Accord sur la Conservation des Albatros et des Pétrels

**Quatorzième Réunion du Comité Consultatif**

*Lima, Pérou, 12 – 16 août 2024*

# Rapport du Groupe de travail sur les captures accessoires

***Groupe de travail sur les captures accessoires***

# Rapport de la douzième réunion du Groupe de travail sur les captures accessoires d'oiseaux de mer, Lima, Pérou, 5 - 7 août 2024

## 1. INTRODUCTION

Ce Rapport résume les discussions et recommandations de la 11e réunion du Groupe de travail sur les captures accessoires (GTCA12), qui s'est tenue à Lima, au Pérou, du 5 au 7 août 2024.

Le Co-Président du GTCA, Igor Debski (Nouvelle-Zélande), a souhaité la bienvenue à tous les membres et observateurs du GTCA **(ANNEXE 1**) à l'occasion de cette 12e réunion. Il a également présenté le Co-Président du GTCA, Sebastián Jiménez (Uruguay), ainsi que les Vice-Président et Vice-Présidente Dimas Gianuca (Brésil) et Megan Tierney (Royaume-Uni)

## 2. ADHÉSION AU GTCA

Le Co-Président a accueilli un nouveau membre, qui s'est joint au groupe depuis la GTCA11 : Cristóbal Anguita (Chili), en remplacement de Jorge Azócar (Chili). Yann Rouxel (Brésil) vient également remplacer Rory Crawford (Brésil). Le GTCA a remercié Jorge Azócar et Rory Crawford pour leur contribution ces dernières années. Le Co-Président a souligné que les Parties peuvent à tout moment désigner de nouveaux membres du Groupe de travail. La composition actuelle du GTCA figure à l'**ANNEXE 1**.

## 3. ADOPTION DE L'ORDRE DU JOUR

Le Co-Président a présenté l'ordre du jour et les documents connexes. La réunion a adopté l'ordre du jour **(SBWG12 Doc 01 Rev 1**).

## 4. CONSEILS DE L'ACAP EN MATIÈRE DE BONNES PRATIQUES RELATIVES À L'ATTÉNUATION DES CAPTURES ACCESSOIRES DES OISEAUX DE MER – DÉFINITION ET CRITÈRES

Le Co-Président a noté que ce point de l'ordre du jour permet de rappeler la nécessité permanente de revoir la définition et les critères des Conseils de l'ACAP en matière de bonnes pratiques, afin de s'assurer qu'ils restent adaptés à leur objectif. Il a également été suggéré que le GTCA envisage de créer un document simplifié et autonome décrivant clairement les critères et les étapes à suivre pour qu'une mesure soit considérée et adoptée par l'ACAP comme un Conseil en matière de bonnes pratiques.

Le document **SWBG12 Inf 01** décrit les bases de données assemblées des méthodes d'atténuation pour les espèces à risque exposées à la pêche à la palangre pélagique, à la pêche au thon à la senne coulissante ainsi qu'à la pêche au filet maillant dérivant. Il définit

également les éléments clés nécessaires à des évaluations complètes des stratégies de gestion des captures accessoires multi-espèces (MSE), ce qui permet ensuite de simuler les résultats des stratégies alternatives afin de déterminer celle qui répond le mieux aux objectifs.

L'annexe 7 du **SBWG12 Inf 01** comprend un projet de Décision ou de Résolution quant à une MSE holistique des captures accessoires afin d'aider les organisations régionales de la gestion des pêches à identifier les éléments candidats à une éventuelle inclusion dans les mesures. Le document a été présenté à plusieurs ORGP qui l'ont accueilli favorablement. Le GTCA s'est félicité de ce document et a noté qu'il pourrait être utile pour le GTCA d'examiner l'application potentielle de ce processus lorsque l'ACAP prévoit de passer en revue ou d'enrichir les critères utilisés pour évaluer si une mesure d'atténuation devrait être considérée et adoptée par l'ACAP en tant que Conseil en matière de bonnes pratiques. Le GTCA a convenu de surveiller l'adoption de la Résolution et, lors de sa prochaine réunion, d'examiner la possibilité que l'ACAP modifie sa stratégie de communication de manière à inclure la communication des approches MSE aux ORGP.

