated on board the vessel and provided with food and facilities reserved for officers.

15.3 The Permit Holder shall proportionately bear the costs of the Department's Observer programme.

15.4 The Permit Holder (as identified in paragraph 1.4) must notify the Observer coordinator of the sailing time of the vessel, not less than 2 (two) hours prior to sailing.

15.5 The Permit Holder shall allow the Observer unrestricted access to monitor fishing activity and compliance with permit conditions and all applicable laws.

15.6 Should the Department reasonably believe that an Observer is being prevented from carrying on his/her obligations in any way or threatened in any way while on board, the Department may call the vessel into port and may take steps to immediately suspend fishing activities by the Permit Holder(s).

16 TRANSFER OF FISHING RIGHTS

16.1 The Permit Holder may only transfer the long-term commercial fishing right allocated to it in terms of section 21 of the MLRA read together with the Policy for the Transfer of Commercial Fishing Rights (Gazette No 32449).

16.2 Any transfer of shares or sale of shares and/or or membership interest that results in a change in control or ownership of the Permit Holder must be approved by the Department in terms of section 21.

16.3 Failing to comply with 16.1 and/or 16.2 may lead to the initiation of further legal proceedings including but not limited to proceedings in terms of section 28 of the MLRA.

17 FISHING PERFORMANCE MEASURING

17.1 The Permit Holder shall be obliged to provide the Department with information required to carry out a performance measuring exercise, which information may include but not limited to:

(a) Data regarding transformation levels;
(b) Sustainable fishing practices;
(c) Data regarding investments made in the fishery and jobs created and sustained; and
(d) Data regarding compliance initiatives.

18 ECOSYSTEM EFFECTS OF FISHING

18.1 The Permit Holder must take cognisance of sustainable fishing practices and of the impacts of fishing on the ecosystem (also see **Section C**).

18.2 In this regard steps must be taken to minimise the incidental mortality of unwanted by-catch. By-catch of chub mackerel and horse mackerel (maasbanker) should be managed as per the attached proposed by-catch management plan (Annexure B) (also see **paragraph 9.6**).

18.3 Furthermore, steps must also be taken to minimise impacts of fishing on top predators, such as seabirds (see paragraph 6.1 (iv) and (v)).

19. SECTION C - MANAGEMENT MEASURES

PELAGIC FISH (SARDINE/PILCHARD): 2024

1. GENERAL

1.1 This permit is issued subject to the further provisions of the following once finalised and/or promulgated (See also Paragraph 2.1 of Section B):

a) Pelagic (Sardine/Pilchard) Fishery Management Plan (to be developed), and;

b) National Plans of Action for the Conservation and Management of Sharks (NPOA-sharks) and Seabirds (NPOA-seabirds).

2. OBSERVERS

2.1 The Department wishes to achieve coverage of at least 10% of the annual catch per Permit Holder and 25% during the B-Season (should a B-season exist). The cost of Observer coverage for the B-Season shall be borne by the Permit Holder.

2.2 The requirement to carry an Observer in accordance with the requirements of the Department's Observer programme (**Section B, paragraph 13.1**) is a simple approach to achieve this goal. However, if this approach does not achieve the desired goal (e.g. through Permit Holders shortening trips when Observers are on board) then a more onerous approach may become necessary.

2.3 The onus is on the Permit Holder to ensure that one or more Observers are carried on a minimum of trips (10% of total number of annual trips).

2.4 It is the Department's intention to introduce a cost-recovery framework for the Observer programme and costs may be borne proportionately by all Permit Holders in the sector.

3. ECOSYSTEM EFFECTS OF FISHING

3.1 The Permit Holder must take cognisance of sustainable fishing practices and of the impacts of fishing on the ecosystem (see also **Section B paragraph 11.1**).

3.2 In this regard steps must be taken to minimise the incidental mortality of unwanted by-catch. By-catch of chub mackerel and horse mackerel (maasbanker) should be managed as per the attached by-catch management plan (Annexure B) (also see paragraphs 9.6 and 11.2).

3.3 Furthermore, steps must also be taken to minimise impacts of fishing on top predators, such as seabirds (see also **Section B paragraph 6.1 (iv) and (v)**).

4. CONSOLIDATION

4.1 The Policy on the Allocation and Management of Small Pelagic Commercial Fishing Rights: 2021states that following the allocation of 15-year commercial fishing rights in this sector, the Department will facilitate the consolidation of the operations of RHs active in the sector, if necessary.

M. MQOQI
Department of Forestry Fisheries and the Environment
Foretrust Building, Martin Hammerschlag Way, Foreshore, Cape Town, 8000
Offshore & High Seas Fisheries Management

DIRECTOR: OFFSHORE & HIGH SEAS FISHERIES MANAGEMENT
DATE: 17 January 2024

ANNEXURE A

SCHEDULE: SARDINE/PILCHARD CATEGORISATION

Notes:

1. Distinguishing between large and small Sardine/Pilchard:
   - **LARGE** = greater than (>) 14.0 cm Total length (*LT*); and
   - **SMALL** = less than or equal to (≤) 14.0 cm (*LT*).

- **ALL** juvenile pilchard (14cm and smaller) will **ALWAYS** be categorized to "**PILCHARD BY-CATCH ≤ 14CM**"
- Adult (larger than 14cm) pilchard reflecting **more** than **50%** in **ANY** sample as part of the **ENTIRE** sample will ALWAYS be categorized as "**DIRECTED PILCHARD**"
- Adult (larger than 14cm) pilchard **less** than 50% in **ANY** sample as part of the **ENTIRE** sample will ALWAYS be categorized as "**PILCHARD BY-CATCH > 14CM**"
- For the purposes of pilchard categorization, ICE / WATER and JELLY will **NOT** be taken into account!

2. Whether fish is cooled or not is of no significance for categorisation purposes.

3. Examples of how to determine allocations based on the revised Sardine/Pilchard Categorisation Flowchart are given below.

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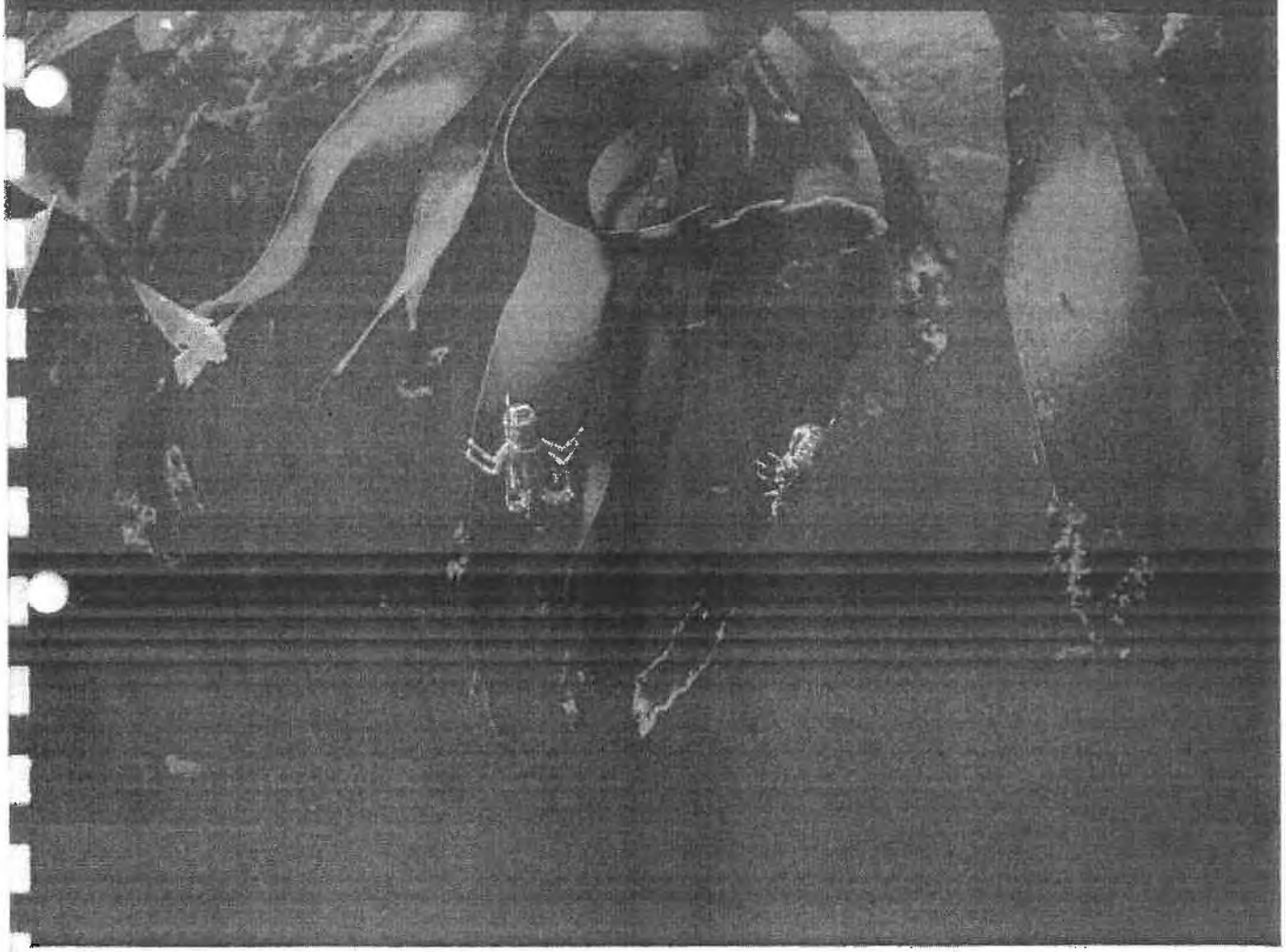
STATUS OF THE SOUTH AFRICAN MARINE FISHERY RESOURCES 2023



forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

2030 NDP

Small pelagic fish (sardine, anchovy and round herring)

Stock status	Unknown	Abundant West Coast round herring	Optimal Anchovy Sardine	Depleted Sardine	Heavily depleted
Fishing pressure	Unknown	Light West Coast round herring	Optimal Anchovy Sardine	Heavy	

Introduction

Forage fish of the order Clupeiformes occur in the South African continental shelf waters between the Orange River mouth on the West Coast and Durban on the East Coast. They generally exhibit schooling behaviour, have a small body size with rapid growth rates, have short lifespans and exhibit strong population responses to environmental variability which result in large natural fluctuations in abundance over space and time even in the complete absence of fishing. Abundant small pelagic forage fish off the coast of South Africa include anchovy *Engraulis encrasicolus*, sardine *Sardinops sagax* and West Coast redeye round herring *Etrumeus whiteheadi*, and these three species generally account for more than 95% of the total pelagic purse-seine catch. Long-term changes in the relative abundance of anchovy and sardine, over decadal and centennial time-scales, have been observed both locally and worldwide. Changes in the abundance of the two species are generally associated with variability in their recruitment, owing to changing environmental factors that affect, amongst others, transport of eggs and larvae, and feeding conditions. These characteristics also render small pelagic fish resources susceptible to those impacts of climate change that result in changed circulation patterns, altered composition and productivity of lower trophic levels, and the distribution of marine organisms – all of which are likely to exacerbate recruitment variability.

Pelagic fish resources are important to the country for several reasons. Firstly, the purse-seine fishery in which they are caught is South Africa's largest fishery in terms of landed mass and second only to the hake fishery in terms of value. Secondly, pelagic fish are an important and high-quality source of protein. Anchovy and round herring are mostly reduced to fish meal and oil in industrial-scale factories and used as a protein supplement in agri- or aqua-feeds. Sardine is mainly canned for human and pet consumption, with a small amount packed whole for bait or as cutlets for human consumption. Thirdly, the pelagic fishery employs a large workforce in fishing and related industries. Finally, pelagic fish occupy a key position in the marine food web where they are the link that transfers energy produced by plankton to large-bodied predatory fish, seabirds, and marine mammals. In this role, forage fish species can and do have major effects on higher trophic levels as well as on lower trophic levels, and variability in forage fish abundance is likely to propagate throughout the entire ecosystem.

Because animals and humans alike depend on forage fish, it is important to manage the fishery that targets them in a manner that accounts for their high degree of variability and importance to the ecosystem. This is so because of the potentially severe risks of local depletion of forage fish for dependent species such as seabirds, particularly in years of low fish abundance in certain areas. However, an often-overlooked fact is that whereas forage fish abundance influences higher trophic levels, the predation pressure exerted by these predators also has a controlling influence on the abundance of forage fish, given that they are the main food source for many predators. Estimates of forage fish losses to predation are typically much higher on average than losses to fisheries, yet the assumption is often made that fishing is the main driver of reduced forage fish biomass.

Although it remains difficult to disentangle the impacts of fishing and natural processes at relevant time-scales in extremely complex marine ecosystems, excessive fishing is likely to disrupt important trophic interactions, particularly at low levels of forage fish abundance. Furthermore, predation pressure is likely to increase too as forage fish abundance declines, at least until a new predator-prey equilibrium is established. Fisheries management responses to such declines in forage fish abundance should therefore be precautionary to limit the risk that abundance falls below levels at which future recruitment is compromised and/or the ecosystem is markedly impacted.

while at the same time having regard for the important socio-economic role of the commercial fisheries that depend on forage fish.

History and management

The first pelagic fishing operations began in South Africa in 1935, but commercial operations only started in 1943 in the St Helena Bay area in response to the increased demand for canned products during the Second World War, with purse-seiners operating between Lambert's Bay and Cape Hangklip. Sardine, horse mackerel *Trachurus capensis* and chub mackerel *Scomber japonicus* dominated pelagic catches in the early years. Annual sardine catches increased rapidly from less than 200 000 t in the 1950s to more than 400 000 t in the early 1960s, whereas annual horse mackerel catches, which had peaked at around 120 000 t by the mid-1950s, decreased to less than 30 000 t annually by the end of the 1960s. Similarly, annual chub mackerel catches that peaked at almost 130 000 t in 1967 decreased markedly by the mid-1970s. As sardine, horse mackerel and chub mackerel stocks started collapsing in the mid- to late-1960s, the fishery changed to using smaller-meshed purse-seine nets to target juvenile anchovy, which dominated catches and largely sustained the South African purse-seine fishery for the next 30 years. Anchovy catches peaked at around 600 000 t in the late 1980s then subsequently decreased to a low of 40 000 t in 1996. Catches of sardine gradually increased throughout the 1990s under a conservative management strategy and reached 374 000 t in 2004 following a rapid increase in sardine population size, particularly on the South Coast. Anchovy catches also recovered quickly during the early-2000s, resulting in total pelagic landings of more than 500 000 t per annum between 2001 and 2005. Round herring catches have been reported since the mid-1960s but have never exceeded 100 000 t or dominated the pelagic landings, despite several attempts by the pelagic industry to increase catches of this species.

A prolonged period of low sardine recruitment since 2004 resulted in a rapid decline in the size of the sardine stock with sardine catches dropping to levels in the order of 90 000 t between 2008 and 2014 and to less than 40 000 t in 2017 and 2018. The sardine catch in 2019 of only 2 100 t was the lowest recorded over the past 70 years. Sardine catches recovered to 14 800 t in 2020, 23 000 t in 2021 and 26 000 t in 2022, although more than 70% of catches in 2021 and 2022 were taken on the South Coast. The current low sardine catches are insufficient for profitable operation of the major canning facilities and the bulk of canned sardine products currently produced in South Africa contain sardine that are sourced from Morocco and elsewhere. This has enabled the industry to retain market share and to keep their workers employed, though current unfavourable exchange rates are affecting profitability and threatening the long-term viability of the canning industry, particularly if local catches remain at these low levels.

Owing to this rapid decline in sardine catches, anchovy catches again dominate the fishery, with average catches of around 220 000 t between 2000 and 2018. The 2019 anchovy catch of around 165 000 t was the lowest recorded since 2013 and although the 2020 anchovy catch of 285 000 t was the highest since 2012, catches in 2021 and 2022 were only 156 000 t and 172 000 t, respectively.

Historically, the fisheries for sardine and anchovy were managed separately in South Africa. The South African anchovy fishery has been regulated using an operational-management-procedure (OMP) approach since 1991. This adaptive management system is designed to respond rapidly to major changes in resource abundance without increasing risk. The first joint anchovy-sardine OMP was implemented in 1994, with subsequent revisions. The joint anchovy-sardine OMP is needed because sardine and anchovy school together as juveniles, resulting in the bycatch of juvenile sardine with the mainly juvenile anchovy catch during the first half of the year. This results in a trade-off between catches of anchovy (and hence juvenile sardine) and future catches of adult sardine, and the OMP aims to ensure the sustainable utilisation of both resources. Total allowable catches (TACs) for both species and a total allowable bycatch (TAB) for juvenile sardine are set at the beginning of the fishing season, based on results from the total biomass survey of the previous November. However, because the anchovy fishery is largely a recruit fishery, the TAC of anchovy and the juvenile sardine TAB are revised mid-year following completion of the recruitment survey in May/June.

The OMP formulae are selected with the objectives of maximising average directed sardine and anchovy catches in the medium term, subject to constraints on the extent to which TACs can vary from year to year in order to enhance industrial stability. Even though these formulae are also conditioned on low probabilities that the abundances of these resources drop below levels at which successful future recruitment might be compromised, now that the sardine biomass has dropped below that threshold, the primary and overriding consideration becomes assisting its speedy recovery, while still having consideration for the socio-economic implications associated with any TAC recommendation.

OMP-14, which was finalised in December 2014, was used to recommend TACs and TABs for the small pelagic fishery from 2015 to 2018. Although development of OMP-14 also included substantial analyses related to the implications of the sardine resource consisting of two components with different spatial distributions rather than a single stock, OMP-14 was still tuned using an operating model which reflected a single, homogeneously distributed sardine stock.

OMP-18, which was adopted in December 2018, was, however, developed using an operating model of the sardine resource consisting of two mixing components with differing productivity characteristics. The model of two sardine components, a western component assumed to be distributed west of Cape Agulhas and a southern component distributed east of Cape Agulhas, estimated the extent of west-to-south movement of fish of ages 1 and above each year. This assessment indicated that in terms of recruits-per-spawner, the western component is much more productive than the southern component and that future sardine population growth is mainly dependent on West Coast recruitment. OMP-18 therefore included spatial management components to limit the amount of sardine caught west of Cape Agulhas. Spatial management was formally implemented for the first time in 2019, with each sardine Right Holder constrained to take a maximum of 43% of their sardine allocation off the West Coast. This percentage varies interannually and has ranged from 33% to 46% since then.

OMP-18, as with previous OMPs, also included agreed procedures for deviating from the OMP-calculated TACs and TABs in the event of Exceptional Circumstances (ECs) when application of the TAC generated by the OMP is considered

to be inappropriate. Such a deviation may occur, for example, when an observed survey biomass falls outside the range of biomass distributions simulated during the development of the OMP. ECs were first declared for sardine in 2019 and then for both sardine and anchovy in 2020 on this basis and OMP-18 was set aside. Instead, TACs for anchovy and sardine were recommended based on short-term biomass projections from updated assessments pending the development of a new OMP. These projections of spawner biomass under alternative constant catch scenarios, with testing of sensitivity to various assumptions, are evaluated in terms of the proportional increase in biomass that would be achieved in the absence of fishing. A new OMP-18rev was developed for anchovy in 2021 and used to provide TAC advice for anchovy in 2022 and 2023. This revised OMP, however, does not include a juvenile sardine bycatch vs adult sardine TAC component, given that new operating models for sardine are not yet available (see sardine population structure section below) and hence both sardine TACs and TABs continue to be based on short-term projection results, pending finalisation of a new combined anchovy and sardine OMP that incorporates advances in knowledge of sardine population structure.

Research and monitoring

Ongoing research on several issues that have an impact on the sustainable use and management of small pelagic fisheries off the coast of South Africa includes regular monitoring of pelagic fish abundance, development and revision of management procedures, and investigation into, amongst others, population structure, biology and ecology, catch patterns, distribution and behaviour of key species.

The biomass and distribution of anchovy and sardine, but also of other schooling pelagic and mesopelagic fish species such as round herring, juvenile horse mackeral and lanternand lightfish (*Lampanyctodes hectoris* and *Maurolicus walvisensis*, respectively) are assessed biannually using hydroacoustic surveys. These surveys, which have been conducted since 1984, comprise a summer total biomass survey and a winter recruit survey. Data for the estimation of a number of other key biological measurements needed as input into the OMP and information pertaining to the environment are also collected during these surveys. Given the fluctuating nature of the abundance of pelagic fish species, these surveys continue to provide estimates that are far more reliable than those that would have been obtained through mathematical estimation from commercial catch data only and have enabled optimal use of these resources at times of high biomass while offering protection to them at low biomass levels.

This time-series of biannual biomass estimates was unfortunately disrupted in 2018 and 2021 owing to the unavailability of the research vessel FRS *Africana* and funding delays in chartering an alternative vessel to conduct the 2018 pelagic recruit survey and 2021 pelagic total biomass survey. The loss of these surveys has had far-reaching consequences both for setting subsequent TACs and for our recent understanding of the status of the anchovy and sardine resources. Fortunately, both the 2022 recruit and adult biomass surveys were successfully conducted onboard the MFV *Compass Challenger*. The FRS *Africana* is expected to resume these surveys in late 2023 following essential replacement of power-generation units.

Data on catch statistics, including landed mass, species composition, and catch position and date, are obtained from the pelagic fishery. Samples from commercial catches are processed to obtain the length frequency distributions of harvested fish that are required as input in the species-specific population dynamics models, in addition to other data on biological characteristics such as sex and gonad maturity stage, and fish condition. The current absence of official scale-monitors at offloading factories is, however, of great concern and potentially compromises the quality of reported landing statistics. Initial investigations have suggested that bycatches of sardine in both the anchovy and round herring fisheries may have been under-reported in the absence of scale-monitors. This has serious consequences for the sustainable management of these resources and attention to this matter is urgently needed.

Sardine population structure

A substantial amount of research over the past decade has documented spatial (regional) differences in a variety of sardine traits around the South African coast. These include differences in: (i) life history strategies such as spawning and nursery areas and their environmental characteristics, and reproductive seasons; (ii) meristic characteristics such as gillraker number and vertebral number; (iii) morphometric characteristics such as gillraker length, and body and otolith shape; (iv) the prevalence and abundance of a digenean parasite biotag; and (v) otolith elemental composition and muscle metallic element composition. These results, together with observations that marine species around South Africa tend to be subdivided into regional populations associated with distinct biogeographic provinces, had suggested the existence of three sardine subpopulations (hereafter stocks) around the country, off the West, South and East coasts, respectively. The eastern stock was thought to comprise fish that mix with southern stock sardines during summer, but then separate from them during winter to travel toward their East Coast spawning grounds during the KZN sardine run. Although management of the purse-seine fishery for sardine has incorporated this hypothesised spatial structure by developing a 2-stock (western and southern) assessment model and setting region-specific catch levels in recent years, previous genetic studies did not support this multi-stock hypothesis.

Most recently, thousands of genetic markers from across the genomes of hundreds of sardines captured around the SA coast (Figure 80) were analysed to test the hypothesis that sardines participating in the KZN sardine run are genetically distinct. A suite of genetic markers with a signal of adaptation to water temperature showed regional differences within the species' temperate core range and only two stocks; one associated with South Africa's cool-temperate West Coast and the other with the warm-temperate South Coast. The strong affiliation with water temperature suggests that thermal adaptation maintains these patterns because each stock is adapted to the temperature range that it experiences in its native region.

Surprisingly, sardines participating in the run were not genetically distinct and showed a clear affiliation with the cool-temperate stock, indicating that the former were migrants that originate from the cool-temperate Atlantic. Not only are these sardines not well adapted to subtropical conditions, but they actually prefer the colder, upwelled waters of the West Coast. Off the Southeast Coast, the autumn and winter occurrence

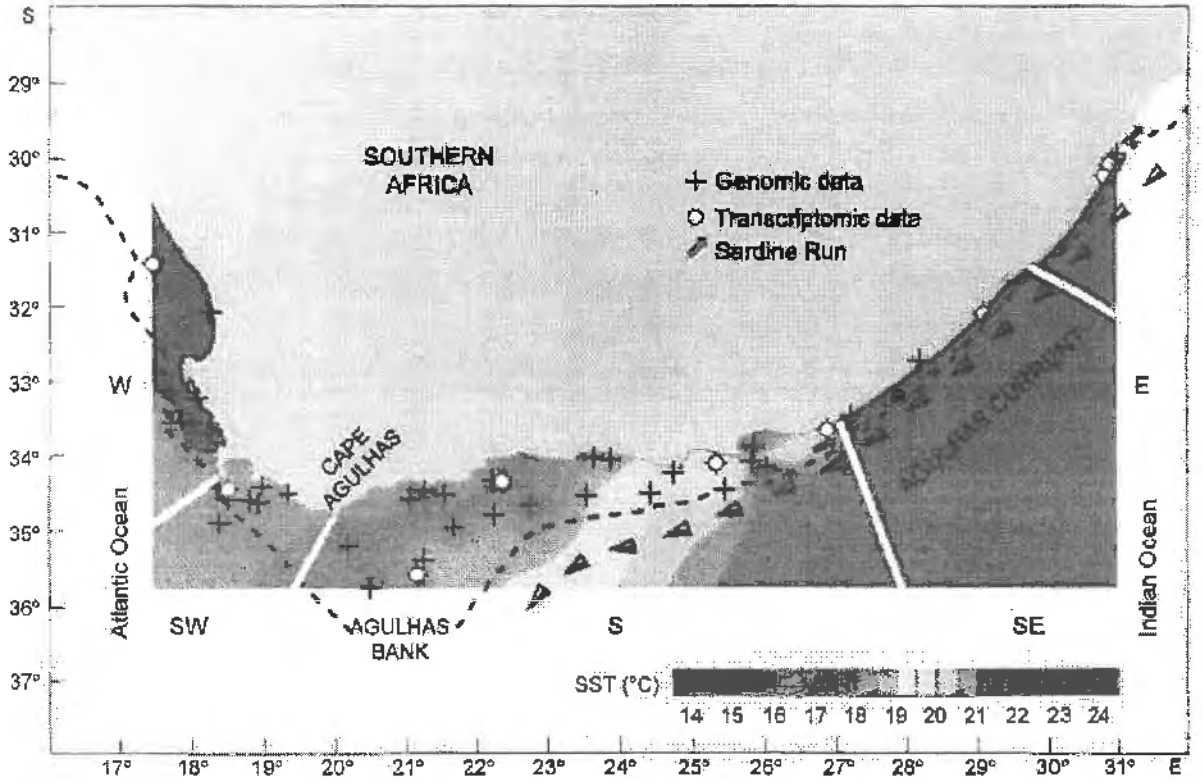


Figure 60: Map showing sites at which sardines were caught for genome and transcriptome sequencing. Colours represent mean sea surface temperatures (SSTs) with the contour plot derived from average SSTs over the previous 30 days at each location before sampling. The coastline was divided into five temperature-defined geographical regions (temperate core range: W, west; SW, southwest; S, south; SE, southeast; sardine run: E, east). Cape Agulhas indicates the approximate boundary between the Atlantic and Indian oceans; the dashed line indicates the edge of the continental shelf (200-m isobath), beyond which the sardines rarely disperse; and the black and white arrows represent the approximate path of the Agulhas Current, which transports tropical Indian Ocean water southward and confines sardines participating in the run (blue arrows) to a narrow coastal band of cooler water (not shown) (from Teske et al. 2021)

of mesoscale cyclonic eddies along the inshore edge of the Agulhas Current that transport cold water onto the shelf can result in shelf waters becoming temporarily cooler than those further west. This cooling creates conditions that favour cool-temperate sardines, triggering an aggregation of these migrants at the northeastern limit of the South Coast, and their northward movement is favoured by intermittent upwelling. Eventually, the sardines find themselves in subtropical waters that exceed their preferred thermal range and where they are subjected to intense predation, suggesting that the sardine run does not benefit South Africa's sardine population as a whole (Figure 61).

Importantly, the genomic results confirm the existence of two sardine stocks off South Africa that have adapted to different water temperatures and experience reduced fitness and lower survival when outside their preferred temperature ranges. This is supported by analyses of sardine-otolith oxygen-isotope ratios and microstructure that showed that fish from the West Coast grew significantly slower in water that was several degrees cooler than those from the South and East coasts. These results have important implications for management of the sardine fishery since, despite mixing between the two stocks, a single-stock management strategy can result in population declines if regional stocks adapted to specific temperature ranges are overexploited.

Anthropogenic pollutants in small pelagic fishes

The potential impacts on the marine environment of increasing levels of anthropogenic pollutants, such as metallic elements, persistent organic pollutants (POPs) and microplastics, are cause for concern, but information on their concentration levels and effects on marine life is limited or absent for many ecosystems, including those off South Africa. Metallic elements and POPs can attain toxic levels through bio-accumulation and can impair the functioning and survival of marine and other (e.g. human) organisms. Ingestion of microplastics can have detrimental effects, and microplastics can themselves be carriers for absorbed or adsorbed co-contaminants such as other harmful chemicals or pathogens. Studies to determine the levels of metallic elements and POPs in small numbers of South African sardine, and the occurrence and concentration of microplastics in anchovy, West Coast round herring and sardine off the South African West and South coasts, have recently been conducted. These measurements have not previously been made on small pelagic fishes in the region and hence can be used as baseline values against which data from future studies can be compared

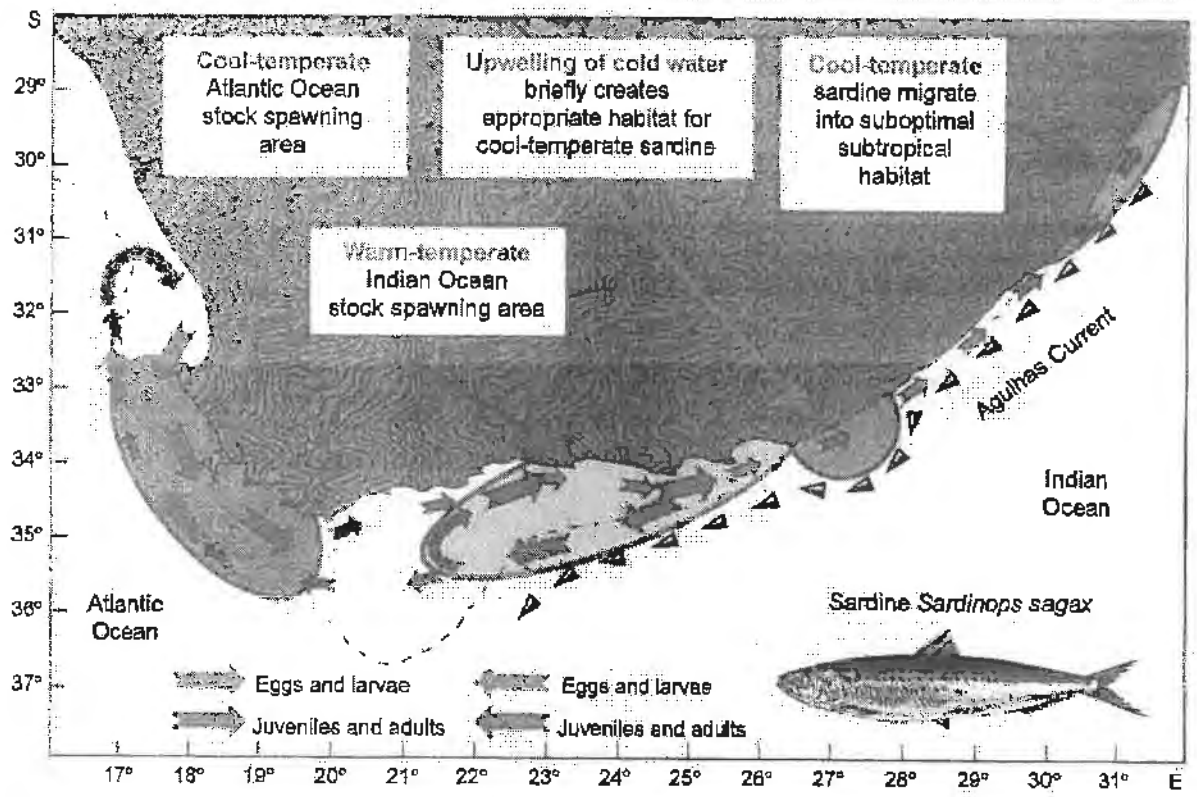


Figure 61: Stock structure of sardine in South African waters and sequence of events that result in a sardine run (from Teske et al. 2021)

as well as enabling an assessment of human consumer safety for sardine.

A total of 29 metallic elements were detected in the muscle of 30 sardine examined, with zinc (24 mg kg-dry-mass^{-1}), titanium (17 mg kg-dry-mass^{-1}) and strontium (5 mg kg-dry-mass^{-1}) having the highest concentrations. Additionally, the relative composition of metallic elements differed between sardines sampled off the West Coast compared to those from the South Coast. Based on limits set by the South African government as well as those set by the European Union, concentrations of three major toxic metals (cadmium, lead and mercury) in sardine do not pose a threat to human consumer safety. The most prominent anthropogenic POPs in sardine muscle tissue were the insecticide dichlorodiphenyltrichloroethane (DDT; now banned in South Africa for agricultural use but still used to control malaria) and polychlorinated biphenyls (PCBs) used in electrical equipment and electronic devices. Concentrations of both of these were markedly lower than concentrations of levels of naturally-occurring halogenated natural products (HNPs), and POPs were not considered to pose a human consumer safety risk. Additionally, PCB levels in South African sardine were substantially lower than those reported in sardines and sardinellas from European waters.

Small pelagic fishes feed on planktonic organisms that are of a similar size to microplastics and hence are considered useful bio-indicators of levels of this pollutant. Samples of ~200 individuals per species of anchovy, West Coast round herring and sardine collected between the Orange River mouth and Mossel Bay during the 2019 Pelagic Recruit Survey were processed to (i) apply a proposed approach for the extraction and quantification of microplastics in small pelagic fish; (ii) investigate interspecific differences in microplastic ingestion; (iii) identify the main plastic and polymer types ingested by these species; (iv) investigate spatial variations and the possible identification of "accumulation zones" of microplastics contamination; and (v) identify and propose a suitable bio-indicator species for the monitoring of microplastics in South African waters. Analyses indicated interspecific differences, with a higher concentration of microplastics in sardine (mean of 1.58 items individual^{-1}) compared to round herring (1.38 items individual^{-1}) and anchovy (1.13 items individual^{-1}), and a higher occurrence of microplastics in sardine (72% occurrence) and round herring (72%) compared to anchovy (57%). Microfibers accounted for 80% of ingested microplastics (the remainder being plastic fragments), with the main ingested polymers being poly(ethylene:propylene:diene) (33% occurrence), and polyethylene (20%), polyamide (20%), polyester (20%) and polypropylene (7%). The abundance of ingested items was not significantly correlated with fish size or body weight, and the abundance of ingested items increased from the West to the South coast. West Coast round herring was proposed as a bio-indicator for microplastics in the South African coastal environment and samples of this species have been collected for this purpose during subsequent surveys. That estimates of the occurrence of microplastics in South African anchovy and sardine are higher than those reported for these species elsewhere is

concerning, but a lack of data on levels of transferral of microplastics from edible aquatic species to humans precludes predictive decisions in regard to human consumer safety.

Current status

Annual TACs and landings

The total combined catch of anchovy, sardine and round herring landed by the pelagic fishery decreased by 45% from 396 000 t in 2016 to just 217 000 t in 2019, due mainly to a substantial decrease in the catch of anchovy from 262 000 t in 2016 to only 165 000 t in 2019. The catch of anchovy subsequently rebounded in 2020, reaching 285 000 t and pushing the total combined catch of small pelagic fish above the long-term average. Catches of anchovy were again at low levels in 2021 and 2022, despite high TACs being set for these years. The average combined catch over the last five years of 288 000 t is about 45 000 t lower than the long-term (1949–2022) average annual catch of 333 000 t (Figure 62). The utilisation of the anchovy TAC allocated for most years since 2000 remains low, with only 56% of the TAC being caught on average since 2000 (Figure 63a).

The directed sardine catch fell rapidly from 63 000 t in 2016 t to an all-time low of 2 100 t in 2019 (Figure 63b) as a result of drastically reduced TACs given the declaration of ECs for sardine at the end of 2016 and in subsequent years. In 2019, the directed sardine TAC was only 12 000 t, but has since been increased to around 33 300 t because of a slight recovery of the resource in 2022. The landings of sardine in 2021 and 2022 averaged around 30 000 t, with most of these catches having been taken on the South Coast. The sardine resource, however, remains in a stressed state, following poor recruitment in most years since 2004.

Sardine bycatch, which includes juvenile sardine caught with anchovy, adult sardine, and round herring as well as adult sardine caught with round herring, decreased from 17 000 t in 2016 to around 3 000 t in 2018 and 2019 (Figure 63c) but has subsequently ranged from 7 000 to 9 500 t during the past 3 years. The levels of sardine bycatch are well below that allowed in most recent years – mainly because the industry has tried to avoid areas with high bycatches of sardine to improve the chances of a recovery in the size of the adult sardine population.

The catch of West Coast round herring has remained relatively stable, averaging at 55 000 t over the last 5 years, and a relatively large catch of 66 000 t in 2022 (Figure 63d). These recent catches, however, are only half of the 100 000 t precautionary upper catch limit (PUCL) recommended for this resource and reflects the difficulty of catching this species with purse-seine nets. Increased utilisation of the West Coast round herring resource is encouraged but attempts to improve catch rates using midwater trawling have not been successful to date. Bycatches of juvenile horse mackerel have also been well below the three-year PUCL of 12 000 t, averaging only 3 600 t in the most-recent 3 years. This PUCL has now been increased to 15 000 t to make provision for those years where a high bycatch of horse mackerel is unavoidable (Figure 63e).

An annual PUCL for mesopelagic fish of 50 000 t was introduced in 2012, following increased catches of lantern- and lightfish by the experimental pelagic trawl fishery in 2011, when just over 6 000 t of these species were landed. A resumption of the trawl experiment in 2018 resulted in mesopelagic catches of 5 800 t and 3 500 t in 2018 and 2019, respectively. The relatively high costs associated with this experiment, coupled with the recent downturn in the anchovy and sardine fishery, has led to the applicant not pursuing this any further. The PUCL

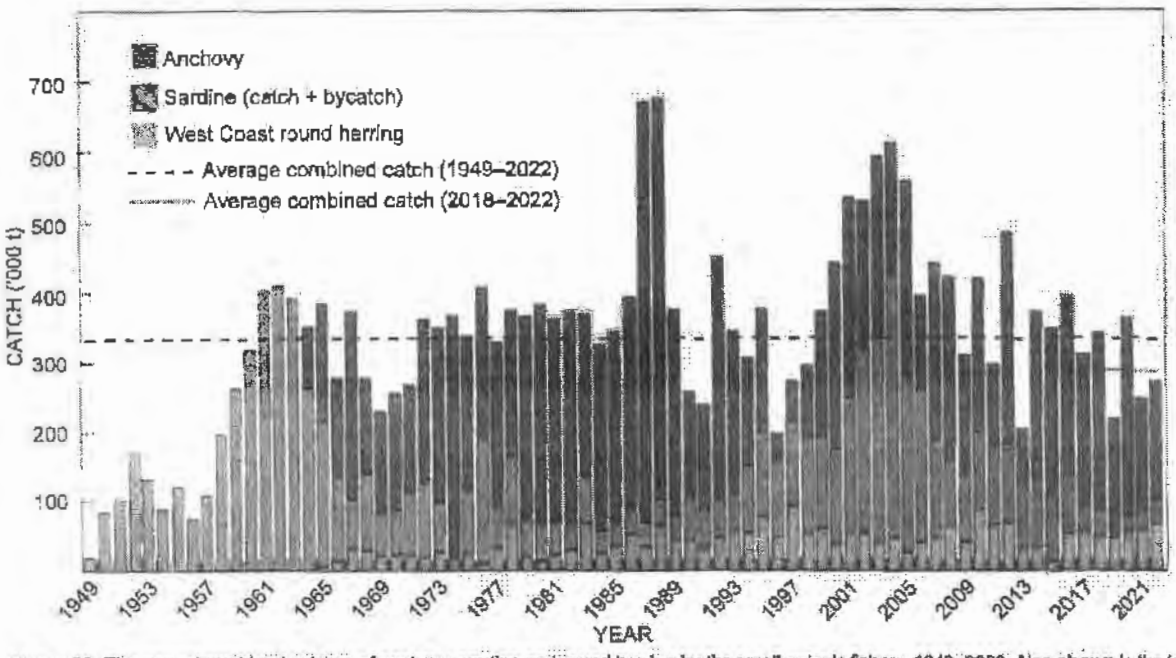


Figure 62: The annual combined catches of anchovy, sardine and round herring by the small pelagic fishery, 1949–2022. Also shown is the long-term average combined annual catch (black dashed line) and for the past five years (2018–2022; red solid line)

has subsequently been reduced to 25 000 t. The Department remains desirous of continuing this experimental fishery as well as the exploratory trawl fishery for anchovy and West Coast round herring aimed at improving utilisation of these resources off the South Coast, especially given the current depleted state of the sardine resource.

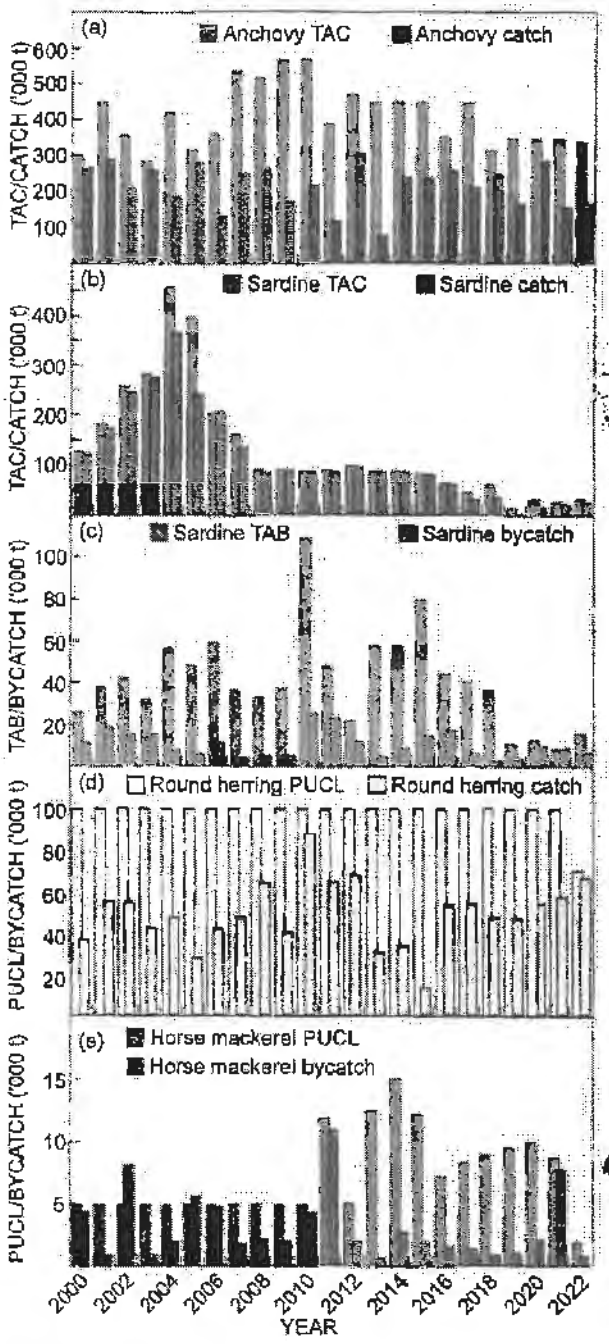


Figure 63: Total allowable catches (TACs), total allowable bycatch (TAB) and precautionary upper catch limits (PUCLs), and subsequent landings of each by the South African pelagic fishery for (a) anchovy, (b) directed sardine, (c) sardine bycatch, (d) round herring and (e) horse mackerel, 2000–2022

Recruitment strength and adult biomass

Anchovy recruitment measured in 2016 was considerably lower than the long-term average and almost half that measured in 2015. This was followed by a record high anchovy recruit estimate of 830 billion fish in 2017 (Figure 64a). Fish sampled during that survey on average weighed about 1.4 g less than those sampled during the preceding two years and not many of them appeared to have survived subsequent to the survey, with the adult anchovy biomass in 2017 and 2018 remaining relatively stable at around 1.5 million t. The decrease of close to 50% in the adult anchovy biomass from 1.5 million t in 2018 to only 0.84 million t in 2019 was followed by above average anchovy recruitment in 2020 giving rise to a 3-fold increase in adult biomass in that year. Recruitment of anchovy in 2021 and 2022 was again below average with a subsequent below average adult biomass of only 1 million t measured at the end of 2022.