## 5. ATTÉNUATION DES CAPTURES ACCESSOIRES DANS LES PÊCHERIES AU CHALUT

### 5.1. Examen des récents progrès de la recherche sur l'atténuation, et mise à jour des Conseils en matière de bonnes pratiques

Le **document SBWG12 Doc 05** fournit une version amendée (avec suivi des modifications) des conseils approuvés par la CC13 en matière d'atténuation des captures accessoires d'oiseaux de mer dans les pêcheries au chalut. Les modifications apportées ont permis d'améliorer la clarté des conseils et la cohérence avec les documents de conseils relatifs aux autres types d'engins de pêche industrielle, et d'inclure une section récapitulative sur les Mesures d'atténuation non-recommandées. Le GTCA a approuvé les changements proposés et, compte tenu des nouvelles informations présentées, a identifié plusieurs autres changements, notamment :

(i) séparer les conseils sur les mesures d'atténuation visant à réduire les accidents de câbles des mesures visant à réduire la superficie aérienne des câbles (poulies coupées, par exemple) et des mesures visant à éloigner les oiseaux des câbles (lignes d'effarouchement, par exemple) ;

(ii) modifier la mesure d'atténuation générale des fermetures temporelles et spatiales afin de s'assurer qu'elle reflète non seulement la nécessité de veiller à ce que ces fermetures ne déplacent pas le risque vers des zones adjacentes, mais également que le risque ne soit pas déplacé vers d'autres méthodes de pêche en conséquence.

Le **SBWG12 Doc 16** donne le compte-rendu du développement de mesures d'atténuation concernant les câbles de contrôle des filets sur les chalutiers en continu opérant dans les pêcheries de krill de la zone de convention de la CCAMLR. Une récente dérogation à l'interdiction de la CCAMLR concernant l'utilisation des câbles de contrôle des filets a permis aux chalutiers en continu d'effectuer des essais de mesures d'atténuation des captures accessoires d'oiseaux de mer pour ce « troisième câble ». Le document fait état d'essais sur trois navires norvégiens pêchant le krill. Le GTCA a accueilli favorablement le rapport et a

reconnu que certaines des bonnes pratiques actuelles pour la pêche au chalut pourraient ne pas être applicables aux chalutiers en continu ; il a donc convenu de les modifier si nécessaire, en faisant la distinction entre l'utilisation de chaluts traditionnels et en continu. Le GTCA a recommandé que cette question soit examinée plus avant lors de la prochaine révision intersession des Conseils en matière de bonnes pratiques. Le GTCA a également noté que l'emplacement des essais rapportés n'était pas clair par rapport à la distribution des espèces inscrites à l'ACAP, générant par conséquent des inquiétudes : en effet, si de telles opérations ont lieu dans des eaux importantes pour les espèces inscrites à l'ACAP, de telles pêcheries pourraient poser un risque considérable. Le GTCA a conclu que les preuves fournies à ce stade étaient insuffisantes pour évaluer les mesures d'atténuation proposées, mais a convenu qu'elles devaient être notées comme « en cours de développement » et d'encourager la poursuite des travaux dans ce domaine. Le GTCA s'est demandé si les eaux issues du traitement du poisson rejetées par les chaluts en continu pêchant le krill n'attirait pas les oiseaux de mer, augmentant ainsi le risque d'interactions, et a recommandé de poursuivre les recherches à ce sujet.

Le document **SBWG12 Inf 03** fait état d'investigations sur les mesures d'atténuation visant à réduire la mortalité causée par les câbles de contrôle des filets : 1) l'utilisation d'un nouveau matériau (« Dynice ») pour la construction de ces câbles ; et 2) la configuration du dispositif d'effarouchement des oiseaux qui permet couvrir le point d'entrée du câble dans l'eau et réduire les enchevêtrements. Le taux de collision des oiseaux de mer avec le câble fabriqué à partir du nouveau matériau était inférieur à celui des câbles traditionnels, fabriqués à partir d'acier ; les raisons de ce phénomène ne sont pas encore claires, cependant. Les adaptations de la conception du dispositif d'effarouchement des oiseaux visant à réduire les enchevêtrements (et les dommages potentiels) avec le câble de contrôle des filets doivent faire l'objet d'une expérimentation plus poussée afin de démontrer leur efficacité dans la réduction du taux d'impact. Le GTCA s'est félicité des travaux en cours visant à améliorer la conception et l'efficacité des dispositifs d'effarouchement des oiseaux, et attend avec impatience de nouvelles mises à jour.

Le document **SBWG12 Inf 08** décrit un dispositif électronique de contrôle de la conformité du dispositif d'effarouchement des oiseaux (https://imveloblue.co.za/electronic-monitoring-imvelo-bsl/). L'appareil fonctionne sans fil ; il mesure en continu la tension exercée par un dispositif d'effarouchement des oiseaux lorsqu'il est traîné dans l'eau, et transmet ces données en temps réel. En développement depuis 2020, l'appareil est actuellement en phase finale de production. Outre sa capacité à s'intégrer aux systèmes de surveillance électronique déjà en place à bord des navires, le dispositif renforce la sécurité de l'équipage en réduisant la nécessité de surveiller physiquement les dispositifs d'effarouchement. Il pourrait être utilisé sur tous les navires de pêche industrielle qui déploient des dispositifs d'effarouchement. Le GTCA a accueilli favorablement la mise à jour concernant le développement de cet appareil et l'a ajouté aux formes de suivi électronique pouvant être utilisées pour contrôler la mise en œuvre des dispositifs d'effarouchement dans les documents de Conseils en matière de bonnes pratiques pour les pêcheries au chalut, à la palangre démersale et à la palangre pélagique. Le GTCA note toutefois que si cet appareil permet de contrôler l'utilisation des dispositifs d'effarouchement des oiseaux, il n'atteste pas de leur conformité aux spécifications.

Le document **SBWG12 Inf 19** fait état d'expériences visant à produire des preuves sur les normes minimales et l'efficacité des mesures d'atténuation adaptées pour les sonars de filet et les câbles de funes dans les pêcheries démersales au chalut chiliennes. L'utilisation d'un

système combiné « en rideau » dans les flottes de chaluts en eau froide, composé de séries de sonars à filet et de dispositifs pour dérouter les oiseaux, a permis de réduire le nombre de collisions de plus de 90 % pour neuf espèces d'oiseaux de mer, dont cinq espèces inscrites à l'ACAP. Le GTCA a noté l'importance de ce travail et son grand potentiel d'application à d'autres flottes ; il note également qu'une fois le travail achevé, les résultats pourront être pris en compte pour être inclus dans les Conseils en matière de bonnes pratiques. Le GTCA a également noté que ce projet est soutenu par une petite subvention de l'ACAP, ce qui démontre la valeur de ce programme pour faire progresser les travaux dans ce domaine.

Le document **SBWG12 Inf 07** fait également état de l'évolution des mesures d'atténuation concernant les câbles de contrôle des filets, et a été examiné au point 15 de l'ordre du jour.

## 5.2. Priorités en matière de recherches sur l'atténuation

Après passage en revue, le GTCA a réitéré que les principales priorités en matière de recherches sur l'atténuation des captures accessoires d'oiseaux de mer dans les pêcheries au chalut restent les suivantes :

**Atténuation des effets des câbles :** poursuite du développement et de l'expérimentation d'options d'atténuation visant à réduire les interactions des oiseaux de mer avec les câbles, en particulier les câbles de surveillance des filets, y compris de nouveaux dispositifs de dissuasion (notamment « en rideaux »), de nouveaux matériaux pour les câbles et des moyens de réduire la superficie aérienne, ainsi que la prise en compte par les pêcheries d'une gamme de pratiques opérationnelles différentes ;

**Interactions avec les câbles :** déterminer les relations entre l'abondance des oiseaux de mer, les interactions avec les câbles et la mortalité (quantifier le niveau de mortalité non détectée ou cryptique), y compris la possibilité d'utiliser la suivi électronique (SE) des collisions avec les câbles ;

**Enchevêtrement dans les filets** : poursuivre le développement et l'expérimentation d'options visant à réduire les interactions entre les oiseaux de mer et les engins de pêche au chalut afin de réduire les cas d'enchevêtrement ou de capture d'oiseaux de mer dans les filets lors de la mise en place et du virage ; et

**Rejets :** approfondir l'évaluation du niveau d'attraction des oiseaux par les eaux de traitement du poisson ou par d'autres rejets qui ne sont normalement pas considérés comme faisant partie des rejets d'abats ou des déchets.