Sardine recruitment has remained very low. The lowest recruit estimate in 30 years of <1 billion fish in 2016 was followed by an estimate of 7 billion fish in 2017 and 4 billion fish in 2019

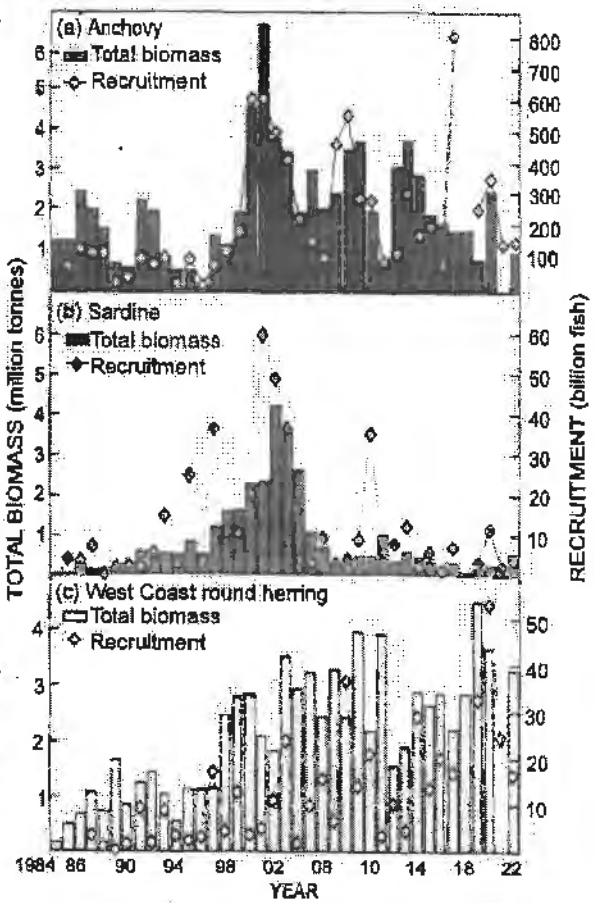


Figure 64: Time-series of acoustically estimated recruitment strength and total biomass of (a) anchovy, (b) sardine and (c) round herring, 1984–2022

(Figure 64b). Despite a slight increase in sardine recruitment in 2020, half of the recruitment estimates in the past 10 years have been lower than 5 billion fish. Given this sustained below-average recruitment, the adult sardine biomass decreased further to only 91 000 t in 2018. A slight increase to 190 000 t in 2019 and to 250 000 t in 2020, although encouraging, did not provide sufficient motivation to set aside low-biomass ECs provisions for this species. By 2022, the biomass had, however, increased to over 560 000 t. Despite this recent increase, the 2022 biomass estimate is still lower than the long-term average of 844 000 t, hence the categorisation of sardine status as being between depleted and optimal and the setting of a precautionary TAC for 2023. The 2019 West Coast round herring recruit estimate was the third highest on record (Figure 64c) and resulted in a 80% increase in the biomass of adult West Coast round herring from 1.4 million t in 2018 to 2.3 million t in 2019, the highest yet recorded. Recruitment dropped substantially in 2021 and 2022 but remained above the long-term average recruitment of 13 billion fish and the adult biomass by the end of 2022 remained relatively high at over 3 million t.

Shifts in the distribution both of anchovy and sardine adults that have previously been reported on (see previous issues of Status of the South African Marine Fishery Resources Report, since 2012) continue to be monitored. The abrupt eastward shift of anchovy that occurred in 1996 persists in most years, with an average of 38% of the adult anchovy biomass observed in the area to the west of Cape Agulhas since 1996 compared to 64% on average in the years preceding the shift (Figure 65a). Given the recent decline in the size of the anchovy population, the biomass of anchovy in this western area has declined to <500 000 t, a level far below that observed from 2012 to 2016. The percentage of the sardine biomass found in the area to the west of Cape Agulhas remains highly variable but has decreased considerably in recent years. Around 71% (180 000 t) of the sardine biomass was found in the area to the west of Cape Agulhas in 2016 (Figure 65b), but this percentage decreased to 32% in 2017 and subsequently to only 23% (44 000 t) in 2019 and 21% (52 000 t) in 2020. Despite a large increase in the biomass of sardine in both regions in 2022, the percentage located to the west of Cape Agulhas remains relatively low (39%). This decrease in the biomass of sardine to the west of Cape Agulhas is likely to compromise future recruitment, given the relatively low transport of eggs and larvae to the West Coast nursery area from sardine spawning on the South and East coasts.

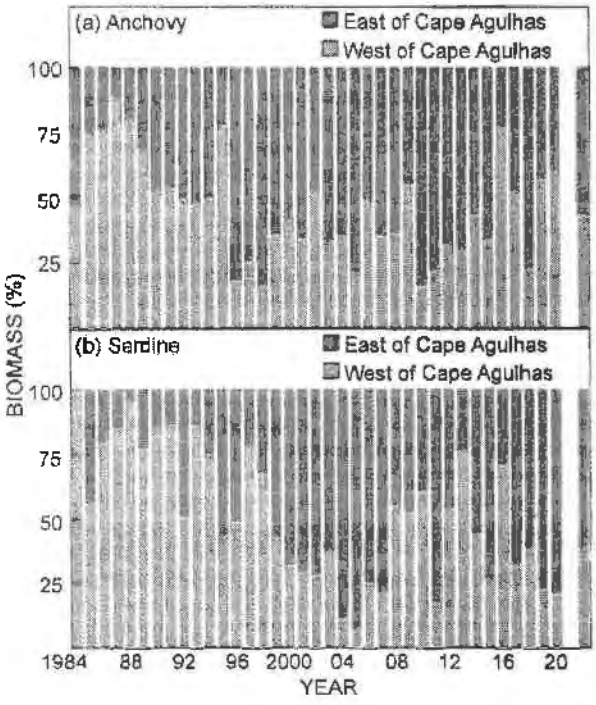


Figure 65: Percentage of the total (a) anchovy and (b) sardine biomass found to the west and east of Cape Agulhas, 1984–2022

Ecosystem interactions

The primary approach that has been used to limit catches of forage fish is Rights-based management with specific annual TACs. The incorporation of ecosystem considerations and the development of ecosystem-based management is typically carried out through OMP simulation testing to ensure certain probabilities that sardine and anchovy abundances would not drop below specified thresholds when harvested. Recent OMPs were also tested using parameters denoting risk to the African penguin *Spheniscus demersus* population. Penguins were chosen as a key predator species for consideration because they feed predominantly on sardine and anchovy and because of their conservation status, which is of concern due to appreciable reductions in their numbers at the major breeding colonies over recent years and their listing as Endangered by the IUCN. As part of the implementation of an ecosystems approach to fisheries (EAF) in South Africa's fishery for small pelagic fish, a model of penguin dynamics was developed for use in conjunction with the small-pelagic-fish OMP so that the impact on penguins of predicted future pelagic fish trajectories under alternative harvest strategies could be evaluated. So far results have suggested that fishing is likely to have a relatively small impact on penguins, especially when compared with uncertainties that arise from the variable spatial distribution of the sardine population. For example, OMP-18 performance statistics indicated that even with zero sardine catch, penguin numbers were expected to decline only about 1.4 % slower than if there was fishing. However, these results are now dated and both the OMP and the penguin population model need updating. Additionally, central to the development of any future OMP will be the consideration of harvest strategies that include spatial management of sardine, given the existence of two local stocks of this resource as described above. Such spatial management, which has already been formally implemented to avoid high local exploitation levels, also has the associated benefit of preventing local forage fish depletion and heightened competition between dependent predators and the fishing industry.

Penguins are potentially also sensitive to changes in pelagic fish abundance and distribution because of their land-based breeding sites and their limited foraging range (< about 20 km) during breeding. An experiment that involved alternating periods of fishing and closure to fishing around some important penguin breeding colonies (the Island Closure Experiment) was conducted between 2008 and 2020 to assess the impact of localised fishing on the breeding success of these birds.

Results from this study indicated that although certain island closures may help reduce the rate of decline of the penguins (by between 0.25% and 1%), they would do little to halt the decline, which is as much as 10% per annum at some colonies. Furthermore, these fishery closures have cost implications for the small pelagic fishing industry and, as such, any benefit of fishery closures should be weighed up against their costs.

Following increased media attention and calls from the conservation sector to intensify fishing restrictions, an internal Governance Forum comprising senior managers of the Department was established to advise the Minister on this matter. Under this forum, the Department sought to develop a compromise proposal for future fishing restrictions that would decrease the cost of closures to industry, but still maintain reasonable levels of protection of those areas where penguins prefer to forage. Further discussion of this proposal with the fishing industry and conservation sector resulted in an impasse. The Consultative Advisory Forum for Marine Living Resources (CAFMLR) established by the Minister to advance the discussion took a "middle of the road" approach between having no closures around colonies (advanced by the fishing industry based on the marginal benefits to penguins as quantified during the experiment) and full closure of core penguin foraging areas or marine important bird areas (MIBAs) around the largest six remaining colonies (as advanced by the conservation sector). The CAF recommendations, which essentially advocated closure of a total of 50% of the 6 MIBAs (i.e. 300% instead of the 600% recommended by the conservation sector) were rejected by both the fishing industry and the conservation sector. A further recommendation of the CAF, however, was to convene an international panel of experts to assist in decision-making.

The Minister has subsequently appointed such a panel to review the interpretation of the results from the experiment, explore the value of fishing closure around penguin colonies in providing meaningful benefits to penguins, review the processes and outcomes completed through the Governance Forum and CAFMLR, and make recommendations on the future implementation of fishing closures. This process is currently underway. In the meantime, and pending the outcome of the review, the Minister approved interim closures in September 2022 around the six breeding colonies of Dassen and Robben Islands on the West Coast, Stony Point and Dyer Island off the Southwestern Cape coast and St Croix and Bird Islands in Algoa Bay (Figure 66).

Climate change implications

Small pelagic fishes have been characterised as excellent bio-indicators of climate-driven changes in marine systems because of their responsiveness to environmental forcing. Predicted effects of climate change include changed species distributions, and these are frequently the first effect to be observed and are driven primarily by changed temperatures. The relative distributions of both anchovy and sardine have shifted eastwards over the past few decades, with these shifts significantly correlated with the cross-shelf SST gradient off the South Coast. Spatial catch patterns of both species have also changed, and whereas for sardine recent catch patterns will have been affected by explicit spatial management measures, a higher proportion of annual anchovy catches (which are not spatially restricted) have been taken on the western Agulhas Bank (between Cape Point and Cape Agulhas) than previously.

Improving predictive capacity in terms of the likely responses to climate change of exploited fish has been identified as a critically needed adaptation for South African fisheries management, including the need to develop models to better understand the potential impacts of climate change on species, food webs and fisheries. Given that small pelagic fish distri-

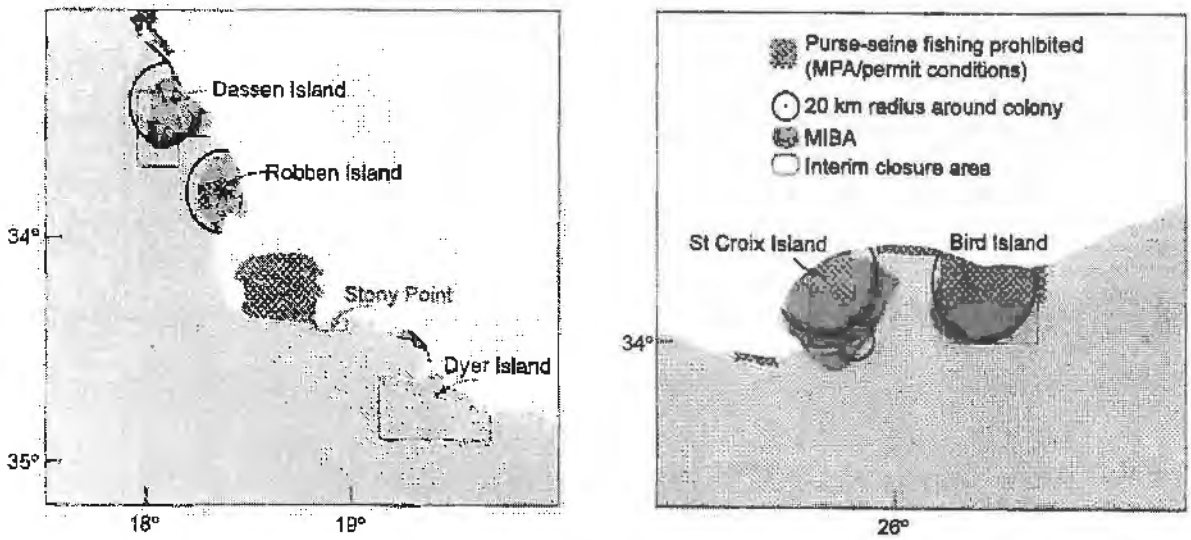


Figure 66: The locations of marine important bird areas (MIBAs; core foraging areas of African penguins), the 20-km-radius closed areas implemented during the Island Closure Experiment (note that an area of 5 km-radius around Rly Banks, to the southeast of St Croix Island, was also closed when St Croix Island was closed to fishing), and the interim closures that are presently in place. Also shown are the locations of marine protected areas (MPAs) and other restricted areas where pelagic fishing is not allowed. The dotted line within the interim closure area around Dyer Island demarcates an inshore area where no pelagic fishing is allowed and an offshore area where only small vessels are allowed to fish

butions are changing, a first step in developing models to improve predictive capacity is to better understand the effects of different environmental parameters on their distributions. Such bioclimatic-envelope models use associations between environmental variables and a species' occurrence to define sets of conditions under which that species is more likely to be found, and once envelopes are estimated they can be applied to forecast the effects of climate change on species' distributions.

A recent study used generalised additive models (GAMs) to assess the influence of several environmental variables on the distributions of eggs, recruits, and adults of anchovy, round herring and sardine in the Southern Benguela ecosystem. Abundance and distribution data of these different stages and species were collected during routine Pelagic Recruit (recruits) and Total Biomass (adults and eggs) surveys conducted between 2000 and 2011. Selected environmental variables were those expected to respond to climate change and that can be remotely sensed, and included sea surface temperature (SST), sea surface height (SSH), sea surface chlorophyll (Chl *a*), Ekman upwelling (Ek-Up) and eddy kinetic energy (EKE). Environmental data for the regions and periods matching the Pelagic Recruit and Total Biomass surveys of each year were collected from online sources (mostly the National Oceanic and Atmospheric Administration – NOAA) and were then mapped to the species- and stage-specific abundance and distribution maps for GAM analyses. The relative importance of these variables in influencing fish distribution patterns was also estimated.

Whereas almost all of the GAMs had good predictive performance, those for sardine had relatively higher explanatory capabilities compared to those for round herring and anchovy, and hence had a better capability for modelling sardine habitat suitability. This suggests that sardine distributions respond more strongly to environmental variables than do those of round herring and anchovy. Sea surface temperature had the highest relative importance of predictor variables for eight of the nine life stage / species combinations, sometimes by a substantial margin (Figure 67). The only exception was for

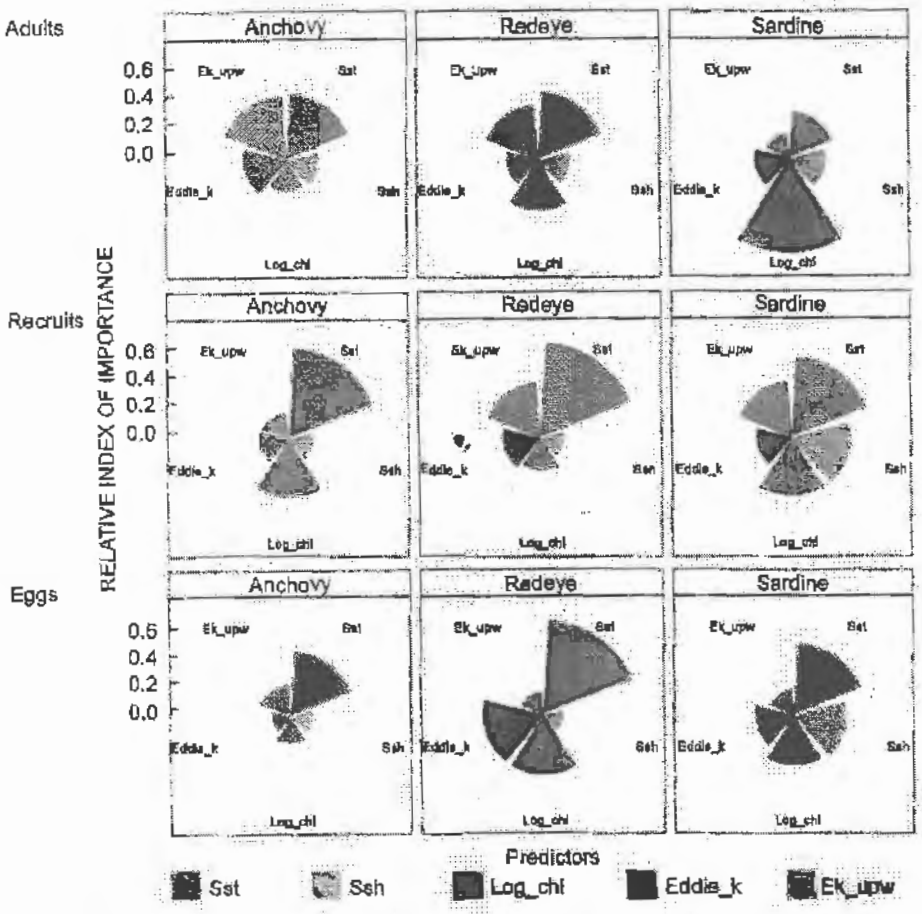


Figure 67: Pie diagrams illustrating the relative importance of the top five environmental variables in generalised additive models relating to the distributions of adults (top row), recruits (middle row) and eggs (bottom row) of anchovy (left column), West Coast round herring (redeye; middle column) and sardine (right column). The sizes of environmental predictor ples are proportional to their relative importance in predicting the distribution of that life stage of that species, and range from 0.14 for EKE (Eddie_k) on anchovy eggs to 0.71 for SST on round herring (redeye) eggs Sst = sea surface temperature; Ssh = sea surface height; Log_chl = log of surface chlorophyll a concentration; Eddie_k = eddy kinetic energy; Ek_upw = Ekman upwelling

adult sardine where SST had the second-highest relative importance, substantially lower than that for Chl *a*. This latter predictor was also important for anchovy recruits, and round herring eggs and adults. Sea surface height and eddy kinetic energy typically had lower values of relative importance. Other interspecific and intraspecific (i.e. between life history stages of the same species) differences in the relative importance of environmental variables were apparent (Figure 67).

These analyses have improved understanding of how present distribution patterns of small pelagic fish are related to environmental variables and are a necessary first step to investigating how changing oceanographic conditions might affect their future distributions. The interspecific differences in the relative importance of environmental variables in affecting the distributions of small pelagic fishes off South Africa suggest that species will be impacted differently by, and respond differently to, climate change. Importantly, the intraspecific differences observed suggest that different life history stages will also be impacted differently by climate change. These models can be coupled with models that predict future ocean state around South Africa to indicate where, and when, particular areas/regions may become less or more favourable to small pelagic fishes. This is important for the development of appropriate management strategies and the long-term sustainable exploitation of these valuable marine resources.

Adaptation to climate change measures that should be considered for the small pelagic fishery include, *inter alia*, (i) rebuilding the sardine population; (ii) developing anchovy products for human consumption and developing local markets for such; (iii) determining sustainable harvesting levels for West Coast round herring and lanternfish, with consideration for ecosystem needs, and increasing their exploitation levels if warranted; and (iv) developing an integrated, concerted and multi-disciplinary national research response to climate change impacts on South African marine fisheries. The analysis described above forms part of the last adaptation measure and could usefully be applied to other important marine resources.

Further reading

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Useful statistics

Pelagic fish catches and TACs/TAB/PUCLs, 2000–2022 (x 1000 tonnes).

Year	Anchovy catch	Sardine catch	Directed sardine	Sardine bycatch	Horse mackerel bycatch	Chub mackerel bycatch	Round herring catch	Meso-pelagic catch	TOTAL	Anchovy TAC	Sardine TAC	Sardine TAB	Round herring PUCL	Horse mackerel PUCL	Meso-pelagic PUCL
2000	267.29	135.20	123.57	11.63	4.50	0.04	37.28	0.18	444.31	291.00	125.00	26.20	100.00	5.00	
2001	287.51	191.53	172.64	18.90	0.82	0.12	55.33	0.08	535.41	451.00	182.00	38.40	100.00	5.00	
2002	213.45	260.68	244.74	16.14	8.15	0.08	54.80	0.03	537.36	359.72	257.97	42.47	100.00	5.00	
2003	258.88	289.99	274.15	15.85	1.01	0.25	42.53	0.06	592.66	285.00	280.00	32.31	100.00	5.00	
2004	190.09	373.83	365.79	8.03	2.05	0.48	47.23	0.47	613.68	423.00	457.00	57.15	100.00	5.00	
2005	282.73	246.71	240.29	6.42	5.63	0.4	28.39	0.00	563.81	315.89	397.00	48.45	100.00	5.00	
2006	134.18	217.28	205.87	11.42	4.82	0.10	41.89	0.00	398.28	362.25	204.00	59.30	100.00	5.00	
2007	253.09	139.50	134.62	4.88	1.90	0.40	47.93	0.00	442.83	536.94	162.44	36.50	100.00	5.00	
2008	265.82	90.92	85.74	5.17	2.28	0.87	64.23	0.00	424.13	517.50	90.78	32.85	100.00	5.00	
2009	174.47	94.33	89.20	5.12	2.09	0.62	40.49	0.01	311.99	569.44	90.00	37.73	100.00	5.00	
2010	217.05	112.41	87.70	24.71	4.39	0.64	88.49	0.33	422.99	573.18	90.00	109.51	100.00	5.00	
2011	119.88	112.14	89.05	23.09	10.99	0.24	64.64	8.03	307.89	390.29	90.00	48.54	100.00	12.00	
2012	307.30	109.44	97.91	11.53	2.20	0.07	68.30	0.02	487.31	472.72	100.80	21.95	100.00	5.00	
2013	78.80	91.94	87.84	4.10	0.60	0.02	31.30	0.00	202.67	450.00	90.00	58.87	100.00	12.47	
2014	240.50	97.03	88.41	8.62	2.76	0.84	34.38	0.01	375.51	450.00	90.00	58.78	100.00	15.19	
2015	237.90	98.14	80.94	15.20	2.04	0.93	13.42	0.00	350.43	450.00	83.47	60.22	100.00	12.23	50.00
2016	261.51	80.25	62.99	17.26	1.50	3.90	53.95	0.17	401.21	354.33	64.93	45.01	100.00	7.27	50.00
2017	216.56	37.41	30.99	6.42	1.41	2.13	54.27	0.33	311.78	450.00	45.56	41.16	100.00	8.37	50.00
2018	253.37	39.26	36.51	2.75	0.85	2.07	48.29	5.83	343.94	315.24	65.00	37.28	100.00	8.95	50.00
2019	164.80	5.21	2.048	3.16	1.06	3.76	47.14	3.48	222.00	350.00	12.25	10.75	100.00	9.57	50.00
2020	285.18	24.56	15.01	9.55	2.17	2.63	53.75	0.00	368.51	350.00	32.00	13.05	100.00	9.99	50.00
2021	156.24	31.84	22.52	9.32	7.86	1.53	57.30	0.02	254.79	350.00	26.80	9.17	100.00	8.76	50.00
2022	172.19	33.00	25.94	7.07	0.82	0.83	66.42	0.01	273.28	341.00	33.35	16.15	70.00	1.91	25.00

forestry, fisheries
& the environment
Department
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

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MINISTER

RECOMMENDATIONS FROM THE REVIEW PANEL OF EXPERTS TO ADVISE ON THE PROPOSED FISHING AREA LIMITATIONS OR CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES

1. PURPOSE

To request that Minister-

1.1 Note the Report by the International Review Panel of Experts to advise on the proposed fishing-area closures adjacent to South Africa's African penguin breeding colonies.

1.2 Grant approval for the policy decisions following the Report from the Panel .

1.2.1 That the limitation of small pelagic fishing adjacent to penguin colonies will henceforth be used by the Department as an appropriate intervention in the conservation and management of the African Penguin. Whilst it is acknowledged that small pelagic fishery limitations do have a benefit to penguins, but it should be noted that these benefits are small relative to the observed decreases in the penguin populations over recent decades.

1.2.2 Furthermore, that fishing limitations around selected penguin colonies are established for the following penguin colonies: Dassen Island, Robben Island, Stoney Point, Dyer Island, St. Croix Island and Bird Island. The fishing limitations are *to* be implemented for a minimum of ten (10) years with a review after six (6) years of implementation and data collection. The transition to implementing fishing limitations is described in Paragraph 2.10. However, in the absence of penguin colony specific agreements across the fishery and conservation stakeholders on limiting small pelagic fishing,

consideration should be given on the current interim limitations or closures that must continue from 1 August 2023, as the interim limitations are due to end on the 31st of July 2023.

1.3 Approve the implementation of the recommendations for future science from the International Review Panel. These will be implemented in a phased approach depending on funding and resources available with industry and civil society organisations encouraged to contribute to the program.

1.4 Approve that Branches Fisheries Management and Oceans and Coasts develop a communications and stakeholder engagement plan to report at least annually to stakeholders on the implementation of these fishing limitations and other measures implemented as actions in the African Penguin Biodiversity Management Plan.

1.5 Approve that the Panel work is now concluded and that the Panel will be remunerated as per the National Treasury Approved rates at the B1 daily rate scale. Each Panel member will be remunerated for 12 weeks of time and the Chair for 14 weeks. Any actual expenses incurred will be reimbursed in addition to this.

1.6 Note that the Chair and Panel Members are available on a date to be determined to present their Report to Minister and local stakeholders via an online meeting.

1.7 Approve that the Report of the Expert Panel can be distributed to all stakeholders and be made publicly available.

2 BACKGROUND AND DISCUSSION

2.1 South Africa's substantial decrease in the number of adult African Penguins since the mid-2000s is considered to be caused by a number of different drivers including food competition between penguins and the small pelagic purse seine fishery. This fishery overlaps with foraging areas around penguin breeding colonies such as Dassen, Robben, Stony Point, Dyer, St Croix and Bird Islands, which vie for the same sardine and anchovy resources. To further understand this, a study was initiated from 2008 until 2021 to assess the effects of closure or limiting of purse-seine fishing around penguin breeding colonies. The results have been controversial, with different opinions on how to interpret them.

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2.2 This prompted the establishment of the Governance Forum in January 2021 to provide a synthesis of the current scientific information relating to fishing closures and African penguin population declines. The Governance Forum (GF) was primarily made up of DFFE scientists from the Branches Oceans & Coasts, Fisheries Management and the South African National Parks (SANParks). The Governance Forum was further supported by the Extended Task Team which incorporated into the GF three representatives each from the small pelagic fishing sector and the civil society conservation sectors. The objective of the Extended Task Team was to propose actions to slow the decline of the African penguin through; (i) exploring overlaps in penguin forage areas and small pelagic fishing; and (ii) developing a science plan to investigate the cause, possible interventions and impact of interventions. No agreement was reached within the Extended Task Team on the possible interventions and their impact. This task was then referred to the Consultative Advisory Forum for Marine Living Resources (CAFMLR) in January 2022.

2.3 The Consultative Advisory Forum for Marine Living Resources was tasked to develop recommendations on limiting small pelagic fishing activities adjacent to penguin colonies. A range of documents and presentations were provided to the CAFMLR and joint recommendations were sought on potential fishing closures. The CAFMLR recommended a compromise between two positions provided by conservation and the fishing industry, through a 50:50 approach using Marxan, a commercially available decision support tool. The other CAFMLR recommendations included, amongst others, the appointment of an international panel of experts to scientifically evaluate the science, that models of intermediate complexity for ecosystems assessments (MICE) be applied to quantify the impacts from other drivers of penguin decline and that there needs to be stronger action and focus on implementation of the African Penguin Biodiversity Management Plan in order to address the most important drivers of penguin decline. The CAFMLR fishing limitation recommendations were not widely accepted by either sector, with both sectors requesting that the Minister appoint an International Panel that would review:

a) quantitative scientific analyses of the Island Closure Experiment (ICE) and subsequent publications to evaluate whether the scientific evidence from the ICE indicates that limiting small pelagic fishing around colonies provides a meaningful improvement to penguin populations.

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b) Assess the cost-benefit trade-off of 1) costs to fisheries, versus 2) the proportion of penguin foraging range protected during the breeding season, for different fisheries exclusion scenarios.

2.4 While the processes of the International Panel were underway, the Department implemented precautionary preliminary closures from 1 September 2022 to 31 July 2023.

2.5 A notice was published in the Government Gazette in October 2022 to establish a panel of experts in terms of Section 3A of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The Terms of Reference and the expected scope of work were set out in the schedule to the notice. The Terms of Reference were negotiated across the Small Pelagic Fishing Industry and Conservation Sector representatives. Members of the public were invited to nominate qualified individual persons with relevant expertise and experience, to be considered for appointment as members of the Panel. The following Panel was appointed in December 2022:

- Prof. André Punt (Chair)
- Dr. Ana Parma
- Dr. Éva Plagányi-Lloyd
- Prof. Robert Furness
- Prof Philip Trathan
- Prof. James Sanchirico (added later in 2023 as the Panel required economic sciences expertise).

2.6 The Panel requested information from both the fisheries and conservation sectors before, during and after engagements in March and June 2023. These requests were made based on a substantial amount of pre-reading and preparation before each engagement. In total the Panel reviewed about 200 documents. Additionally, the Panel, especially the Chair, engaged with analysts from the Department, fisheries and conservation sectors to clarify analyses that were needed - often with rapid turn-around times. A further meeting of the local stakeholders and scientists to present and clarify their assertions and assumptions was convened by the DFFE in May. Panel members were observers at this meeting. Oral presentations at the meetings were made by:

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- The Consultative Advisory Forum (CAF) for Marine Living Resources
- DFFE's: Fisheries Management, Oceans and Coasts and SANParks
- South African Pelagic Fishing Industry Association (SAPFIA)
- Conservation Sector (SANCCOB – The South Africa foundation for the Conservation of Coastal Birds, BirdLife-SA, EWT – Endangered Wildlife Trust and WWF-SA - World Wildlife Fund for Nature, South Africa)
- Marine Resource Assessment and Management Group of the University of Cape Town
- University of Exeter
- Nelson Mandela University.

The Panel subsequently requested additional information from stakeholders, most of which were provided by means of written responses. During the June meeting, the first two days were open to the stakeholders for further oral presentations, whilst the last three days were closed for panel deliberations. The Panel did call analysts back during the week to clarify aspects or undertake additional analyses.

2.7 The Panel produced its first draft report on the 8th of July 2023. This draft was then edited by the Editor-in-Chief of the African Journal of Marine Science (housed in the Fisheries Management Branch) and the Report was laid out for publication by DFFE Communications. A proof version was sent to the Panel on the 18th of July with final comments expected by the 21st of July. It is expected that the Report will be ready for distribution by the 28th of July.

2.8 The Executive Summary is attached as **Annexure 1** and the draft Full Report is attached as **Annexure 2**. The Panel settled several scientific discussions during their deliberations. While these are summarized in **Annexure 1** – the Executive Summary, a few are highlighted here to motivate the policy recommendations in this submission. Also note that Section 7 of the Full Report summarizes conclusions of the Panel. (Note **Annexure 2** is still in draft low resolution lay out format while awaiting final comment from Panel.)

2.8.1 The Island Closure Experiment (ICE), although with some limitations in scope and observations, showed that limiting small pelagic fishing adjacent to penguin colonies does have benefits to penguins, albeit small relative to the observed decrease in the penguin population (benefits to population annual growth rates range from 0.71% - 1.51% compared to decreases

of 10 to 13% from 2005 to 2022 for West Coast Islands). (This conclusion does not fully include the Algoa Bay Colonies of St. Croix and Bird Islands owing to the limited observations that were possible.)

2.8.2 There may be additional benefits of fishing limitations to penguins that could not have been observed in the design of the ICE, e.g. benefits to juvenile and adult survival.

2.8.3 Fishing limitations in years of above-average small pelagic fish abundance are likely to offer a smaller benefit to penguin reproductive success.

2.8.4 Closures should be implemented for periods of up to 10 years. This will allow for a fuller assessment of benefits to the adult population.

2.8.5 Fishery costs of closure or fishing limitations as presently estimated are likely to be an overestimation. Current methods offered to calculate costs to the fishing industry can however be used to evaluate the relative impact of different closure options.

2.8.6 Additional scientific investigations and observations are needed. The Panel's recommendations in this regard will be implemented in a phased manner, including the development of Models of Intermediate Complexity for Ecosystem assessments (MICE), improving penguin monitoring and the assessment of other contributing factors to the decline in penguin populations.

2.8.7 The Panel has provided a methodology to evaluate different fishing limitation options. These methods can be used to assess trade-offs of existing and new fishing limitation proposals.

2.9 Based on the above and in light of the dire state of the African penguin population it is recommended that fishing limitations be employed as one of the interventions to support the conservation of this species. Fishing limitations are then proposed for Dassen Island, Robben Island, Stoney Point, Dyer Island, St. Croix Island and Bird Island. There are currently interim fishing limitations at these islands that were implemented from September 2022.

2.10 The interim fisheries limitations or closures are set to expire at the end of July 2023. These should continue until the end of the current fishing season unless there are other colony-specific agreements from the representatives from the Small Pelagic Fishing Industry and Civil Society Conservation Sectors. The remaining months until the end of the current small pelagic fishing season will be used to evaluate fishing limitation options using the trade-off methods suggested by the Panel to propose fishing limitations for colonies where there is no agreement across the Sectors. If no alternate fishing limitation proposals are concluded by the start of the

RECOMMENDATIONS FROM THE REVIEW PANEL OF EXPERTS TO ADVISE ON THE PROPOSED FISHING AREA LIMITATIONS OR CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES

2024 Small Pelagic Fishing Season (January 15th 2024) the current interim fishing limitations will continue until the end of the 2033 Fishing Season, with a review in 2030 after six years of implementation from the start of the 2024 fishing season. Fishing limitations can be additionally reviewed during years of higher-than-average abundance of small pelagic fish stocks. The definition and method to calculate this average including the number of years and valid data points are to be determined by the Fisheries Management Branch within the 2023/24 year. Similarly, the Operational Management Plan for the Sardine and Anchovy can be adapted to acknowledge models of the penguin population, including at low fish biomass levels and at suitable spatial scales. Any decision to alter fishing limitations must be a joint recommendation from the Branch Oceans & Coasts and the Branch Fisheries Management. The Interim Closures Maps are attached as **Annexure 5**.

2.11 Notably, during the June Panel meeting the Chair encouraged the representatives of the fishing and conservation sectors to find each other on fishing limitation and benefit discussions. There was some movement towards agreement during a dedicated negotiation time for possible fishing limitations at Robben Island, Bird Island and for the St. Croix Island. If Sector representatives can confirm these, these agreed fishing limitations can be implemented immediately. Agreed fishing limitations will be formalised through the Deputy Directors General of the Branches Oceans and Coasts and the Fisheries Management. Fishing limitations will be implemented through permit conditions as is the case with current interim fishing limitations.

3 IMPLICATIONS

Personnel:	None.
Financial:	Remuneration and reimbursement costs for the Panel, including local travel and associated costs to major airports and meals during travel are estimated at between R 1 500 000 and R 1 800 000. Approval from National Treasury to use the B1 rate is attached as **Annexure 3** and the 2022/23 rates are attached as **Annexure 4**.
Communication:	The Expert Panel report will be made available via the DFFE Website.
Legal:	None.

RECOMMENDATIONS FROM THE REVIEW PANEL OF EXPERTS TO ADVISE ON THE PROPOSED FISHING AREA LIMITATIONS OR CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES

4 OTHER BRANCHES/ CHIEF DIRECTORATES CONSULTED

4.1 The Branch: Oceans & Coasts, Branch: Fisheries Management, SANBI and SANParks.

5. RECOMMENDATIONS

It is recommended that Minister —

5.1 Note the Report by the International Review Panel of Experts to advise on the proposed fishing-area closures adjacent to South Africa's African penguin breeding colonies.

5.2 Request approval for policy decisions following the Report from the Panel.

5.1.1 That the limitation of small pelagic fishing adjacent to penguin colonies will henceforth be used by the Department as an appropriate intervention in the conservation and management of the African Penguin. Whilst it is acknowledged that small pelagic fishery limitations do have a benefit to penguins, but it should be noted that these benefits are small relative to the observed decreases in the penguin populations over recent decades.

5.1.2 Furthermore, that fishing limitations around selected penguin colonies are established for the following penguin colonies: Dassen Island, Robben Island, Stoney Point, Dyer Island, St. Croix Island and Bird Island. The fishing limitations are to be implemented for a minimum of ten (10) years with a review after six (6) years of implementation and data collection. The transition to implementing fishing limitations is described in Paragraph 2.10. However, in the absence of penguin colony specific agreements across the fishery and conservation stakeholders on limiting small pelagic fishing, consideration should be given on the current interim limitations or closures that must continue from 1 August 2023, as the interim limitations are due to end on the 31st of July 2023.

5.2 Approve the implementation of the recommendations for future science from the International Review Panel. These will be implemented in a phased approach depending on funding and resources available, of which both the industry and the civil society organisations will be encouraged to contribute to the program.

5.3 Approve that Branches Fisheries Management and Oceans and Coasts develop a communications and stakeholder engagement plan to report at least annually to stakeholders

RECOMMENDATIONS FROM THE REVIEW PANEL OF EXPERTS TO ADVISE ON THE PROPOSED FISHING AREA LIMITATIONS OR CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES

on the implementation of these fishing limitations and other measures implemented as actions in the African Penguin Biodiversity Management Plan.

5.4 Approve that the Panel work is now concluded and that the Panel will be remunerated as per the National Treasury Approved rates at the B1 daily rate scale. Each Panel member will be remunerated for 12 weeks of time and the Chair for 14 weeks. Any actual expenses incurred will be reimbursed in addition to this.

5.5 Note that the Chair and Panel Members are available on a date to be determined to present their Report to Minister and local stakeholders via an online meeting.

5.6 Approve that the Report of the Expert Panel can be distributed to all stakeholders and be made publicly available.

CHIEF DIRECTOR: OCEANS & COASTS RESEARCH
DATE:

RECOMMENDED/RECOMMENDED AS AMENDED/NOT RECOMMENDED

DEPUTY DIRECTOR-GENERAL: OCEANS AND COASTS
DATE:

RECOMMENDED/RECOMMENDED AS AMENDED/NOT RECOMMENDED

DIRECTOR-GENERAL
DATE: 21/07/2023

RECOMMENDATIONS FROM THE REVIEW PANEL OF EXPERTS TO ADVISE ON THE PROPOSED FISHING AREA LIMITATIONS OR CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES

6. RECOMMENDATIONS

It is recommended that Minister —

5.1 Note the Report by the International Review Panel of Experts to advise on the proposed fishing-area closures adjacent to South Africa's African penguin breeding colonies.

NOTED/NOTED WITH COMMENT

5.2 Request approval for policy decisions following the Report from the Panel.

5.2.1 That the limitation of small pelagic fishing adjacent to penguin colonies will henceforth be used by the Department as an appropriate intervention in the conservation and management of the African Penguin. Whilst it is acknowledged that small pelagic fishery limitations do have a benefit to penguins, but it should be noted that these benefits are small relative to the observed decreases in the penguin populations over recent decades.

5.2.2 Furthermore, that fishing limitations around selected penguin colonies are established for the following penguin colonies: Dassen Island, Robben Island, Stoney Point, Dyer Island, St. Croix Island and Bird Island. The fishing limitations are to be implemented for a minimum of ten (10) years with a review after six (6) years of implementation and data collection. The transition to implementing fishing limitations is described in Paragraph 2.10. However, in the absence of penguin colony specific agreements across the fishery and conservation stakeholders on limiting small pelagic fishing, consideration should be given on the current interim limitations or closures that must continue from 1 August 2023, as the interim limitations are due to end on the 31st of July 2023. Technical extension of closures for [illegible] as discussed with Mr Naidoo on 22/7 pending release of rep. 1

APPROVED/APPROVED AS AMENDED/NOT APPROVED

10 AM DG

RECOMMENDATIONS FROM THE REVIEW PANEL OF EXPERTS TO ADVISE ON THE PROPOSED FISHING AREA LIMITATIONS OR CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES

5.3 Approve the implementation of the recommendations for future science from the International Review Panel. These will be implemented in a phased approach depending on funding and resources available, of which both the industry and the civil society organisations will be encouraged to contribute to the program.

APPROVED/APPROVED AS AMENDED/NOT APPROVED

5.4 Approve that Branches Fisheries Management and Oceans and Coasts develop a communications and stakeholder engagement plan to report at least annually to stakeholders on the implementation of these fishing limitations and other measures implemented as actions in the African Penguin Biodiversity Management Plan.