Igor Debski, Verónica Iriarte et Leandro Tamini restent à la tête du GTCA pour l'atténuation des captures accessoires dans les pêcheries au chalut.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Approuve l'étude actualisée et les Conseils en matière de bonnes pratiques destinées à réduire l'impact de la pêche au chalut pélagique et démersale sur les oiseaux de mer figurant à l'**ANNEXE 2.** Ces mises à jour améliorent la clarté et la cohérence du document et reflètent les dernières recherches présentées à la

GTCA12. Bien que les modifications n'apportent pas de changement substantiel aux Conseils en matière de bonnes pratiques, elles incluent des références à diverses options d'atténuation en cours de développement pour les câbles de contrôle des filets, dans les cas où leur utilisation ne peut être évitée.

2. Encourage la mise en œuvre des priorités de recherche concernant l'atténuation des captures accessoires dans les pêcheries au chalut identifiées au point 5.2.

## 6. ATTÉNUATION DES CAPTURES ACCESSOIRES DANS LES PÊCHERIES PALANGRIÈRES DÉMERSALES

### 6.1 Examen des récents progrès de la recherche sur l'atténuation, et mise à jour des Conseils en matière de bonnes pratiques

Le **document SBWG12 Doc 06** fournit une version amendée (avec suivi des modifications) et approuvée par la CC13 des conseils en matière d'atténuation des captures accessoires d'oiseaux de mer dans les pêcheries au chalut. Bien qu'aucune modification substantielle n'ait été apportée aux avis relatifs à la pêche à la palangre démersale, des efforts supplémentaires ont été déployés pour garantir la cohérence et l'accessibilité des Conseils en matière de bonnes pratiques pour tous les types d'engins industriels (chalut, palangre démersale, palangre pélagique). La GTCA12 a soutenu une proposition d'action visant à donner aux trois documents de conseils un format plus convivial et standardisé. Cette tâche revient aux Présidents et responsables des GTCA pour chaque type d'engin, durant l'intersessions. Le GTCA a identifié quelques modifications supplémentaires à apporter aux Conseils en matière de bonnes pratiques afin d'en améliorer la cohérence du langage et la clarté.

Le document **SBWG12 Doc 13** documente le développement d'un « flotteur au compte-goutte » ainsi que la manipulation des régimes de lestage des lignes et des configurations des lignes d'effarouchement des oiseaux visant à immerger les hameçons appâtés à 5 m dans la superficie aérienne du dispositif d'effarouchement des oiseaux dans les pêcheries palangrières démersales de Nouvelle-Zélande. Ce dispositif comprend deux flotteurs fixés à la palangre par une corde de 7 m, associés à un lest permettant contrecarrer leur flottabilité. L'utilisation d'une pondération accrue pour les lignes et d'un espacement réduit entre les lests a également été mise en place, tandis que la superficie aérienne des dispositifs d'effarouchement des oiseaux a été maximisée. Cette configuration n'entravait pas les opérations. Les « flotteurs au compte-goutte » ont bien fonctionné, ils se sont avérés simples à installer et à récupérer, et les enchevêtrements sont restés rares. La faiblesse et la disparité des taux de capture n'ont pas permis de tirer des conclusions définitives quant à l'influence sur les taux de capture des espèces ciblées. Des options ont été identifiées pour permettre aux pêcheurs de varier davantage la flottaison sans nuire aux taux d'immersion. Le GTCA s'est félicité de ces travaux qui abordent les lacunes et les défis actuels et a souligné leur pertinence pour les pêcheries utilisant des palangres démersales flottantes dans le monde entier, notamment à bord de navires de petite taille. Le GTCA a suggéré des travaux supplémentaires pour étudier les impacts sur les taux de capture d'espèces cibles et pour déterminer si des pertes d'appâts ont eu lieu. Cette méthode a été mentionnée dans les Conseils en matière de bonnes pratiques, parmi les options en cours de développement. Le GTCA a encouragé des mises à jour régulières sur l'avancement des travaux sur ce sujet.

Le document **SBWG12 Doc 17** présente les résultats des analyses de la mortalité incidente des oiseaux de mer dans les pêcheries palangrières démersales argentines, en tenant compte de la stratification spatiale et temporelle de l'effort de pêche et en incorporant, pour la première fois, les chiffres de la mortalité cryptique. Les mortalités annuelles potentielles pour la période 2005-2009 ont été estimées pour deux espèces clés inscrites à l'ACAP : 686 (95 % IC : 582-800) *Thalassarche melanophris* and 2 278 (95 % IC : 1 981-2 606) *Procellaria aequinoctialis*. La pêcherie ciblant principalement l'abadèche du Cap présentait, pour les deux espèces, des niveaux de mortalité supérieurs d'un ordre de grandeur à ceux des deux autres strates ciblant la raie et la légine australe. Il a été souligné que, bien que l'effort de pêche de la pêcherie palangrière en Argentine ait progressivement été réduit à des niveaux négligeables au cours des dernières années, il est possible que les circonstances économiques favorisent la croissance d'une telle flotte à l'avenir. Le GTCA a accueilli favorablement ce travail, notant les estimations de la mortalité des oiseaux de mer et le fait qu'il aborde la stratification spatiale et temporelle et la mortalité cryptique ; le GTCA tiendra compte de ces chiffres mis à jour dans les examens ultérieurs. Le GTCA a également noté que ce travail était soutenu par une petite subvention de l'ACAP, démontrant une fois encore la valeur de ce programme pour les progrès des travaux dans ce domaine.

Le document **SBWG12 Inf 08** a également été abordé au point 5.2 de l'ordre du jour. Le GTCA a noté que pour les pêcheries palangrières démersales, le dispositif électronique de contrôle de la tension peut être utilisé pour confirmer aussi bien le déploiement du ou des dispositif(s) d'effarouchement des oiseaux que la pose de nuit.

## 6.2 Priorités en matière de recherches sur l'atténuation

Le GTCA a confirmé les priorités suivantes en matière de recherche sur l'atténuation pour les pêcheries palangrières démersales :

**Amélioration du taux d'immersion :** poursuivre l'identification de mesures d'atténuation permettant d'améliorer le taux d'immersion des hameçons appâtés sur les palangres flottantes, notamment la réduction du nombre d'hameçons positionnés près des flotteurs, ainsi que la forme et la conception des lests afin d'accélérer le taux d'immersion. Synthétiser l'expérience et les informations provenant d'autres pêcheries démersales à la palangre flottante afin de contribuer à l'élaboration de recommandations pour cet engin.

**Dispositifs d'atténuation lors du virage :** poursuivre les études sur l'atténuation durant le virage dans les pêcheries démersales (et pélagiques), notamment des essais en mer afin de vérifier l'efficacité de ces dispositifs sur une large gamme d'opérations de pêche.

Pendant l'intersession, les Présidents et les responsables du GTCA pour chaque type d'engin s'efforceront de combiner toutes les priorités en matière de recherche sur l'atténuation en vue de leur examen par la GTCA13, ce qui s'inscrira dans le processus de normalisation et d'amélioration de la cohérence entre les trois documents relatifs aux Conseils en matière de bonnes pratiques.

Ed Melvin, Juan Pablo Seco Pon et Megan Tierney restent les responsables du GTCA concernant les recommandations sur l'atténuation des captures accessoires dans les pêcheries démersales à la palangre.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Approuve l'étude actualisée et les Conseils en matière de bonnes pratiques permettant de réduire l'impact de la pêche palangrière démersale sur les oiseaux de mer figurant à l'**ANNEXE 3**. Ces mises à jour reflètent les dernières recherches présentées à la GTCA12. Bien que les modifications n'apportent pas de changement substantiel aux Conseils en matière de bonnes pratiques, elles mettent à jour la recherche en cours de développement pour la palangre démersale flottante et améliorent la cohérence.

2. Note que les Présidents et les responsables pour chaque type d'engin transposeront les trois documents de conseils un format plus convivial et plus standardisé, qui sera examiné par la GTCA13.

3. Encourage la mise en œuvre des priorités de recherche pour l'atténuation des captures accessoires dans les pêcheries démersales à la palangre identifiées au Point 6.2.

## 7. ATTÉNUATION DES CAPTURES ACCESSOIRES DANS LES PÊCHERIES PALANGRIÈRES PÉLAGIQUES

### 7.1 Examen des récents progrès de la recherche sur l'atténuation, et mise à jour des Conseils en matière de bonnes pratiques

Le **document SBWG12 Doc 07** fournit une série de propositions d'amendements au document de recommandations sur l'atténuation des effets de la pêche à la palangre pélagique de l'ACAP, issues d'un examen intersession de routine. Plusieurs autres propositions d'amendements ont été identifiées.