APPROVED/APPROVED AS AMENDED/NOT APPROVED

5.5 Approve that the Panel work is now concluded and that the Panel will be remunerated as per the National Treasury Approved rates at the B1 daily rate scale. Each Panel member will be remunerated for 12 weeks of time and the Chair for 14 weeks. Any actual expenses incurred will be reimbursed in addition to this. where necessary approval of other financial matters

APPROVED/APPROVED AS AMENDED/NOT APPROVED

5.6 Note that the Chair and Panel Members are available on a date to be determined to present their Report to Minister and local stakeholders via an online meeting. Minister will give his date early in August to meet with panel + stakeholders

NOTED/NOTED WITH COMMENT

5.7 Approve that the Report of the Expert Panel can be distributed to all stakeholders and be made publicly available. This will happen after Minister has released it to the public

APPROVED/APPROVED AS AMENDED/NOT APPROVED

MS B D CREECY

MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

DATE: 23/7/23

11 Aug

REPORT OF THE INTERNATIONAL REVIEW PANEL REGARDING FISHING CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES AND DECLINES IN THE PENGUIN POPULATION

EXECUTIVE SUMMARY

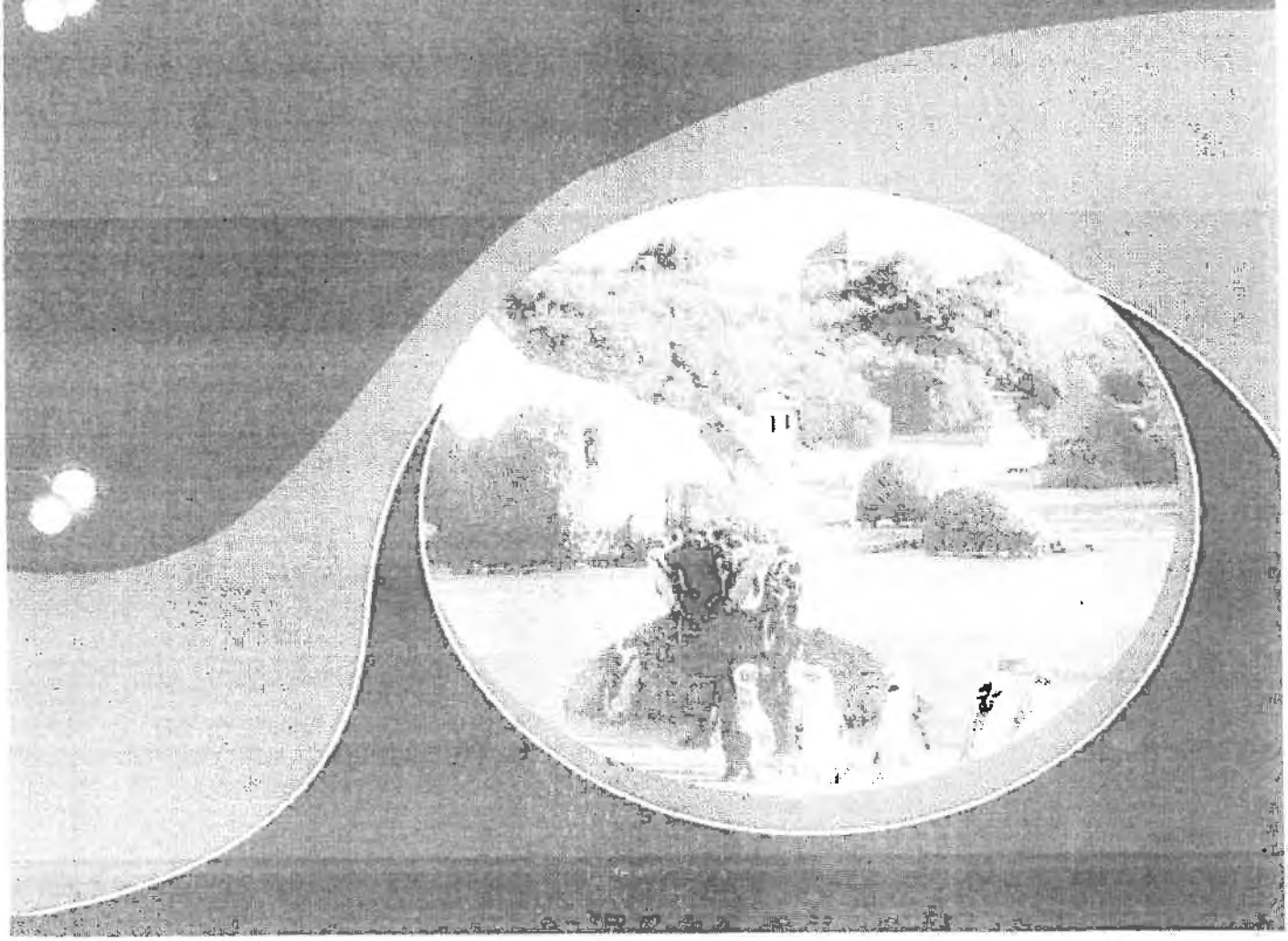
- The population of African penguins breeding in South Africa has been declining rapidly (approximately 8% per annum since 2005) and is consequently at a high risk of extinction in the wild in the coming decades. It is essential to understand and mitigate the primary factors leading to this decline.
- Considerable effort has been made by the fishing and conservation sectors in collaboration with government to understand the causes of the decline and how they might be mitigated. The Panel commends South Africa on its world-leading efforts to underpin challenging utilisation-conservation policy decisions with sound science.
- Implementation of closures managed within the Island Closure Experiment (ICE) aimed to understand whether reducing fishing around islands with penguin breeding colonies would help to reduce the current rate of decline. This internationally-recognised experiment involved implementing an alternating pattern of closures around four island breeding colonies on the South African west and south coasts. It is now complete and, notwithstanding the difficulties implementing the experiment, has been successful in demonstrating for the west colonies of Dassen and Robben islands (those more intensively studied within the ICE), that excluding fishing around island breeding colonies is likely to reduce the rate of decline in the population to a small extent, mediated through improvements in reproductive success. Excluding purse-seine fishing around island breeding colonies is also likely to have other positive benefits for penguin conservation, such as facilitating higher adult survival, but the ICE was not designed to estimate such effects.
- The Panel recognises that closure of purse-seine fisheries around penguin colonies will provide only a part of the measures required to slow/reverse the population decline of African penguins.
- There is a trade-off amongst maximising benefits to penguins, minimising the costs to the fishing industry, and having a reliable basis to quantify the effects of closures (including no closures) on the penguin recovery rate. The trade-off among closure options is a policy decision related to conservation, economic and social goals and objectives for South Africa. This report outlines some aspects that could form part of a decision-making framework to identify the closure options that will provide the best outcomes for penguins given some level of cost to the fishing industry.
- The effects of alternative fishery closure designs differ amongst the island breeding colonies, in terms of reducing the rate of decline, costs to the fishing industry, and social impacts. Hence, advice related to the effects of possible closure options is presented by island breeding colony, and not simply at the regional or national level; decisions on closures should also be made by colony, taking account of the unique aspects of the fishery and threats at each colony.
- The impacts to the fishing industry can be evaluated using an "opportunity-based model" (OBM) that predicts the proportion of the catch of pelagic fish in closure areas that cannot be "replaced" by fishing outside these areas, together with a Social Accounting Matrix

(SAM) model that converts "lost catch" into economic impacts (loss of GDP and jobs) on the fishery, suppliers of goods and services to the fishing industry, and the broader economy. The OBM and SAM model can be used to rank closure options in terms of economic effects but the OBM likely overestimates the potential lost opportunities outside the closed area on a given day. The Panel remains concerned about: (i) the lack of information on how the closures impact fishing costs and fishing behaviour; (ii) the ability of the SAM model to adequately attribute impacts at the scale of fishing communities; and (iii) that there are social impacts that are not estimated using the SAM, but are important to consider in any trade-off analysis.

- Evidence suggests that catches from within closure areas will be more difficult to replace around Dyer Island and St Croix Island than around the other remaining five colonies with important breeding populations. Evidence also suggests that levels of lost catch can be reduced, if closures around penguin preferred habitats are well designed.
- The Panel identified (in this report) recommendations related to future monitoring of penguin colonies and research to understand the effects of closures on the change in penguin numbers and costs to the fishing industry and local communities.
- Further attempts were made to identify consensus closure options among the fishing and conservation sectors during the Panel meeting and ongoing efforts to identify such options are encouraged, particularly as closures may need to be adjusted given the results of future monitoring.
- The Panel strongly encouraged continued communication, and collaboration, with transparency of research data and analyses, as means to build trust and strengthen these discussions. Working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African penguin.

REPORT

OF THE INTERNATIONAL REVIEW PANEL REGARDING FISHING CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES AND DECLINES IN THE PENGUIN POPULATION



forestry, fisheries & the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

2030

REPORT
OF THE INTERNATIONAL REVIEW PANEL
REGARDING FISHING CLOSURES ADJACENT TO SOUTH AFRICA'S AFRICAN PENGUIN BREEDING COLONIES
AND
DECLINES IN THE PENGUIN POPULATION

DEPARTMENT OF FORESTRY, FISHERIES
AND THE ENVIRONMENT (DFFE)

July 2023

Panel Members

- Prof. André Punt (Chair) - Professor in the School of Aquatic and Fishery Sciences at the University Washington, Seattle, USA and a past Director of the School.
- Dr. Ana Parma - Principal Scientist with the National Scientific and Technological Research Council of Argentina (CONICET),
- Dr. Éva Plagányi-Lloyd - Senior Principal Research Scientist at CSIRO based in Brisbane, Australia
- Prof. Robert Furness - Principal Ornithologist at MacArthur Green
- Prof Philip Trathan – Visiting Professor at Ocean and Earth Science, National Oceanography Centre, Southampton
- Prof. James Sanchirico - Professor of natural resource economics and policy in the Department of Environmental Science and Policy at the University of California at Davis.

CONTENTS

EXECUTIVE SUMMARY

- The population of African penguins breeding in South Africa has been declining rapidly (approximately 8% per annum since 2005) and is consequently at a high risk of extinction in the wild in the coming decades. It is essential to understand and mitigate the primary factors leading to this decline.

- Considerable effort has been made by the fishing and conservation sectors in collaboration with government to understand the causes of the decline and how they might be mitigated. The Panel commends South Africa on its world-leading efforts to underpin challenging utilisation-conservation policy decisions with sound science.

- Implementation of closures managed within the Island Closure Experiment (ICE) aimed to understand whether reducing fishing around islands with penguin breeding colonies would help to reduce the current rate of decline. This internationally-recognised experiment involved implementing an alternating pattern of closures around four island breeding colonies on the South African west and south coasts. It is now complete and, notwithstanding the difficulties implementing the experiment, has been successful in demonstrating for the west colonies of Dassen and Robben islands (those more intensively studied within the ICE), that excluding fishing around island breeding colonies is likely to reduce the rate of decline in the population to a small extent, mediated through improvements in reproductive success. Excluding purse-seine fishing around island breeding colonies is also likely to have other positive benefits for penguin conservation, such as facilitating higher adult survival, but the ICE was not designed to estimate such effects.

- The Panel recognises that closure of purse-seine fisheries around penguin colonies will provide only a part of the measures required to slow/reverse the population decline of African penguins.

- There is a trade-off amongst maximising benefits to penguins, minimising the costs to the fishing industry, and having a reliable basis to quantify the effects of closures (including no closures) on the penguin recovery rate. The trade-off among closure options is a policy decision related to conservation, economic and social goals and objectives for South Africa. This report outlines some aspects that could form part of a decision-making framework to identify the closure options that will provide the best outcomes for penguins given some level of cost to the fishing industry.

- The effects of alternative fishery closure designs differ amongst the island breeding colonies, in terms of reducing the rate of decline, costs to the fishing industry, and social impacts. Hence, advice related to the effects of possible closure options is presented by island breeding colony, and not simply at the regional or national level; decisions on closures should also be made by colony, taking account of the unique aspects of the fishery and threats at each colony.

- The impacts to the fishing industry can be evaluated using an "opportunity-based model" (OBM) that predicts the proportion of the catch of pelagic fish in closure areas that cannot be "replaced" by fishing outside these areas, together with a Social Accounting Matrix (SAM) model that converts "lost catch" into economic impacts (loss of GDP and jobs) on the fishery, suppliers of goods and services to the fishing industry, and the broader economy. The OBM and SAM model can be used to rank closure options in terms of economic effects but the OBM likely overestimates the potential lost opportunities outside the closed area on a given day. The Panel remains concerned about: (i) the lack of information on how the closures impact fishing costs and fishing behaviour; (ii) the ability of the SAM model to adequately attribute impacts at the scale of fishing communities; and (iii) that there are social impacts that are not estimated using the SAM, but are important to consider in any trade-off analysis.

- Evidence suggests that catches from within closure areas will be more difficult to replace around Dyer Island and St Croix Island than around the other remaining five colonies with important breeding populations. Evidence also suggests that levels of lost catch can be reduced, if closures around penguin preferred habitats are well designed.

- The Panel identified (in this report) recommendations related to future monitoring of penguin colonies and research to understand the effects of closures on the change in penguin numbers and costs to the fishing industry and local communities.

- Further attempts were made to identify consensus closure options among the fishing and conservation sectors during the Panel meeting and ongoing efforts to identify such options are encouraged, particularly as closures may need to be adjusted given the results of future monitoring.

- The Panel strongly encouraged continued communication, and collaboration, with transparency of research data and analyses, as means to build trust and strengthen these discussions. Working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African penguin.

1. BACKGROUND

1.1 Historical decline of African penguins

The African penguin, *Spheniscus demersus*, breeds only in Namibia and South Africa, where it is restricted to coastal waters, except over the Agulhas Bank where its preferred prey may occur further offshore. Their usual non-breeding habitat is also highly coastal, spanning ~3 200 km of coastal Namibia and South Africa, but with the occasional individual recorded as far north as Gabon, in the west, and Mozambique, in the east (Crawford et al., 2013).

In the 1920s, the African penguin may have had an estimated breeding population as large as between ~500 000 and ~1 000 000 pairs. The population subsequently decreased so that almost a century later less than ~20 000 pairs remained, of which ~25% were in Namibia and ~75% in South Africa (Coetzee et al., 2021a). As a consequence of the marked population declines across both these range states, the species was classified in 2010 as Endangered on the Red List of the International Union for Conservation of Nature (IUCN, 2018). The IUCN has not made regional assessments, but these would almost certainly show the species to be of even greater conservation concern in some parts of its range.

As recently as 2004, ~52 000 pairs of African penguins could be found at 19 breeding localities in South Africa, but by 2019 the population had fallen to ~13 200 pairs, with five colonies becoming extinct (Coetzee et al., 2021a; see Figure 1.1 for a map of the breeding colonies referred to in this report). The latest counts from 2022 show the decline continuing, with an estimated breeding population of ~10 000 pairs (Masotla et al., 2023). Further, the small size of the remaining colonies means that all now face a substantial probability of extinction; indeed, it is anticipated that a further seven colonies will become extinct in the near future (Coetzee et al., 2021a). Coetzee et al. (2021a) also note that stemming the population decline at the larger remaining colonies therefore represents the best means of maintaining the species in the wild, and that if current population trajectories continue, the species could be functionally extinct by 2035.

The latest population surveys in 2022 reported that seven colonies collectively held more than 95% of the remaining population in South Africa (Masotla et al., 2023): Dassen Island (2 513 pairs [25.1%]), Robben Island (991 [9.9%]), Boulders Beach (891 [8.9%]), Stony Point (1 565 [16.6%]), Dyer Island (1 026 [10.2]), St Croix Island (1 262 [12.6%]) and Bird Island (1 437 [14.4%]).

Against this background, it is important to recognise that a decline in the numbers of African penguins is not inevitable. Between 1987 and 2004, the number of adult African penguins at west coast sites in South Africa increased from 7 500 to 33 000 (Sherley et al., 2020; Figure 1.2). It is evident that numbers can increase during periods when conditions are favourable, but that this has rarely been the case in recent decades.

1.2 Summary of basic penguin population and feeding ecology

African penguins generally commence breeding aged around 5 to 6, but unsuccessful breeding attempts at earlier ages are also known. They can continue breeding past age 20, although this is probably uncommon (Crawford et al., 2013). Adult survival, breeding propensity and reproductive output are all highly variable, with reported links to food availability (Crawford et al., 2013). Juvenile survival, as with many seabirds, is lower in the first year after fledging (Crawford et al., 2013).

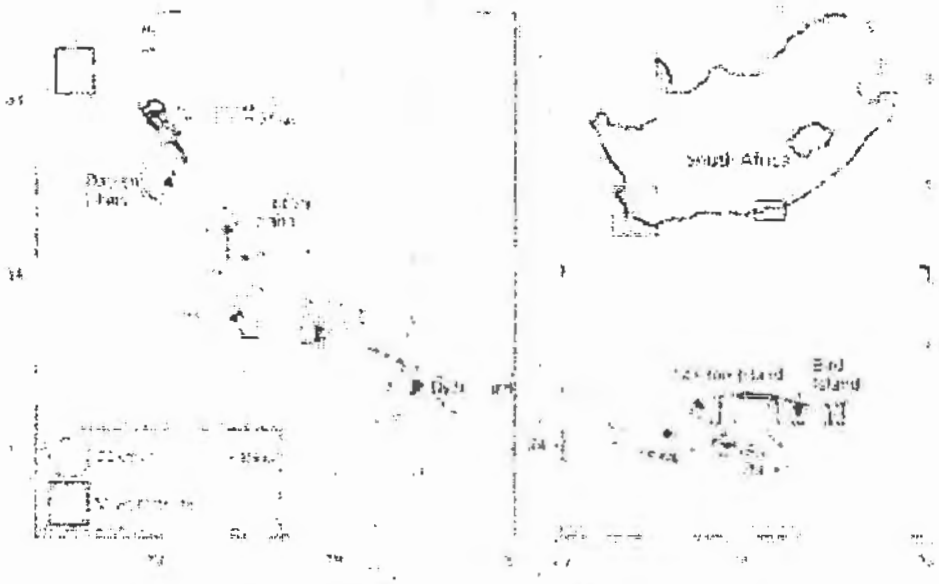


Figure 1.1: Map (courtesy of J Coetzee) of southern Africa showing the location of the breeding colonies for African penguins off South Africa

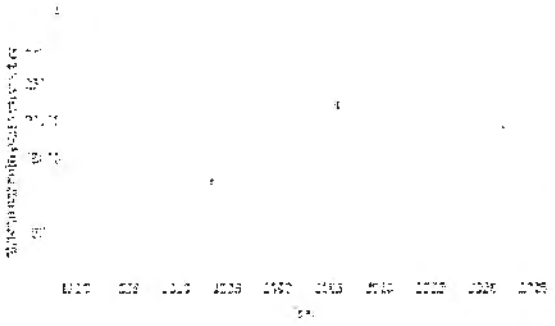


Figure 1.2: Total number of pairs of African penguins at all known west coast sites between 1984 and 2019 (data from Sherley et al., 2020)

Access to energy-dense prey (small pelagic fish) is critical to African penguins at multiple different times of year. Two periods are particularly demanding: moult and breeding. Adult penguins must build up their body reserves prior to moult, as they cannot enter the water to obtain prey within this 21-day fasting period, during which time they replace their entire plumage (Crawford et al., 2013). Moult tends to be synchronized at most individual localities, although the timing varies among localities. At Dassen Island, the peak moult is August–November; at Robben Island and Boulders Beach, most birds moult from November; at Dyer and St. Croix islands, peak moult is October–December; while a large proportion of birds at Bird Island start moult in September (Crawford et al., 2013). At all localities, most immature birds moult in October–March (Crawford et al., 2013).

Adequate prey is also important prior to and during breeding. Females must accumulate the resources necessary for egg production, whilst both parents must accumulate sufficient reserves to ensure they can repeatedly stay ashore whilst incubating, brooding or guarding their offspring. Incubation lasts 38–41 days and is shared equally by both sexes; chicks are brooded by adults until about 10 days after hatching; from 26–30 days, chicks are often left unguarded and may form crèches of up to 25 chicks; chicks fledge when between 55–130 days old (Crawford et al., 2013). During breeding, adults can sacrifice their own body condition to a certain extent, but generally not to the point beyond which their own survival is compromised (c.f. Southwell et al., 2015). Therefore, during breeding, and immediately post breeding, adequate resources are necessary to ensure adult maintenance, chick growth, and eventually to ensure independent chicks can forage successfully whilst still naïve, and adults can recover lost condition. African penguin breeding can occur throughout the year, with a second clutch possible, or with adults relaying if their first clutch is lost (Crawford et al., 2013). At Dassen Island, eggs are mostly laid in December–June, with most chicks during January–August; at Robben Island, eggs are laid in January–August, with chicks abundant in April–September; and at St. Croix Island, egg laying peaks in January (Crawford et al., 2013). Thus, as with moult, peak breeding time differs between sites.

When foraging, African penguins feed alone or in small groups and sometimes in conjunction with other seabirds. They are visual hunters but may use other cues to locate prey. Most dives are shallower than 30 m deep, although some may reach 85 m, lasting up to 2.5 minutes (Crawford et al., 2013). Almost all dives occur during daylight with virtually none at night. Adults provisioning young chicks generally forage within 40 km of their colony, but may travel up to 120 km, swimming at speeds of just under 2 m s^{-1}, or up to 5 m s^{-1} in short bursts (Crawford et al., 2013). Local forage fish abundance based on hydro-acoustic surveys has been shown to explain around 60% of the variation in time spent diving for penguins foraging within two days of the survey (Campbell et al., 2019). Penguin foraging effort (time spent diving, number of wiggles per trip, number of foraging dives and the maximum distance travelled) increased as forage fish abundance declined; in addition, quantile regression revealed that variation in foraging effort increased as prey abundance around the colony declined (Campbell et al., 2019).

Locating prey at sea is complex. Physical ocean features, such as thermoclines, are often used as foraging cues by marine predators, as these concentrate and hence increase the likelihood of locating prey. This is also true for African penguins, which have been shown to forage at and below the thermocline even though its depth and gradient may shift over time; indeed, penguins dive deeper in search of prey when there is no thermocline (van Eeden et al., 2016). Such physical cues are therefore important. However, olfactory cues have also been shown to be important. Dimethyl sulphide (DMS), an organo-sulphur compound released when phytoplankton are grazed, is known to attract seabirds (Nevitt et al., 2004) including African penguins (Wright et al., 2011). DMS-scented oil slicks attracted 2–3 times more penguins than control slicks, whereas penguins showed no response to slicks containing cod liver oil. The number of penguins attracted to DMS increased for at least 30 min, suggesting penguins could travel up to 2 km to reach scent cues. Such results also support the hypothesis that African penguins use DMS as an olfactory cue to locate prey patches at sea from a distance, which is particularly important given their slow commuting speed, relative to that of flying seabirds (Wright et al., 2011).

African penguins are known to hunt either independently or cooperatively, pursuing both solitary as well as schooling pelagic fish (McInnes et al., 2017). The most profitable foraging involves herding of fish; compressing schools upwards during the ascent phase of a dive where most prey captures then constitute isolated fish, separated from the main school (McInnes et al., 2017). Catch-per-unit-effort for penguins is significantly improved when targeting schools rather than solitary fish, especially when penguins forage in groups. It appears that African penguins have evolved specialist hunting strategies closely linked to their primary reliance on schooling pelagic fish (McInnes et al., 2017). As penguins drive prey to the surface, it is also likely to enhance the foraging efficiency of flying seabird species (McInnes and Pistorius, 2019). As such, penguins may be integral to important processes that influence the structure and integrity of marine communities. Importantly, if group foraging confers an advantage to African penguins, then dwindling populations may suffer from an Allee effect as colonies become too small to support sufficient densities of birds for foraging groups to form (Ryan et al., 2012).

Predicting how populations respond to their environment requires detailed knowledge of demographic traits, such as survival and reproduction. However, translating foraging efficiency into demographic responses remains challenging for most marine predators, including African penguins. However, for macaroni penguins, Horswill et al. (2017) have shown that when prey availability is low, foraging trips are significantly longer and extend overnight; birds forage farther from the colony, potentially to reach more-distant foraging grounds, and allow for increased search times. These extended foraging trips are also linked to a marked decrease in fledgling weight, most likely associated with reduced rates of provisioning (Horswill et al., 2017). Further, work on the same macaroni penguin population suggests that lowered first-year survival rates are, at least partially, associated with fledgling masses (Horswill et al., 2014).

Declines in African penguin numbers might be caused by low survival rates of penguins or by low breeding success, or a combination of these. Survival rates of adult African penguins can be estimated by analysis of re-sightings (either visual or electronic) of individually-marked birds. Survival of adult African penguins has in many recent years been considerably lower than is typical for seabird species, suggesting that factors reducing adult survival are likely to contribute to the observed population decline. Although monitored survival rates do not appear to indicate any correlation with anchovy, *Engraulis encrasicolus*, stock biomass, a strong correlation between adult survival and sardine, *Sardinops sagax*, stock biomass has been reported by Robinson et al. (2015) and by Crawford et al. (2022). Both studies found little relationship between adult survival and sardine stock biomass in years when stock biomass was average, or above average, but found very low adult survival in most years of particularly low sardine stock biomass.

1.3 Hypotheses related to how fisheries can impact penguin populations

1.3.1 Fishery related hypotheses

There is a considerable literature related to the effects of marine capture fisheries on seabird population processes (e.g., Montevecchi, 2002; Cury et al., 2011; Sydeman et al., 2017). However, for some processes relatively few studies have access to data appropriately matched to predator needs in both space and time (see Trathan et al., 2022). Nevertheless, it remains axiomatic that fisheries have the potential to disrupt seabird population processes. The primary impacts on predators can be characterized as either negative (e.g., bycatch, resource competition), or positive (e.g., discard provisioning), whilst converse impacts of seabirds on fisheries also exist (e.g., bait stealing); see Montevecchi (2002) for a more detailed summary. However, in terms of purse seiners targeting small pelagic fish and interactions with African penguins, the most important interactions are likely to be related to bycatch and resource competition, or possibly to disturbance of group foraging by penguins. African penguins have not been recorded as bycatch in South Africa which may be due to a combination of spatio-temporal separation of foraging (during the day) and fishing (mostly at night) and net avoidance behaviour. In contrast, resource competition is perceived to be a major cause of African penguin decline by some authors (e.g., Sydeman et al., 2021, and cited references therein), although this is contested (Butterworth and Ross-Gillespie, 2022, and cited references therein). Disturbance of group foraging, unrelated to any prey depletion effects, could possibly occur if groups of penguins were disturbed or displaced by fishing vessels, or if their group coordination and communication while hunting was affected because of noise.

Resource competition plausibly could happen through reductions in local prey biomass, or disruption of the prey field so that preferred foraging opportunities are diminished. For example, removal of parts or even whole shoals of schooling fish would diminish local prey biomass and specifically the prey aggregation states thought to be most attractive to penguins. However, key to the realized impact on penguins will be the rates by which local prey are replaced via regional advection or directional movement of prey and diurnal prey migrations. This means that a key aspect of management must be to consider the relative rates of various ecological processes related to prey availability.

Information documenting advection or directional movement of small pelagic fish is sparse. However, along the coast of South Africa, headlands and embayments interact with the oceanographic flow of the coastal countercurrent and shelf-edge jet currents, leading to areas of retention (Kirkman et al., 2016; Hutchings et al., 2002). Such complexities are key to understanding the local movements of fish as they come within the foraging ambit of a given penguin colony, replenishing the prey field depleted by penguins, other predators, or fisheries. Moreover, the African penguin, in common with other penguins, undergoes periods of positive and negative energy balance as they accumulate, or lose, body weight during reproduction (e.g., Southwell et al., 2015). Consequently, depletion of prey, whether due to natural predation or through resource interactions with fisheries, is likely to have variable consequences depending upon the exact timing in relation to breeding, or seasonal prey movement.

Thus, identification of how fisheries impact African penguin populations, particularly foraging, is complex, resulting from interactions between the timing and stage of moult, or breeding, at a given colony (e.g., Crawford et al., 2013; Southwell et al., 2015), the availability of prey locally (e.g., Campbell et al., 2019), advection and transport (e.g., Kirkman et al., 2016; Hutchings et al., 2002), as well as penguin foraging efficiency (e.g., McInnes et al., 2017).

1.3.2 Other hypotheses

1.3.2.1 Forage fish abundance

Butterworth et al. (2015) note that counts of moulting penguins and re-sightings of tagged penguins at Robben Island (Robinson et al. 2015) found that the primary reason for the post-2003 penguin decline was an increase in adult mortality which they attributed to reduced abundance of sardine off the South African west coast. Analysis of African penguin annual mortality rate at Robben Island in relation to 1+ sardine stock biomass scaled to the maximum November survey estimate of 1 343 000 t in 2003 (Figure 1.4) showed no change in penguin mortality when sardine biomass exceeded about 25 to 30% of the maximum biomass (pen-

guin annual mortality varied among years around a mean of about 15% per annum but with no trend in relation to sardine abundance). However, penguin mortality increased rapidly as sardine biomass fell below 25 to 30% of maximum biomass. Penguin annual mortality was estimated by Robinson et al. (2015) to be about 27% at a sardine biomass index of 20%, and about 55% at a sardine biomass index of 10% (Figure 1.3). Observed (and predicted) mortality exceeding 50% in years with sardine biomass below 10% of maximum represents a very unusual situation for any seabird species, as seabirds are normally long-lived with adult survival rates typically around 0.8 or more.

Crawford et al. (2022) found that penguin survival was around 0.8 when sardine stock biomass was average or above average but declined strongly with sardine standardised stock biomasses below 40% of maximum biomass, results similar to those previously shown by Robinson et al. (2015) but based on more years of data and from two colonies (Dassen and Robben islands). Perhaps surprisingly, there seems to be no clear correlation between African penguin survival and anchovy stock biomass, suggesting that sardine may be the key forage fish determining penguin survival (possibly due to its higher energetic content; Balmelli and Wickens 1994).

The changes in numbers of African penguins (Figure 1.2) show a close similarity to changes in western sardine total stock biomass (Figure 1.4).

Figs 1.1 and 1.4 suggest that breeding numbers of African penguins may be strongly influenced by western sardine total spawning biomass, although this is correlational evidence so inferring a causal relationship is hazardous. Plotting the change in penguin numbers from one year to the next in relation to western sardine spawning biomass averaged over the year and previous year (Figure 1.6) and fitting a regression line to those data, indicates that breeding numbers of penguin increased in almost all years when sardine spawning biomass averaged more than about 350 000 t but decreased in most years when spawning biomass was below about 350 000 t. As inferred by Butterworth et al. (2015), these data also suggest that western sardine spawning biomass may have been one of the most important drivers of change in west coast African penguin numbers (but noting considerable noise in the data in Figure 1.5).

In relation to sardine stock dynamics, de Moor and Butterworth (2015) concluded *"Importantly, however, average recruitment for the west stock declines for spawning stock biomasses below about 800 000 t"*. Similar strong relation-

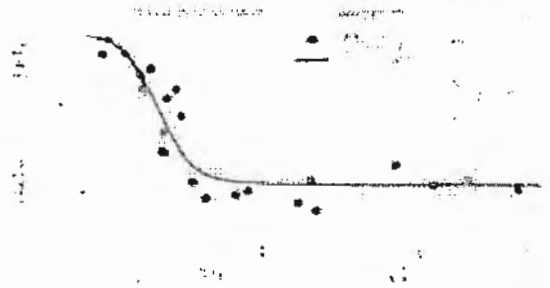


Figure 1.3: The estimated relationship between the 1+ sardine biomass index and penguin adult mortality (from Robinson et al., 2015)

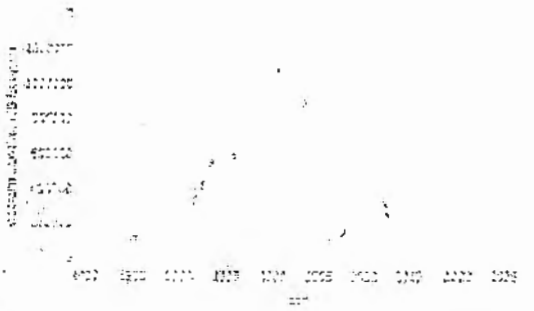


Figure 1.4: Estimated total stock biomass (TSB) of western sardine from 1984 to 2019 (data from de Moor, 2021 and Coetzee et al., 2022).

ships where recruitment reduces rapidly at low spawning stock biomass exist for other sardines (e.g., Japanese sardine, Bai et al. 2022; Pacific sardine, McClatchie et al., 2010).

In order to ensure long-term sustainability of the western South African sardine stock, it is important to avoid depleting stock biomass below 800 000 t because recruitment from significantly smaller stock biomasses will be likely to be greatly reduced, resulting in prolonged depletion of the stock with limited potential for recovery. In that context, it is noteworthy that, rather than reducing fishing mortality continuously as stock biomass falls to low levels, the harvest control rule (HCR) for this stock allows increasing fishing mortality to be imposed as the stock biomass falls from 524 000 t to 300 000 t (Coetzee et al., 2022). A consequence of this HCR is that the exploitation rate peaked at >70% of estimated stock biomass in 2016 (de Moor, 2021) despite stock biomass being below 200 000 t and therefore already at risk of depressed recruitment. This depletion by the fishery is likely to have reduced the prospects for stock recovery by reducing future recruitment (see, for example, Easington et al. 2015). The implication of that is not only that the available stock biomass for fishing has had limited potential for recovery to allow greater Total Allowable Catches (TACs) because of impaired recruitment, but also that the reduced sardine stock biomass will

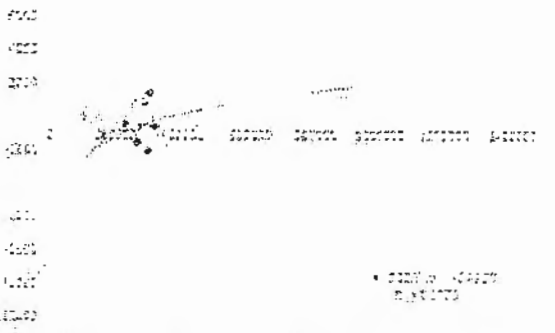


Figure 1.5: Change in numbers of pairs of African penguins between successive years off the South African west coast in relation to sardine total spawning biomass averaged over the year and previous year. The dotted line is the best fit logarithmic regression. Penguin data from Shelley et al. (2020), sardine data from de Moor (2021) and Coetzee et al. (2022)

have impacted African penguin adult survival (Robinson et al., 2015), contributing to the severe decline in breeding numbers of African penguins. Based on the available evidence (de Moor and Butterworth, 2015; Robinson et al., 2015; de Moor, 2021) lower survival and low sardine biomass appears to have been likely to have been one of, and possibly the single, most powerful driver of African penguin population dynamics in recent years, at least at Robben Island.

Further, prey capture, adult survival, the amount delivered to chicks, reproductive success, and other vital rates, all depend upon another set of important ecological interactions, including parental age and experience (e.g., Ainley, 2002). In a declining population, such as for African penguins, juvenile recruitment is vital; indeed, within a given year, penguins fledging with heavier body masses are likely to show higher survival rates than birds fledging lighter (Horswill et al., 2014). Thus, the individual quality of parents and juveniles becomes important, where individual quality is linked to different performance levels consistent throughout life (Lescroël et al., 2009). Seabirds respond to environmental changes by adjusting their breeding and foraging strategies (Cohen et al., 2014), and relationships exist between adult survival and quality, such that population demographic patterns affected by factors at the individuals' level (e.g., individual quality) may be obscured at the population-scale level (Lescroël et al., 2009). Also, for a given population, life-history trade-offs that connect different aspects of a population's demography may be important (Horswill et al., 2021).

Life-history theory suggests that long-lived animals (which include seabird species) should buffer their adult survival by abandoning breeding efforts if conditions are likely to have an adverse effect on adult survival, but several studies show empirical evidence of adult survival as well as breeding success of seabirds being reduced by low abundance of their preferred prey (e.g., Oro and Furness, 2002; Frederiksen et al., 2004; Davis et al., 2005). In an analogous manner, fisheries should respond to ecosystem conditions, especially for small pelagic fishes such as anchovy and sardine, which are typified by 'boom and bust' population dynamics that arise from inherent variability in their recruitment strength and short life-spans. For example, from the mid-1980s until the early-2020s, sardine biomass on both the west coast and south coast of South Africa was at low historical levels, apart from during a short period from the late-1990s, until the early-2000s (Coetzee et al., 2021a). Subsequently, fishery catches increased, as did the exploitation rate (Coetzee et al., 2021a).

1.3.2.2 Egg collecting and guano harvests

Egg collecting was a pressure but is no longer an issue. Loss of nesting habitat as a result of guano harvesting has reduced the suitability of available nest sites over many decades of guano removal. Guano harvests ended decades ago, but the legacy is that African penguins now breed in sites where they are more exposed to predators, nest flooding or overheating.

1.3.2.3 Predation

Predation by avian predators (especially kelp gulls) and by introduced alien mammal predators (such as feral cats, rats, dogs) occurs at some colonies, mainly affecting survival of eggs and chicks. Predation also occurs at sea, with penguins in some areas vulnerable to predation by Cape fur seals. Predation on adult penguins by Cape fur seals has been particularly frequent at Dyer Island. During 2004 and in 2005–2007 Cape fur seals were estimated to kill about 7% of adult African penguins, mostly when penguins were returning to the colony in the evening to feed chicks (Makhado et al., 2013). Previous estimates of this mortality were 9% in 1994–1996 and 2 to 2.5% in 1999–2001 (Makhado et al., 2013). The predation is thought to be mainly by a small number of immature male Cape fur seals. It is considered to be a learned behaviour, and Makhado et al. (2009) suggest that the removal of these 'problem' seals may be an appropriate management response. That would appear to have the potential to reduce adult mortality by a significant amount at Dyer Island, but possibly would have relatively little benefit at most other colonies.

1.3.2.4. Noise

African penguins are known to be sensitive to underwater noise (Pichegru et al., 2017) and use acoustic communication to increase group feeding efficiency (McInnes et al., 2020). This raises the possibility that African penguin foraging success may be influenced by levels of underwater noise that could compromise group feeding efficiency and consequently result in a form of habitat loss or degradation for foraging penguins. Such impacts could arise from presence of fishing vessels in penguin foraging areas or from presence of vessel traffic such as tankers and cargo vessels. It has been suggested that increased shipping activity in Algoa Bay may have contributed to the decline in African penguin numbers at St Croix Island, and that increased shipping noise may represent an increasing threat to African penguins in South African waters in general (Pichegru et al., 2022).

1.3.2.5 Nest boxes

African penguins are adapted to nest where they are safe from mammalian predators, historically only on offshore islands. On these islands they nest alongside large numbers of other seabirds. As cold-adapted birds they are vulnerable to overheating on land. They dig burrows in guano in which they nest so that they have a buffered microclimate with high relative humidity, protected from solar heating and safe from avian predators (Frost et al., 1976). Harvesting of guano resources from islands off southern Africa removed most of this preferred nesting habitat decades ago, forcing most penguins to nest on the surface, which exposes them to predators, rain, wind, and especially to solar heating. Solar heating can result in temporary nest desertion by adults forced to go into the sea to cool down, which leaves eggs exposed to predation and overheating, reducing their breeding success (Frost et al., 1976; Randall, 1995; Lei et

al., 2014; Welman and Pichegru, 2023). Similar effects also occur in the closely-related Magellanic penguin in South America (Yorio and Boersma, 1994). One solution to this problem is to provide nest boxes that protect penguins from these pressures (see additional details in Appendix C).

1.3.2.5 Other

African penguins are vulnerable to impacts on their survival, ability to achieve breeding condition, and breeding success, of low abundance of their key forage fish (sardine, anchovy), and changes in the geographical distribution of forage fish stocks relative to the locations of penguin colonies and moulting sites. Climate change is widely considered likely to be a main factor influencing abundance and distribution of these key prey. Oil pollution has been a long-term pressure on African penguins and continues to be a pressure. Disturbance at colonies by people, and disturbance at sea by ship traffic are ongoing concerns.

1.4 Background to the establishment of the Expert Panel.

The African penguin was classified as Endangered on the Red List of the International Union for Conservation of Nature in 2010. An African Penguin Biodiversity Management Plan (BMP-AP; Shaw et al., 2011; Anon, 2010) was developed that aimed to halt the decline of the African penguin population in South Africa within two years of its implementation and after that achieve a population growth that would result in a down-listing of the species in terms of its IUCN Red List status. These objectives were not achieved but it did lead to: (i) improved cooperative management; (ii) population reinforcement; (iii) improved breeding-habitat management; and (iv) improved management of the captive population (Table 1 of DFFE, 2021).

Modelling studies suggest that adult mortality is lower when sardine biomass is below a critical threshold (Robinson et al., 2015) and low adult survival is a strong driver of the reduction in the population size of African penguins since around 2003. However, projections based on the-then Operational Management Procedure (OMP) for sardine by Robinson et al. (2015) suggested that changing the OMP was unlikely to have a marked impact on penguin growth rate relative to closing the fishery entirely (Figure 1.6). Thus, the focus for potential management actions in recent years has focused on fishing near breeding sites.

Penguins may be especially sensitive to changes in pelagic fish abundance and distribution as a consequence of their land-based breeding sites and their limited foraging range during breeding (e.g., Shorley et al. 2013; Crawford et al. 2019). For this reason, a study to assess the effects of closure to purse-seine fishing around penguin breeding colonies was initiated in 2008. This study comprised two parts: (i) a feasibility study (2008–2012) during which purse-seine fishing was prohibited around some island breeding colonies and data on penguins and small pelagic fish were collected to determine whether an experiment would have adequate statistical power, within a reasonable time-period, to detect a statistically significant effect of closure, if such existed; and (ii) an Island Closure Experiment (ICE; 2014+), during which data were to be collected to enable a scientific evaluation of whether closures within a distance of 20 km are beneficial to penguin breeding success. In order to maximise contrast for more precise estimation, the study involved a three-year alternation of opening and closing to fishing around islands[1].

African Penguin in a nest incubating an egg

Two groups of scientists conducted analyses of the data from the ICE. The analyses were subject to review by the International Fisheries Stock Assessment Workshops (IFSAWs), and over time the differences in terms of methods, data used and results regarding the effects of island closures on penguin reproductive parameters between the two groups declined. However, the two groups of scientists could not reach agreement on some aspects of the analyses and its implications for penguin conservation (see a detailed summary in CAF [2022] and Section 2). This was despite the Minister of Forestry, Fisheries and the Environment tasking the Consultative Advisory Forum (CAF) for Marine Living Resources to develop agreed recommendations on the limiting of small pelagic fishing activities adjacent to penguin colonies. This group considered many documents and held over 50 hours of virtual meetings and several one-on-one meetings in attempts to broker consensus, but this could not be reached and as a last resort they recommended an average of 50% closed and 50% open of the marine Important Bird Areas (mIBA) (CAF, 2022).

[1]This time-period was not well-matched to the biology of African penguins, which usually do not breed until aged 4–6 years, so the experiment was designed not to provide information on changes in population size, only on changes in parameters related to reproduction.

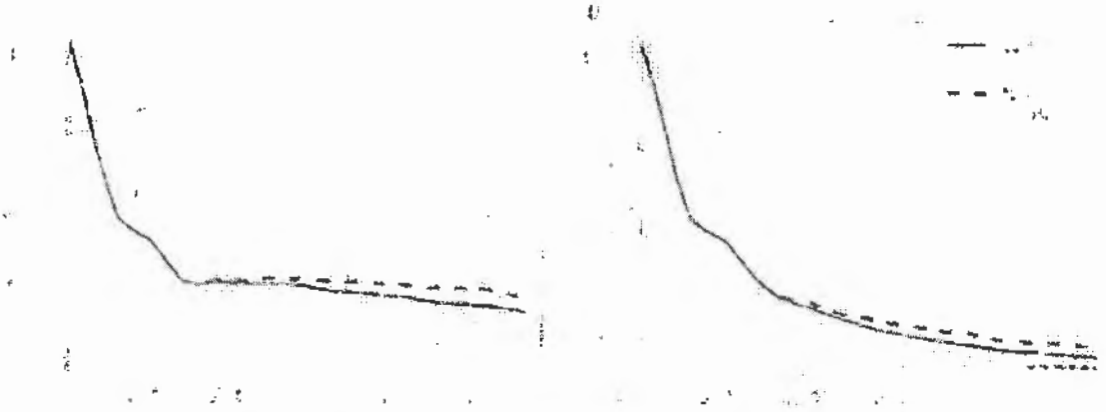


Figure 1.6: Comparison of median projected penguin numbers under Interim OMP-13, and without fishing for future sardine distributions similar to those observed in (a) 1984—1998 and (b) 1998—2012. The 80% probability intervals are indicated for the projections under Interim OMP-13. Projections commence in 2012.

The most recent estimates of the effects of closures on penguin reproductive parameters are documented in Sherley et al., (2018, 2021) and Butterworth and Ross-Gillespie (2021a), although these were updated for this report using data up to 2019 and a series of models proposed by the Panel. Models were developed to estimate the implications of changes to each reproductive parameter individually on population growth rate (Butterworth and Ross-Gillespie, 2021b; Sherley et al., 2018, 2021) and attempts were made to infer changes in population growth given the effects of island closures, accounting for the effects on each reproductive parameter (Butterworth and Ross-Gillespie, 2021b; Sydeman et al., 2022).

Options for area closures more aligned with the feeding behaviour of penguins or with the needs of the fishery were developed by a variety of stakeholder groups (e.g., Coetzee et al., 2021a; CAF, 2022). The benefits to penguins were quantified by estimates in the change to the population growth rate and the difference in numbers of penguins expected to be added to the population given the size of the closures (e.g., Butterworth and Ross-Gillespie, 2021b; Sherley et al., 2018, 2021; Bergh, 2022) while costs to the fishery were quantified in terms of catches in areas proposed to be closed, the amount of that catch that would be "lost", and the resulting reduction in jobs in the fishing sector and the general economy (e.g. Coetzee et al., 2021b; Bergh, 2022). Butterworth (2021) outlines a decision table approach to compare the costs and benefits of addressing potential drivers of the dynamics of African penguin. However, there was no agreement amongst the stakeholders on a closure option owing to differences regarding whether the benefits to penguins were meaningful given the predicted change in growth rate (including relative to other potential causes for the decline in abundance), as well as costs to the fishing industry, and all proposals for closures were rejected. However, the stakeholders agreed that an expert panel could help to resolve the technical issues regarding the interpretation of the ICE.

1.5 Panel process

A call was made on 28 October 2022 for nominations of qualified individuals to be members of an Expert Panel (henceforth "Panel"), and the Minister selected five scientists with expertise in seabird and penguin ecology, population ecology and ecosystem modeling, and applied statistics (Prof. Robert Furness, Dr. Ana Parma, Dr. Éva Plagányi, Prof. André Punt [Chair], and Prof Philip Trathan) in December 2022. Recognizing the need for expertise in economics considerations, Prof. James Sanchirico was appointed to the Panel in March 2022. Appendix A lists short biographies for the expert Panel. The Terms of Reference for the Panel are summarized in Appendix B.

The Panel was provided with a list of background documents after a meeting with the Minister of Forestry, Fisheries and the Environment and departmental staff, which was supplemented by documents identified by the stakeholders. The Panel held an online meeting (March 21–23, 2023) at which stakeholders provided input to the Panel in the form of oral presentations and written submissions, after which the Panel met to discuss the implications of the material presented and the necessary next steps. The meeting led to a request for additional information on catches that were reported to have occurred in the closed areas.

A meeting of South African scientists and stakeholders took place on 15 May 2023 during which updated results related to the ICE, the impact of closures on catches and the fishery, as well as how penguin foraging areas could be specified were discussed; one Panel member acted as an observer at the May meeting.

The material from the 15 May 2023 and earlier meetings, along with brief comments by meeting participants, were made available to the Panel, which then met from 5–9 June 2023. The June meeting of the Panel involved a two-day "open" session at which stakeholder groups were provided the opportunity to make presentations to the Panel, followed by a three-day "closed" session during which the

Panel reviewed the available evidence, debated conclusions and identified advice and recommendations.

1.6 Current management arrangements

The Department of Forestry, Fisheries and the Environment (DFFE) implemented the following interim closures in September 2022 (Figure 1.7):

1. An L-shaped closure around Dassen Island stretching about 12.5 nm offshore from Yzerfontein and 21.5 nm offshore of Bokpunt, with an extension southward in the offshore area so that the maximum North/South extent is about 20 nm.
2. No additional closure around the Robben Island colony, with only the MPA purse-seine fishery control zone of the Robben Island MPA being closed to fishing.
3. A small closure stretching eastward from Cape Hangklip on the eastern side of False Bay for about 9 miles along the coast and about 3 nm offshore. This includes the small Betty's Bay MPA and the Stony Point penguin colony.
4. A rectangular area around Dyer Island between Danger Point and Quoin Pt, extending offshore for about 18 nm from Dyer Island and southwards for about 12 nm from the island. This rectangular area is further divided into an inshore area that is closed to all purse seiners and a larger offshore area where only vessels with a total length of less than 26 m may fish.
5. A rectangular area about 20 nm south of St Croix Island in Algoa Bay, with a maximum alongshore extent of about 20 nm, but with fishing allowed around the Riy Banks.
6. A square closure extending about 12 miles south of the Addo MPA in the vicinity of Bird Island with a maximum west/east extent of around 20 nm.

Other restricted areas include the 16-mile beach MPA inshore along the west coast, north of Dassen Island, the entire False Bay, the inshore area in Walker Bay between Stony Point and Dyer Island and the Sardinia Bay MPA, just west of Algoa Bay and the inshore parts of the Addo MPA between the interim closures of St Croix and Bird islands.

Figure 1.7: Interim closures to fishing (red polygons) as currently implemented. These closures have been implemented since September 2022. Vessels <26 m in length are allowed to fish in the offshore area (outside the red dotted line) of Dyer Island

2. BENEFITS OF ISLAND CLOSURES TO PENGUINS

2.1 Aims and design of the ICE, and reproductive parameters monitored

The Island Closure Experiment (ICE) was established in 2007 to provide a scientific basis to assess whether closures to pelagic fishing in the neighbourhood of penguin breeding islands might provide a meaningful improvement to penguin reproductive success. The design of the ICE therefore had a basic aim to detect differential reproductive success under open and closed situations during periods when other conditions were unlikely to confound results through having changed themselves.

The ICE comprised two parts: (i) a feasibility study during which purse-seine fishing was prohibited around two pairs of penguin breeding islands: Dassen and Robben islands on the West Coast and St Croix and Bird islands in the Eastern Cape (Figure 1.1); and (ii) an experimental phase (2015–2021) where a series of three-year alternating island closures around the four breeding islands were implemented (Table 2.1). Figure 2.1 summarises the timeline of the ICE and the associated reviews of the analyses conducted.

The three-year alternation of opening and closing to fishing around islands was selected to maximise contrast for more precise estimation of closure effects (CAF, 2022). Three years was selected according to DFFE (2021) to balance conflicting objectives of: (i) rapid alternation to maximise contrast in the data to enable more precise estimation; (ii) a slower alternation to take account of possible autocorrelation in the penguin indices being monitored; and (iii) the desirability to integrate the feasibility study into a possible future experiment to lead to earlier answers.

The feasibility study was originally planned to last two years (2008 and 2009), but that proved to be insufficient time to allow experimental power to be estimated for all the penguin parameters monitored, and analyses of the impacts of purse-seine fishing in the vicinities of breeding islands failed to produce clear-cut results. It was therefore agreed that the feasibility study was to be extended for an additional four years (until the end of 2014).

The penguin parameters that were intended to be measured during the experiment were: chick condition, survival and growth, fledgling success and as measures of foraging behaviour: maximum distance, path length and trip duration (see Campbell et al. [2019] for detailed specifications for how each of these variables are defined and calculated based on monitoring data). Not all response variables could be measured in all colonies; the west colonies (Dassen and Robben islands) were the most intensively monitored while only data on chick condition and foraging-related variables were collected at St Croix and Bird islands (see Table 2.2 for details regarding data availability).

Small-scale acoustic surveys using an inflatable vessel were conducted to provide direct estimates of the biomass of small pelagic fish available to penguins around some of the islands. Those surveys were initially around Robben Island (six surveys were conducted in 2009) but in later years the surveys were extended to around Dassen, St Croix and Bird islands (Coetzee et al., 2016). Fine-scale surveys were also conducted by non-governmental researchers around St Croix and Bird islands from 2014 to 2018 (McInnes et al., 2017). The small-scale surveys were subsequently abandoned at the end of 2018 given their relatively low precision, staff shortages and lack of funding (DFFE, 2021).

2.2 Methods used to estimate effects of closures (catches) on penguin population growth rate

2.2.1. Rationale for models

The impacts of fishing closures on the response variables monitored were quantified using generalised linear mixed-effects models (GLMM). Various model variants were applied since the first analyses of the ICE data were conducted during the initial feasibility period, including an analysis to evaluate the power to detect biologically meaningful impacts caused by the fishery as data accumulated. The power analyses completed in 2016 indicated that meaningful results could be obtained within 20 years of the onset of the experiment (Ross-Gillespie and Butterworth, 2016a). The main features that distinguish the various model variants utilised are summarised in this section. Mathematical specifications and further details are provided in Appendix

Table 2.1: Schedule of closures around the four penguin breeding colonies during the ICE. Crosses indicate years in which a 20 km radius area around the island was closed to fishing

Island	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dassen Island	X	X					X	X	X				X	X[1]
Robben Island				X	X	X				X	X		X	X[2]
St Croix Island		X	X	X				X	X	X				X[3]
Bird Island					X	X	X				X	X	X	

[1]Closed from 15th January to 31st March and from 1st October to 31st December, and open from 1st April to 30th September.
[2]Closed from 15th January to 31st December.
[3]Closed from 1st April to 30th September, and open from 15th January to 31st March as well as from 1st October to 31st December

Table 2.2: Reproductive parameters monitored at the four breeding colonies that were part of the Island Closure Experiment

Response variable	Island	Year range
Chick condition	Dassen	2004–2019
	Robben	2004–2019
	Bird	2008–2019
	St Croix	2008–2019
Chick Survival	Dassen	2008–2019
	Robben	2008–2019
	Bird	–
	St Croix	–
Fledging success	Dassen	1995–2015
	Robben	1988–2015
	Bird	–
	St Croix	–
Chick growth	Dassen	1989–2014
	Robben	2004–2014
	Bird	–
	St Croix	–
Max distance	Dassen	2008–2018
	Robben	2008–2018
	Bird	2008–2018
	St Croix	2008–2018
Path length	Dassen	2003–2018
	Robben	2003–2018
	Bird	2007–2018
	St Croix	2008–2018
Trip duration	Dassen	2003–2018
	Robben	2003–2018
	Bird	2007–2018
	St Croix	2008–2018

D and cited documents.

Two main classes of models were considered. These differ in the choice of independent variable used to represent the effect of fishing. In one class, fishing is included as a binary variable having a value of 1 when the island is open to fishing and 0 when it is closed. Predictions from this class of models are referred to as "closure-based estimates" of the impact of fishing. In the alternative class of models, the effect of the actual catches taken within the 20-km areas around the colonies are evaluated as covariates. In this case, the predicted "catch-based estimates" of the impact of fishing within a given closure is calculated using the average catch taken from that closure when the island was open to fishing during the ICE. A concern with the catch-based estimators is that the true impact of fishing may be underestimated if catches tend to be higher when fish biomass is higher due to the confounded effects of fishing and food availability on penguin breeding success. The preference for using the closure-based models as the base for inference regarding the impacts of island closures was supported by the finding of positive correlations between the time-series of catches taken within the 20-km areas (when open) and regional survey estimates of biomasses of anchovy in the west and sardines in the east (Ross-Gillespie and Butterworth, 2023a). In the final set of results presented in Ross-Gillespie and Butterworth (2023a), catch-based models were also examined but they were used only as sensitivity runs requested by the Panel to evaluate the impact of some non-negligible catches apparently taken within the area closed around St Croix Island mainly in 2017 (see section 2.4).

In all cases, separate analyses were conducted for the two pairs of colonies (Dassen and Robben islands on the west coast, and St Croix and Bird islands on the east), assuming that nearby colonies experienced rather similar conditions affecting breeding success, except for the experimental treatment. Separate island-specific effects of the closure were however estimated considering that several factors not controlled by the experimental design may lead to different responses to the closure between the paired islands. The significance of those differences was evaluated by Shelley (2023), and the model with a common effect was selected based on standard model-selection criteria by Shelley (2023). Concerns were expressed that the estimation of a common effect would tend to be biased towards the island with the higher sample size and/or lower variance (Bergh, 2023) and that alternative weights (e.g., size of the colony) could be used to average island-specific estimates. While this is a valid point, the differences between the results were not large and the integrated estimate of a regional impact would not be largely affected.

An important difference between the approaches favoured by different analysts was a preference to analyse the data aggregated as annual means (Ross-Gillespie and Butterworth, 2023a) versus using individual-records-based disaggregated data (Shelley et al., 2018; Sydeman et al., 2021). The relative merits of aggregated and disaggregated data models were the subject of substantial debate (e.g., Butterworth and Ross-Gillespie, 2022; Sydeman et al., 2022). The individual-based approach has the advantage of analysing the data at the level they are collected, but the model needs to appropriately capture the factors and sources of variability (observed or unobserved) impacting the observations, other than closure alone (Haddon et al., 2020). If the model is incorrectly specified and there are unaccounted common random effects that affect all observations from a given stratum (e.g., all observations from a given month, year and colony), individual observations are not independent. This so-called "pseudo-replication" may lead to underestimation of the standard errors of important model outputs. Aggregated models, on the other hand, have the advantage of not requiring assumptions about within-stratum correlation, but are vulnerable to assigning inappropriate weights by stratum (Haddon et al., 2020). Because the two approaches would be statistically equivalent provided that a correct model structure is assumed in the estimation (Butterworth and Ross-Gillespie, 2022, Haddon et al., 2020), the debate centred on the choice of a hierarchical random structure for the disaggregated models that would be able to account for the pseudo-replication.

The choice of random model structure to be used in each of the two approaches was discussed during an international review conducted in 2020 where a recommendation was made to use standard model selection criteria combined with knowledge of the sampling design (Haddon et al., 2020). In both cases, a random Year effect, com-

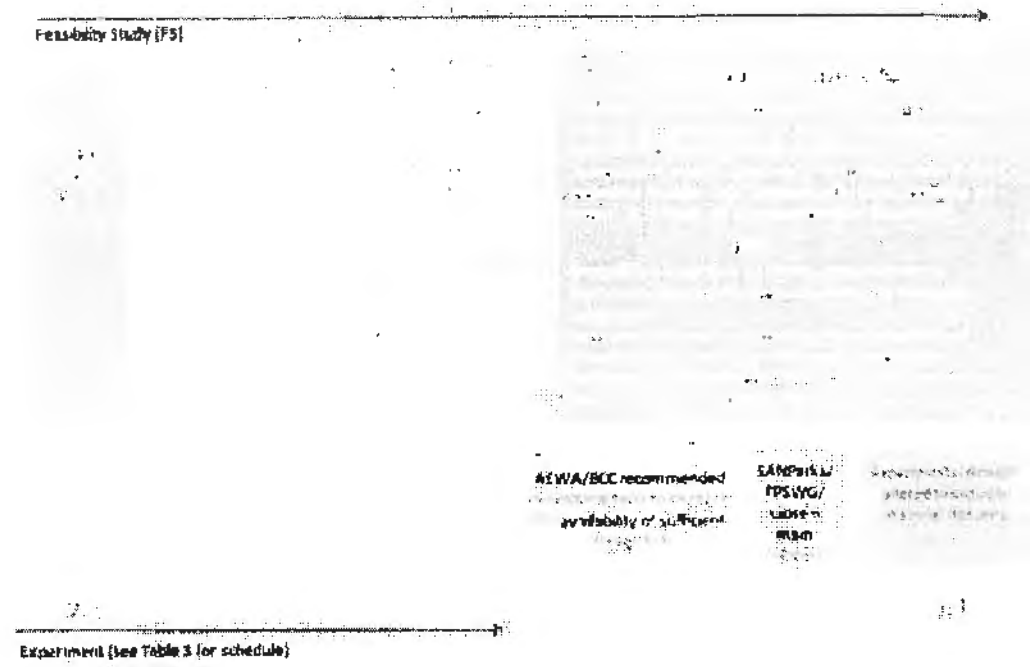


Figure 2.1: Timeline describing major events, decisions etc., during the feasibility study and experiment (Figure 8 of DFFE, 2021). SWG-PEL = small pelagic scientific working group; IRP = International Review Panel; B: O&C = Branch: Oceans and Coasts; AEWA = ???; BCC = Benguela Current Commission; SANParks = South African National Parks; TPSWG = Top Predator Scientific Working Group; OMP = operational management procedure; GLMM = generalised linear mixed-effects model

mon to the paired islands, was incorporated to account for year-to-year changes in food availability and other unspecified factors affecting annual breeding success at a regional scale. Monthly differences in chick condition were found to be important and therefore aggregated data were first standardised for the month effect as explained in Ross-Gillespie and Butterworth (2021a), while a random Month effect, nested within Year, was incorporated in the data-disaggregated models (Sydeman et al., 2021). The remaining question, therefore, was which further random effects, if any, would need to be nested within Year (or Year/Month) to account for possible correlation between the individual observations in the disaggregated data models. Sydeman et al. (2021) found that accounting for the identity of the penguin nest (NestID) in the chick survival analysis was significant given that the survival of chicks from the same nest are expected to be correlated. However, their preferred model with random effects Year + Year/NestID did not include Island (nested within Year) and therefore could still be affected by pseudo-replication, as discussed by Butterworth and Ross-Gillespie (2022). The final set of analyses presented by Sherley (2023) used hierarchical model structures suggested by the Panel in the light of previous results presented at its March 2023 meeting. The suggested model structures attempted to address the pseudo-replication by including Island in the random effects in a way that differed depending on the response variable. For the analysis of individual chick condition data, the hierarchical random effects involved Year + Year/Month + Year/Month/Island, i.e., it included the effect of Island nested within the Year × Month interaction. Likewise, the inclusion of Island was suggested for the analysis of chick survival data as Year + Year/Island + Year/Island/NestID, which follows the natural nesting of the data collection program given that different nests are monitored in different years.

The suggested random model structures were preferred based on model selection criteria (Sherley, 2023). In the analysis of chick condition data, the inclusion of the Island random effect nested within Year + Year/Month resulted in wider confidence intervals for the predicted impacts on penguin population growth rate due to a higher standard error of the estimated fixed closure effects (compare models 3 and 3.1 respectively with models 5 and 5.1 in Sherley's Figure 2), as anticipated if observations within year-month-island strata were not independent. Furthermore, the closure effects estimated using these preferred models had very similar precision to those produced using aggregated data (model 8 in Sherley's Figure 2). A difficulty to partition the variance and to estimate the variance attributed to the Year factor was observed so a simpler random structure that excluded the Year factor was selected with no impact on the closure-effect estimates.

For the chick survival data, the inclusion of Island in the nested random structure also decreased the precision of the estimated closure effects (compare models 4 versus 8 and 5 versus 9 in Sherley's Figure 4). In this case, however, the standard errors estimated with the selected data-disaggregated model were larger than those estimated using aggregated data for models containing the equivalent fixed effects. This may be related to the shared frailty (i.e., linked probability of dying) for chicks in the same nest, which was estimated through the NestID random effect in the data-disaggregated models while it was either ignored when generating the annual aggregated survival times series (the A(B) models in Sherley's Figure 4) or it was accounted for prior to evaluating the closure effects in a separate parametric model (the A(S) models).

In conclusion, the Panel **agreed** that the debate about the relative merits of analyses based on aggregated versus disaggregated data was essentially closed based on the final set of results presented at the June 2023 meeting. Although differences in preferences between the analysts remained, the Panel **agreed** that the two approaches would provide similar results (as expected) when appropriately configured (especially to account for pseudo-replication), all other things related to data pre-processing being equal.

2.2.2 Converting impacts on reproductive parameters to changes in penguin population growth rate

Fishing effects on reproductive parameters estimated from the models need to be linked to impacts on penguin population growth rates. A method based on a demographic model described in Ross-Gillespie and Butterworth (2021b) was used by all analysts as a basis to convert changes in chick condition, fledging success and chick survival into absolute effects on annual population growth rate. In the case of chick condition, a relationship between mass at fledging and first-year survival estimated for the macaroni penguin (Horswill et al., 2014) was used to translate changes in chick condition to changes in population growth rate (Sherley et al., 2018). For the other response variables (chick growth, trip duration, maximum distance and path length), whose impact on demography are not straightforward, it was assumed that the estimated relative change in the response variable due to fishing resulted in the same relative change in juvenile survival (Robinson et al., 2014; Butterworth and Ross-Gillespie, 2021a, Table A1). This assumption is not supported by evidence available for other species, which indicate that the relationship between, for example, foraging trip duration or distance travelled with chick survival is nonlinear and involves thresholds. Aside from these nonlinearities, the assumption that the relative impacts on, say, trip duration and chick survival have the same magnitude is highly questionable. The Panel **agreed** to interpret the impacts of fishing in foraging-related parameters only qualitatively, and to not integrate them into the overall impacts on penguin population growth rates.

2.2.3. Integrating fishing impacts predicted from separate analyses into overall fishing impacts on penguin growth rate

The results of the ICE provide estimates of how closing a penguin breeding island will impact the value of a parameter related to penguin reproductive success, and models were developed that related the change in the value of one parameter to a change in population growth rate. Ultimately, it is necessary to 'integrate' the effects for each reproductive parameter to derive an 'overall' estimate of the change in population growth rate due to closing a breeding island. This calculation is complicated because of several factors:

- There are factors that will determine population growth rate other than changes in reproductive rate

such as immigration/emigration and changes in survival for post-fledgling animals. Thus, reported changes in population growth rate are those related only to changes in reproductive success, essentially assuming that the survival rate for animals after the first year of life is not impacted by closures to breeding islands and that immigration and emigration balance out.
- Only a subset of the parameters was monitored on all breeding islands and some parameters were not monitored for all years (Table 2.2).
- Some of the parameters (e.g., chick survival and chick condition/growth) are not independent.
- There is a need to infer the effect of closures for breeding islands that were not part of the ICE.
- The estimates of changes in population growth rate derived from the ICE results pertain to a *status quo* of no closure, so changes in population growth rate of half those estimates are pertinent to the recent situation of closures half of the time.

Butterworth and Ross-Gillespie (2021b) provide a "qualitative" scheme for conducting the integration based on the following assumptions/algorithm:
- The three foraging metrics were assumed not to be independent nor were chick condition and chick growth, and measures of uncertainty (standard errors for the estimates of population change by reproductive parameter) were calculated based on dividing the 95% interval for the population growth rate by 4.
- Fledgling success, chick condition, and chick survival are more 'reliable' as there is a demographic model relating changes in these variables to changes in population growth rate. Thus, for example, when information about chick condition and chick growth were integrated for Dassen Island, values of 0.06% and 1.74% were averaged qualitatively to get 0.5% and the standard deviation of this value was set to that corresponding to the 0.06% estimate (i.e., 0.42%).
- Of the foraging metrics, maximum distance was considered to be less reliable than path length and trip duration, given there is more uncertainty associated with a maximum than an integrated measure. Thus, inferences regarding changes in foraging distance on population growth rate involved a "qualitative average" of the effects of primarily path length and trip duration, with the standard error set to averages of the standard errors of the change percentages by island.
- No attempt was made to infer changes on chick growth, chick survival and fledgling success for St Croix and Bird islands from the results for Dassen and Robben islands, but estimates of population growth were determined from changes in chick condition/growth and foraging alone.

In their presentation to the Panel, Butterworth and Ross-Gillespie (2023) outlined two alternatives for combining the predicted changes in population growth rate derived from changes in chick condition and chick survival, one in which the effects were averaged and a second in which the effects were added. As explained in section 2.2.2, the relationship between chick condition and juvenile survival used to translate changes in chick condition to changes in population growth rate corresponds to a relationship between mass at fledging and first-year survival (estimated for the macaroni penguin). Therefore, the Panel **agreed** that it is more appropriate to treat those effects as additive when calculating the overall impacts on population growth rates.

2.3 Predicted effects of fishery closures (catches) on penguin population growth rate

2.3.1 Summary of outcomes among analyses

A broad summary of the results in terms of the impacts of fishing around breeding colonies on penguin population growth rates obtained for the west and east colonies included in the ICE is given below. A negative value corresponds to a predicted positive effect of closing the 20-km areas on population growth rate because the reported values correspond to fishing impacts.

Results for three different closure-based estimators are shown for the analyses of chick condition and chick survival in Figures 2.2 and 2.3. The first two estimators involve models fitted to disaggregated data (D) and the third is based on the analysis of aggregated data (A). These estimators correspond to the preferred choices made by the analysts, and use the random-effects hierarchical structure that was recommended by the Panel for the case of models fitted to disaggregated data.

2.3.1.1 Dassen and Robben islands

The two alternative estimates shown in Figure 2.2 obtained using disaggregated data differ with respect to whether the effect of fishing was assumed to be the same on both islands (models W1 and W4) or was allowed to differ between them (models W2 and W5), while separate effects for the two islands were estimated by models W3 and W6, which were fitted to aggregated data. A slight preference for the models that assume the same effect size in both islands was found when the models based on disaggregated data were compared (Sherley, 2023). While some analysts argued that separate effects should be preferred independently of the results of the tests (Butterworth and Ross-Gillespie, 2023a), they acknowledged that the integrated estimates for the western Cape colonies would not be much affected.

The resulting estimates for the three selected alternative models are similar although confidence bounds were narrower when the effects were forced to be the same for both islands, as expected. The exceptions are the results for chick survival for Robben Island, which indicate a larger negative impact of fishing on population growth rate when the analysis is based on disaggregated data than when aggregated data are used. Part of the reason for this difference may be the way the individual data were aggregated to construct the time-series of chick survival.

Larger negative impacts of fishing, close to the -1% value used as a reference, were estimated for Dassen and Robben islands based on chick survival data except for the smaller effect estimated for Robben Island using aggregated data. Most estimated effects based on chick condition

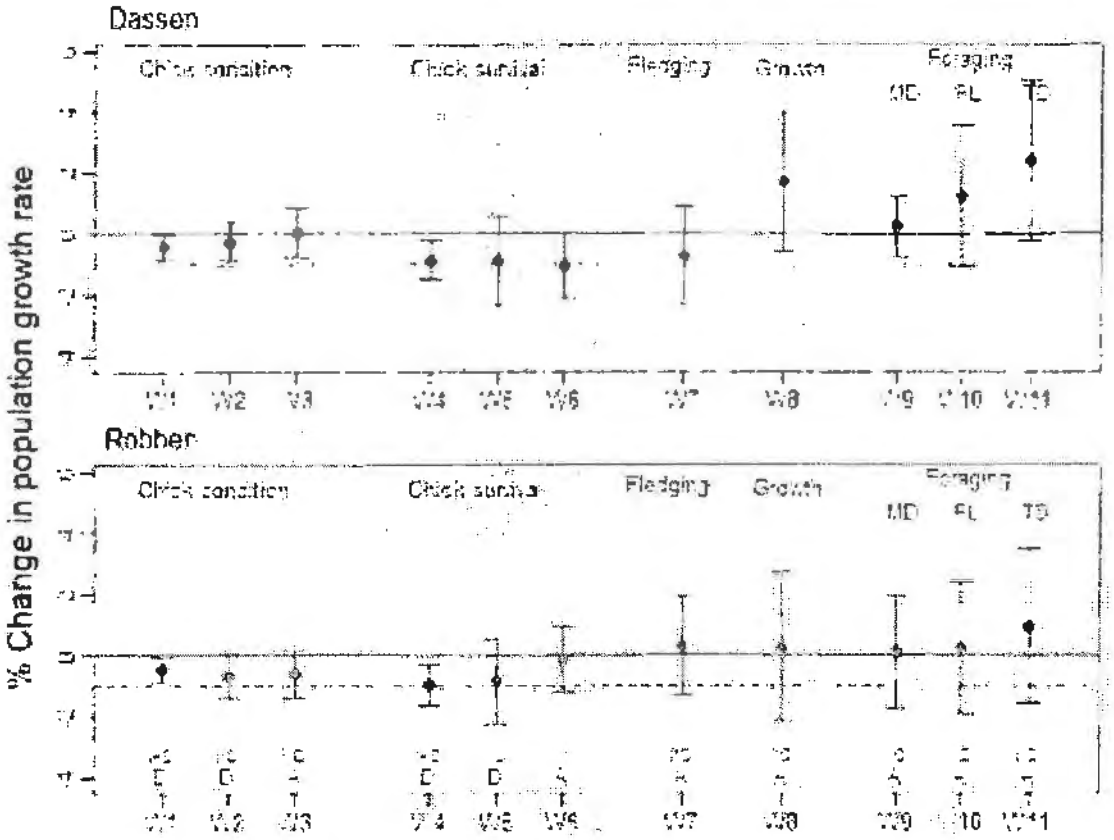


Figure 2.2: Estimates of change in population growth rate for Dassen and Robben islands as a result of fishing (expressed as a percentage per annum) resulting from the analysis of various response variables measured at those colonies: chick condition, chick survival, fledging success, chick growth, and three variables related to foraging behaviour: maximum foraging distance (MD), path length (PL) and trip duration (TD). W1–W11 = model numbers. Model specifications are detailed in Appendix D

were negative but somewhat smaller, ranging from 0.04% to -0.67%.

The results based on analyses of chick growth and foraging-related parameters give little indication of a biologically meaningful impact of the closures. A reduction in growth rate during years when an island was open to fishing was expected but the opposite was estimated (model W8). Results are not consistent with the generally negative fishing impacts estimated from chick condition and survival, the response variables that are more directly related to population trends.

2.3.1.2 St Croix and Bird islands

The fishing impacts estimated for St Croix and Bird islands based on chick condition data were positive except that for Bird Island based on aggregated data (model E3), which was negative and very small (–0.24%) (Figure 2.4). A negative impact was estimated for some of the foraging variables in some of the island-method combinations, but the estimated impact was positive for other cases. The reliability of foraging metrics as indicators of the impact of fishing on the breeding success of penguins is therefore questionable, particularly given opposite signs of fishing impacts estimated for St Croix Island.

Overall, the Panel did not consider the results for the east colonies to be reliable, given the very little fishing that took place around Bird Island when the area was open except in the early years (Figure 2.4). Also, the first two model results based on disaggregated data included data for the year 2017 when some sizeable catches were taken from within the St Croix Island closure when the area was supposed to be closed. Some sensitivity runs conducted in response to a request by the Panel using the aggregated data (Ross-Gillespie and Butterworth, 2023b) indicate that these catches did not impact the broad results from the ICE for St Croix Island. In particular, the analyses still resulted in positive estimates of fishing impacts for St Croix Island when year 2017 was excluded from the data. This result was not substantially altered in other sensitivity runs reported by Butterworth and Ross-Gillespie (2023a; results not shown here). The only run that resulted in a negative, albeit small, impact (–0.39 in units of % population growth) was when data for 2008–2010 were excluded, Bird Island was treated as closed during all years, and St Croix Island was treated as open in 2017.

The alternative catch-based estimator, which uses actual catches taken within the 20-km areas instead of the open/closed treatment, led to negative but still very small fishing impacts (–0.28 in units of % population growth) at St Croix Island for the chick condition data (Ross-Gillespie and Butterworth, 2023a, results not shown). The results based on foraging-related variables, on the other hand, tended to show smaller negative impacts for St Croix Island than when the open/closed treatment was used.

The existence of other confounding factors not controlled by the ICE add to the difficulties in interpreting the results for the eastern colonies. In particular, the increased number of bunkering operations in Algoa Bay since 2018 may have impacted the penguin population at St Croix Island (Pichegru et al., 2022). A sensitivity run that only included years up to 2015 (Model S5 in Ross-Gillespie and Butterworth, 2023a) failed to identify any impact of the closures on chick condition, and led to lower impacts based on foraging trip parameters.

In summary, the Panel **concluded** that the ICE results for the east colonies were more uncertain and difficult to interpret given that the paired islands did not provide the anticipated contrast, and given the few response variables that could be monitored at those colonies. Notwithstanding these limitations, the Panel **concluded** that the available results only provide indirect evidence of negative impacts of fishing around St Croix Island through increased foraging distances of breeding penguins during years when the colony was open. However, these changes in foraging behaviour were not reflected in estimated poorer chick condition.

2.3.2. Integrated estimates of the overall impact of closures on penguin population growth rate

As discussed in Section 2.2.3, the Panel considered it more appropriate to treat effects estimated from impacts on chick condition and chick survival as additive when calculating the predicted overall impact on population growth rates (Table 2.3). Only the predictions for Dassen and Robben islands are shown given the concerns regarding the use of foraging-related variables (see section 2.2.1) and that fact that, for St Croix and Bird islands, only estimates based on chick condition are available.

Overall, the Panel **concluded** that the results of the ICE for Dassen and Robben islands indicate that fishing closures around the breeding colonies are likely to have a positive impact on population growth rates, but that the impacts may be small, in the range 0.71–1.51 % (expressed in units of annual population growth rate). These impacts are small relative to the estimated relative reductions in penguin abundance for these two colonies over the period 2005–2022, which were estimated by the Panel at ~13% for Dassen Island and ~10% for Robben Island using abundance data provided to the Panel.

The ICE in its current form (to estimate the effects of fishing closures on reproductive success) is completed. Future closures of forage-fish fishing around penguin colonies would be likely to benefit penguin conservation, but should be part of a larger package of conservation measures as such closures alone would be unlikely to reverse the current decline in penguin population numbers.

2.4 Caveats associated with the ICE and the associated analyses

The commitment by the South African government to implementing an experimental management scheme (the ICE) to understand whether fishing near breeding colonies negatively affects African penguin populations should be recognised, notwithstanding the caveats in this section because without the ICE, management decisions would have to be based on analogy and expert opinion. The experiment aimed to collect data that could allow the effects of fishing closures on the reproductive parameters of African penguins to be estimated. It implemented several best practices, including paired controls and treatments, monitoring of key reproductive parameters, and an initial period to assess how long it would take for there to be sufficient statistical power to detect a potentially meaningful effect of fishing closures, if one existed. In addition, the data from the experiment were analysed using multiple modelling approaches and the analyses were regularly peer-reviewed within the domestic process as well as by the International Fisheries Stock Assessment Review Workshops (e.g., Haddon et al. 2020), likely increasing the robustness of the

Table 2.3: Overall integrated fishing impacts on penguin population annual growth rates estimated from the data collected during the ICE for the Dassen Island and Robben Island breeding colonies. Three estimates are provided for each island to illustrate the range of results produced by the selection of model runs shown in Figure 2.2. Note that the values provided refer to the predicted effects of fishing around the colonies, so a negative value implies a positive change in population growth rate if the areas were closed relative to if they were kept open to fishing

Dassen Island	Chick condition	Chick survival	Added fishing impacts on population growth rate	Models	Modelling of closure effect
	–0.43	–0.86	–1.29	W1 & W4	I + C
	–0.24	–0.86	–1.1	W2 & W5	I × C
	0.04	–1.04	–1	W3 & W6	I × C
Robben Island	**Chick condition**	**Chick survival**	**Added fishing impacts on population growth rate**	**Models**	**Modelling of closure effect**
	–0.43	–0.91	–1.34	W1 & W4	I + C
	–0.67	–0.84	–1.51	W2 & W5	I × C
	–0.59	–0.12	–0.71	W3 & W6	I × C

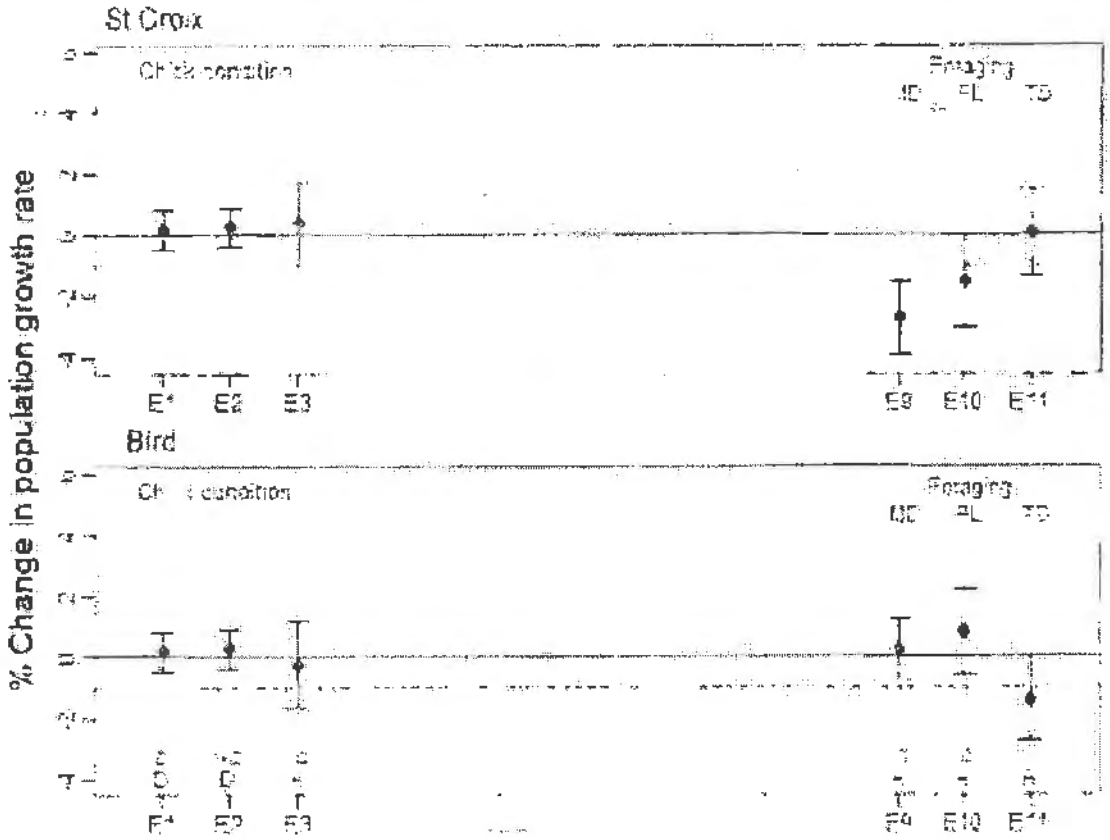


Figure 2.3: Estimates of change in population growth rate for St Croix and Bird islands as a result of fishing (expressed as a percentage per annum) resulting from the analysis of chick condition and three variables related to foraging behaviour measured in those colonies: maximum foraging distance (MD), path length (PL) and trip duration (TD). E1–E11 = model numbers. Model specifications are detailed in Appendix D

results. The ICE was highlighted by Sydeman et al. (2017) in their review of best practices for assessing forage fish fisheries – seabird resource competition, noting that field experiments are the "holy grail" of seabird-fisheries competition studies because of the potential to detect causal effects. In fact, it is the only case where an experiment has been designed with the aim of detecting fishing effects on reproductive parameters of seabirds. However, Sydeman et al. (2017) note that field experiments can be difficult to design and implement, and the ICE is no exception in this regard.

Notwithstanding that the experiment was designed following best practices, there are several weaknesses of the design and implementation that need to be recognised and their consequences accounted for when interpreting the results in section 2.3 of this report.

- The experiment aimed to estimate the effects of fishing closures on penguin reproductive parameters, meaning that it was necessary to develop models to predict changes in the population growth rate given expected changes in reproductive parameters (see section 2.2.3). While it would have been ideal to relate fishing closures to changes in population sizes directly, it was recognised when the experiment was proposed that the time to detect changes in population size attributable to an island closure would potentially involve a much longer experiment than that needed to detect changes in reproductive parameters. This was due, for example, to the time that penguins take to recruit to the adult population, and that the results in terms of population size might be confounded by the effects of, for example, movement among breeding colonies.
- The experiment involved temporal blocks of 3 open and 3 closed periods (Table 2.1). This design was a compromise between longer blocks, which might permit detection of changes in population size and shorter blocks, given the focus on reproductive parameters. The design was implemented nearly as anticipated – the exception was 2021, the data for which are not used in the analyses.
- The closures pertained to 20 km around breeding colonies. However, analyses subsequent to the start of the experiment (e.g., Annexure 1 of CAF, 2022) show that penguin foraging can extend well beyond 20 km (especially for St Croix Island) so while the results of the experiment allow the effect of 20 km closures to be quantified, potentially larger effects may have been observed with closures that more closely reflected foraging areas. The ability to infer changes in reproductive parameters (and hence population growth rates) for closures that dif-

fer from 20 km around islands requires an extra step of interpretation that is necessarily primarily qualitative.

- The experiment relates to four of six major breeding colonies. Closures have been proposed for Dyer Island and Stony Point. Inference of the effect of closures for these colonies requires extrapolation of the effects of the closures for the islands in the experiment, and are consequently more uncertain.
- The experiment manipulated the ability to fish within 20 km of the four islands. It did not specify that catches had to occur when an island was "open". One consequence of this is that catches might be low during open years. This was the case for Bird Island where catches were low irrespective of whether this island was open or closed to fishing due to operational issues. Moreover, analyses provided by Janet Coetzee (DFFE) showed that some catches had occurred inside the closure areas in years when they were supposed to be fully closed to pelagic fishing (in particular, off St Croix Island in 2017; Coetzee, 2023; Figure 2.4). In addition, some recorded catches occurred close to the 20 km closure boundaries. Whether some of these catches actually occurred within 20 km of the islands was not checked given the time available but some of these catches may have occurred inside the closures.
- A primary aim of having two colonies in each region was to enable the effects of factors other than fishery closures on reproductive parameters to be accounted for in the analyses. Given that the ICE is a natural experiment and even though the two islands on each coast are relatively close, there were still differences in distribution of pelagic fish between islands (Coetzee, 2023) that cannot be accounted for in the analyses based on results of the ICE.
- It was not possible to monitor all variables that could affect reproductive success owing to logistical constraints and the possibility that monitoring could have a negative effect on reproductive success of an endangered seabird. Several key parameters, including chick survival and fledging success, were not monitored at the eastern colonies, which reduced the potential to detect the effect of fishing near colonies on reproduction. The choice of parameters to monitor reflected monitoring that was ongoing at the time the experiment was designed. In retrospect (and subject to the constraints of available resources), monitoring of additional variables would have been desirable (see section 5).
- The modelling accounts for the effects of factors other than island, closure, and month of sampling using a year effect. In principle, a key determinant of year-to-variation in reproductive success relates to the biomass of prey species. Acoustic surveys of local biomass were undertaken, but it was found that there is considerable variation over the breeding season and high sampling error (DFFE, 2021) so this factor could not be included in the analyses. Another factor that may have impacted reproduction on St Croix Island is the effect of bunkering near Gqeberha since 2016 (Pichegru et al., 2022).

2.5 Potential but not studied benefits to adult and immature African penguins from ICE

The ICE measured variables that were considered to be direct measures or proxies for African penguin breeding success or post-fledging survival, but did not measure impacts of island closures on African penguin adult survival or immature survival. Evidence (outlined below) indicates that increases in prey abundance/availability would be likely to result in some gains in adult survival and immature survival.

Seabirds tend to have high adult survival and low fecundity (breeding success). Life history theory predicts that seabird adult survival is likely to be more strongly buffered than breeding success by behavioural responses because seabird population dynamics is driven more strongly by adult survival than by breeding success (Cairns, 1992). The prediction is that long-lived birds will tend to protect their survival by abandoning breeding when times are bad, so low breeding success is likely to be a more conspicuous consequence of low food availability around colonies than is low adult survival. Testing whether there is a relationship between forage-fish stock biomass and adult survival of forage-fish dependent seabirds is made difficult because few studies have collected long-term data on adult survival rates of seabirds in locations where there are matching time-series of forage fish stock biomass data. Nevertheless, several studies have found that adult survival rates are influenced by food availability. While none of the studies listed below are directly comparable to the African penguin situation, they provide an *a priori* basis to raise the expectation that there are fishery-related impacts on adult and immature survival.