Le document **SBWG12 Doc 09** explique pourquoi il est logique et approprié que le poids de 50 g, hameçon inclus, soit acceptable en tant que configuration minimale recommandée de lestage des lignes de branchement, en lieu et place d'un ajout de poids autorisé de 40 g jusqu'à 0,5 m de l'hameçon. Un hameçon lourd de 50 g, par exemple, pourrait donc servir d'option alternative en matière de lestage de la ligne de branchement, au lieu de voir ce poids dépassé si 40 g étaient ajoutés au niveau de l'hameçon, ou sur ce dernier directement. Il a été signalé que placer des poids sur l'hameçon présente l'avantage d'éviter tout décalage dans le profil d'immersion de la ligne de branchement par rapport à des poids plus éloignés de l'hameçon ; par ailleurs, l'hameçon lourd de 50 g proposé a permis d'obtenir un taux d'immersion équivalent aux configurations de lestage de la ligne de branchement recommandées par l'ACAP. La GTCA12 a discuté des effets potentiels de l'intégration d'un lest à l'hameçon, notamment des risques pour l'équipage en cas de flybacks, et des risques pour les espèces vulnérables, par exemple les cétacés, les requins et les tortues de mer, si elles venaient à mordre à l'hameçon équipé d'un lest en plomb plutôt qu'en matériau non-toxique. Il a été noté qu'hameçon lourd présente l'avantage, en termes de sécurité, de ne pas subir d'effet de recul dû au poids lorsqu'un animal y mord. Le GTCA a discuté de la recommandation de ne pas utiliser de plomb lors du lestage de l'hameçon, mais de privilégier

des matériaux non toxiques, en partie afin d'éviter la contamination des aliments pour l'homme. Le GTCA a décidé de mettre à jour les Conseils en matière de bonnes pratiques, afin d'indiquer que les hameçons d'un poids total minimum de 50 g respectent désormais le taux d'immersion des configurations de lestage des lignes de branchement recommandées par l'ACAP, soit 0,5 m/s.

Le document **SBWG12 Doc 19** note que les bonnes pratiques actuelles en matière de lestage des lignes de branchement ne tiennent pas compte des matériaux utilisés dans le lestage, qui peuvent grandement influencer leur performance en termes d'immersion des hameçons hors de portée des oiseaux de mer, et qu'il est préférable d'utiliser des lests de densité et de masse élevées, mais de faible volume. Le GTCA a discuté des options permettant de résoudre les problèmes soulevés, en notant que des lampes et d'autres accessoires sont utilisés dans certaines pêcheries comme alternative au lestage des lignes de branchement, et que les configurations actuelles de lestage des lignes de branchement indiquées dans les bonnes pratiques de l'ACAP permettent d'obtenir, dans des conditions contrôlées expérimentalement, un taux d'immersion de 0,5 m/s. Le GTCA a noté que ce taux d'immersion permettait de garantir que les hameçons appâtés atteignent une profondeur de 5 m dans la superficie aérienne du ou des dispositif(s) d'effarouchement des oiseaux. Le GTCA a accepté de mettre à jour ses orientations pour indiquer que les configurations de lestage des lignes de branchement les plus performantes doivent être choisies parmi celles qui ont atteint un taux d'immersion minimal de 0,5 m/s à 5 m de profondeur dans des conditions contrôlées expérimentalement, et pour souligner que l'utilisation de lampes ou d'autres accessoires n'est pas recommandée à moins qu'ils ne satisfassent au critère de taux d'immersion.

La GTCA11 a mis à jour l'avis sur la palangre pélagique, pour notamment :

(i) indiquer que la bonne pratique de lestage des lignes de branchement doit permettre d'obtenir un taux d'immersion minimal dans des conditions contrôlées expérimentalement de 0,5 m/s à 5 m de profondeur, sur la base du document SBWG7 Doc 07.

(ii) indiquer que lorsqu'un lest est fixé ou intégré à l'hameçon, un poids total minimum de 50 g sera nécessaire pour atteindre un tel taux d'immersion.

(iii) éviter l'utilisation de plomb lorsque celui-ci peut être ingéré (par exemple, attaché ou intégré à l'hameçon).