- Black-legged kittiwake adult survival is correlated with prey density in the non-breeding area in winter (Reiertsen et al., 2014) as well as in the breeding area in summer (Oro and Furness, 2002; SSERenewables, 2022).
- Black-legged kittiwake adult survival and breeding success at Shetland (north Scotland) were both strongly effected by Shetland sandeel stock biomass (Oro and Furness, 2002).
- Black-legged kittiwake adult survival and breeding success at the Isle of May (east Scotland) were both reduced in years when sandeel fishing occurred on the ICES Sandeel Area 4 stock compared to years when there was no sandeel fishery (Frederiksen et al., 2004).
- Return rates (a proxy for survival) of black-legged kittiwake, Atlantic puffin, common guillemot and razorbill at the Isle of May all show strong asymptotic relationships with ICES Sandeel Area 4 sandeel stock biomass (SSERenewables, 2022).
- Return rate of adult Arctic skuas (parasitic jaegers) at Shetland as well as their breeding success was increased by supplementary feeding of broods, implying that low sandeel abundance was likely responsible for low adult survival in that species as a result of the increased costs of breeding when food was scarce (Davis et al., 2005).
- Low food availability reduced adult little auk body condition and reduced adult survival (Harding et al., 2011).

Figure 2.4: Catches of sardine and anchovy taken inside the 20-km closures during the duration of the ICE. Letters above each bar denote years when the areas were open (O) or closed (C). Figure credit to J Coetzee (DFFE, pers. comm.)

- Increased parental effort by breeding common guillemots (common murres) when foraging conditions deteriorated resulted in reduced adult survival rate and only partly compensated for low prey availability so also resulted in reduced breeding success (Wanless et al., 2023).

Measuring survival of immature seabirds is much more difficult than measuring survival of adults. There is evidence that survival rates of immature seabirds tend to be lower than those of adults (Horswill and Robinson, 2015), presumably because immature animals are less experienced and therefore less competitive. That suggests that low food availability would be likely to impact immature animals more strongly than adults. Therefore, gains from improved prey availability may benefit immature survival more than adult survival. Few studies report examples of change in immature survival rates, but immature survival of crested terns was strongly reduced when forage fish prey biomass was depleted (McLeay et al., 2008).

Evidence from other studies therefore suggests that the ICE is likely to have led to some unquantified improvement to adult and immature African penguins in addition to the quantified gain seen in breeding success for the western breeding colonies. It is impossible to determine the magnitude of any unquantified gain, but it is likely to have been small.

3. BASIS FOR EVALUATING FISHING IMPACTS OF CLOSURES

3.1 Background

The literature investigating the impacts of fishery area closures on commercial fishing fleets and coastal communities highlights the importance of considering the short-run, long-run, and heterogenous effects across communities and fishers (e.g., large- vs small-scale). The short-run impacts on the harvesting sector include the displacement of the vessels from the closed areas that in turn could result in lower (or lost) catches, greater fishing costs, and lower revenues, everything else being equal. The short-run changes to the harvesting sector can also result in changes in throughput into processing facilities, which could lead to fewer shore-side jobs and less product. The long-run impacts include potential changes in shore-based infrastructure (e.g., processing capacity, fuelingfuelling stations, bait stores, and ice availability), and the number of vessels operating in the fishery.

Both the magnitude and importance of the short- and long-run impacts are unlikely to be uniformly distributed across fishery participants and coastal communities. The placement and size of a closure could, for example, raise the cost of fishing for smaller vessels by increasing their steaming time to the open fishing grounds in a way that results in the exit of these vessels from the fishery over time. Vessel exit can have knock-on effects to the communities in terms of economic activity, shore-side infrastructure, employment, and social wellbeing. Implementing closures, including those to protect ecological processes, in South Africa will impact the fishing industry and local communities to some extent, but accurately quantifying this is challenging.

Economic methods to measure the changes due to a closure differ for the most part on according to whether the focus is on predicting the impacts before the intervention is implemented (ex-ante analysis) or measuring the impacts after the intervention is in place (ex-post analysis).

Section 3 is organised as follows. Section 3.1 is divided between a summary of the random utility class of model that is generally used to predict the impacts of proposed fishery closures and program evaluation methods that measure the causal impact of a fishery closure on the harvesting sector. Section 3.2 reviews the opportunity-based model (OBM) and section 3.3 reviews the social accounting matrix (SAM) modelling. Section 3.4 assesses the integration of the results from OBM and SAM modelling by highlighting how lost catches on the water are mapped back to coastal communities and regional economies.

3.1.1 *Ex-ante* analysis of the harvesting sector

The literature on the *ex-ante* analysis of the impacts of proposed fishery closures is dominated by random utility models (RUMs) which are statistical models of fleet behaviour (RUMs are a class of discrete choice models (DCMs)). While a RUM can take several forms, often researchers model the decision on whether to go fishing and where to go fishing conditional on taking a trip (see Figure 3.1). Vessels/fishers choose to go on a trip when the economic returns to taking a fishing trip are greater than the outside opportunity cost of not fishing, and fishers choose to fish in site i when their expected net returns from fishing in site *i* are larger than the other sites.[1] The expected net returns of a site *i* consist of the vessel's expected catch and price, travel distance to the site from their current location (port or another fishing site), fuel prices, and other variable costs.

RUMs have been applied to a range of fisheries from those for sedentary species (Smith, 2002; 2005; Marcoul

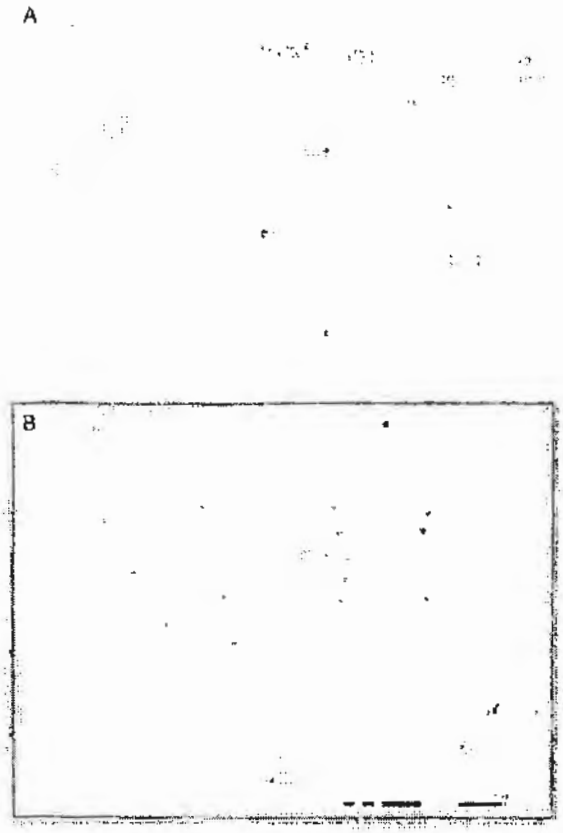


Figure 3.1: Basis of random utility models: Panel A is a stylised decision tree of a commercial fisher (vessel) in any given decision period (Source: Smith et al., 2010). Panel B is an example of the spatial choice of sites available for fishers in the Bering Sea of Alaska (Source: Abbott and Wilen, 2011).

[1]Extensions of the basic RUMs include variables such as variance of the expected net returns (Dupont, 1993; Mistiaen and Strand, 2000; Hutniczak and Münch, 2018), preference heterogeneity (Smith, 2005), state dependence (your past experience affects future choice) (Holland and Sutinen, 2000; Smith, 2005), evolving information and information sharing (Curtis and McConnell, 2004; Abbott and Wilen, 2011), spatial correlation and learning (Marcoul and Weninger, 2008; Hutniczak and Münch, 2018), bycatch avoidance (Haynie and Layton, 2010; Abbott and Wilen, 2011), and multiple fleets and fisheries (Depalle et al., 2020).

and Weninger, 2008) to those for pelagic species (Curtis and Hicks, 2000; Mistiaen and Strand, 2000; Curtis and McConnell, 2004). For nearshore sedentary species, often vessels fish single-day trips choosing a few fishing grounds to visit (Eales and Wilen, 1986; Smith, 2005; Marcoul and Weninger, 2008). For finfish species such as groundfishes or tunas, vessels make multi-day trips (Curtis and Hicks, 2000; Curtis and McConnell, 2004; Hicks and Schnier, 2008; Abbott and Wilen, 2011; Hutniczak and Münch, 2018). When developing RUMs for multi-day trips (e.g., purse-seine tuna fisheries), it is common to treat the choice of the first location separately, and then conditional on that choice, model the subsequent site choices (Sun et al., 2016).

Two interrelated challenges to RUMs are the spatial (definition of a site or fishing ground) and temporal unit (e.g., daily, weekly), and the estimation of a vessel's expected catch at the set of fishing sites when the vessel is on a trip (Smith, 2000; Dépalle et al., 2021). Studies have employed various methods to calculate expected catches that depend on the assumptions about the set of information available to the vessel at a particular time (Dépalle et al., 2021; Abbott and Wilen, 2009), including the ephemeral nature of that information (e.g., fish stocks might only stay in a particular location for a short period of time or the distribution of the fish stock in a particular location might be more stable from month to month and across years). For example, it is possible to use only vessel level information (e.g., catches at a particular site within the last week/month and/or the same week/month in the previous year). However, it is also possible to assume that vessels share information by including fleet level information (e.g., catches of similar vessels in a site within the last week/month and/or fleet catches in the same window of time in the prior year). If no vessels have visited a site in the relevant window of time, then expected catches can be assumed to be zero. The formation of expected catches will lack necessary observations if the definition of a fishing site is so small that there are few past observations that fall within it or the window of time is too short (Dépalle et al., 2021). Given that there is no theory on how fishers form expectations of catches at different sites, most analyses carry out robustness checks with different weighted combinations of own and fleet information across different site definitions and time windows (Dépalle et al., 2021).

The estimated RUM can be applied removing from the choice set the sites that are included in the closure area to assess the short-run impact of a proposed closure (e.g., Smith and Wilen, 2003). Conditional on the closure, the RUM predicts the number and timing of trips, the displacement of the fleet due to the closure (the model statistically reallocates the trips to different sites based on the empirical model of fleet behaviour), increases in travel costs, and changes in the catch composition (including different target species).

3.1.2 *Ex-post* analysis on harvesting sector

While RUMs dominate the literature predicting the *ex-ante* impacts of fishery closures, more recently researchers are utilising program evaluation methods that quantify the *ex-post* impacts of closures by estimating the counterfactual (Ferraro et al., 2019). For example, Smith et al. (2008) develop an empirical model to isolate the effects of marine reserves that accounts for multiple gear production technologies, heterogeneity in vessel captain skill, spatial heterogeneity of fish stocks, seasonal patterns in abundance, the effects of coexisting management policies, and the possibility that the harvesting sector anticipates reserve establishment.

Reimer and Haynie (2018) quantified the short-run impact of large-scale closures on the net revenue of the commercial Atka mackerel fishery in the North Pacific using difference in difference (DiD), propensity score matching, and synthetic control methods. DiD measures the counterfactual (what would have happened in the absence of the closure) using the trend over time in a control group (vessels that do not fish in the closure). The assumption is that any differences between the treated group (vessels that fish in the closure area) and the control group are invariant over time and by using their parallel trends before the intervention, these differences will net out leaving the impact of the closure on the treated vessels. Favoretto et al. (2023) employed DiD methods to evaluate the impact of Mexico's Revillagigedo National Park on industrial fisheries.

While DiD assumes that all the control vessels contribute equally to the comparison group, propensity score and synthetic control methods develop a more refined measure of the control unit for each treated unit. Propensity score methods, for example, estimate for each vessel the probability of being in the treated group as a function of pre-treatment observable characteristics, such as vessel size, gear technologies, home ports, boat fixed effects, net revenue, etc. Various criteria (e.g., 5 nearest neighbours) are then used to match treated and control units based on similar propensity scores, which are estimated predicted probabilities of fishing in the closed area. The assumption is that treatment and control vessels with similar propensity scores are statistically identical except that the treated vessels were impacted by the closure.

Any method of evaluation will need to address the challenges associated with accounting for exogenous time-varying factors, such as stock abundance trends, prices, costs, local and regional labour markets, global market forces (exchange rates), and endogenous time-varying factors such as behavioural responses to the closures that impact the ability to measure the counterfactual. An example of the latter is when impacted vessels are displaced to the fishing grounds occupied by the comparison set of vessels resulting in congestion on the grounds and lower catch rates for the control fleet than otherwise would have occurred had the closure not happened. Ferraro et al. (2019) discuss these challenges along with other biological and market mechanisms that can lead to contamination or biased estimates of the counterfactual.

3.2 Opportunity-Based Model (OBM) estimates of lost catch.

The OBM was used to estimate the impact of closures on catches by the South African pelagic fisheries targeting anchovy and sardine. Because the number of vessels, shoreside infrastructure, and behaviour of the fleet are held fixed over time, the impacts estimated are short-run even though they are calculated over ten years to develop an average loss. The OBM quantifies the impacts of closures under the

assumption that catches that occurred in the closed area when it was open are a measure of the catches that would have occurred if the closed area was not closed.

Unlike the early literature on the impacts of marine reserves on catches, which assumed that all catches would be lost when an area is closed, the OBM introduces a set of rules to capture potential behavioural responses of the fleet to the closures. These rules were informed by interviews with fishery operators and include how to replace catches taken within closures with alternative catch opportunities observed across areas and species within a narrow window of time (generally same day and year) considering estimated boat factors (vessel fixed effects from GLMM estimation), boat caps, and potential spillover from other closures. Opportunity catches are also adjusted up or down based on an auxiliary analysis used to evaluate possible biases in predicted aggregate catch in any given year depending on the specific rules used by the OBM.

Using these rules, the OBM develops a measure of the average irreplaceable catch stemming from the proposed closures using catches in the closed areas over ten years and the average catch that could be replaced (opportunity catch) for each species at the island closure level (see Appendix E for further details together with figures and summary tables of the results).

The two key modelling assumptions of the OBM are: (a) the observed catches taken in a given day outside a proposed closure provide a complete set of potential alternative fishing opportunities for replacing the catches taken that day within the proposed closure, ; and (b) there is a maximum number of times each alternative fishing opportunity could be used to replace those catches (referred to as "Reuse"). The former relates to the information set the fishers have at any point in time where the OBM implicitly assumes all vessels fishing on the same day have the same set of information and there were no additional potential opportunities where and when fishing did not take place. The latter is questionable considering that additional fishing opportunities, beyond those used when the areas were opened, could be searched for and identified in response to the implementation of a closure. The search for alternative fishing opportunities would be more effective if the fleet shared the information about fishing locations, as was reported during the meeting. It also implicitly assumes the lack of seasonality of fishable aggregations from one year to the next and full information decay of fishable aggregations in a location within a day. These assumptions combine to lead to a low of 40% (Reuse = infinity for sardine bycatch) and a high of 90% (Reuse = 1 for direct sardine) of the sets within a closed area (when it is open) being classified as irreplaceable in the marine Important Bird Area (mIBA) (h = 7 km) run (see Figure 3.2 Panel A). The fraction of irreplaceable sets is lower in the mIBA Area Restricted Search (ARS) run but still ranges from a high over 60% to a low around 20% depending on the scenario (see Figure 3.2 Panel B). In common with RUMs, if no vessels have fished at a site in a window of time, the expected catch of a vessel going to that site would be zero. In forming an expectation of catches for use in RUM, analysts consider a wider window of time (fishing within the last month, same month last year, etc.) while allowing for some weighted average of private information (catch rates of the vessel in the

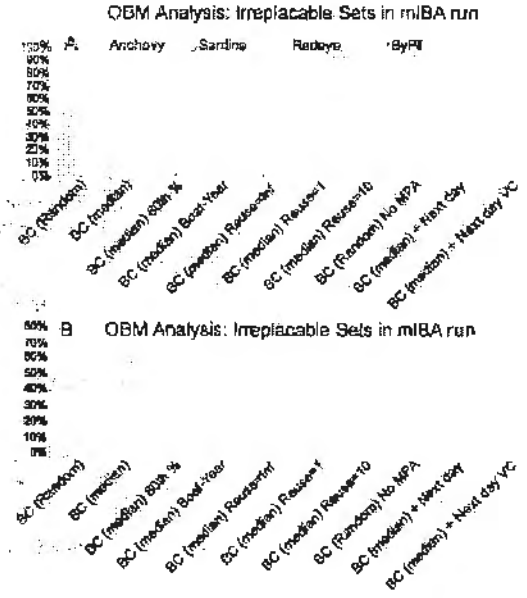


Figure 3.2: Percentage of Irreplaceable Sets in the mIBA (h = 7 km) run of the OBM model (Panel A) and in the mIBA ARS run of the OBM model (Panel B) across a set of model sensitivities. In Panel B, a blank corresponds to scenarios that were not run for the mIBA ARS case.

sites) and fleet-wide information (perhaps due to sharing of information at sea, observing landings, observing activity at sea) to calculate the expected catches in any site i in period t. The Panel agrees that the current window of same day (or same day plus one) is likely too constraining and recommends further statistical analysis should be undertaken to better understand the seasonal nature of anchovy and sardine sets/catches across the fishing sites, especially along the west coast.

Whether to sample alternative opportunities with or without replacement is an important issue in the OBM analysis. The Panel agrees that the OBM would likely be underestimating the potential opportunities outside the closed area on a given day (conditional on all the other assumptions being appropriate) if, for example, 100 catches (sets) within a closed area are matched to just a single catch (set). Currently, the results are presented for the case of allowing only one replacement (Reuse = 1 corresponding to sampling without replacement), only five times (sampling with replacement but only five times), and an infinite number of times (sampling with replacement). The Panel agrees that the random matching of catches is an improvement over the percentile method but recommends that all results should be presented for the Reuse = 1, 5, and infinity cases (see section 6 for additional suggestions on statistical methods to match sets).

The OBM is not able to quantify important potential changes to the net revenue of the fleet due to closures. Net revenue is the total revenue (ex-vessel price*catch) less the variable costs of fishing that include fuel costs (fuel price*fuel used), labour costs, supplies, etc. The fuel costs capture steaming time to and from the grounds, searching efforts, and fuel spent while fishing. Closures can increase

fuel costs due to greater travel distances and can also reduce the quality of the catch at the time of landing, leading to lower ex-vessel prices and total revenues (e.g., greater spoilage, lower quality)[2]. The impacts on net revenues are not likely uniform, as smaller vessels might have less ability to travel further due to the riskiness of being out to sea for longer and a more limited fuel capacity. The Panel agrees that understanding the impact of closures on the net revenue as well as changes in catches is important for understanding both the short-run impacts and the potential long-run impacts due to changes to the fleet composition, shore-side infrastructure, and coastal community dynamics.

3.3 Social Accounting Matrix (SAM) analysis

Quantifying community economic impacts of fishery policy changes requires understanding how changes in production on the water translate into changes in the production of goods and services shore-side either directly or indirectly. Economists use several methods to carry out such analysis, such as input-output (IO) models, social accounting matrix (SAM) models, and computable general equilibrium (CGE) models (Seung and Waters, 2006)[3]. Across the methods, the data requirements of the models are extensive, including industrial output, employment, value-addad, final demands, and imports. CGE models, which are the most expensive to develop but are the gold standard for quantifying community impacts, allow for changes in relative prices, substitutions across inputs (labour, capital), and compute the welfare implications of the economic shocks (e.g., welfare impacts of job losses rather than just quantifying the number of jobs lost) (Seung and Waters, 2006). SAMs improve on simple IO models by quantifying impacts on the distribution of income, but unlike the CGE framework hold prices fixed and do not allow for substitutions (Seung and Waters, 2006). SAM results, therefore, should be viewed as a very short-run measure of the impact (snapshot) whereas e CGE model can capture more dynamic short-run and medium-run responses of the economy (Seung and Waters, 2006). Because SAMs are designed to analyse demand-driven impacts in the local economy (e.g., change in consumer spending), these models tend to overestimate the impacts of supply-side shocks, such as a reduction of catch (Seung, 2014; Seung and Waters, 2013).

UrbanEcon developed a SAM model that models a shock to the regional economy from a reduction in catches due to the closures as calculated by the OBM (irreplaceable catch). The SAM model traces the shock through the economy by modelling a set of linear relationships that capture the direct, indirect, and induced changes (Figure 3.3). Characterising the value chain of the pelagic fishing industry is a way to decompose the direct and indirect impacts of a change in the total catch of sardine, anchovy, or redeye (Figure 3.4). Vessel owners, captains, and crew experience direct income effects from a reduction in the catch, where the crew are paid on a share system based on the fishmeal price and catches rather than a fixed hourly wage. The lower catch results in less throughput into the shore-side processing facilities, which can be substituted in some situations with import quantities though often for higher prices (depending on exchange rates, and transportation costs). The higher costs of processing fish can result in a reduction in labour demanded by processing facilities and lower overall economic performance of the industries. Sales locally or exported might also be impacted if the final output of fishmeal, canned, or bait products is lower due to the lower catches. Lost wages reduce income and purchasing power in the economy, lowering consumer expenditures. Lower expenditures, along with changes in sales, lower economic output that can have further impacts on employment levels in sectors not directly related to fishing (induced effects in Figure 3.3).

An important impact of the proposed closures is the potential job losses both directly on the fishing industry and the knock-on losses due to lower GDP and income. UrbanEcon (2023a) predicts in the preferred scenario, for example, "full-time employment is expected to decrease substantially, with a reduction of 855 jobs" where the direct impact to harvesters is a loss of 35 with indirect losses of 93, and in the processing sector, the direct losses are 181 out of a total of 527 losses. Using the regional distribution of labour in Table 5.1 of UrbanEcon (2023b) and the direct job losses in Table 5.2 of UrbanEcon (2023b), the direct job losses regionally to the harvesting sector are 11.5 west of Cape Point, 8 between Cape Point and Cape Agulhas, 7 in Mossel Bay, and 5.6 in the east.

How to interpret the significance of job losses on regional economies and welfare depends on the quality of the local laborlabour markets, whether the losses are seasonal workers, and whether the losses are permanent or temporary (Holland et al., 2012). If local laborlabour markets are fluid with low unemployment, then a job loss in one sector could be negated by an increase in another sector,

Figure 3.3: Social Accounting Matrix Framework for mapping changes in regional aggregate catches (economic shock) to changes in employment, regional gross domestic product, and regional income. (Source: UrbanEcon June 2023c).

[2]Bergh (2016) states that fuel costs will increase approximately 29% around Dassen and Robben Islands when considering the location of the replaceable sets, which depends on the priority ranking of substitute locations and the assumption regarding the feasible sets from which to search for a replacement.
[3]While the use of IO, SAM, and CGE models dominate the literature in terms of quantifying the impacts of the fishing sector on local communities, a recent paper by (Watson et al., (2021) takes an econometric approach to measuring the impacts using data from Alaska. They find "that a 10% increase in a community's annual resident fishery earnings leads to a corresponding 0.7% increase in resident income. This translates to an increase of 1.54 dollars in total income for each dollar increase in fisheries earnings" where fishery earnings are defined as total revenues of fishing for local permit owners.

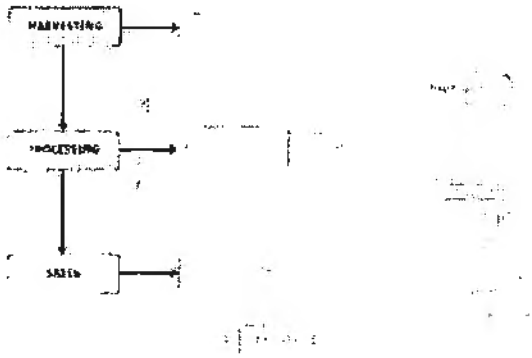


Figure 3.4: Value chain of the pelagic fishing industry highlighting the pathways for loss in regional catches to the direct impacts in the SAM modelingmodelling (Source: UrbanEcon, 2023b).

which makes interpretation of the economic costs associated with job losses more difficult. On the other hand, if losses occur in remote locales with incomplete laborlabour markets with high unemployment (as is the case for several of the towns where fishers and processors are based), then these losses contribute directly to the economic costs due to closure rather than being a transfer from one sector to another. In addition, if the job losses are from seasonal workers or temporary layoffs, then the impacts are likely transient and fleeting as opposed to the case where the job losses are due to the closure of the shore-side processing facility (Watson et al., 2021). The latter will have long-run impacts on the local fishing vessels, employment, and incomes, as may be the case for several of the affected local towns. The Panel agrees that while the SAM is a useful tool for creating snapshots of the impacts on regional economies it recommends that further work needs to be done on the long-run socioeconomic impacts to local communities due to the prospective closures. Moreover, it notes that the predicted effects of closures depend on the reliability of the estimates of lost catch from the OBM, which the Panel agrees is likely to provide overestimates given its restrictive assumptions related to the set of opportunities that are available to replace catches in closures. These overestimates are of uncertain magnitude but may be large.

The heterogeneous impacts on fishing operations (e.g., small vs large vessels) are another important factor in understanding the relative significance of the changes to regional economies. In the preferred scenario, UrbanEcon (2023a) shows "that smaller vessels (less than 20 metres) will be the most highly impacted ... the largest vessels (above 25 metres) will be the least impacted... meaning that the viability of maintaining operations is variable dependent on boat size, and the larger the boat, the higher level of security it has in its operations." These impacts, however, are not evenly distributed across communities and closures, as some ports will be more dominated by larger vessels (and vertically integrated companies). The Panel agrees that while the SAM model provides a measure of the distributional impacts across vessel size it recommends that further work should be done to understand the impacts on local communities more dependent on smaller vessels, such as those operating in the St. Croix area.

Given the complexity of the regional economy, any model (IO, SAM, and CGE) will involve many parameters and relationships, some of which are supported empirically and some of which must be assumed. The UrbanEcon SAM model is not unique in this respect, and the use of interviews with the fishing industry is a best practice to fill in missing data. However, some important questions remain regarding the interpretation of the SAM results. Are the "losses" out of the SAM due to the proposed closures within the standard fluctuations of the local economy due to other kinds of economic shocks, such as fuel prices, exchange rate fluctuations, etc? Fuel price increases, for example, would be expected to result in less fishing due to higher travel costs, less processing due to higher import costs of products, lower sales, lower consumer expenditures, etc. Are the short-run job losses from a fuel price increase greater than the predicted job losses from the preferred scenario? How important for the loss estimates are the assumptions regarding the relative wages of the processing and harvesting sector, especially since most of the job losses occur in the processing sector? How do the results change if the conversion of total employment FTEs is based on a different rate of fishing days per year (currently, 175 fishing days per annum is assumed)? The Panel agrees that additional sensitivity of the SAM results should be carried out to have a better understanding of the range of possible regional outcomes from the prospective closures.

In response to queries by the Panel, UrbanEcon carried out additional sensitivity analysis on the range of aggregate outcomes by varying expected catch loss, and fishmeal price. Variations in the global fishmeal price imply that a loss of catch in one year might not have the same economic value as a loss in another year (Figure 3.5). Specifically, UrbanEcon found that "the fishmeal industry performs at its best when international prices are highest – and therefore the largest industry loss will be experienced whereby the island closures negatively affect the level of raw input (anchovies, red-eye, and sardine off-cuts and bycatch) and international prices are highest" (UrbanEcon, 2023c). These results are not surprising, but also highlight the limitations of the SAM modelling assumptions. With the crew paid in proportion to the fishmeal price, as the fishmeal prices increase, the income of the crew increases, but because some crew also lose their job due to the catch re-

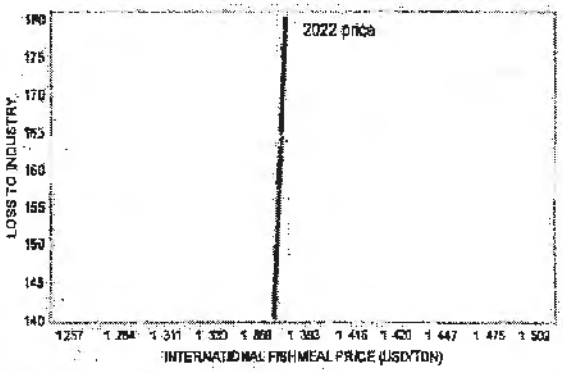


Figure 3.5: Sensitivity on the loss to the industry from the range of fishmeal prices (UrbanEcon, 2023c).

ductions, there are then fewer crew members earning more money in a year with higher fishmeal prices. How much the increase in wages to the remaining crew offsets the losses due to fewer workers is an empirical question that cannot be addressed given the linearity and fixed prices (output, input, and wages) assumptions embedded in the SAM framework.

3.4 Downscaling lost catches at sea to regional economies

The critical piece in quantifying the regional impacts of the proposed closures is the mapping of irreplaceable catches that occur at sea to the ports/local communities. Based on responses to a query of the Panel, there appears to be a discrepancy between the regional catch loss totals provided by the OBM based on where the catch is caught, the regional economic impact measurements determined by employment shares in the SAM modelling for 2022, and the breakdown of the lost catch based on shares of regional processing (Table 3.1). The later breakdown is not currently utilised in the SAM analysis and is imputed based on the average lost catch between 2011 and 2019 for anchovy, bycatch sardine, directed sardine, and redeye considering differences in the location of industrial and sardine processing facilities and landings. While the share of catch processed in any facility and port can change from one year to the next, which is the argument UrbanEcon employs when justifying the use of employment shares (Letter from UrbanEcon to Panel dated June 9th), Table 3.1 highlights the potential for different measures of regional impacts based on the method employed and/or the catch years used in the analysis. The Panel agrees that given little empirical justification for one method, each allocation method should be used, and the results compared across the different cases, to better inform discussions on which communities are likely to be most impacted.

Table 3.1: Mapping lost catches to regional economies. Column 1 shows the percentage of lost catch based on the current method for how OLSPS allocates irreplaceable catches in closure areas to regions, Column 2 shows the percentages that UrbanEcon uses based on employment in the fishing sector (harvesting and processing), and Column 3 shows a new set of percentages that OLSPS calculated based on the share of the catch that is processed shore-side by region (Source: Data provided to the Panel by OLSPS on June 9, 2023).

Region	OLSPS lost catch	UrbanEcon employment shares	Regional processing
Western Cape	17%	33.0%	49.4%
Cape Point to Cape Agulhas	60%	27.1%	27.0%
Mossel Bay	0%	23.6%	12.3%
East	23%	16.5%	11.3%

Penguins at Boulders (photo BM Dyer)

4. CRITERIA AND APPROACHES FOR EVALUATING TRADE-OFFS BETWEEN BENEFITS TO PENGUINS AND COSTS TO FISHERY

4.1 Introduction

There are various aspects involved in any decision regarding the locations and duration of island closures intended to conserve African penguins. These include the location and size of the closures, their seasonal duration, and whether and when any closures will be reviewed. The technical review of these aspects is given in sections 2 and 3. There are three primary trade-off axes to consider when selecting closures (see Figure 4.1 for options considered during the Panel discussions):

- The benefit to penguins of the closure.
- The cost (economic and social) to the fishing industry and the communities, especially where fishing and processing operations are based.
- The ability to evaluate the effectiveness of the closures.

The choice of the location and size of closures, and their duration depends on the relative weights placed on the different anticipated outcomes by the decision-makers. Guidance on these weights may be informed by legislation, existing policy frameworks and international agreements. Recommendation of a specific outcome lies outside the scope of the Panel.

The Panel **recommends** that, if designated, closed areas to protect penguins during breeding, should be year-round, unless reasons demonstrate otherwise, primarily because egg laying and chick provisioning occur year year-round, and these areas may be important during critical pre- and post-moult periods. The Panel further recommends that, if designated, closed areas to protect penguins should be reviewed at a time when results are available to investigate life-history processes such as juvenile recruitment, adult survival and hence population growth rates. This may be at a time between 6 and 10 years after designation. Other reasons to review such closed areas might include major socioeconomic changes in the fishery and processing, or stock abundance, or similar consequences of prey resource change.

4.2 Evaluating effectiveness

The "effectiveness" of a set of closures may be evaluated using a closure program that involves opening and closing

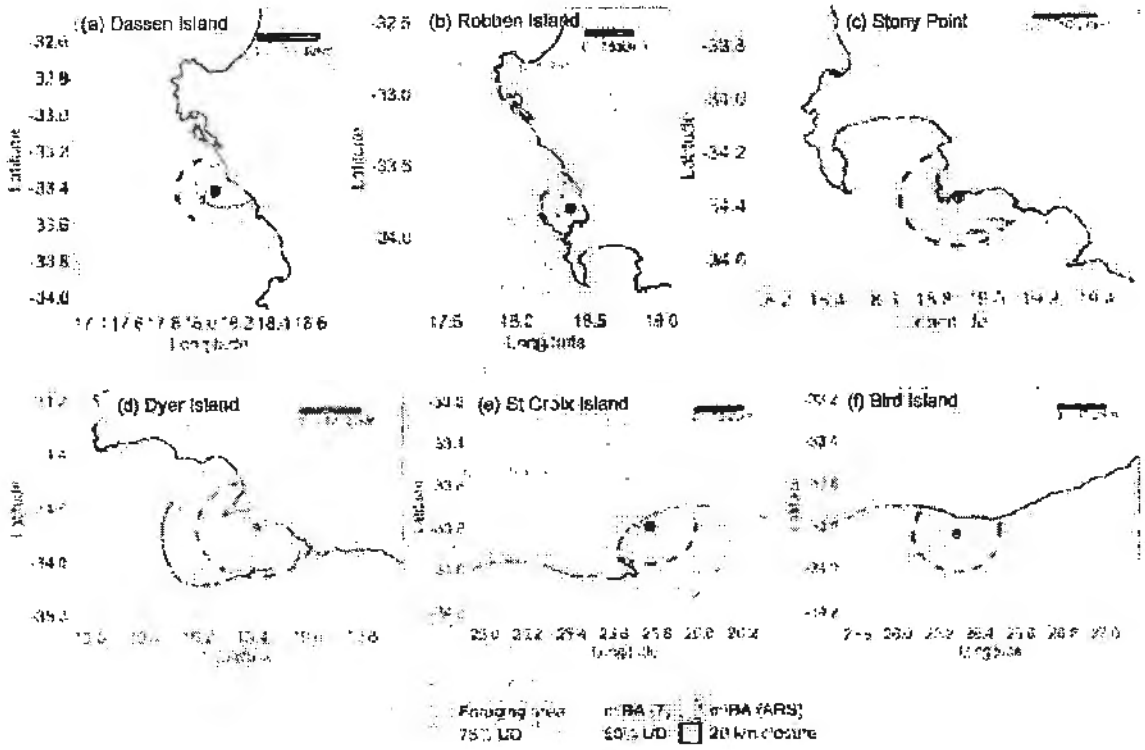


Figure 4.1: Comparison of alternative closure options including the 20-km ICE closures, the inclusive foraging areas defined as the 90% utilisation distribution—UD, (green open polygons), the UD50 and UD75 aggregated kernel density distributions, as well as two mIBA core area versions calculated using a smoothing factor of 7 km (mIBA (h = 7 km)) or the ARS scale value calculated for each colony (mIBA(ARS)) using tracking data of African penguins tagged at (a) Dassen Island, (b) Robben Island, (c) Stony Point, (d) Dyer Island and (f) Bird Island. (From McInnes et al. 2023).

areas to fishing in an experimental manner to test hypotheses and quantify changes in the demographic parameters of penguins, and hence their population growth rate. However, closure programs are not usually structured in this way, with most such programs involving long-term closures and monitoring of the impacted populations. The Panel strongly **recommends** that monitoring should take place irrespective of whether there is an experimental (alternating open and closed) component to the closure program. Section 5 identifies several ways in which monitoring can be changed to more precisely capture changes in penguin demographics and behaviour and hence the effects of any closures on the penguin population. Section 6 outlines improvements to data collection and analysis to facilitate an evaluation of the effect of any closures on the fishery and associated communities.

The Panel does not consider it essential that there is an ongoing experimental approach (as opposed to monitoring for conservation purposes). However, the Panel provides the following recommendations should there be an experimental component to any future closure program:

- The aim of the experimental structure should be to not only estimate parameters related to reproductive success, but also additional parameters, in particular juvenile recruitment, adult survival and hence population growth rate. This is because there is little value in conducting future experimental manipulations if the aim is simply to estimate the effect of closures on reproductive parameters given this is already adequately informed by the ICE (see section 2).
- There is little benefit in trying to use an experimental framework in regions (e.g., the eastern Cape) where it is (currently) not possible to monitor important parameters such as adult and chick survival. Based on the data already available and the ability to undertake regular monitoring, the western and southern Cape regions should be the focus of any future experimental closure program.
- Given the necessary focus on adult survival and population growth rate, it is desirable that a power analysis be conducted to identify an appropriate sequence of (possibly alternating open and closed) closures. The existing MPAs around some islands impose some constraints on the experimental use of closures and this should be taken into account in any power analysis.
- Conservation planning software tools, such as Marxan (e.g., Ball et al., 2009; Watts et al., 2017), provide a way to select areas given constraints on either the desired amount of closure by island or the cost to industry.

4.3 Quantify at-sea habitat area

The purpose of closing areas around penguin colonies is to protect penguin foraging habitat. Relatively little was known about the foraging behaviour of African penguins, especially about their preferred foraging habitats at the start of the ICE. The ICE had therefore been set up using a fixed 20 km radius as the open-closed management option (Figure 1.1). With the newly available telemetry data, closures may be designed to achieve a more effective protection of the penguins' foraging area.

The at-sea habitat used by seabirds whilst foraging varies throughout the year. Although different seabird species have very different characteristic scales of habitat use, all species show variability in relation to their life-history constraints. Seabirds are most constrained during breeding when they need to return to land to provision their offspring. In general, seabirds, including penguins, forage across spatial scales that differ between incubation, early chick rearing (the brood stage), late chick rearing (the crèche stage) and post breeding (e.g., Warwick-Evans et al., 2018). For African penguins, due to their disturbance sensitivities, most information about foraging is only available during the early chick rearing phase when foraging scales are likely to be most constrained. During this period adults can only travel short distances given their need to return to their chick at short temporal intervals. Thus, resource availability during early chick-rearing is critical, given parents are less flexible. Consequently, all estimates of preferred foraging habitat based on tracking data from early chick-rearing are likely to be conservative.

The marine habitat available to penguins varies spatially and temporally, with some areas being preferred, given the availability of prey. Determining such preferred areas is important, especially if resource competition with fisheries is a concern. Estimating areas of preferred foraging habitat can be achieved through numerical spatial analysis of telemetry (tracking) data. Different analytical approaches are available, but in recent years robust methods that identify marine Important Bird Areas (mIBA) have become widely accepted (Lascelles et al., 2016; Dias et al., 2018), including for the identification of Key Biodiversity Areas (e.g., Handley et al., 2020).

Kernel density analysis calculates the density of locations by fitting a bivariate normal function with a pre-defined radius (smoothing parameter, h) around each location and summing up the values to create a smooth density surface. The kernel utilisation distribution (UD) is the isopleth that contains a certain percentage of the density distribution. To obtain core usage areas for foraging seabirds the 50% UD has often been selected (Lascelles et al., 2016). To align the smoothing parameter (h-value) to the scale at which birds use their marine habitat, behavioural characteristics evident within the telemetry data can be used. For example, periods of Area Restricted Search (ARS) when birds are actually feeding, can be identified through First Passage Time (FPT; Fauchald and Tveraa, 2003). Such methods are now commonly used (e.g., Trathan et al., 2008; Scheffer et al., 2010) in the analysis of penguin telemetry data.

The Panel **recommends** that analyses delineating mIBAs using ARS methods represent the best scientific basis for delineating the preferred foraging habitats during breeding. In the future, additional analyses would further improve understanding, especially with respect to how the spatial scale of any given mIBA might vary by year. The Panel concluded that such between-year variation is likely to be important, as the years of the ICE, during which most telemetry data have been collected, have been years of relatively low prey resource abundance.

Further, evidence related to the prolonged African penguin breeding season (e.g., Crawford et al., 2013), also highlights the need to ensure adequate resource availabil-

ity is maintained within a given mIBA around the year, as the demand is not simply seasonal.

The Panel **recommends** that further validation of mIBAs should occur, in particular using dive data that provide objective identification of foraging locations, rather than commuting (or travelling) locations (see also section 5.9). Such analyses could be included in species distribution models (e.g., Warwick-Evans et al., 2018) that could be used to identify areas of key importance. However, important uncertainties remain, particularly if mIBAs are determined (as they have been) using telemetry data predominantly limited to early chick rearing when breeding adults are most constrained; further, that mIBAs may differ in the future, should prey resource abundance increase.

The life history processes of all species do not completely compartmentalise into distinct time periods or physiological mechanisms. Life-history events are often mediated through carryover effects, with events or activities occurring in one season, habitat, or life-history stage, affecting important processes in subsequent life-history stages (Crossin et al., 2010). Thus, seabirds arriving at a colony to breed must have already initiated certain physiological transitions, including with any associated resource accumulation (Crossin et al., 2010).

For African penguins, such carryover effects almost certainly occur, requiring adults to accumulate resources prior to breeding and prior to moult. This means that adequate prey resources are needed throughout different times of the annual cycle, such that delineating where birds forage and accumulate resources requires spatial information across the complete annual cycle. Outside the breeding season, reductions in resource competition that potentially facilitate reductions in foraging effort may benefit penguins prior to moult and post-moult, especially as these periods are energetically demanding.

Accumulating evidence shows that African penguins undergo predictable movements outside the breeding period (Sherley et al., 2017; Carpenter-Kling et al., 2022), suggesting that preferred habitats are also important at other times of the year. Importantly, it is now apparent that the mIBAs delineated using telemetry data from early chick rearing, are sometimes also important during pre- and post-moult foraging trips (Figure 4.2), even though they may only represent a part of important habitat during these other periods.

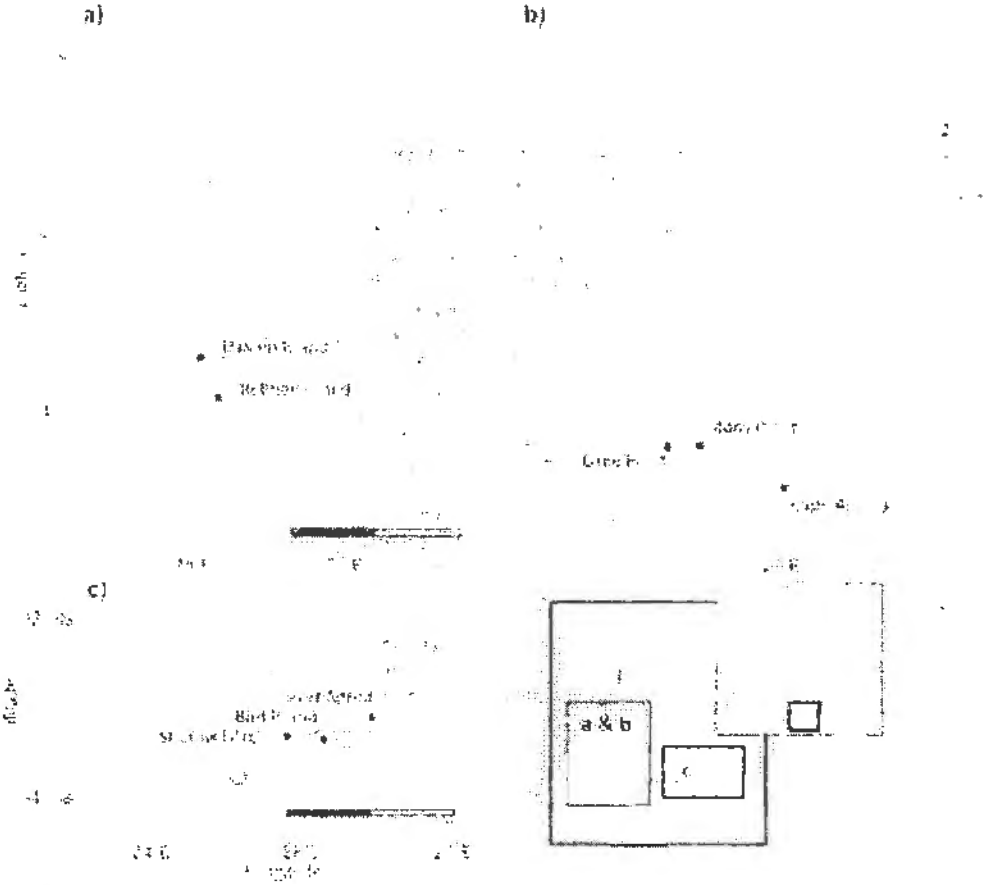


Figure 4.2: The distributional range (90% utilisation distribution—UD, open polygons) and core range (54% UD, shaded areas) of African penguins tagged at (a) Dassen Island, (b) Stony Point, and (c) Bird Island during their pre- (green) and post-(blue) moult foraging trips to the 200, 500 and 1 000 m isobaths (grey lines). Figure from Carpenter-Kling et al. (2022).

4.4 Trade-off space

One way to explore the trade-off between expected benefits to penguins and impacts on fishing is via trade-off plots (see, Hilborn et al. (2021) and Halpern et al. (2013) for examples of trade-off analyses). A trade-off curve (e.g., Figure 4.3) could demonstrate, for example, that the benefits to penguins (as quantified by the proportion of the foraging area that is protected) likely increases rapidly when small areas most used for foraging are closed, with the relative benefits to penguins declining as an increasing proportion of the foraging area is closed to fishing. Because not all closures of the same size are likely to have the same benefit, points A and B in Figure 4.3 demonstrate how a given (hypothetical) 40 km closure (point B) compares with the outcomes of another (hypothetical) closure with the same area but which more closely resembles areas of preferred penguin foraging habitat (point A). Based on the ICE experiment, it is not possible to assign quantitative estimates of the change in population growth rate associated with closed areas that differ from 20 km around colonies, but the qualitative changes in benefits to penguins with increasing closure areas are likely robust (increasing at a decreasing rate). Furthermore, for a given total closure area, closures that more adequately reflect preferred foraging areas will have greater benefits than those that simply close less valuable foraging areas. We also expect that lost fishing catches increase faster when the area closed increases in size, because as demonstrated in the OBM analysis, larger closures lead to more displaced fishing sets and a smaller area available for fishing (and hence fewer fishing opportunities). Based on the OBM results calculated for different alternative closure areas, we developed Figures 4.4 and 4.5, which provide a comparison of closure options across area closed and percent loss in regional catch. Figures 4.4 and 4.5 highlight how not all closures are equal in terms of the predicted lost catch and show that there are potential opportunities to reduce the impact on the fleet while at the same time increasing the amount of area closed (e.g., in Figure 4.4 compare the triangle and square on the blue line for Dyer Island and Anchovy).

The Panel provides the following conclusions and recommendations regarding selecting closures given its review of the work identifying foraging areas and lost catch.

- It is desirable to identify a solution that minimizes societal costs and maximizes benefits to penguins; however, an optimal solution (or acceptable "balance") between competing objectives is not simply obtained by closing 50 percent of any given area.
- Conservation actions should be spread throughout the range of the species given each region is subject to different biophysical and anthropocentric threats.
- One approach (if curves such as those in Figure 4.6 can be created) is to find the point at which the change in penguin benefits (by increasing closures) matches the change in costs to society.
- The trade-offs between costs to the fishery and benefits to penguins in terms of the proportion of the foraging area closed will differ among islands and among sectors within the fishery. Consequently, the benefits to penguins and costs to industry should be considered by island (or region) and not simply at the national level (see below). In addition, given the heterogeneity within the industry, expressing costs and job losses by sector (e.g., for small scale operators) would also seem appropriate.
- The economic analysis (e.g. Urban-Econ, 2023a,b,c) provides estimates of several types of economic impacts (to the fishery as a direct consequence of the reduction in revenue [direct impacts], that occur due to suppliers of goods and services to the industry [indirect impacts], as well as due to shifts in spending on goods and services due to directly and indirectly impacted parties [induced impacts]), as well as lost jobs. However, the estimates of economic effects to the fishing industry may be more robust than estimates for the rest of the economy and for jobs (see Section 3.3).
- Given that the OBM analysis likely provides an overestimate of uncertain magnitude of the loss in catch (see Section 3.2) and these losses are then used in the SAM analysis, the results on economic costs (lower GDP, jobs) and lost catches should be considered in a relative sense and hence used for ranking closure options within a region. The relative ranking of the closure may, however, be sensitive to how catches are allocated to local communities (see section 3.4 for additional details). The eco-

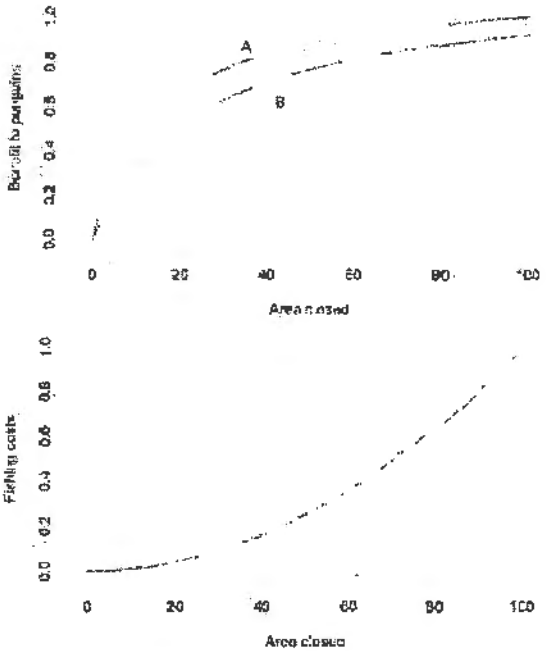


Figure 4.3: Illustrative relationships between benefits to penguins for optimally selected and simple closures given the amount of area closed (upper panel) and between area closed and fishing costs (lower panel). See text for explanations of curves A and B

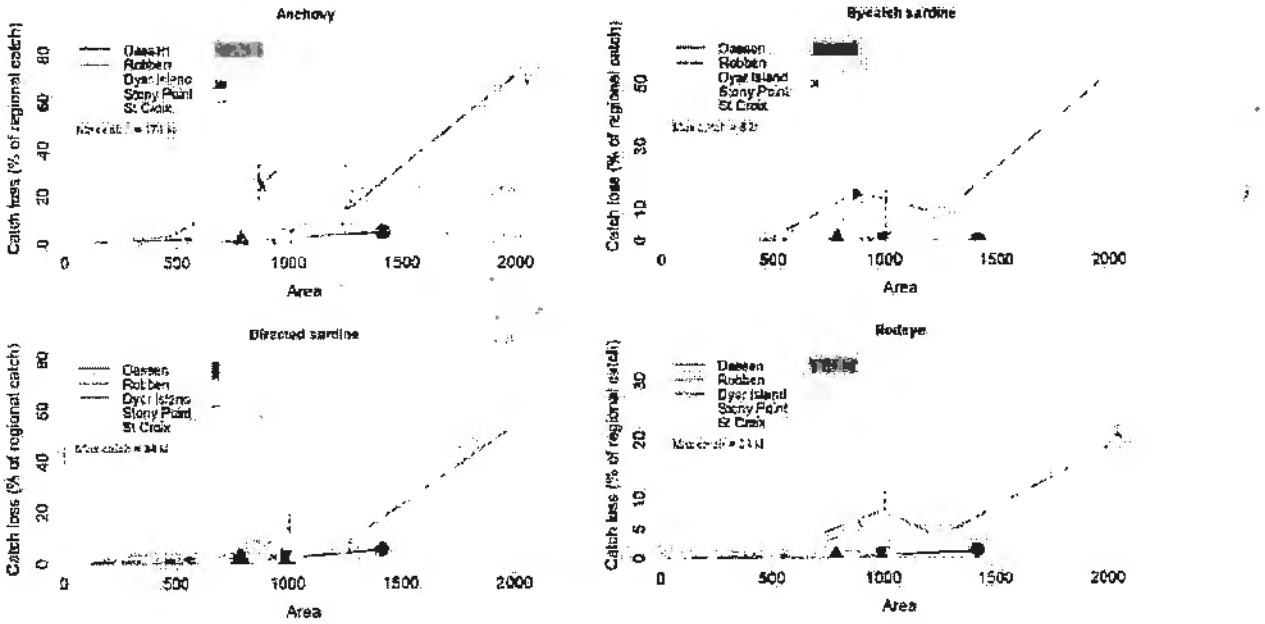


Figure 4.4: Area closed versus loss in catch for five of the six island breeding colonies. Catch losses are expressed relative to the average regional catches during 2011—2020 (west of Cape Point for Dassen and Robben islands; Cape Point to Agulhas for Dyer Island and Stoney Point; east of 24OE for St Croix). The dashed lines indicate results for island breeding colonies with very low catches relative to those for the other island breeding colonies. The different spatial closures considered for each colony are ranked by size on the x-axis: UD90 (closed circle), mIBA(ARS) (closed squares), 20 km (triangle), DFFE (cross), CAF (star), and industry (diamond). The vertical dashed lines cover the range of catch losses computed from the OBM when an alternative set can only be used once or used an infinite number of times. The symbol corresponds to using alternative sets up to five times. The length of the horizontal bars in the legend is proportional to the regional catch.

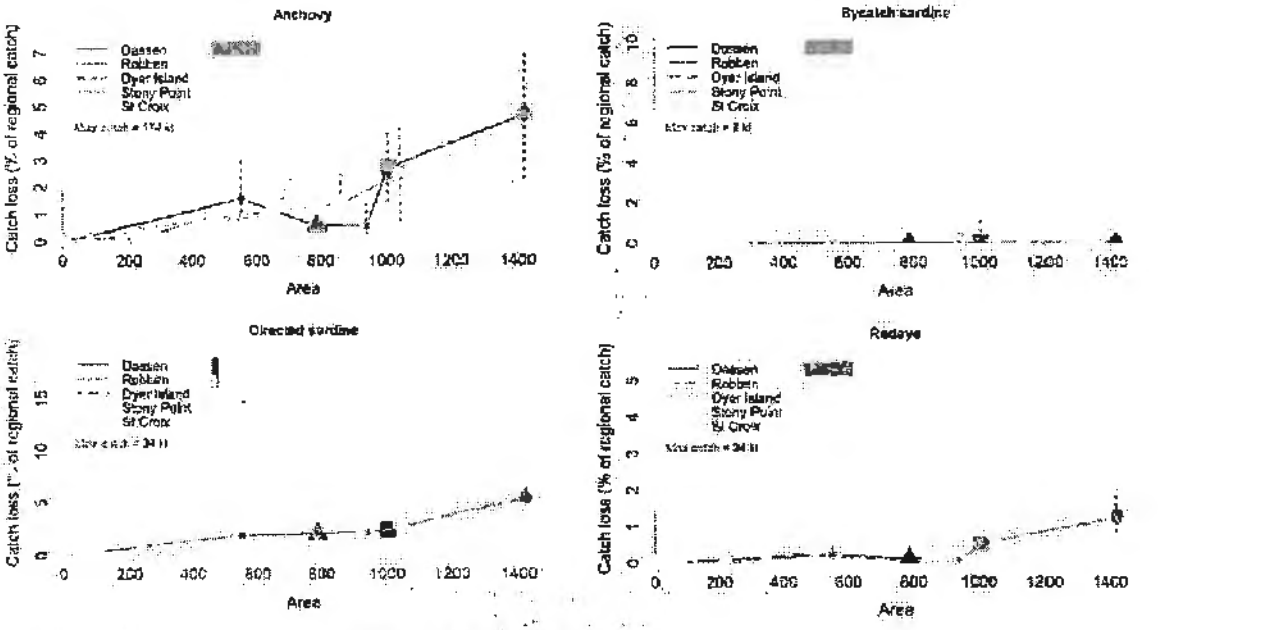


Figure 4.5: As for Figure 4.4, but restricted to Dassen and Robben islands and Stony Point.

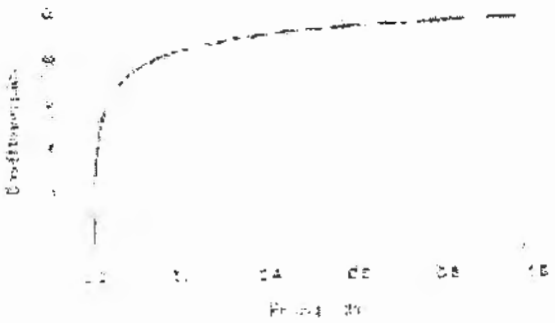


Figure 4.6: Illustrative relationship between the benefit to penguins and fishing costs based on Figure 4.3.

nomic analyses are only able to quantify the social effects of closures in terms of job losses. Future work should consider broader social consequences of reduced catches and job losses on community well-being.

- It is necessary to map catch losses back into regional communities to evaluate how vulnerable these communities are because the SAM could be obscuring important local socioeconomic effects.
- The competition among the fishery and penguins would be expected to be greater in years of low prey abundance. An adaptive closure framework that changes closures among years in response to prey abundance could reduce cost to the fishery in years of high prey abundance, as closures in such years would have little or no benefit to penguins.

4.5 Colony-specific considerations

Based on the information provided to the Panel and the results from Figures 4.4 and 4.5, we highlight the different dimensions of the trade-offs in summary bullets. Across all of the regions, the various penguin foraging areas are important for the small pelagic purse seine fishery.

Dassen Island

- Regionally important for anchovy fishers and redeye fishers.
- Historically important penguin breeding habitat with sufficient habitat for growth; largest remaining breeding population.
- Relatively more susceptible because African penguins are already affected by an overall reduction in regional sardine abundance that, if persistent, may limit their capacity to reverse the declining trend.

Robben Island

- Regionally important for anchovy fishers and redeye fishers.
- Important penguin breeding population.
- Relatively more susceptible because African penguins are already affected by an overall reduction in regional sardine abundance that, if persistent, may limit their capacity to reverse the declining trend.
- Eradication of feral cats should be part of a local conservation management plan.
- Major hub for ecotourism.

Dyer Island

- Regionally important for anchovy fishers, sardine fishers and redeye fishers.
- Important penguin breeding population.
- Relatively stronger fur seal interactions (predation and/or resource competition) with penguins.
- Figure 4.3 indicates that anchovy catches from within a closure are difficult to replace.

Stony Point

- Regionally important for anchovy fishers, sardine fishers and redeye fishers.
- Important mainland penguin breeding population with logistical access to enhance conservation management.
- Population has increased by 15% pa since 2005.
- Major hub for ecotourism.

St Croix Island

- Fishers rely on sardine due to virtual absence of redeye and anchovy.
- Important penguin breeding population.
- Largest rate of decline since 2016 among the extant penguin colonies.
- Evidence that noise disturbance from bunkering facility is disturbing penguin foraging.
- Figure 4.3 indicates that sardine catches from within a closure are difficult to replace.

Bird Island

- Very little small pelagic fishing.
- Important penguin breeding population but limited scope for major increases.

Boulders Beach

- Fully protected from commercial fishing.
- Important mainland penguin breeding population with logistical access to enhance conservation management.
- Population is healthy and stable (891 breeding pairs in 2022).
- Major hub for ecotourism.

5. FUTURE MONITORING TO EVALUATE EFFECTIVENESS

The Panel made the following recommendations in relation to potential scientific research questions related to the African penguin population decline, including associated monitoring techniques:

1. Continue to conduct counts of breeding numbers of African penguins at as many colonies as possible in as many years as possible.
2. Monitor adult survival of African penguins using techniques such as passive integrated transponder (PIT) tags and readers at colonies where this is practical to minimise disturbance to colonies. A comparison of time-series of adult survival at different colonies would help resolve which drivers are having the strongest influence on population change. Use of linear ground antennae are feasible when extensive areas of beach need to be monitored for PIT tags; elsewhere antennae can be incorporated into weighbridges where these are in use.
3. Continue monitoring of breeding success where it can be done without disturbance; however, the Panel considers that metrics such as chick weight/body condition/growth rate represent weak proxies of breeding success and may not be cost-effective.
4. Use automatic weighbridges to monitor weights of adult penguins at the start and end of breeding, as this should provide a direct measure of the costs of breeding in terms of the impact on penguin body condition.
5. Use automatic weighbridges to monitor weights of PIT tagged adult penguins; departure body mass prior to foraging and return body mass subsequent to foraging should provide quantification of foraging efficiency, and potentially meal mass for offspring. Such work will be valuable in itself, but would be especially valuable if complemented by GPS tracking of some individuals.
6. Assess behavioural responses of foraging adult penguins using GPS tracking studies; these will likely remain limited to the period when adults have relatively small chicks. However, deployment of time-depth-recorder tags on these adults (together with GPS units) will provide much improved data on the foraging locations along the path of tracked birds.
7. Conduct foraging studies using telemetry methods, to further determine the impacts of vessel noise (including from bunkering) on foraging behaviour.

5.1 Population counts

African penguins are not easy to count. Breeding birds may be in burrows underground, or in nest boxes, or under bushes, although at most colonies many are visible

Penguins nesting (photo BM Dyer)

in the open. Not all pairs breed at the same time, so that synoptic counts on any particular date underestimate total breeding numbers. For large colonies, counts have generally been undertaken by teams of people walking through the colony counting occupied nest sites, mostly between February and September, but counts at other times of year are used when they are the only data available (Crawford et al., 2011; Sherley et al., 2020). Because breeding is not fully synchronous, potential sites (apparently not active but showing signs of use) may be included in counts, whilst numbers of unguarded chicks in groups (crèches) are divided by two to estimate the (minimum) number of nest sites those birds represent (Sherley et al., 2020). These counts provide relatively low accuracy population estimates but are adequate to demonstrate large changes in population size over time.

Some birds choose not to breed, and so numbers of nests counted at colonies may underestimate the total population, by missing nonbreeding adults, especially when seabirds are under severe pressure (e.g., resource constraints, adverse weather conditions, disturbance). In addition, seabirds tend to become more vulnerable to impacts of human disturbance when already under stress from adverse environmental conditions (Diaz et al., 2021). African penguins are particularly susceptible to human disturbance (Hockey and Hallinan, 1981). Seabirds that would tolerate human activity at a colony when conditions are good may abandon their breeding attempt as a result of a similar level of human disturbance when they are stressed. It is therefore highly desirable to avoid human disturbance at penguin colonies, but especially at those that are in decline and subject to adverse environmental pressures. Use of a drone (unoccupied aerial vehicle; UAV) to overfly a colony and record digital video (or frequent static images that can be mosaiced together) of the breeding sites may allow counts without associated human disturbance, as breeding seabirds show little or no response to an overflying

[1]Rümmler et al. (2021) found no behavioural reactions of penguin adults or chicks to drones flown more than 70 m above the colony. Recognising that monitoring numbers and breeding success of Sandwich terns *Sterna sandvicensis* by visiting colonies tends to cause excessive disturbance, Spaans et al. (2019) tested the use of a drone, flown 15—20 m above nesting Sandwich terns at appropriate dates through the breeding season at colonies in the Netherlands, to count breeding numbers and breeding success from photographs. They found that the drone caused "hardly any visible disturbance to the birds" but gave highly accurate data on breeding numbers and breeding success, so was considered much better than using human observations at Sandwich tern colonies. The same conclusion was reached by Valle and Scarton (2021) in Italy. Geldart et al. (2022) showed that drones flying over nesting eider ducks *Somateria mollissima* did not lead to any increase in heart rate of the incubating birds.

drone providing it is well above the colony[1]. Using drones to count breeding penguins has been shown to be highly effective, and in some cases more accurate than human counts, as well as reducing human disturbance (Hayes et al., 2021; Krause et al., 2021; Mattern et al., 2021; Qian et al., 2023).

Because some African penguins nest in locations where they cannot easily be seen or detected from above ground, a complementary approach to census African penguins may be to use drone counts of créched chicks, or moulting penguin numbers. These are easier to count than breeding birds, as they tend to moult relatively synchronously and in the open, although sometimes these may include small numbers of birds breeding elsewhere. For African penguins, preliminary studies could help determine the efficacy of such techniques.

5.2 Breeding success

Breeding success is an important metric to monitor because it is likely to have a clear influence on population trend and is hence usually a high priority in any seabird monitoring programme. However, this is less straightforward with seabirds that prefer to nest in burrows but may also use open nest sites on the surface. There are likely to be differences in breeding success between nests of different types in different habitats, and this needs to be considered when setting up a monitoring programme. It would be ideal to monitor samples of nests of each type so that annual breeding success can be representative of the colony rather than of just one nest type. Breeding success can be monitored remotely using equipment such as nest cameras or acoustic monitoring, which has the potential to minimise disturbance impacts from people having to visit nests to monitor breeding. Examples of time time-lapse photography are now increasingly common in penguin behavioural studies (e.g., Jones et al., 2018).

5.3 Adult survival

There is evidence that survival of adult African penguins is strongly affected by sardine stock biomass (Robinson et al., 2015; Crawford et al., 2022; Leith et al., 2022), but apparently not to anchovy stock biomass, at least for Robben Island. There is therefore a strong case for increased monitoring of African penguin adult survival, as this is likely to be a major factor determining population trend. Marking of penguins with external tags (e.g., flipper bands) has been shown to have adverse effects, so future monitoring of penguin survival should focus on the use of passive integrated transponder (PIT) tags and deployment of tag readers at colonies to allow monitoring of adult survival with minimal human disturbance and with tags that do not affect penguin fitness. PIT tag deployments have already been made for African penguins at Robben Island and at Stony Point (Leith et al., 2022). The presence of tagged birds at nests can be determined using a hand-held tag reader carried from nest to nest, but this risks impacts from human disturbance. An alternative is to deploy tag readers at strategic locations within the colony to identify birds as they pass within range of the reader. Both approaches risk missing tagged individuals if readers are not close to particular birds, so provide incomplete assessments of adult survival. In addition, mobile robotic tag readers have also been developed, as well as linear beach antennae, both of which may be feasible to use with African penguins (Trathan and Emmerson, 2014). Experimentation with different approaches will help determine approaches appropriate to African penguins.

5.4 Weigh bridge and PIT tags

It has been possible to set up a narrow "entrance" to the nesting area at some penguin colonies so that adults approach nests through a site that can be used to monitor each individual's arrival and departure. This can be achieved with a Passive Integrated Transponder (PIT) and Radio Frequency Identification (RFID) tag reader at the entrance site and PIT/RFID tags in breeding penguins (Kerry et al., 1993; Denhard et al., 2013). Tag deployments can potentially be combined with weigh bridge use to weigh birds as they arrive and depart across a weigh bridge (Lescroël et al., 2021) to provide data on changes in the weight of known individuals at each foraging trip away from the colony. There can be problems associated with such automatic monitoring stations, where, for example, individual penguins use different routes to enter and exit the colony. In such cases, care will be needed to ensure sample sizes are adequate to address key research objectives. Further, there remains the possibility that constrained access to the nesting area could have impacts on the breeding birds, but careful design should be able to avoid such problems.

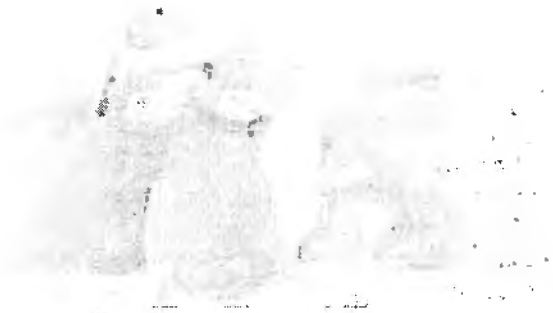
5.5 Arrival weights of adults

Weights of individual penguins departing from and returning to the colony passing over a weigh bridge can provide data giving evidence on foraging efficiency during individual foraging trips (Lescroël et al., 2021) that could be related to food abundance/availability and other factors (such as noise, vessel traffic, weather conditions, fishing activity). Monitoring of foraging efficiency could be highly informative if such sites can be established.

5.6 Pre-moult weights

Penguins are unusual among birds in having an intense pre-moult fattening period to store resources (energy, protein and perhaps especially sulphur amino acids) to support the process of moult. Unlike most birds that moult slowly while continuing normal daily activities, penguins remain on land through a short period of starvation while a com-

Moulting penguin chick (photo BM Dyer)



Penguin creche (photo BM Dyer)

plete moult occurs. During this process they are unable to return to sea because their waterproofing is compromised by the moult process until it has been completed. These birds therefore need a minimum stored amount of resource to successfully complete moult. Weights of penguins at the start of moult may indicate whether environmental conditions have allowed birds to achieve that minimum. Increased adult mortality may in part reflect an inability to achieve the key body reserves needed for moult.

5.7 Chick growth, chick body condition, and chick fledging weights

Chick metrics may provide some indication of how good environmental conditions are for penguin breeding, but they are much less useful than data on breeding success. Chick fledging weights in some seabird species are correlated with post-fledging survival, but that is not the case in all seabirds or in all populations, so fledging weight may not always link to demography. Seabird chicks can show catch-up growth where undernourished chicks end up at a similar fledging weight because they put on weight at a developmental stage where other chicks have reached a plateau weight. Chick condition indices may also show rather little correlation with demography, and may be affected by selective mortality of starving chicks at some colonies and during some years. However, these indices may show little relationship with demography if the main determinant of chick survival is predation rather than starvation. Further, even poor quality adults may fledge chicks in years with good environmental conditions, whereas only high quality parents may succeed in poor environmental conditions. The potential therefore exists for inverse relationships where more poor quality chicks fledge in years of abundant resources.

5.8 Recruitment of juveniles

Use of PIT tags in penguin chicks and deployment of tag readers at breeding or moulting sites may provide data on immature survival and seasonal movements of immatures. Relatively little is known about the ecology of immature seabirds as they are much more difficult to study than breeding adults. However, because immatures are less experienced they tend to have lower foraging efficiency than breeding adults and so periods of increased competition (such as during periods of food shortage) are likely to disproportionately affect immature birds. Studies of recruitment of PIT-tagged individual juvenile penguins may therefore help to shed light on population processes driving population growth or decline.

5.9 Studies with TDRs

Time-depth-recorders (TDRs) can provide data on the foraging activity of diving seabirds. For example, deployment of TDRs in combination with PIT tags on penguins that then cross a weigh bridge as they leave the colony and again as they return from a foraging trip can give information on the amount of food obtained in relation to the number of dives made while foraging (Lescroël et al., 2021). This allows foraging efficiency and effort to be related to local environmental variables. The Panel identifies this as a high priority for future research, including for further validation of any mIBA closures designated.

5.10 GPS tracking of breeding adults and video-cam studies

GPS tracking of seabirds is normally limited to short periods during breeding, as GPS tag attachment is usually temporary and devices are removed from the tagged bird after a few days or weeks. Depending on tag design (and therefore cost and battery life) GPS tags can either be designed to store data for download from the tag on recapture of the same bird, or can transmit data to a base station or to the cellphone network or to a satellite. GPS tracking can provide important data on where individuals choose to search for food in relation to local environmental conditions (Sutton et al., 2020). There is also the potential to deploy video-cameras on adult penguins to record foraging behaviour and interactions with forage fish. Such deployments could provide useful understanding of penguin group foraging behaviour. In general, the weight and induced drag of devices (especially if more than one device is deployed on a bird) must be considered, as they could potentially affect the behaviour that is being studied.

5.11 Tracking of nonbreeding season movements of adults

It is possible to use GPS tags to track African penguins before and after the moult period (Carpenter-Kling et al., 2022). Tags remain on the birds for a matter of days or weeks during the breeding season limiting the duration of such studies. Tags would need to be attached more permanently to birds to track movements throughout the nonbreeding period. That is sometimes possible by using a harness, but harnesses are not suitable for most highly marine seabirds, especially those that dive to chase prey. Permanent attachment can be achieved by implanting tags within the bird's body cavity, but such surgical procedures risk injury and increased mortality, so may be better avoided. Long-term overwinter studies on penguins have been undertaken using light-sensing geolocators (e.g., Ballard et al., 2010; Dunn et al., 2011; Thiebot et al., 2011), but care needs to be taken in deployment, not to constrict legs (which engorge with blood) during moult. The Panel recognises that such research would be useful, but also that the concerns about potential tag effects on birds would need to be given careful consideration.

6. FUTURE RESEARCH OTHER THAN MONITORING

6.1 Refining the estimation of effects of closures on catches, GDP, and jobs

- Further statistical analysis should be undertaken to better understand the seasonal nature of anchovy and sardine sets/catches across the fishing sites, especially along the west coast. •OBM results for the random case should be presented for the 1, 5, and infinity cases.
- The impact of closures on net revenue as well as changes in catches should be explored because it is important for understanding both the short-run impacts and the potential long-run impacts due to changes to the fleet composition, shore-side infrastructure, and coastal community dynamics.
- Further work needs to be done on the long-run socioeconomic impacts to local communities due to the prospective closures. A key part of this research would be data collection at the scale of local communities to better understand how the fishing sector (onshore and offshore) and penguin tourism contribute to the local economy, jobs, and well-being. Examples of community profiles and analysis that could be used as a guide for such an effort are Colburn et al (2016), Himes-Cornell et al (2013), and Polinac et al (2006).
- Some important questions remain regarding the interpretation of the SAM results:
    - Are the estimated "losses" due to the proposed closures within the standard fluctuations of the local economy due to other kinds of economic shocks, such as fuel prices, exchange rate fluctuations, fluctuations in total stock biomass etc.?
    - Are the short-run job losses from a hypothetical fuel price increase (best to consider a range of increases from 5 to 25%) greater than the predicted job losses from the preferred scenario?
      oHow important for the losa estimates are the assumptions regarding the relative wages of the processing and harvesting sector, especially since most of the job losses occur in the processing sector?
    - How do the results change if the conversion of total full-time equivalent employment is based on a different rate of fishing days per year (currently, 175 fishing days per annum is assumed)?Additional sensitivity of the SAM results should be carried out to have a better understanding of the range of possible regional outcomes from the prospective closures.
- Given little empirical justification for one method, alternative methods for allocating catches to regions should be used, and the results compared across the different cases, to better inform discussions on which communities are likely to be most impacted.
- Given that SAM results should be viewed as a very short-run measure of impacts, a Computable General Equilibrium model (Seung and Waters, 2006) should be developed to capture more dynamic short-run and medium-run responses of the economy.

6.2 Supporting evaluation of trade-offs, including refining estimates of foraging areas

- Further validation of mIBAs should occur, in particular using dive data that provide objective identification of foraging locations, rather than commuting (or travelling) locations.
- Between-year variation in mIBA should be explored.

6.3 Understanding and mitigating reasons for the decline in African penguins due to factors other than fishing near breeding colonie

There is broad agreemant that the recent observed decline in African penguin numbers both locally and regionally may be due to a number of factors. The ICE was designed to quantify the impact of sardine and anchovy fishing in the vicinity of penguin breeding islands, and the body of evidence presented to the Panel suggests that this is a contributing factor, but the magnitude of the impacts appears small and could only explain a small part of the recent declines in penguin numbers. Plausible drivers impacting the penguin populations are likely to vary across islands and spatial scales, plus there are variable data available to inform on different impacts, as well as the likely cumulative impacts of different drivers. Future research is needed to address each of the possible drivers. The effects of several drivers could be explored by developing an integrated ecosystem model, such as a MICE (Model of Intermediate Complexity for Ecosystem assessments) (Plagányi et al., 2014; Collie et al., 2016), or so-called MRMs (Minimum Realistic Models – Punt and Butterworth, 1995)[1].

6.3.1 Forage fish abundance

Section 1.43.2.1 summarises information related to the potential for changes in the biomass of prey species to affect population parameters, in particular the effect of sardine biomass on penguin adult survival. Further evaluation of such relationships could involve (a) the development of a new MICE that addresses all of the major penguin colonies off South Africa, and (b) exploration of the consequences of using the current OMP to set catch limits for anchovy, sardine and round herring. The latter exploration may lead to different results than those found by Robinson et al. (2015), given the current (more depleted) status of the sardine population and an OMP that leads to constant catch limits over

[1]See Appendix F for details

ranges of low sardine biomass, and spatial constraints. The Panel notes that the current OMP should be tested to evaluate whether it is adequately precautionary in relation to protecting future recruitment prospects of sardine, as it currently allows high exploitation rates when sardine stock falls to levels where future recruitment may be impaired. This suggests that further consideration should be given to the role of fishing pressure on sardine stock dynamics.

6.3.2 Guano harvests

Past guano harvesting is recognised as an important possible contributory cause to the penguin decline because of its impact on optimal breeding habitat (see section 1.43.2.2). The impact of reductions in guano as nesting habitat is confounded to some extent with other changes in the system, but could be incorporated in a MICE, expanding on local efforts currently underway.

6.3.3. Resource competition with Cape fur seals

The decline of the penguin population may be related to competition with predators that depend upon small pelagic fish. For example, Cape fur seal populations have increased substantially over the previous century and have expanded into areas used by penguins (see section 1.43.2.3). This is an impact that could usefully be investigated using MICE both in terms of direct and indirect predation effects, but also to compare the responses of other predators in the system to changes in pelagic fish abundance. Though known to occur, the incidence of predation of penguins by Cape fur seals, is unlikely to have led to the penguin population changes observed. Data on seal diet and changes in regional seal abundance would be particularly informative as inputs to models to quantify the relative contribution of seal predation (and possibly competition) to penguin mortality.

6.3.4 Noise in the marine environment

Disturbance of penguin group foraging, unrelated to any prey depletion effects, could possibly occur if groups of penguins are disturbed or displaced by fishing vessels, or noise associated with bunkering near St Croix Island (Pichegru et al., 2022), especially if their group coordination and communication while hunting is affected by the noise. Continued investigation of the effects of marine noise could involve, for example, using tracking and deployment of TDR tags to understand the changes in foraging behaviour and distribution in response to bunkering noise. Currently, including such investigations in a MICE would not be feasible.

6.3.5 Nest boxes

Although there is evidence that African penguin breeding success can be increased by providing nest boxes (section 1.43.2.5), the ideal design for such nest boxes has not been agreed by all those involved. Nevertheless, widespread gains in penguin productivity might be possible in some areas if a better design were to be found and nest boxes deployed in large numbers at the main colony sites. If deployed at such scales, the cost (including annual maintenance) of individual nest boxes would be an important consideration. Currently, including such investigations in a MICE would not be feasible.

6.3.6 Climate change

Climate change is recognised as a factor impacting seabirds in South Africa (Crawford et al., 2015), including penguins, both directly, such as impacts due to extreme events (Welman and Pichegru, 2022) and indirectly, given potential influence on the recruitment patterns and spatial distribution of anchovy and sardine in the vicinity of penguin colonies (see van der Lingen, 2023 for details). Sea surface temperature (SST) predictions of future increases (or decreases in localised areas) will variably influence different regions and hence penguin colonies. As such, the Panel highlights the need for penguin management strategies (and monitoring) that encompass multiple spatial regions to increase resilience to climate change and fish distribution changes (McInnes et al. 2023).

Given recognition of the impact on African penguins of a continued eastward shift (i.e., from the west to the south coast) in the distribution of anchovy and especially sardine (van der Lingen, 2023), this is an important factor to include in a MICE. Although it may not be possible to precisely model the exact rates of fish movement, available fishery and survey data and/or stock assessment outputs could be used to reasonably represent a restricted number of alternative scenarios to explore the impact on penguin colonies. In particular, attention needs to be paid to the potentially highly influential relationship between adult survival and sardine availability (Robinson et al., 2015; Leith et al., 2022). A MICE should ideally use and fit to all available penguin survival data. By explicitly representing the ages of tagged penguins as well as other confounding sources of mortality, such as due to oiling events and predation, an integrated MICE could assist in separating the alternative sources of mortality. This then provides an objective integrated framework for quantifying and correctly attributing the relative role of different drivers in causing the decline of the penguins. Given an improved understanding – validated to the extent possible - of the relative contributions of each driver to the penguin decline, a MICE is then a useful tool for testing the efficacy of alternative management strategies through forward projecting the effect of future mitigation measures, either on their own or in combination.

The available penguin and fishery data suggest that a pragmatic starting point is to model regional changes in penguin population dynamics due to changes in prey composition and availability. The next step could be to add to the model available environmental and climate data (such as SST, frequency of extreme events), preferably aligned with penguin monitoring data, to explore to what extent spatio-temporal changes in the environment may be contributing to the decline in penguins. Given differences in habitat and climate resilience across colonies, a spatial model structure would be informative in trying to distinguish a reliable signal from the data.

7. SUMMARY AND CONCLUSIONS AND RECOMMENDATIONS

The following sections summarise the key conclusions and recommendations. Table 7.1 provides a prioritised summary of research and other tasks.

7.1. Design, implementation and interpretation of the ICE

- The ICE has been identified as an example of a best practice for assessing forage fish fisheries – seabird resource competition, but the weaknesses of the design and implementation need to be recognised and their consequences accounted for when interpreting the results (section 2.4).
- The debate about the relative merits of analyses based on aggregated versus disaggregated data was essentially closed based on the final set of results presented at the June 2023 meeting. Although differences in preferences between the analysts remained, the two approaches provide similar results when appropriately configured (section 2.2.1).
- The response variables monitored as part of the ICE were considered to be direct measures or proxies for African penguin breeding success or post-fledging survival, but did not measure impacts of island closures on African penguin adult survival or immature survival. The Panel interpreted the estimated impacts of fishing on foraging-related parameters only qualitatively and did not integrate them into the inferences regarding overall impacts on penguin population growth rates (section 2.2.2). Only the predictions for Dassen and Robben islands are discussed in detail given the concerns regarding the use of foraging-related variables (see section 2.2.1) and the fact that only estimates based on chick condition are available for St Croix and Bird islands (section 2.3.2).
- Overall, the results of the ICE for Dassen and Robben islands indicate that fishing closures around the breeding colonies are likely to have a positive impact on population growth rates, but that the impacts may be small, in the range 0.71—1.51 % (expressed in units of annual population growth rate). These impacts are small relative to the estimated rates of reduction in penguin abundance for these two colonies over recent years (section 2.3.2).
- The change in population growth rate estimated in Section 2.3 did not include impacts of island closures on African penguin adult survival or immature survival, which are likely to exist based on evidence for other situations, but cannot be quantified for African penguins (section 2.4).
- The ICE is completed. Future closures of forage-fish fishing around penguin colonies would be likely to benefit penguin conservation, but will need to be part of a larger package of conservation measures as such closures alone would be unlikely to reverse the current decline in penguin population numbers (section 2.3.2).

7.2 Calculating the costs to the fishery associated with closures

- Implementing closures will impact the fishing industry and local communities to some extent, but accurately quantifying this is challenging (section 3.1).
- The OBM and SAM are appropriate methods for estimating costs to the fishery but their result should be considered primarily in a relative sense (section 4.4) and as measures of short-run impacts.
- The OBM quantifies the impacts of closures under the assumption that catches that occurred in the closed area when it was open are a measure of the catches that would have occurred if the closed area was not closed (section 3.2).
- The OBM likely overestimates the loss in catches due to closures, to an unquantified extent, given its assumptions related to the set of opportunities that are available to replace catches in closures, particularly those considered "irreplaceable" because all of the catch on a given day occurred inside a closure (section 3.2).
- Understanding the impact of closures on the net revenue as well as changes in catches is important for understanding both the short-run impacts and the potential long-run impacts due to changes to the fleet composition, shore-side infrastructure, and coastal community dynamics (section 3.2).
- The predicted impacts of closures depend on the reliability of the estimates of lost catch from the OBM, which the Panel agrees is likely to provide overestimates (section 3.3).
- Because SAMs are designed to analyse demand-driven impacts in the local economy (e.g., change in consumer spending), these models tend to overestimate the impacts of supply-side shocks, such as a reduction of catch (section 3.3).

7.3 Issues pertinent to evaluating trade-offs

- There are three primary trade-off axes to consider when selecting closures: (a) the benefit to penguins of the closure; (b) the cost (economic and social) to the fishing industry and the communities where fishing and processing operations are based; and (c) the ability to evaluate the effectiveness of the closures (section 4.1).
- Closed areas to protect penguins during breeding should be year-round, unless reasons demonstrate otherwise (section 4.1).
- If designated, closed areas to protect penguins should be reviewed at a time when results are available to investigate life-history processes such as juvenile recruitment, and adult survival, and hence population growth rates. This may be at a time between 6 and 10 years after designation. Other reasons to review such closed areas might include major socioeconomic changes in the fishery

Table 7.1: Prioritised summary of research and other tasks. Short-term tasks pertain to the next 1-2 years, medium-term tasks to the next 2-5 years and long-term tasks the next 6+ years. The relative priorities and timings reflect an integrated outcome of the Panel, which assigned priorities and timings to each task.

Task	Relative priority	Timing
1. Refining the estimation of effects of closures on catches, GDP, and jobs		
a. Explore the seasonal nature of anchovy and sardine sets/catches (West Coast)	Medium	Medium
b. Present OBM results for the 1, 5, infinity cases	High	Short
c. Investigate the impact of closures on net revenue	Medium	Medium
d. Analyse the long-run socioeconomic impacts	Medium	Medium
e. Conduct an in-depth interpretation of the SAM results	High	Short
f. Conduct SAM sensitivity analysis - regional outcomes	High	Short
g. Explore SAM sensitivity to allocation of catches to regions	High	Short
h. Develop a Computable General Equilibrium model	Low	Long
2. Supporting evaluation of trade-offs, including refining estimates of foraging areas		
a. Validate the mBAs given information on foraging locations	High	Medium
b. Summarise between-year variation in mBAs	Medium-High	Short
3. Understanding and mitigating reasons for the decline in African penguins due to factors other than fishing near breeding colonies		
a. Develop a MICE/integrated ecosystem model	High	Medium
b. Test that the current OMP is adequately precautionary at low sardine biomass for penguin conservation	High	Medium
c. Collate and collect data on changes in seal diet and regional abundance	Medium-Low	Medium-Long
d. Conduct tracking and deployment of TDR tags to understand the changes in foraging behaviour and distribution in response to bunkering noise	High	Short
e. Optimise nest box design and deployment	Medium	Medium
f. Conduct analyses related to climate change impacts and the variable role of SST on different regions/ penguin colonies	Medium	Medium-Long
g. Further explore the relationship between adult survival and sardine availability (e.g., tagging data preferably matched to estimates of regional sardine abundance)	High	Medium
4. Future monitoring to evaluate effectiveness		
a. Continue counts of breeding numbers at as many colonies as possible	High	Short-Long
b. Monitor adult survival of penguins using low disturbance methods such as PIT tags and readers	High	Short-Long
c. Continue to monitor breeding success	High	Short-Long
d. Use automatic weighbridges to monitor weights of adult penguins	Medium	Medium
e. Use weighbridges to monitor weights of PIT tagged adults + GPS tracking	High	Medium
f. Deploy time-depth-recorder tags (together with GPS units, accelerometers, or video recorders)	Medium	Medium
g. Apply telemetry methods, to examine impacts of vessel noise (including from bunkering)	High	Short-Medium
h. Use drones for monitoring	Low	Medium
j. Use PIT-tagging of juvenile penguins to understand survival	High	Short-Long
k. Conduct video-cam studies of adult group foraging behaviour	Low	Medium
5. Improving communication and collaboration		
a. Improve processes and platforms for sharing data	High	Short-Long
b. Conduct collaborative workshops to share information, jointly discuss compromises and seek solutions	High	Short-Long

and processing, or stock abundance, or similar consequences of prey resource change (section 4.1).