L'utilisation de dispositifs d'éclairage ou d'autres accessoires de pêche en tant que lest n'est pas recommandée, à moins qu'ils n'atteignent le taux d'immersion exigé. Le document **SBWG12 Doc 12** utilise une approche de modélisation de méta-régression bayésienne en réseau multiniveau pour effectuer une synthèse des données disponibles permettant d'évaluer l'efficacité relative de divers modèles de pondération des palangres pélagiques en matière d'atténuation des captures accessoires d'oiseaux de mer. La modélisation a indiqué que les taux de capture des oiseaux de mer variaient selon les modèles évalués, et que certains modèles réduisaient considérablement les taux de capture accessoire d'oiseaux de mer, par rapport à un modèle de référence où aucun lest de ligne n'est fixé à moins de 5 m de l'hameçon. La GTCA12 a noté que la méta-régression était basée sur un petit nombre d'études et une série limitée de pêcheries, et que d'autres études, y compris celles tenant compte de diverses variables affectant les taux de captures accessoires d'oiseaux de mer, telles que les différences régionales et les différents rassemblements d'oiseaux de mer, permettraient d'améliorer la fiabilité des analyses. Le GTCA a noté l'utilité potentielle de la

méthodologie pour évaluer les bonnes pratiques en matière de mesures d'atténuation et a encouragé la poursuite des recherches.

Le document **SBWG12 Doc 10** décrit le développement d'une approche de modélisation de l'évaluation des risques environnementaux (EASI-Fish) utilisée pour comparer différentes combinaisons et spécifications entre les directives actuelles de la CICTA et les Conseils de l'ACAP en matière de bonnes pratiques, y compris sur les dispositifs de protection des hameçons. Le GTCA a noté que la modification de la mesure d'atténuation des oiseaux de mer de la CICTA pour la pêche à la palangre pélagique dans l'Atlantique Sud, afin qu'elle intègre les Conseils de l'ACAP en matière de bonnes pratiques, était susceptible de réduire sensiblement la mortalité des oiseaux de mer par rapport à l'approche actuelle, où les opérateurs sont autorisés à sélectionner deux des trois mesures d'atténuation possibles. Le SBWG12 a également noté que le fait de rendre obligatoire l'application simultanée des trois mesures d'atténuation indiquées dans les bonnes pratiques de l'ACAP, ou l'utilisation de dispositifs de protection des hameçons, était susceptible de réduire encore davantage la mortalité des oiseaux de mer par rapport aux mesures existantes. La GTCA12 a également noté qu'aucun des amendements évalués et apportés à la mesure d'atténuation des oiseaux de mer de la CICTA ne devrait affecter de manière significative les taux de capture des espèces ciblées ou d'autres espèces de captures accessoires non conservées. La GTCA12 a félicité les auteurs pour leur élaboration de graphiques accessibles, qui peuvent être utilisés pour démontrer l'efficacité relative des combinaisons de mesures d'atténuation à des interlocuteurs tels que la CICTA. La GTCA12 a noté que l'approche de modélisation comportait quelques limites, mais que le modèle était conçu pour mettre en évidence les différences relatives entre les différentes options d'atténuation des oiseaux de mer examinées par la CICTA. Le GTCA a salué cette avancée dans l'approche de la modélisation de l'évaluation des risques environnementaux et a encouragé la poursuite des recherches.

Le document **SBWG12 Inf 02** fournit une mise à jour des progrès réalisés dans le développement d'un hameçon lourd pour les pêcheries pélagiques à la palangre, qui a été soutenu par une petite subvention de l'ACAP.

Le document **SBWG12 Inf 08** a également été abordé au point 5.2 de l'ordre du jour. Le GTCA a noté que pour les pêcheries pélagiques à la palangre, le dispositif de contrôle de la tension peut être utilisé pour confirmer aussi bien le déploiement du ou des dispositif(s) d'effarouchement des oiseaux que la pose de nuit.