- Analyses needed to determine juvenile recruitment, and survival, and adult survival, will require closures of between 6 and 10 years after closure designation, if adequate responses are to be determined (section 4.1).
  - Monitoring should take place irrespective of whether there is an experimental (alternating open and closed) component to the closure program (section 4.2).
  - If an experimental component is to be part of any closure regime: (a) it should be focused on parameters such as juvenile recruitment and survival, and adult survival in addition to those related to breeding success monitored during the ICE; (b) the western and southern Cape regions should be the focus of any future experimental closure program given data availability and the ability to undertake regular monitoring; and (c) it is desirable that a power analysis be conducted to identify an appropriate sequence of (possibly alternating open and closed) closures (section 4.2).
- Penguin foraging areas should be quantified for trade-off analyses delineating mIBAs using ARS methods (section 4.3).
- Conservation actions should be spread throughout the range of the species given that each region is subject to different biophysical and anthropocentric threats (section 4.4).
- The following considerations are relevant to designing a framework to help decision makers select closed areas (if any):
  - An optimal solution (or acceptable "balance") between competing objectives is not simply obtained by closing 50 percent of any given area.
    - One approach is to find the point at which the change in benefits to penguins (by increasing closures) matches the change in costs.
    - The trade-offs between costs to the fishery and benefits to penguins in terms of the size of an area closed will differ among islands and among sectors within the fishery. Consequently, the benefits to penguins and costs to industry should be considered by island (or region) and not simply at the national level (see section 4.5 for aspects of each major breeding colony that are relevant for decision making). In addition, given the heterogeneity within the industry, expressing costs and job losses by sector (e.g., for small scale operators) would also seem appropriate.
    - Care should be taken when interpreting the estimated impacts to the fishing industry given the OBM likely provides an overestimate of uncertain magnitude of the loss in catch (see Section 3.2) so the results of the OBM and hence the SAM model should be considered primarily in a relative sense and hence used for ranking closure options. The relative ranking of a closure may, however, be sensitive to how catches are allocated to local communities.
    - The economic analyses are only able to quantify the social effects of closures in terms of job losses, and future work should consider broader social consequences of reduced catches, such as measures of community well-being.
  - The OBM indicates that the ability to replace catches currently taken in penguin foraging areas, and in turn the impacts of closures on the fishing industry, differs among colonies (most difficult for Dyer Island and St Croix Island) (Figures. 4.4 and 4.5).
  - The likely effectiveness of closures for mitigating the decline in penguin abundance also differs among colonies given their variable rates of declines (largest declines in St Croix Island) and the presence of other factors unrelated to fishing contributing to those declines (e.g., bunkering close to St Croix Island) (section 4.5).
  - It is possible to design closures within the overall foraging area to minimise lost catch for any given choice of percentage of penguin foraging area to be protected (Figures. 4.4 and 4.5).

7.4 Monitoring and research to determine causes for the primary reasons for the decline

Section 5 provides details on potential scientific research questions related to the African penguin population decline, including associated monitoring techniques. Key tasks are:

1. Continue to conduct counts of breeding numbers of African penguins at as many colonies as possible in as many years as possible.
2. Monitor adult survival of African penguins. A comparison of time time-series of adult survival at different colonies would help resolve which drivers are having the strongest influence on population change. In order to minimise disturbance to colonies, monitoring should use techniques such as PIT tags and readers at colonies where this is practical. Use of linear ground antennae are feasible when extensive areas of beach need to be monitored for PIT tags; elsewhere antennae can be incorporated into weighbridges where these are in use.
3. Continue monitoring of breeding success where it can be done without disturbance; however, the Panel considers that metrics such as chick weight/body condition/growth rate represent weak proxies of breeding success and may not be cost-effective.
4. Use automatic weighbridges to monitor weights of adult penguins at the start and end of breeding, as this should provide a direct measure of the costs of breeding in terms of the impact on penguin body condition.
5. Use automatic weighbridges to monitor weights of PIT tagged adult penguins; departure body mass

prior to foraging and return body mass subsequent to foraging should provide quantification of foraging efficiency, and potentially meal mass for offspring. Such work will be valuable in itself, but would be especially valuable if complemented by GPS tracking of some individuals.

6. Assess behavioural responses of foraging adult penguins using GPS tracking studies; these will likely remain limited to the period when adults have relatively small chicks. However, deployment of TDR tags on these adults (together with GPS units) would provide much improved data on the foraging locations along the path of tracked birds.
7. Conduct foraging studies using telemetry methods, to further determine the impacts of vessel noise (including from bunkering) on foraging behaviour.

7.5 Future research

Sections 1, 4 and 6 summarise hypotheses related to aspects other than fishing near island breeding colonies leading to resource competition, that could explain past and ongoing declines in African penguin populations. Section 6 identifies data sources and analysis methods (including the use of Models of Intermediate Complexity for Ecosystem Assessment – MICE) that could assist in understanding the effect of these aspects and how they can be mitigated.
Section 6.3.1 offers further information related to the potential for changes in the biomass of prey species to affect African penguin population parameters, in particular exploration of the consequences of using the current OMP to set catch limits for anchovy, sardine and round herring. The latter exploration may lead to different results than those found by Robinson et al. (2015), given the current (more depleted) status of the sardine population and an OMP that leads to constant catch limits over ranges of low sardine biomass, and spatial constraints.

7.6. Other

If designated, closed areas to protect penguins should be reviewed at a time when results are available to investigate life-history processes such as juvenile recruitment, and adult survival, and hence population growth rates. This may be at a time between 6 and 10 years after designation. Other reasons to review such closed areas might include major socioeconomic changes in the fishery and processing, or stock abundance, or changes in estimates of core foraging areas, for example, due to mIBAs being based on where foraging occurs and not entire tracks, or similar consequences of prey resource change (section 4.1).

7.7 Communication and collaboration

Continued communication, collaboration, and transparency of research data and analyses, are strongly encouraged to build trust and strengthen progress towards seeking acceptable solutions. Working collaboratively will further enhance the effectiveness and social acceptability of management measures and decisions aimed at mitigating the decline of the African penguin.
Clear, fair and objective communication around this controversial issue is important to ensure the best possible outcomes for penguins whilst respecting that conservation decisions may impact to varying extents on livelihoods and community well-being.

Penguin colony, Bird Island, Algoa Bay (photo BM Dyer)

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8.2 Presentations to the Panel

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Penguins at Port Elizabeth (photo BM Dyer)

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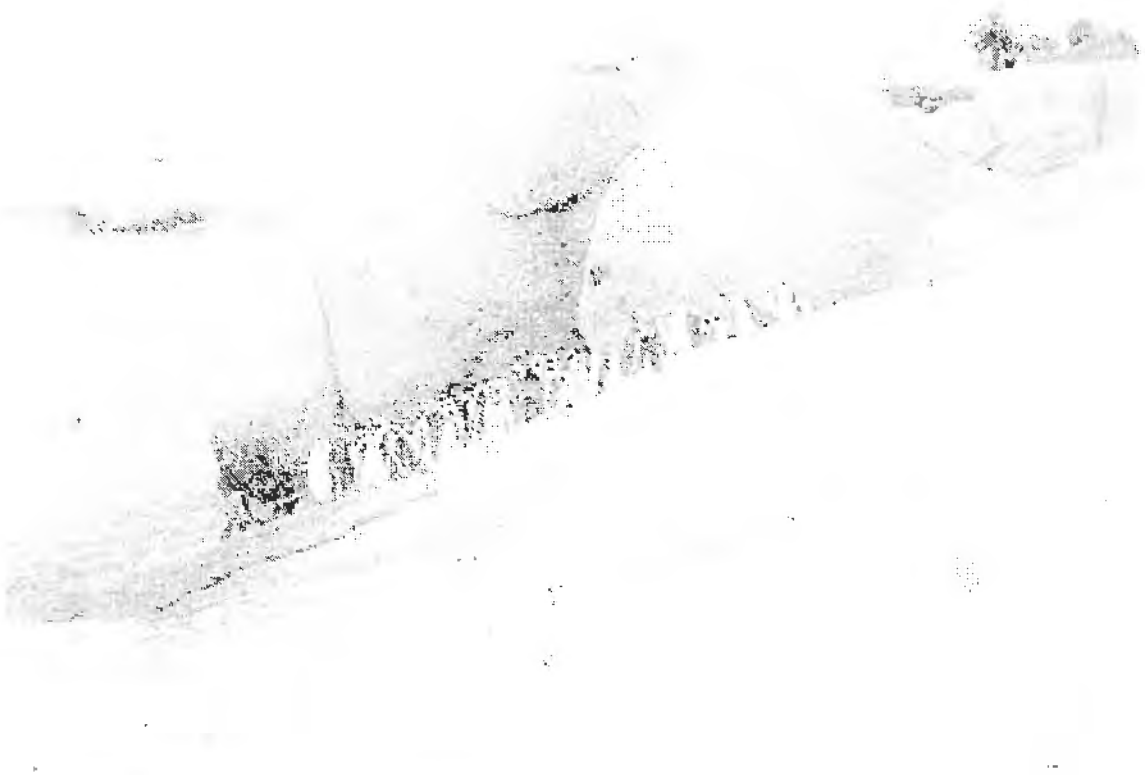


Penguins on the rocks, Boulders (photo BM Dyer)

APPENDIX A
PANEL BIOGRAPHIES

Robert W. Furness is Principal Ornithologist at MacArthur Green, working mainly on impacts of offshore wind farms on seabird populations and appropriate compensation measures. He was previously Professor of Seabird and Fishing Interactions at the University of Glasgow, Scotland. His scientific publications have been important in influencing policy in marine conservation with over 33,800 citations in Google Scholar and an H index of 100. As International Fish Meal and Oil Manufacturers' Association (IFOMA) Professor he developed plans for a sandeel closed box near kittiwake colonies while allowing continued sandeel harvest in offshore areas of the North Sea with no reduction in the total allowable catch. That closed box was implemented by the European Commission in 2000 and is still functioning. He was appointed by Scottish Government Ministers to the Board of Scottish Natural Heritage (SNH), the statutory adviser to Scottish Government on wildlife conservation and management, where he has played a role in developing government policy in wildlife conservation and management. He chaired SNH's Scientific Advisory Committee, a panel of experts drawn from Universities and Research Institutes to assess the science underpinning conservation policy. He has served as a member of the JNCC Marine Subgroup, developing UK policy on marine protected areas. Professor Furness chaired the International Panel of Experts in Marine Ecology (IAPEME) set up by the Danish Government to review the scientific programme monitoring impacts of the world's first major offshore wind farms (Nysted and Horns Rev). He has chaired several panels of experts set up by the International Council for the Exploration of the Sea (ICES) to advise the European Union on fisheries management, including Benchmark Workshops on sandeel stock assessment and management, assessment methods for short-lived fish stocks (e.g. sprat), and the ICES Working Group on seabird ecology. He was a member of the Marine Stewardship Council certification panels for several important North Pacific fisheries, including Western Bering Sea and Gulf of Alaska walleye pollock, Canadian sablefish, Pacific halibut, and Alaskan sablefish.

Ana M. Parma is a Principal Scientist with the National Scientific and Technological Research Council of Argentina (CONICET), working at the Center for the Study of Marine Systems, the National Patagonic Center in Puerto Madryn, Argentina. She earned her Ph.D. in Fisheries Science in 1989 from the University of Washington, and worked as an assessment scientist at the International Pacific Halibut Commission until 2000, when she returned to Argentina, her home country. Dr. Parma has worked on different aspects of fisheries modelling, assessment and manegement of a diverse range of fisheries, from artisanal coastal fisheries targeting benthic shellfish to large-scale international fisheries targeting tunas. The main focus of her research has been on the evaluation and design of management strategies, attending to ecological and institutional dimensions, both in data-rich and in date- and capacity-limited contexts. She was awarded a PEW Fellowship in Merine Conservation and a Guggenheim Fellowship for her contributions in this field. Dr. Parma has always worked at the interface between science and management, being involved in several scientific and policy advisory boards and review panels at the national and international levels. She co-chaired a National Research Council (NRC) panel on evaluating the effectiveness of fish stock rebuilding in the United States, was a member of four other NRC committees focused on diverse aspects of stock assessments, marine protected areas and ecosystem-based fisheries management, and was a lead author of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Assessment Report on the Sustainable Use of Wild Species. She chairs the modelling group of the Commission for the Conservation of Southern Bluefin Tuna, is a member of the Steering Committee of the bluefin tuna program at the International Commission for the Conservation of Atlantic Tunas, and until recently was a member of the Science Council and Global Board of The Nature Conservancy. She has been part of several of the international panels that regularly review South African stock assessments and management strategy evaluations, including those that advised on the design and analyses of the penguin Island Closure Experiment.

Éva Plagányi is a Senior Principal Research Scientist at CSIRO based in Brisbane, Australia since 2009, where she is also Domain leader for Climate Impacts and Adaptation. She has broad experience working on a range of natural ecosystems, mostly marine, from tropical through temperate to Antarctic systems, and focused on species ranging from plankton, sea cucumbers, crustaceans, fish to whales, with a strong focus also on climate change impacts. Her specific skills relate to using mathematics and mathematical models to model the dynamics of natural populations to support sustainable management of natural resources and contribute to conservation outcomes. Her research focuses on stock assessment modelling, ecosystem modelling and management strategy evaluation (MSE) and she has collaborated widely internationally, plus is currently a scientific member of three Australian Resource Assessment Groups: Torres Strait tropical rock lobster, Torres Strait Hand Collectable Fishery and the Northern Prawn Fishery. She has pioneered the approach she coined MICE (Models of Intermediate Complexity for Ecosystem assessments) which is being used to underpin natural resource decision-making in Australia and globally. Dr Plagányi has a joint mathematical-biological background and after completing a Masters degree in the Zoology Department of the University of Cape Town (focussed on anchovy-copepod interactions), she completed a PhD in 2004 from the Department of Mathematics and Applied Mathematics. Before relocating, she was awarded a National Research Foundation (NRF) President's Award and was a senior lecturer in the latter department, whereafter she has remained an Honorary Research Associate of the University of Cape Town. She was a member of the Lenfest Forage Fish Task force (2009-2014) which focussed on global recommendations for forage fish management. She has published over 120

peer-reviewed papers, ca.400 technical reports, 50 popular articles, and is on the editorial board of Ecological Applications and Reviews in Fish Biology and Fisheries.

André E. Punt is a professor in the School of Aquatic and Fishery Sciences at the University of Washington, Seattle, USA and a past Director of the School. He received his B.Sc, M.Sc and Ph.D. in Applied Mathematics at the University of Cape Town, South Africa. Before joining the University of Washington, Dr Punt was a Principal Research Scientist with the CSIRO Division of Marine and Atmospheric Research in Australia. Dr. Punt has been involved in stock assessment and fisheries management for over 35 years and has been recognized for his contributions in this area with awards from the CSIRO, the University of Washington, the Australian Society for Fish Biology, and the American Fisheries Society. The research undertaken by Dr. Punt and the MPAM (Marine Population and Management) group at the University of Washington relates broadly to the development and application of fisheries stock assessment techniques, bioeconomic modelling, and the evaluation of the performance of stock assessment methods and harvest control rules using the Management Strategy Evaluation approach. Currently, projects that Dr. Punt is undertaking with his research group include ecosystem modelling, assessment and management methods for data-poor methods , and understanding the impact of climate change and environmental variation on the performance of assessment and management methods. Dr. Punt has conducted stock assessments for a wide range of species, ranging from anchovies and sardines, to groundfish, tunas, and cetaceans. He has published over 420 papers in the peer-reviewed literature, along with over 400 technical reports. He was a member of a National Research Council panel on evaluating the effectiveness of fish stock rebuilding in the United States and has been a member of the panel that reviews aspects of South African stock assessments and management strategy evaluations since its establishment. Dr Punt is currently a member of the Scientific and Statistical Committee of the Pacific Fishery Management Council, the advisory committee for the Center for the Advancement of Population Assessment Methodology, the Standards and Petitions Committee for the International Union for the Conservation of Nature, the Crab Plan Team of the North Pacific Fishery Management Council, and the Scientific Committee of the International Whaling Commission.

James N. Sanchirico is a professor of natural resource economics and policy in the Department of Environmental Science and Policy at the University of California at Davis. His main research interests are the economic analysis of policy design, implementation, and evaluation for marine and terrestrial species conservation, and the development of economic-ecological models for forecasting the effects of resource management policies. Before coming to UC Davis, he was a Senior Fellow at Resources for the Future (RFF) in Washington DC (non-profit think tank on environmental and natural resource policy) and is currently a University Fellow of RFF. He received the Rosenstiel Award for Oceanographic Sciences in 2012 given to researchers who have made outstanding contributions to Ocean Science, the UC Davis Distinguished Scholarly Public Service Award in 2014, and the 2023 Publication of Enduring Quality Award from the Association of Environmental and Resource Economists. He is currently co-Editor at the Journal of the Association of Environmental and Resource Economists and the Journal of Environmental and Resource Economics, member of the U.S. National Academies of Science Ocean Studies Board, chair of the U.S. National Academies Standing Committee on Offshore Wind Energy and Fisheries, and principal investigator on the NSF-funded Sustainable Oceans National Research Training program at UC Davis. Past professional service includes the Lenfest Fishery Ecosystem Task Force, a National Research Council (NRC) committee evaluating the effectiveness of stock rebuilding plans of the 2006 Fishery Conservation and Management Reauthorization, and six years on NOAA's Science Advisory Board.

Philip Trathan has an extensive publication record on the biology, ecology and management of marine ecosystems in the Southern Ocean. He has wide experience and an established track record of interdisciplinary research, commissioned research and international collaboration. Before retiring from the British Antarctic Survey in 2022, Phil had authored 286 peer-reviewed publications, giving him an academic H-index of 56. Whilst at BAS, Phil was Head of Conservation Biology, a diverse group of marine predator scientists that undertook ecological research on a wide variety of Southern Ocean seabirds and marine mammals. Key components of this research focussed upon food-web interactions (e.g. foraging ecology, energetic requirements), critical constraints on life histories (e.g. environmental impacts, breeding performance), circumpolar connections (e.g. post-breeding dispersal) and anthropogenic impacts (e.g. climate change, and resource competition with fisheries). The Conservation Biology group managed BAS long-term monitoring of key marine predators in the Antarctic and Sub-Antarctic. The group provided national capability and advocacy for science into Antarctic policy arenas, including for the Commission for the Conservation of Antarctic Marine Living Resources, the International Whaling Commission, and the Agreement for the Conservation of Albatrosses and Petrels. Phil was personally involved with CCAMLR for over 30 years, providing advice on the management of the fishery for Antarctic krill, on the designation of Scientific Special Areas, on Marine Protected Areas, and on climate change. Phil was the UK's senior ecological advisor to CCAMLR for more than 16 years. Phil participated in 20 Antarctic field trips, having been involved in predator studies (primarily penguin species, but also marine mammals) for over 20 years. He is particularly interested in how marine predators utilise their available habitat and how this relates to their reproductive output and performance. He has strong links with BirdLife International and WWF (UK) and is a member of the IUCN Species Survival Commission Penguin Specialist Group. Phil was the founding Chair of the Science Advisory Group, Antarctic Wildlife Research Fund, a novel collaboration between the krill fishing industry, NGOs and scientists. Phil is now a Visiting Professor at Ocean and Earth Science, National Oceanography Centre, Southampton, he is a BAS Emeritus Fellow, and an Honorary Fellow of Bangor University. Phil was honoured with an OBE in 2018 for his contribution to Antarctic science and conservation.

APPENDIX B

EXTRACTS FROM THE TERMS OF REFERENCE

1. BACKGROUND

In the mid-2000s, a substantial decrease in the numbers of adult African Penguins was observed off western South Africa. In response to this observed decrease from 2008 and the potential impact of food competition between penguins and fishers in the vicinity of breeding islands, a study to assess the effects of closure to purse-seine fishing around penguin breeding colonies was initiated in 2008. Since the study required income sacrifice from the industry, this study, the Island Closure Experiment (ICE), comprised two parts: (i) a feasibility study (2008– 2014) during which purse-seine fishing was prohibited in an alternating pattern around two pairs of nearby colonies and data on penguins (as well as on small pelagic fish from the routine pelagic fish management process) were collected to determine whether an experiment would have adequate statistical power to detect a significant effect of closure if such existed; and (ii) an experimental phase (2015–2019) where these alternating island closures were continued with the associated continuation of the monitoring during the feasibility study. The results, however, led to a lengthy debate with dichotomous views. The plans for and results of the ICE were regularly reviewed by DFFE's Small Pelagic Scientific Working Group, informed by the advice provided from an annual review, i.e., a DFFE review meeting of world-leading quantitative marine resource scientists on ten occasions since 2006. Most recently, the scientific results have been debated in the peer-reviewed literature (Sydeman et al. 2021, Butterworth and Ross-Gillespie 2022, Sydeman et al. 2022).

A Governance Forum (GF), comprising researchers and managers from the Branches: Oceans and Coasts and Fisheries Management as well as SANParks (South African National Parks), was established in 2021. The aim was to prepare a comprehensive Synthesis Report on the current state of knowledge relating to African Penguins, island closures, fisheries management relevant to African Penguins and the socioeconomics of island closures and penguin-related tourism. The Governance Forum compiled a report titled "A Synthesis of Current Scientific Information Relating to the Decline in the African Penguin Population, the Small Pelagic Fishery and Island Closures" (DFFE 2021) which collated science over the last decade on penguins, small pelagic fisheries and their interactions including the Island Closure Experiments. The Synthesis Report was further scrutinized by two independent reviewers who provided extensive comments; the Governance Forum's Extended Task Team (which added fishing industry and conservation NGO representation to the Governance Forum) and then the Minister's Consultative Advisory Forum for Marine Living Resources (CAFMLR). Comments on that Synthesis Report and recommendations produced by these groups remain contested.

The Department now seeks to establish an international Panel of Experts to—

a) Review the interpretation of the ICE
b) explore the value of island closures in providing meaningful benefits to penguins
c) review the processes and outcomes completed through the GF and the CAFMLR process
d) make recommendations on the implementation of island closures, including spatial delineation, time frames and
e) advise on further science and monitoring methods.

2. OBJECTIVES

The International Review Panel will—

a) Review the quantitative scientific analyses of the Island Closure Experiment (ICE) and subsequent publications to evaluate whether the scientific evidence from ICE indicates that limiting small pelagic fishing around colonies provides a meaningful improvement to penguin parameters that have a known scientific link to population demography in the context of the present rate of population decline. Assess the cost-benefit trade-off of 1) costs to fisheries, versus 2) the proportion of penguin foraging range protected during the breeding season, for different fisheries exclusion scenarios. The losses to the fishery should be fleshed out using available economic information, such as was used in the GF and CAF processes. The panel may also comment on the limitations of available information and methods (data collection) to improve the assessment of positive penguin outcomes as well as fishery impact. Costs to fisheries must include an assessment of replacement costs accrued during periods closed to fishing during the ICE.
b) Within the context of an urgent need to implement timeous conservation actions for the African Penguin and considering the information and rationale of the various scientific reviews and associated documents of the Island Closure Experiment evaluate the evidence supporting the benefits of fishery restrictions around African Penguin colonies to adopt precautionary measures by implementing long-term fishery restrictions.
c) If closures or fishing limitations are viewed to contribute positively to the support of the African Penguin population, recommend a trade-off mechanism as a basis for setting fishing limitations and mapping. This mechanism must consider a potential positive return to penguins and the impact on fisheries. (As a basis for discussion the Governance Forum Approach and the CAF approach can be considered.) Consideration must also be given to the current state of observations, data and analyses (Penguin, Environmental and Fisheries Economic data). Recommendations on these can be included under future science considerations.
    a. Delineation of fishery no-take areas around six African Penguin colonies (Dassen Island, Robben Island, Dyer Island, Stony Point, St Croix Island and Bird Island) and the duration of the closures, considering

life history traits, e.g., age when most birds start breeding, and associated duration required to signal potential population benefits.

d) Recommendations on the scientific work that is required to evaluate the effectiveness of such no-take areas.

e) Recommendations about what scientific work is appropriate in the short term to determine the dominant causes of the rapid and concerning rate of decline of the penguin population, including recommendations about the use of ecosystem model approaches such as MICE (models of intermediate complexity for ecosystem assessments).

3. PANEL PROCESS AND PROCEDURES

a) The panel should attempt to reach a consensus but if not achieved, names supporting each of the alternative views should be noted. There should be no voting.

b) Virtual and physical meetings are not prescribed at this stage. One option is to have one or two brief virtual meetings to familiarise the panel with the key issues, followed by a week-long physical meeting in Cape Town to wrap it up. Travel expenses will be covered by DFFE. [Panel members may opt to join the weekly session virtually if travelling is not preferred.]

c) Members of the Panel of Experts will be remunerated in accordance with the Republic's Public Finance Management Act, 1999 (Act No.1 of 1999) and the associated Treasury Regulations, and in particular, according to the remunerative structure for non-official members of Commissions and Committees of Inquiry in consultation with the Minister of Finance for this panel's proposed work.

d) Meetings may include closed meetings, meetings with protagonists separately and together.

e) DFFE will appoint the Chair of the Panel and the Chair will report directly to the Minister.

f) DFFE will provide secretarial services.

4. TASKS

The following tasks are required from the panel (administrative and secretarial functions will be supported by DFFE):

a) Panel Members must agree to being available and accepting these Terms of Reference and constitute themselves as a Panel with the Chair.

b) Notification of stakeholders about deadlines for their submissions.

c) Drawing up of a list of attendees at plenary meetings where submissions are heard, indicating who are key participants and who are observers (Sectors will be asked to submit names of observers to be invited).

d) The appointed Panel Members to meet with DFFE Senior Managers to clarify their tasks and outputs.

e) Review documents and information pertaining to proposed island closures for penguin population recovery support. While these will initially be composed of an agreed selection (by local scientists and stakeholders) from the extensive number of documents produced over the last 1.5 years, panel members may request any additional documents such as scientific working group documents. Documents to be categorised into (a) those relevant to the interpretation of the ICE results, (b) documents that propose island closures including stakeholder reports submitted during the ETT and CAFMLR processes and (c) other related documents. This is required to facilitate the panel dividing its focus between

i. an initial assessment of whether the analysis of ICE supports the view that island closures will benefit penguins, and

ii. if (i) suggests that island closures will benefit penguins, what closures should be implemented, or what are the trade-offs involved for such closures.

f) Meet with conservation and fisheries sector scientists and where each will be allowed to present their arguments/interpretation of information. (At panel discretion, other scientists, and experts may be invited to make presentations.)

g) Respond to objectives (a) to (e) above.

h) Prepare report on outcomes.

5. OUTCOMES AND RECOMMENDATIONS

a) Recommend whether, based on the results from ICE and other evidence-based information, island closures are likely to benefit penguins.

b) Describe the scientific and evidence-based rationale for recommending implementing/not implementing fishing limitations around penguin colonies

c) Make recommendations about whether a percentage (%) of penguin foraging range and other biological criteria (such as regional representation, population recovery potential, monitoring and evaluation potential) provide a basis for determining benefits from closures for penguins and assess the merits of different proposed methods to delineate important penguin foraging habitat.

d) Make specific recommendations on trade-off mechanisms for island closures in the event that the panel finds that the results of ICE and other evidence demonstrate that island closures are likely to benefit penguins, including specific areas and durations. In addition to recommendations on trade-off mechanisms, the panel must preferably advise on biologically meaningful penguin habitat extents for fishery limitations per island, recommendations must be spatially and temporally explicit, and provided on a map. [DFFE will provide mapping capacity.]

e) Provide advice and recommendations on best estimates and uncertainties of the ratio between penguins gained and losses sustained by the industry as a result of island closures for future suggested closure options.

f) Provide advice on a well-structured analyses framework to monitor the impact of island closures, including what penguin and fish data needs to be collected; how benefits to penguins are to be determined; and how these will be analysed.

g) To recommend scientific analyses, including but not limited to MICE, to determine the reasons for the decline in the penguin population.

APPENDIX C

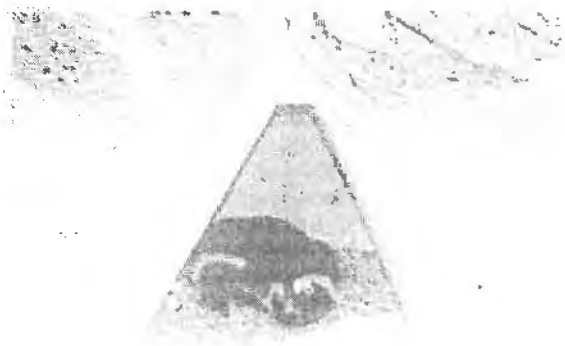
DEPLOYMENT OF NEST BOXES FOR AFRICAN PENGUINS

At Bird Island in the 2000s, only about 1% of African penguins bred in natural burrows in the remaining patches of guano, so the majority of nests appear to be in suboptimal nesting habitat (Lei et al., 2014). In an effort to mitigate the impacts of guano removal, artificial nest sites (nest boxes) of a variety of designs and materials have been constructed for African penguins at a number of colonies, including Marcus Island (Saldanha Bay), Halifax Island (Namibia), Dyer Island, Boulders Beach, and Robben Island (Western Cape), Stony Point (Betty's Bay), and Bird Island (Algoa Bay) (Sherley et al., 2012; Espinaze et al., 2020). These were first developed in the 1980s by Wilson and Wilson (1989) at Marcus Island and had some success in improving African penguin breeding success. Penguin nest boxes have also been used successfully to increase breeding success of little penguins in New Zealand and Australia (Perriman and Steen, 2000; Sutherland et al., 2014). Sutherland et al. (2014) concluded that 92% of nest boxes installed for more than 6 years for little penguins at Phillip Island, Australia, were occupied, and that nest boxes increased survival of eggs to hatching by 8%, increased survival of chicks to fledging by 9%, and increased fledging weights of chicks (which is likely to increase post-fledging survival) by 11%, leading to a significant local increase in breeding numbers.

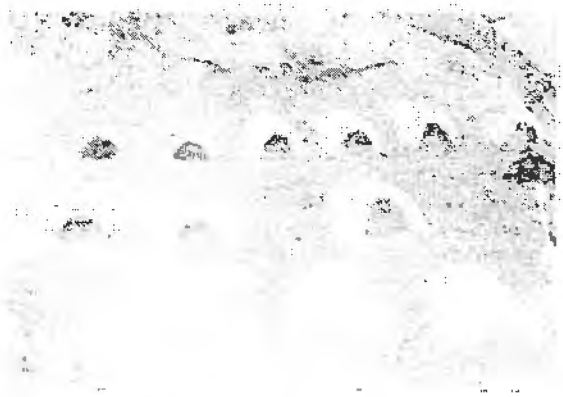
At Robben Island, penguin nest boxes were installed (22 triangular plywood boxes in 2001 and a further 37 in 2005 and 10 in 2010, plus 70 fibreglass curved boxes in 2007) and the breeding success of penguins in nest boxes and in other nest sites was monitored each year (Sherley et al. 2012). There was no difference in hatching or fledging success between wooden and fibre-glass nest boxes. Relative to pairs in nests under vegetation, birds nesting in the open had significantly lower egg survival during incubation, but egg survival was no different between birds under vegetation and birds in nest boxes. However, the chicks of birds occupying nest boxes and nests in abandoned buildings had higher survival than chicks in nests under vegetation, with about 10% more chicks fledging per egg laid from nests in nest boxes (Sherley et al., 2012). Chick survival was also higher in nest boxes than in surface nests and nests under shrubs during the chick-guarding stage on Halifax Island (Sherley et al., 2012). Sherley et al. (2012) concluded that "provision of artificial nests can improve breeding productivity for penguins nesting in temperate climes and could help stem the decline of the African penguin".

At Bird Island, some nest box designs provide protection from predators but trap heat and have adverse effects on penguin breeding success (Welman and Pichegru, 2023) and in some cases have now been removed and replaced with new designs intended to perform better. A double-layered ceramic nest chamber installed at Bird Island since 2018 appears to perform better than exposed surface nests, cement nest boxes, or natural nests, by overheating less and by maintaining higher humidity (Welman and Pichegru, 2023). However, penguin breeding success has not yet been compared between ceramic nests and other nests, so the gain in breeding output from such nests is uncertain.

At Stony Point, African penguin adults and chicks were on average heavier in artificial nest boxes than in open nests but for the sample nesting in nest boxes were lower in nest boxes with highest soil temperature (Espinaze et al., 2020). There is evidence that ectoparasite abundance can be higher in penguin nest boxes that are warmer and drier than other penguin nests (Espinaze et al., 2020). Fibreglass and cement-fibre nest boxes established at Stony Point in the 2010s had higher soil temperatures and lower relative humidity than did penguin nests under bushes, and held larger numbers of ticks and fleas (Espinaze et al. 2020) and so design of penguin nest boxes needs to consider not only the breeding success achieved by penguins in boxes compared to those in other nest types, but also how penguins might be affected by ectoparasites and stress in boxes that tend to overheat and dry out. Espinaze et al. (2020) suggest that glassfibre, concrete, and other non-porous material nest boxes for African penguins should be re-evaluated and that it may be better to construct nest boxes from much more porous material and with better ventilation designed into the structure.



Triangular nest boxes, Robben Island (photo BM Dyer)



Ceramic nest boxes, Boulders (photo BM Dyer)

APPENDIX D

TECHNICAL SPECIFICATIONS OF MODELS USED TO ANALYSE THE ICE DATA

1. Mixed-effect models used to estimate fishing impacts on penguin reproductive success

Two main classes of mixed-effect models were used, referred to as closure-based and catch-based. Technical specifications are provided below:

1.1 Closure-based models:

The model equation for the closure-based estimator applied to the aggregated data was:

$$f(F_{y,i}) = \alpha_0 + \alpha_1 I_i + \alpha_2 X_{i,y} + \alpha_3 I_i X_{i,y} + Y_y + \varepsilon_{i,y} \quad (1)$$

where $F_{y,i}$ is the average response variable for year y and island i, possibly log-transformed depending on the data source, i = 1,2 is the Island, y = 2008,...,2019 is the Year, $X_{i,y}$ is a binary for the treatment (open = 0, closed = 1) applied at island i during year y, I_i is a binary for the colony (Dassen = 0, Robben = 1 or Bird = 0, St Croix = 1), α_0, α_1, α_2, α_3 are fixed effects (α_1 is an island effect, α_2 is a fishing effect applied when the area around the colony is open, and α_3 is the treatment × Island interaction), Y_y is a year random effect, and $\varepsilon_{i,y}$ is the residual error.

Details about how the various response variables were pre-processed are provided in Ross-Gillespie and Butterworth (2021a) and Butterworth and Ross-Gillespie (2022).

Models applied to disaggregated data included the same fixed effects, but the random effects varied depending on the response variable.

For chick condition, the random structure requested by the Panel included a Year effect plus Month nested within Year, plus the Island nested within Month and Year.

$$y_{i,y,k,l} = \beta_0 + \beta_1 x_{i,y} + \beta_2 z_i + \beta_3 X_{i,y} z_i + b_y + b_{y,k} + b_{y,k,i} + \varepsilon_{y,k,i}$$

where $y_{i,y,k,l}$ is the condition of individual chick l in year y, island i and month k, i = 1,2 is the Island, y = 2008,..., 2019 is the Year, k = 1,...,K is the Month, $X_{i,y}$ is a binary for the closure treatment (open = 0, closed = 1) applied at island i during year y, z_i is a binary for the colony (Dassen = 0, Robben = 1) chick l belongs to, β_0, β_1, β_2, β_3 are fixed effects and b_y, $b_{y,k}$, $b_{y,k,i}$ are random effects, b_y ~Normal(0, σ_1^2), $b_{y,k}$ ~Normal(0, σ_2^2), $b_{y,k,i}$ ~Normal(0, σ_3^2), and $\varepsilon_{y,k,i,l}$ ~Normal(0, σ_4^2) is the residual error.

In R lmer syntax:
Condition ~ Island/Closure+(1|Year)+(1|Year:Month) +(1|Year:Month:Island)
The significance of the Island × Closure interaction was evaluated by comparing the full model with one where β_3 = 0 using maximum likelihood (Shirley, 2023).
For chick survival, equation 2 in Shirley (2023) gives the mean hazard function as:

$$\Lambda_{y,k,n,l} = \beta_0 + \beta_1 x_{i,y} + \beta_2 z_i + \beta_3 x_{i,y} z_i + \omega_y + \omega_{y,i} + \omega_{y,i,n}$$

where n is nest ID, β_0, β_1, β_2, β_3 are fixed effect parameters, and ω_y ~Normal(0, σ_1^2), $\omega_{y,n}$ ~Normal(0, σ_2^2) and $\omega_{y,i,n}$ ~Normal(0, σ_3^2) are random effects for Year, Year × Island and Year × Island × NestID, respectively.

1.2 Catch-based models:

The model equation for the catch-based estimator applied to the aggregated data was:

$$f(F_{y,i}) = \beta_0 + \beta_1 I_i + \beta_2 C_{i,y} + \beta_3 I_i C_{i,y} + Y_y + \varepsilon_{i,y} \quad (2)$$

where $C_{i,y}$ is the catch (of anchovy and/or sardine) taken within the 20-km area around island i during year y and other variables are as defined for equation (1). Parameters β_0, β_1, β_2, β_3 are fixed effects, the last corresponding to the Catch × Island interaction. A simpler model with a common catch effect for the two paired islands (β_3 = 0) was suggested for the east colonies given the observed negligible catches around Bird Island except during the early years. For such a model, catches need to be either in absolute values (as in equation (2)), or normalised using a common average catch for the island pair.

Once the parameters are estimated, the effect of fishing around colony i on the response variable (to be translated into the effect of keeping island i open on the island's penguin population growth rate) is predicted using:

$$\Delta y_i = \beta_1 \bar{C}_i + \beta_3 I_i \bar{C}_i \quad (3)$$

where $\bar{C}_i$ is the average catch taken around island i during years when fishing around that island was allowed. Using as predictor the average catch over open years would afford consistency with the closure-based estimator.

The formulation above differs from the catch-based estimators used in the past (e.g., Ross-Gillespie and Butterworth, 2016b) where catches used as covariates were normalised with respect to the average catch taken within each island closure during the years when the island was open.

The effect predicted from equation (3) would be equivalent to the λ_i effect estimated in those previous catch-based analyses that used normalised catches only when a catch × Island interaction is included (i.e., $\beta_3 \neq 0$).

2. Subset of models selected to provide final estimates of fishing impacts on penguin population growth rate

Figures 2.2 and 2.3 show results for a subset of the models presented by Sherley (2023) and Ross-Gillespie and Butterworth (2023b). Tables D.1 and D2 provide a summary of the characteristics of those selected models. Further details about the data preprocessing and the estimation procedures are described in Sherley (2023) and Ross-Gillespie and Butterworth (2023b).

Table D.1: Details of the models applied to the ICE data from Dassen and Robben Islands whose results are reported in Figure 2.2.

Model	Response variable	Data aggregation	Fixed effects	Random effects	Reference
W1	Chick condition	Disaggregated	Island+Closure	Year + Year:Month + Year:Month:Island	M6 in Sherley (2023)
W2	Chick condition	Disaggregated	Island×Closure	Year + Year:Month + Year:Month:Island	M5.1 in Sherley (2023)
W3	Chick condition	Aggregated	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
W4	Chick survival	Disaggregated	Island+Closure	Year + Year:Island + Year:Island:Nest	M9 in Sherley (2023)
W5	Chick survival	Disaggregated	Island×Closure	Year + Year:Island + Year:Island:Nest	M8 in Sherley (2023)
W6	Chick survival	Aggregated	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
W7	Fledging success	Aggregated	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
W8	Chick growth	Aggregated	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
W9	Maximum distance	Aggregated foraging	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
W10	Path length	Aggregated	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
W11	Trip duration	Aggregated	Island×Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)

Table D.2: Details of the models applied to the ICE data from St Croix and Bird Islands whose results are reported in Figure 2.3.

Model	Response variable	Data aggregation	Fixed effects	Random effects	Reference
E1	Chick condition	Disaggregated	Closure	Year + Year:Month + Year:Month:Island	M7E in Sherley (2023)
E2	Chick condition	Disaggregated	Island + Closure	Year + Year:Month + Year:Month:Island	M6E in Sherley (2023)
E3	Chick condition	Aggregated	Island × Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
E8	Maximum foraging distance	Aggregated	Island × Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
E10	Path length	Aggregated	Island × Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)
E11	Trip duration	Aggregated	Island × Closure	Year	S1 in Ross-Gillespie & Butterworth (2023b)

Penguin nest, Dassen Island (photo BM Dyer)

APPENDIX E

ADDITIONAL DETAILS ON THE OBM AND WHY ITS RESULTS ARE LIKELY OVERESTIMATES

The Panel concluded that the OBM likely overestimates the effects of closures on lost catches given the algorithms used to decide whether a catch in a proposed closure area can be replaced or not. The Panel was less concerned with the method used to replace a catch when it is replaceable (and endorsed the "random" approach).

For each set made in a closure area when the area was open the algorithm involves searching the areas within which it can replace the "lost set". If there were no sets outside the closure area made on the same day (and in the area considered to be where a replacement set can occur) the set is considered to be irreplaceable. An example of this case is given in Figure E.1. Note that the catches off Dassen Island in Figure E.1 might not be considered irreplaceable if a longer window of time was available (see, e.g., the discussion on the development of expected catches in the RUM subsection in Section 3), and sensitivity is shown in some OBM analyses to a 2-day window rather than only allowing sets on the same day to replace sets in a closure area. A second cause of irreplaceable catches arises when considering how to match the outside sets with the inside sets (with or without replacement). Specifically, even when there are sets outside of the closed area that could be matched with an inside set, it is possible that the inside set is irreplaceable because there is a limit (base case 5) on how often a set outside a closure can replace a set inside a closure area. An example of this case is given in Figure E.2.

The effects in Figures E.1 and E.2 would not be a concern if the proportion of the catch lost due to the set being irreplaceable (i.e., "irreplaceable catch") was small relative to the catch lost due to catch rates being lower in the alternative sets (i.e., "opportunity loss"), but this is not the case, particularly when the closure area is large (e.g., closures based on mIBA (7 km)). Figure E.3 and Table E.1 illustrate this for a selected set of OBM scenarios and closure proposals. Results correspond to estimated catch losses for anchovy and for directed sardine, summed over the six islands included in the analysis. Several features of the results in Table E.1 are pertinent to note:

- The catch in the closure area ("inside catch") varies substantially among the closure options (largest for mIBA (7 km) and least for "industry").
- The catch that is lost due to being unreplaceable ranges from 8.7% to 91.8% of the total lost catch among OBM scenarios and the closure size, and is larger than 50% for some of the closure options (mIBA (7km), mIBA (ARS), and DFFE).
- There is considerable sensitivity of the unreplaceable catch (particularly for the larger closure areas) depending on whether a set can be reused as many times as needed, 10 times, 5 times or only once.
- The irreplaceability percentage is lower when catches on one day can be replaced by catches on the next day (scenario "Plus1day" in Figure E.3), but the effect is smaller than the effect of the reuse value.

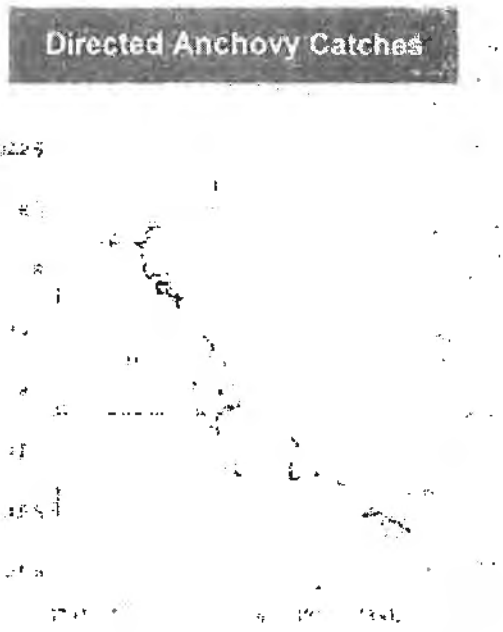


Figure E.1: A (hypothetical) example of catches off Dassen Island on a given day that would be "lost" owing to there being no sets outside the closure on that day

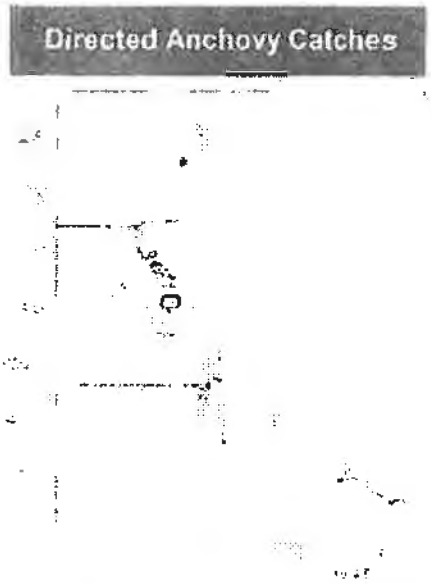


Figure E.2: A (hypothetical) example of catches off Dassen Island on a given day, some of which would be "lost" owing to there being sets outside the closure on that day, but the value of the "reuse" parameter does not allow all of the catches in the closure area to be replaced

Table E.1: Example results from the OBM. Results are shown for several closure options and several ways to apply the OBM. Blank cells indicate the results concerned are not available

ANCHOVY	Inside Catch				
Total catch	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry
206 695	65 081.3	44 061.3	20 444.6	12 941.0	2 312.7

	Irreplaceable Catch					Opportunity Loss					Irreplaceability %				
Model	MIBA (7 km)	MIBA) (ARS)	DFFE	CAF	Industry	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry
BC(Random)	40 354.7		4 650.9	555.0	30.0	3 427.7		378.9	576.2	200.2	67.3%		24.6%	8.7%	10.0%
BC(median)	40 694.9	14 330.4	4 703.9			3 820.6	4 427.9	1 723.3			66.4%	42.6%	31.4%		
BC(median) Reuse = Inf	28 697.9	8 477.5	2 744.1	304.8	30.0	5 485.7	5 969.4	1 486.1	1 849.3	209.6	52.5%	32.8%	20.7%	16.6%	10.4%
BC(median) Reuse=1	52 683.6	25 699.3				1 911.6	2 064.4				83.9%	63.0%			
BC(median) Reuse = 10	36 349.9		3 648.2			3 689.8		1 900.0			61.8%		27.1%		
BC(median) + Next day	37 081.3		4 068.5			3 252.0		2 099.0			62.0%		30.2%		

SARDINE	Inside Catch				
Total catch	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry
61 985	33 413.5	17 554.1	7 639.0	2 058.7	436.5

	Irreplaceable Catch					Opportunity Loss					Irreplaceability %				
Model	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry	MIBA (7 km)	MIBA (ARS)	DFFE	CAF	Industry
BC(Random)	26 988.1		3 002.6	463.4	436.5	950.6		493.8	223.5	13.6	63.6%		48.4%	33.4%	41.9%
BC(median)	27 013.1	6 837.6	3 065.4			1 234.9	1 074.1	733.0			84.5%	45.1%	50.6%		
BC(median) Reuse = Inf	25 122.8	5 832.4	2 645.7	463.4	436.5	1 730.0	1 462.2	808.7	319.1	42.1	80.4%	41.6%	45.8%	38.0%	48.5%
BC(median) Reuse=1	30 313.2	11 385.7				375.8	270.8				91.8%	66.4%			
BC(median) Reuse = 10	25 796.6		2 824.8			1 583.7		810.7			81.9%		48.2%		
BC(median) + Next day	25 796.6		2 343.4			1 529.4		942.1			81.9%		43.6%		

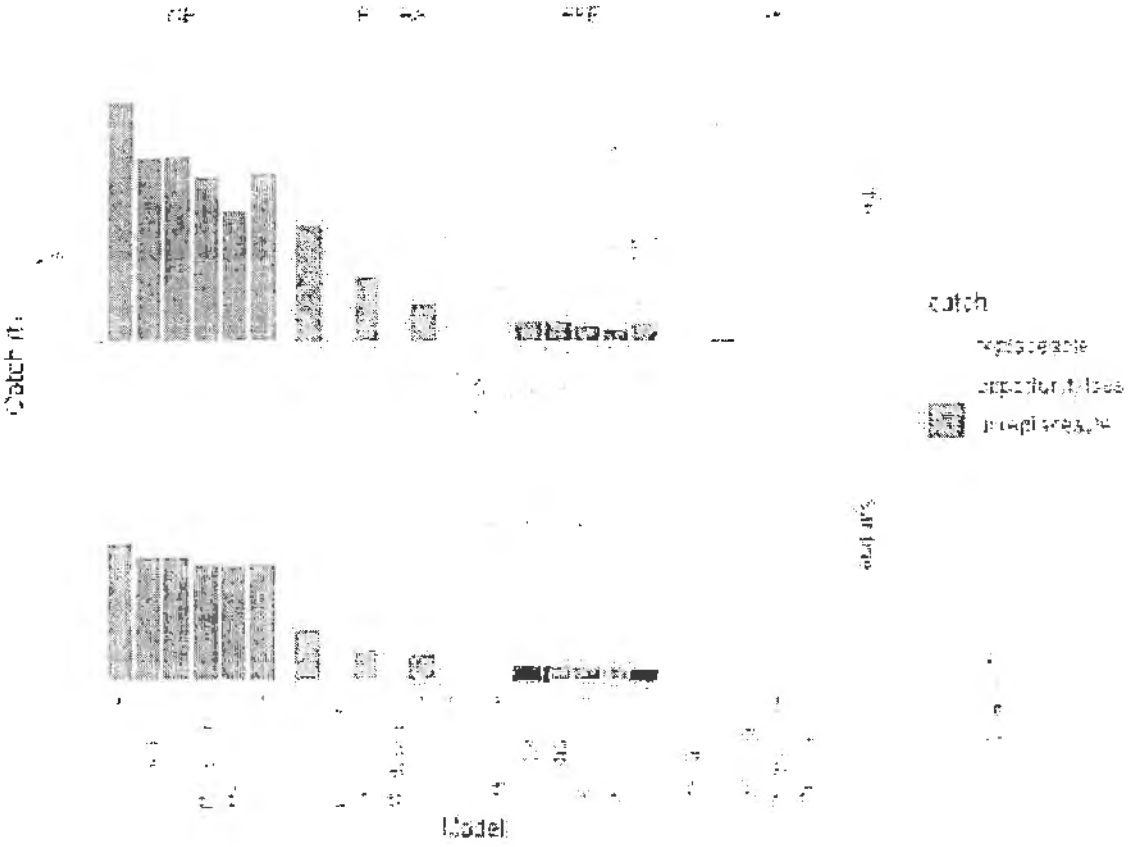


Figure E.3: Catch losses for anchovy and directed sardine estimated by the OBM for four closure proposals (mIBA (h = 7 km), mIBA-ARS, DFFE and CAF) using five model assumptions, four based on the median selection of alternative opportunities and one based on random selection, for Reuse = 1, 5, 10 and Inf (sampling with replacement) specifying the maximum number of times each alternative opportunity can be used as a replacement; the label "Plus1day" refers to the OBM scenario where a 2-day window is used instead of the same day to define the set of alternative fishing opportunities. The height of each stacked bar corresponds to the total annual catch taken inside each closure proposal ("inside catch" in Table E.1), a fraction of which (blue) is estimated to be unreplaceable, a small fraction (light blue) is lost due to lower average catch rates of the replacement sets, and the rest is replaceable (grey). Missing bars indicate the results concerned are not available.

APPENDIX F
OUTLINE OF MICE AND THEIR USE TO ASSESS DRIVERS OF THE DECLINE OF AFRICAN PENGUINS

F.1. Introduction

MICE (Models of Intermediate Complexity for Ecosystem assessments) are recognised as an appropriate tool to address complex science and management issues such as assessing the status of both fisheries and other non-targeted species, including those of high conservation concern, and evaluating the trade-offs among management plans aimed at addressing conflicting objectives (e.g., Tulloch et al., 2019; Goethel et al., 2022). MICE draw on the rigorous quantitative and statistical methodology of stock assessment approaches and extend this to representation of multiple co-existing species and stressors in an ecosystem. MICE have a tactical focus, are context- and question-driven and limit complexity by restricting the focus to those components of the ecosystem needed to address the main effects of the management question under consideration (Plagányi et al., 2014). Stakeholder participation and dialogue is an integral part of this process. MICE estimate parameters by fitting to data, use statistical diagnostic tools to evaluate model performance and account for a broad range of uncertainties. MICE aim to be based on the most appropriate balance between variance and complexity (Collie et al., 2014). These models therefore address many of the impediments to greater use of ecosystem models in strategic and particularly tactical decision-making for marine resource management and conservation.

F.2. A possible structure of an African penguin-centric MICE

The MICE should ideally include a regional sub-structure (i.e., separate western, eastern and southern regions) and be designed based on the data availability and being cognisant that a penguin-centric rather than fishery-centric approach is needed. If focussed on a single region, based on data availability, the western region would be an ideal starting point with explicit representation of Dassen and Robben islands. Including paired islands would allow assumptions that some parameters are constant across islands thereby reducing confounding estimation of island-specific effects. Having smaller scale islands embedded in a larger scale model may also be helpful in analysing regional versus local impacts of changes in penguin prey availability, as well as the ability to explicitly model penguin inter-island movements. The key species that will need to be represented in the model include African penguins (age-structure formulation is needed – see Robinson et al. [2015] as an example), sardine, anchovy and Cape fur seals. Other species may be considered based on pre-agreed conceptual models describing plausible hypotheses as to their role as a competitor or predator. In general, it is recommended that MICE and similar ecosystem models be developed in a step-wise manner (Figure F.1) to ensure they remain tractable and only incorporate as much complexity as is needed to explain the available data.

Key processes to be investigated should similarly first be clearly identified via hypotheses and/or conceptual models of the system functioning. Using a structured, step-wise approach enables objective evaluation of the extent to which alternative hypotheses are consistent with, and able to explain, the available data. The model should be fitted to all available data to allow for consistency in assumptions whilst accounting for the associated uncertainty associated with different data sources and propagating this to the final outputs, as per accepted methods used in integrated analysis (Maunder and Punt, 2013).

In some cases, based on the overall system conceptual model, it may be helpful to develop complementary mechanistic models for more in-depth exploration of system functioning. The outputs of such a model can then be used to inform the functional relationships between different components in a MICE, with the latter being the integrated framework used to evaluate the plausibility of the interaction. For example, a bioenergetic model could be used to investigate how fishing around islands affects penguin foraging behaviour (including cooperative foraging in small groups), performance and travel distance (and hence net energetic budget) when compared with an equivalent no-fishing scenario, taking into account data such as foraging tracks, dive location, etc..

Additional modelling suggestions:

- Ultimately any model will only be as good as the underlying assumptions and the data available to inform them. The ICE has resulted in some very useful data, which needs to be integrated with data on penguin relative abundance as well as tagging and other data sources to inform on survival. Ideally a MICE should be constructed in an iterative fashion so that it is regularly updated with new data and information as these become available.
- A one-way interaction only between penguins and their prey needs to be assumed (i.e., penguin foraging will be assumed to have a negligible effect on their prey)
- As demonstrated in a number of existing MICE (e.g., Plagányi and Butterworth, 2012; Tulloch et al., 2019), it is not always essential to explicitly model the consumption of prey – rather the net effect of relative changes in available prey biomass can be tested as influencing breeding success and/or survival of different penguin stages.
- The relative abundance and energetic content of sardines and anchovy during different times of the year could be evaluated in relation to the peak timing of breeding and moulting of African penguins, as well as when fishing takes place. An annual time time-step may not provide sufficient resolution and it will likely be necessary to use a seasonal or monthly time time-step in the model, together with the role of environmental drivers, discussed below.

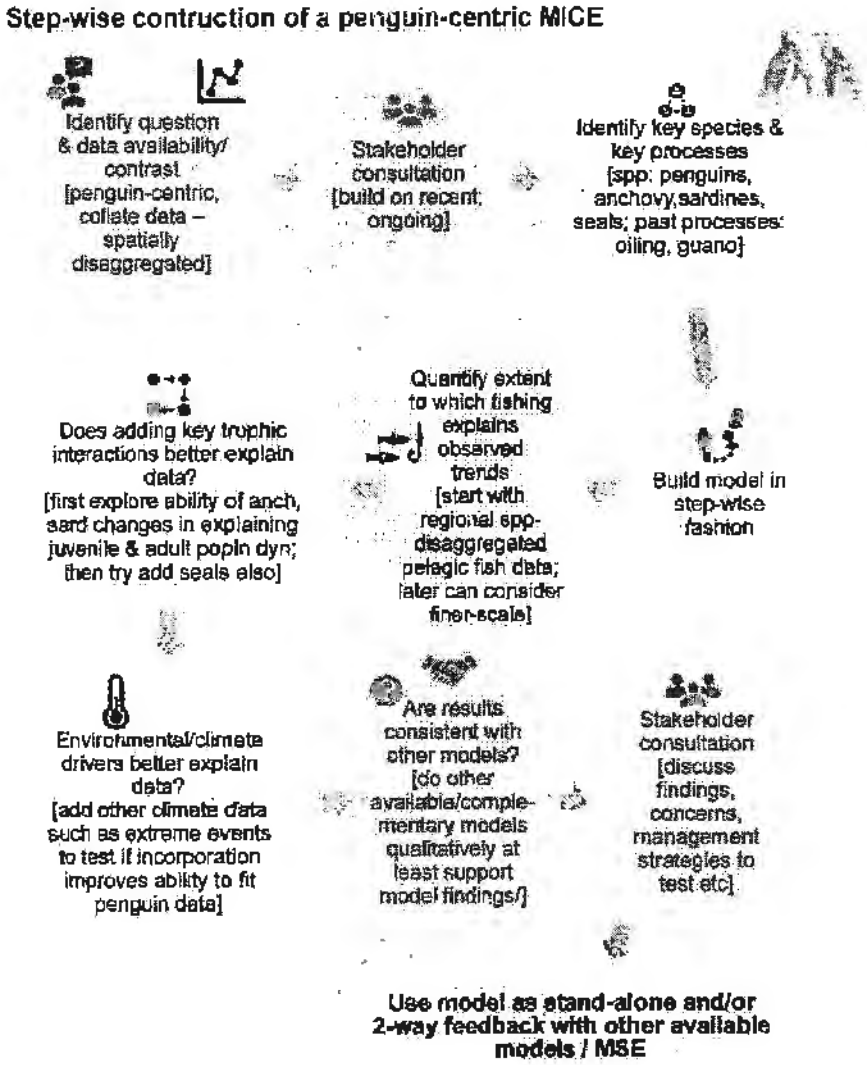


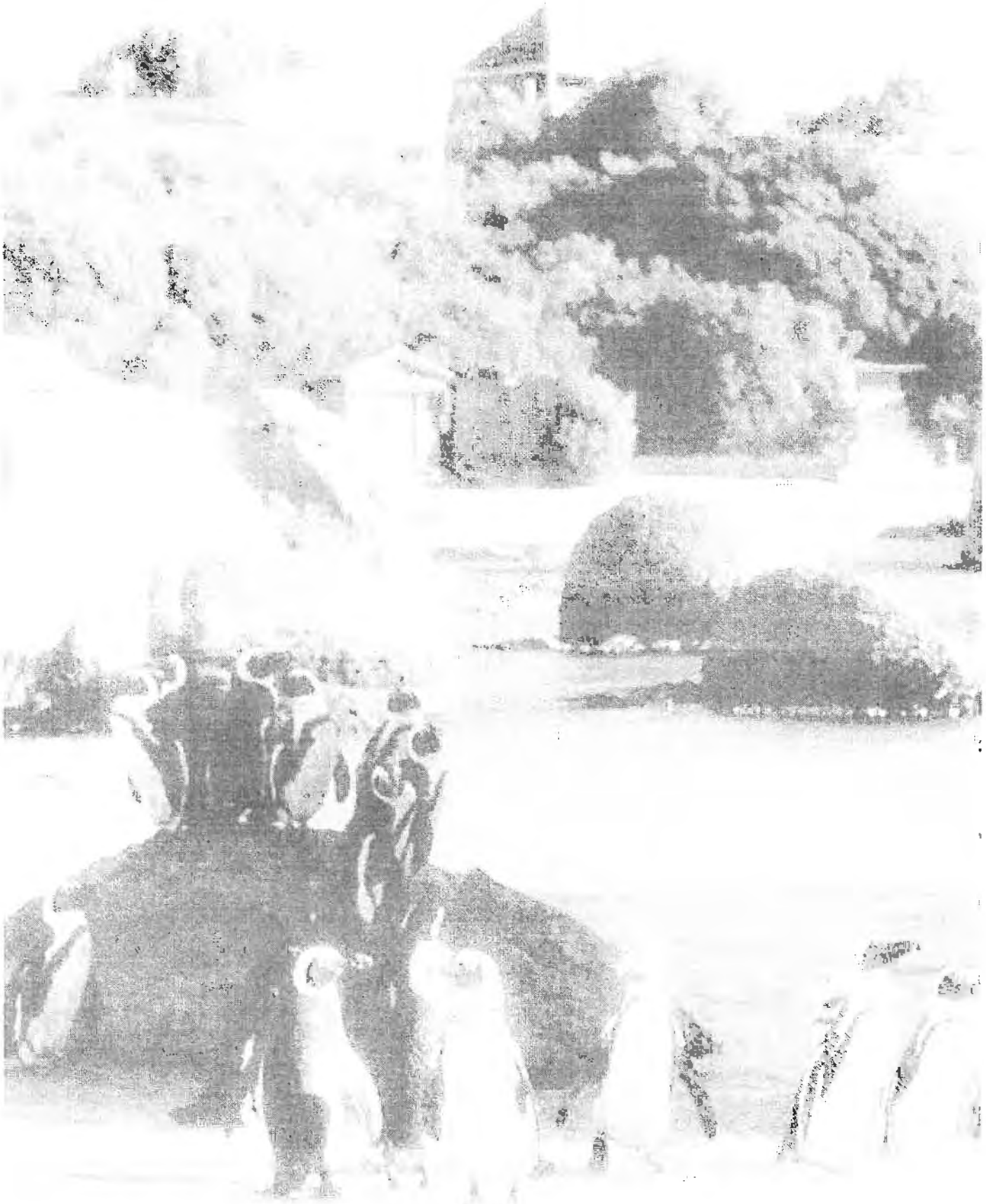
Figure F.1: Schematic summary of step-wise approach to building a MICE, modified from Plaganyi et al. (2022) with illustrative notes shown in square brackets.

- Depending on the MICE structure, it would be helpful to distinguish between total regional prey abundance and local abundance (such as that which would theoretically be available within a mBA(ARS) area), to evaluate match-mismatches between penguin foraging and prey availability, and how fishing might influence this. If there are insufficient data to fully inform explicit spatial modelling, a proxy such as an availability term (parameterised based on what is known) could be used instead (e.g., Tulloch et al., 2018), or a higher variance of prey availability could be used to model situations where foraging is more restricted (see, for example, Koehn et al., 2021).
- Using a fully integrated model and explicitly representing age and stage (e.g., breeding) structure will be important when trying to partition sources of mortality because these operate on different ages, stages and time time-periods, and hence attributing declines to a particular factor needs to involve demonstrating that the data are consistent with the proposed mechanism. Having two or more colonies explicitly represented will further assist with separating confounded sources of mortality and growth.
- A variety of approaches could be used to incorporate measures of foraging behaviour (maximum distance, path length and trip duration) and translate these into population growth in an integrated MICE, although this will likely be a secondary effect that is investigated/sequentially added after first incorporating more direct measures of prey abundance influencing vital rates. There are few studies where

this has been done – for example, Sydeman et al. (2017) note that Robinson et al. (2015) provides one of the few models linking adult survival and prey availability. However, more recently, Koehn et al. (2021) developed a structured seabird model to test the impact of fishing forage fish prey on seabirds and they incorporated both seabird life history and seabird–forage-fish dynamics. Similar to Robinson et al. (2015), they found seabird sensitivity to fishing was mainly dependent on the relationship between adult survival and prey availability, rather than between reproductive success and prey availability. They used a simple equation with two alternative parameter settings to model scenarios of wide vs. limited foraging ranges during the breeding season. A literature search may yield further helpful examples – for example, Houston et al. (1996) developed a model to show the relationship between foraging distance and the maximum size of a chick, which could translate into differences in chick survival; Plagányi et al. (2000) modelled how temporal and spatial match/mismatches between anchovy and their copepod prey could influence anchovy growth rates – conceptually this is similar to how a more detailed penguin foraging model could be used to quantify implications for adult and juvenile energetic budgets and hence growth and survival, with the final relationships (i.e. not the entire submodel) used as an input to a MICE.

- It may not be necessary to include a detailed representation of Cape fur seal dynamics to explore the potential role of Cape fur seal predation and competition contributing to the past and current decline in penguin numbers. Rather, it is important to include available data on trends in abundance, especially at the regional scale, relative rates of growth of seal populations (and possibly other predators), diet data and other data to substantiate the intensity and types of competition posited.
- A variety of methods such as described in the literature (see, for example, Hollowed et al., 2020; Hallouch and Punt, 2011; Holsman et al., 2016, Adadi et al., 2017) and used in previous MICE (e.g., Tulloch et al., 2019; Rogers and Plaganyi, 2022; Plaganyi et al., 2021), are available for investigating the role of environmental drivers such as temperature (and extreme events in particular) as well as climate change.
- Once the MICE is adequately validated, it should be a useful tool for testing and quantifying the relative efficacy of alternative penguin conservation measures. Hence the suggested approach is to first develop and fit to data a MICE that includes trophic interactions and key environmental drivers. This will hopefully provide a rigorous framework for quantifying the relative roles of (cumulative) factors causing the decline. The fitted model could then be used to evaluate and compare the likely conservation benefits of a range of mitigation measures such as rehabilitation of adults, predator control, extreme weather risk mitigation and so forth.
- The MICE could also be used as an operating model in a MSE framework (see also Sipla et al., 2021), noting that, if coupled with the current small pelagic Operational Management Procedure, consideration needs to be given to aligning in some way the spatial scales that are relevant for the fishery versus the smaller scales that are likely relevant for penguins. Nonetheless, as a first step, the current OMP could usefully be coupled with a penguin population dynamics model to update previous analyses given that sardine biomass is now at much lower levels then was the case during previous testing.

Penguin in full song (photo BM Dyer)



MINISTRY: FINANCE
REPUBLIC OF SOUTH AFRICA

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Ref: M3/15/40(1308/2022)

Hon. Ms Barbara Creecy, MP
Minister of Forestry, Fisheries and the Environment
Private Bag X447
PRETORIA
0001

Dear Minister Creecy,

REMUNERATION RATES FOR THE APPOINTED OF MEMBERS TO MINISTERIAL TASK TEAMS AND PANELS OF EXPERTS THAT ARE ESTABLISHED IN TERMS OF SECTION 3A OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

In my letter dated 27 July 2022 in which I stated that an appropriate basis for the recommendation of a remuneration category for any other forum or committee be established in terms of Section 3A of the National Environmental Management Act, 1998 (NEMA) must be established through a Central Evaluation Committee process to give me a basis to consider requests for approval of remuneration categories.

It has come to my attention that you intend establishing several ministerial task teams and panels of experts to execute functions as intended in Section 3A of the NEMA. To avoid additional administrative tasks in our own heavy schedules, I was advised that my concurrence to a single remuneration category for all these task teams and panels would be more productive.

I hereby give my consent to the determination of a single remuneration category, namely category. B1, for members of the ministerial task teams and panels of experts to be appointed in terms of Section 3A(c) of the National Environmental Management Act, 1998, (Act No. 107 of 1998). Any deviation from this consent would have to be specifically and individually follow the CEC process which would give me also a basis to consider requests for approval of alternative remuneration categories.

The B1-category rates would be as follows:

Category Classification	**B1** (Part-time members)		
Remuneration		**2019 rates**	
Position	**Full-time rate** *(for comparison purposes only)*	**Meeting rate**	
	Per annum	Per day	Per hour
Chairperson 1)	R1 087 879	R4 317	R540
Members	R660 087	R2 619	R327

Expenditure incurred in respect of this concurrence is to be accommodated within the budget allocation of the Department of Forestry, Fisheries and the Environment.

I trust that you will find the above in order.

Yours sincerely,

ENOCH GODONGWANA
MINISTER OF FINANCE
DATE: 11/01/2023

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

Private Bag X115, Pretoria, 0001 • 40 Church Square, PRETORIA, 0002 • Tel: +27 12 315 5111, Fax: +27 12 406 9055 • www.treasury.gov.za

FROM: Mr JC Krüger Ref: FP20-8/6/2/2/4/1/001 Tel: 012 315 5219 e-mail: Chris.Kruger@treasury.gov.za

TO ALL –
ACCOUNTING OFFICERS OF CONSTITUTIONAL INSTITUTIONS, AND NATIONAL AND PROVINCIAL DEPARTMENTS, HEADS OF PROVINCIAL TREASURIES AND ACCOUNTING AUTHORITIES OF PUBLIC ENTITIES

2022 REMUNERATION LEVELS: SERVICE BENEFIT PACKAGES FOR OFFICE-BEARERS OF CERTAIN STATUTORY AND OTHER INSTITUTIONS

1. The Minister of Finance has approved a cost-of-living adjustment of 3,0 per cent as indicated in Annexure A with effect from **1 April 2022.**

2. The relevant category levels provide for all-inclusive flexible remuneration packages (inclusive of service benefits). Full-time members' remuneration packages must be structured in accordance with the principles of the *Senior Management Service* (SMS)[1]. In structuring the packages, office-bearers should make due provision for pension and medical aid and must also ensure that taxation rules governing the structuring of salary packages are complied with. The indicated rates are sitting fees and exclusive of payments in respect of preparation, research and travelling (to and from meeting venues) time. The rate per day is the maximum allowable remuneration in any 24-hour day irrespective of the number of boards/councils and/or committees non-official members serve on.

3. The relevant executive authorities also need to approve an increase in the remuneration of office-bearers. These authorities therefore need to ensure that the increased remuneration is affordable, before granting such approval. The extent to which the authorities wish to apply the adjusted remuneration should be based on the evaluation of work done by the office-bearers of the relevant institution.

4. Current VAT law requires non-executive directors (NEDs) of companies to register for and charge VAT in respect of any director's fees earned for services rendered as a non-executive director. **Kindly note that the above rates are VAT inclusive.**

   The value of the fees must, however, exceed the compulsory VAT registration threshold of R1 million in any 12-month consecutive period but NEDs can voluntarily register for VAT as well[2].

[1] The SMS handbook is compiled by and available from the Department of Public Service and Administration.
[2] Further details on the remuneration of Non-executive Directors is available on

2022 REMUNERATION OF NON-OFFICIAL MEMBERS: COMMISSIONS & COMMITTEES OF INQUIRY, AND AUDIT COMMITTEES

5. Funds for inflation-related increases in expenditure and salary adjustments for 2022/23 have been made available in the MTEF and were allocated to departments, public entities and institutions. Any additional expenditure that could arise by implementing this approval must be defrayed from existing budget allocations of departments/public entities/institutions.

6. *Employees of organs of State serving as office-bearers on public entities/institutions are not entitled to additional remuneration.*

GOOLAM MANACK
(CHIEF DIRECTOR: PUBLIC ENTITIES GOVERNANCE UNIT)
for DIRECTOR-GENERAL: NATIONAL TREASURY
DATE 12/01/2023

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

ANNEXURE A (3,0%)

CONVERSION KEY: WITH EFFECT FROM 1 APRIL

Chairperson	1 398 373	6 549	894	69 919	111 870	1 440 324	5 716	714	72 016	115 226
Vice-chairperson	1 186 777	4 709	589	59 339	94 942	1 222 380	4 851	606	61 119	97 790
Member	1 087 879	4 317	540	54 394	87 030	1 120 515	4 446	556	56 026	89 641
Sub-category A1										
Chairperson	1 317 874	5 230	654	65 894	105 430	1 357 410	5 387	673	67 871	108 593
Vice-chairperson	1 120 078	4 445	556	56 004	89 606	1 153 680	4 578	572	57 684	92 294
Member	979 781	3 888	486	48 989	78 382	1 009 173	4 005	501	50 459	80 734
Sub-category A2										
Chairperson	1 170 677	4 646	581	58 534	93 654	1 205 796	4 785	598	60 290	96 464
Vice-chairperson	993 580	3 943	493	49 679	79 679	1 023 387	4 061	508	51 169	81 871
Member	924 582	3 669	459	46 228	73 957	952 320	3 779	472	47 616	76 186
Sub-category B1										
Chairperson	1 087 879	4 317	540	54 394	87 030	1 120 515	4 446	556	56 026	89 641
Vice-chairperson	952 181	3 778	472	47 609	76 175	980 745	3 892	486	49 037	78 460
Member	660 097	2 619	327	33 004	52 807	679 890	2 698	337	33 995	54 391
Sub-category B2										
Chairperson	979 781	3 888	486	48 989	78 382	1 009 173	4 005	501	50 459	80 734
Vice-chairperson	849 886	2 738	342	34 499	55 199	718 685	2 820	353	35 534	56 855
Member	600 268	2 382	298	30 014	48 023	618 297	2 454	307	30 915	49 464

2022 REMUNERATION OF NON-OFFICIAL MEMBERS: COMMISSIONS & COMMITTEES OF INQUIRY, AND AUDIT COMMITTEES

ANNEXURE A (3,6%)

CONVERSION KEY: WITH EFFECT FROM 1 APRIL

Sub-category C1										
Chairperson	928 984	3 886	461	46 448	74 317	986 832	3 797	475	47 842	75 547
Vice-chairperson	628 553	2 494	312	31 429	50 284	847 409	2 569	321	32 370	51 790
Member	531 497	2 109	264	26 575	42 520	547 443	2 172	272	27 372	43 795
Sub-category C2										
Chairperson	663 215	2 652	325	33 161	53 057	683 112	2 711	339	34 156	54 649
Vice-chairperson	586 169	2 247	281	28 308	45 293	593 146	2 314	289	29 157	46 652
Member	501 456	1 990	249	25 073	40 116	516 501	2 050	256	25 825	41 320
Sub-category D1										
Chairperson	531 497	2 109	264	26 575	42 520	547 443	2 172	272	27 372	43 795
Vice-chairperson	482 969	1 917	240	24 148	38 637	497 457	1 974	247	24 873	39 797
Member	429 052	1 742	213	21 853	35 125	452 236	1 785	224	22 612	36 179
Sub-category D2										
Chairperson	501 456	1 990	249	25 073	40 116	516 501	2 050	256	25 825	41 320
Vice-chairperson	450 617	1 788	224	22 531	36 049	464 138	1 842	230	23 207	37 131
Member	420 575	1 669	209	21 029	33 646	433 194	1 719	215	21 680	34 656
Sub-category E1										
Chairperson	432 130	1 715	214	21 606	34 570	445 095	1 766	221	22 255	35 609
Vice-chairperson	395 156	1 568	196	19 758	31 612	407 010	1 615	202	20 351	32 561
Member	360 493	1 431	179	18 025	28 839	371 307	1 473	184	18 565	29 705
Sub-category E2										
Chairperson	409 021	1 623	203	20 451	32 722	421 293	1 672	209	21 065	33 703
Vice-chairperson	369 737	1 467	183	18 487	29 579	380 829	1 511	189	19 041	30 466
Member	328 141	1 302	163	16 407	26 251	337 986	1 341	168	16 899	27 039

Annexure 5

Interim Fishing Limitations or Closures Implemented from 1 September 2022

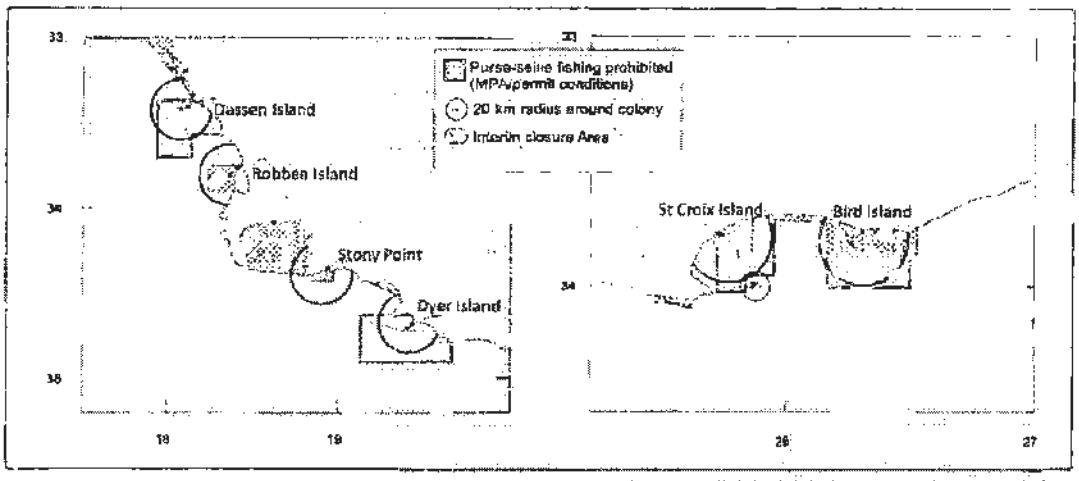


Figure 1.7. from the Expert Panel report showing interim closures to fishing (red polygons) as currently implemented. These closures have been implemented since September 2022. Vessels <26m in length are allowed to fish in the offshore area (outside the red dotted line) of Dyer Island.

Arista Wasserman

From: Janet Claire Coetzee
Sent: Thursday, 12 September 2024 19:53
To: Arista Wasserman
Subject: Fwd: Data request / Mike Bergh, SAPFIA

Further attachment requested

Get Outlook for Android

From: Azwianewi Makhado <AMakhado@dffe.gov.za>
Sent: Thursday, July 25, 2024 4:13:02 PM
To: Janet Claire Coetzee <JCoetzee@dffe.gov.za>
Subject: FW: Data request / Mike Bergh, SAPFIA

Dear Janet

Do we need to respond further to the request or is this a new request? Please see the response below

Dr Azwianewi Makhado
Specialist Scientist
Department of Forestry, Fisheries and the Environment
Branch: Oceans and Coasts
Cape Town
amakhado@dffe.gov.za

forestry, fisheries and the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Honorary Research Associate
FitzPatrick Institute of African Ornithology
Department of Biological Sciences
University of Cape Town
Rondebosch 7701
South Africa

From: Alistair McInnes <alistair.mcinnes@birdlife.org.za>
Date: Monday, 05 February 2024 at 13:42
To: Azwianewi Makhado <AMakhado@dffe.gov.za>
Cc: lorien.pichegru@mandela.ac.za <lorien.pichegru@mandela.ac.za>, r.sherley@exeter.ac.uk <r.sherley@exeter.ac.uk>, Lauren Waller <laurenw@ewt.org.za>
Subject: RE: Data request / Mike Bergh, SAPFIA

Dear Newi

I have consulted with the data providers regarding your request. Unfortunately, we are not in a position to provide this data (already made available for the specific purposes of the International Panel Review process and subject to an NDA) outside a formal review process which includes seabird biologists. The purpose of the data-request is not

clear to us and we are reluctant to share data which is currently the subject of imminent peer review and publication.

Regards

Alistair

From: Azwianewi Makhado <AMakhado@dffe.gov.za>
Sent: Wednesday, January 31, 2024 9:34 AM
To: Alistair McInnes <alistair.mcinnes@birdlife.org.za>
Subject: FW: Data request / Mike Bergh, SAPFIA

Dear Alistair

I have received a data request from Mike Bergh on the tracking of penguins. Please below his request and please advise if it is possible to make those data available.

Regards
Newi

From: Dr Mike Bergh <mike@olsps.com>
Date: Monday, 29 January 2024 at 10:21
To: Azwianewi Makhado <AMakhado@dffe.gov.za>
Cc: copeland.fishconsult <copeland.fishconsult@gmail.com>
Subject: RE: Data request / Mike Bergh, SAPFIA

Dear Newi

I am following up my data requests in the email below with some more detail on item 1 in my email of 26 January 2024. I would like to obtain the following information:

1. African Penguin tracking data from the Dassen Island, Robben Island, Stony Point, Dyer Island, St Croix Island, and Bird Island colonies.

2. R code to create core foraging areas, otherwise known as Marine Important Bird Areas (mIBAs), as formed the basis for MIBA shape files proposed as closed areas by Birdlife late last year, or alternatively as were submitted to the international panel on penguins in the first half of 2023.

The information should be sufficient for an independent scientist to understand how these MIBAs are calculated and to repeat them.

Regards

Mike Bergh

From: Dr Mike Bergh
Sent: Friday, January 26, 2024 5:17 PM
To: Azwianewi Makhado <AMakhado@dffe.gov.za>
Cc: Michael Copeland <copeland.fishconsult@gmail.com>
Subject: FW: Data request / Mike Bergh, SAPFIA

Dear Newi

I am responding to your request for any data requests from SAPFIA, your email to Mike Copeland on 20 January 2024 refers. From my side I have two fairly straightforward data requests which I think you would be able to respond to quite quickly. These are as follows

A. The most recent time series of seal pup counts for South Africa, by location and year
B. The most recently updated time series of penguin population size estimates for South Africa, by colony and year.

Then in broad terms I have the following data requests:

1. The penguin foraging data and associated R code used by Birdlife to calculate MiBA shape files. I will need to provide a follow-up request with more detail, but since we previously obtained these directly from Birdlife, they would know what I need. But I will re-clarify that in an email to you early next wee.
2. Detailed information from hydro-acoustic pelagic surveys. I will need to follow-up next week on this via email, but this is just a heads up of a request I will clarify then.

Regards

Mike

agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

CODE OF CONDUCT FOR SCIENTIFIC WORKING GROUPS, including Task Groups established under the auspices of the Scientific Working Groups

Why a Code of Conduct?
The purpose of the Code of Conduct is to ensure that SWGs continue to provide forums for unrestricted, uninhibited and therefore rigorous scientific exchange and debate, with the primary objective of ensuring a sound scientific base for the recommendations on which management decisions are made.

What does this mean to you as a Member or Observer of a SWG?
As a Member or an Observer of a SWG, this means that you may engage freely in rigorous scientific debate. It also means that you have the responsibility to respect and protect the integrity of the scientific deliberations, information, and other Members and Observers within the SWG. Issues raised during SWGs may be discussed with others within your interest group (for example a scientific team, an industry association, etc.). However, Members and Observers are expected to honour these scientific processes by not making confidential information disclosed (either verbally or in writing) by Members, Observers or the Department available in public forums or media without prior permission from the disclosing Member, Observer or the Department. Members and observers are to familiarize themselves with the general terms of reference for SWGs.

This Code of Conduct is also applicable to participants of Task Groups established under the auspices of Scientific Working Groups.

Declaration by Member or Observer of a Scientific Working Group

In my capacity as Member/ Observer of a Scientific Working Group, I undertake to honour the following Code of Conduct for Scientific Working Groups. I hereby pledge to:

- participate in the Scientific Working Group to the fullest of my ability, with scientific rigour being my primary objective
- participate in a manner that is respectful to all other participants in the Scientific Working Group
- perform tasks or duties agreed upon by myself and the Scientific Working Group within the agreed timeframes
- ensure that data and information on which scientific recommendations may be based is freely available to the Scientific Working Group
- provide protection for the Scientific Working Group, its Members and Observers by ensuring that discussions held within Scientific Working Groups are not revealed in public forums or media
- provide protection against research in progress, or the process of scientific debate, being used to damage the reputation of the Department, the Scientific Working Group and/or its Members and Observers
- ensure that confidential data/information/documents disclosed by Members, Observers or the Department are not revealed in public forums or media or used in publications or by the Scientific Working Group in the formulation of management advice without prior permission of the disclosing party

- protect commercial interests through maintaining confidentiality of commercially valuable information
- protect against Scientific Working Group documents classified as confidential being circulated outside of the Scientific Working Group, and particularly to public forums and media without prior permission from the Department until the decision-making process has been completed and the decision made public by the Minister (or delegated authority), or a period of temporary confidentiality granted to a document has expired.

I further acknowledge that failure to honour this Code of Conduct may result in forfeiting my participation in the Scientific Working Group.

Scientific Working Group:.....

Signature: .....

Name: .....

Date: .....

IN THE HIGH COURT OF SOUTH AFRICA
GAUTENG DIVISION, PRETORIA

CASE NO.: 2024/029857

In the matter between:

BIRDLIFE SOUTH AFRICA	First Applicant
SOUTH AFRICAN FOUNDATION FOR THE CONSERVATION OF COASTAL BIRDS	Second Applicant
and	
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT	First Respondent
DEPUTY DIRECTOR-GENERAL: OCEANS AND COASTS, DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT	Second Respondent
DEPUTY DIRECTOR-GENERAL: FISHERIES MANAGEMENT, DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT	Third Respondent
THE SOUTH AFRICAN PELAGIC FISHING INDUSTRY ASSOCATION	Fourth Respondent
EASTERN CAPE PELAGIC ASSOCIATION	Fifth Respondent

CONFIRMATORY AFFIDAVIT

D.M

I, the undersigned,

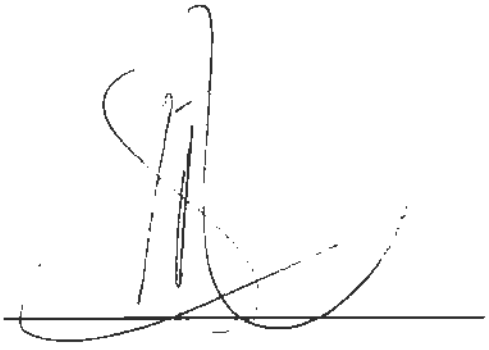
DIKELEDI MOLEPO

do hereby make oath and state that:

1. I am an adult female and employed as an attorney with the office of the State Attorney in Pretoria. I am the attorney of record for the Minister and the Department of Forestry, Fisheries and the Environmental (DFFE) in the aforementioned matter.

2. The facts contained herein are true and correct and fall within my personal knowledge and belief save where the content indicates otherwise. I am duly authorised to depose to this affidavit on behalf of the DFFE.

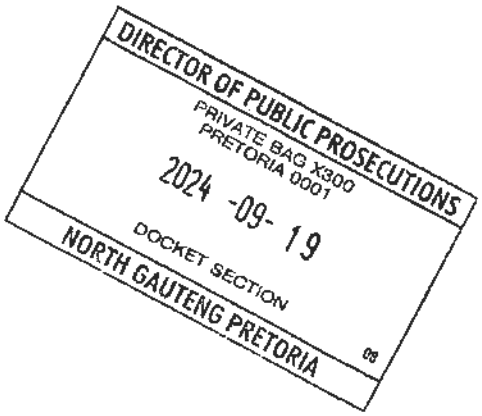
3. I have read the affidavit of Dr Dion George, the Minister of Forestry, Fisheries and the Environment and confirm the content thereof insofar as it relates to me and/or steps taken by me.



DIKELEDI MOLEPO

I hereby certify that the deponent knows and understands the contents of this affidavit and that it is to the best of the deponent's knowledge both true and correct. This affidavit was signed and sworn to before me at PRETORIA on this the 19th day of **SEPTEMBER 2024**, and that the Regulations contained in Government Notice R.1258 of 21 July 1972, as amended by R1648 of 19 August

1977, and as further amended by R1428 of 11 July 1989, having been complied with.



COMMISSIONER OF OATHS

Full names: BARBARA BARTLE

Address: 28 CHURCH SQUARE

Capacity: ADMIN CLERK

D.M