Le **SBWG12 Inf 10** a fait état d'essais en mer dans une pêcherie palangrière sud-africaine comparant l'utilisation d'un dispositif de protection des hameçons (Hookpod-mini) et de plombs Lumo pendant les opérations de pose de jour. Aucun enchevêtrement ou capture accessoire d'oiseaux de mer n'a été observé avec l'un ou l'autre de ces dispositifs ; l'étude a cependant révélé un enchevêtrement accru des Hookpod-minis avec les engins de pêche, la CPUE totale des espèces de thon ciblées étant inférieure à celle de l'engin de contrôle, alors qu'aucune différence n'a été constatée dans la CPUE pour les espèces non ciblées. La GTCA12 a noté que la fixation du Hookpod-minis à 3 m de l'hameçon peut avoir entraîné des problèmes d'enchevêtrement, que l'utilisation de bâtons lumineux a brouillé les résultats et que les intervalles de confiance associés à la CPUE étaient trop grands pour garantir que le dispositif de protection de l'hameçon avait une incidence sur les taux de capture.

## 7.2 Priorités en matière de recherches sur l'atténuation

Le GTCA a passé en revue les principales priorités pour la recherche sur la réduction des captures accessoires d'oiseaux de mer dans les pêcheries pélagiques à la palangre et a recommandé les suivantes :

**Lignes de branchement lestées** : mener d'autres recherches collaboratives sur le terrain concernant les liens entre les Conseils actuels de l'ACAP en matière de bonnes pratiques relatifs à la configuration du lestage des lignes de branchement et la mortalité et/ou les taux d'attaque des oiseaux de mer qui en résultent, les conséquences sur les taux de capture des espèces ciblées, les captures accessoires d'autres espèces (les tortues de mer, par exemple) et les questions de sécurité liées à la pondération des lignes. Mener des recherches supplémentaires pour étudier l'effet de la longueur totale des lignes de branchement sur la vitesse d'immersion.

**Amélioration du lestage des lignes de branchement pour les pêcheries en haute mer :** Des vitesses d'immersions élevées en faible profondeur sont avantageuses pour la conservation des oiseaux de mer, et sont particulièrement importantes en l'absence de dispositifs d'effarouchement des oiseaux ou de pose de nuit. Un taux d'immersion minimal de 0,5 m/s à 5 m de profondeur (déterminé dans des conditions contrôlées) doit être utilisé pour enrichir le développement de nouveaux régimes de lestage. Un poids unique, ou une version améliorée du système de double poids existant, pourrait constituer la meilleure option de lestage sur le plan opérationnel. Une approche pluridisciplinaire, impliquant éventuellement des membres clés de l'industrie de la pêche, des ingénieurs maritimes et tout autre profil jugé approprié, est encouragée.

**Dispositifs de protection des hameçons** : mener d'autres recherches sur le terrain afin d'évaluer les contributions relatives de la vitesse d'immersion et des éléments protecteurs qui composent les dispositifs de protection des hameçons dans la réduction des captures accessoires (y compris par enchevêtrement). La recherche sur les dispositifs de protection des hameçons devrait également porter sur leur durabilité à long terme ou leur taux de défaillance, ainsi que sur la possibilité d'augmenter la profondeur (ou la durée) de la protection fournie. Des recherches supplémentaires sur l'efficacité du Hookpod-mini (48 g) sont encouragées. Les recherches portant sur les performances des dispositifs de protection des hameçons, quels qu'ils soient, doivent recueillir des données concernant les attaques d'oiseaux de mer sur les hameçons appâtés afin d'évaluer le risque d'enchevêtrement ou d'ingestion avec l'appât.

**Dispositifs d'effarouchement des oiseaux** : en la matière, la principale priorité reste le développement de configurations des dispositifs d'effarouchement pour les navires plus petits, et l'élaboration de méthodes qui minimisent l'enchevêtrement de la partie immergée des dispositifs d'effarouchement avec les flotteurs des palangres, tout en créant une résistance suffisante pour maximiser la section aérienne. Les activités de recherche visant à évaluer l'efficacité d'un seul dispositif d'effarouchement des oiseaux par rapport à deux, les caractéristiques de conception des dispositifs d'effarouchement (longueur des banderoles, configurations et matériaux) et les méthodes permettant de les récupérer et de les ranger efficacement restent des priorités de recherche.

**Période de la journée** : déterminer l'efficacité relative des dispositifs d'effarouchement et du lestage des lignes de branchement la nuit en caractérisant le comportement nocturne des oiseaux de mer à l'aide de technologies thermiques ou de vision nocturne.

**Dispositifs sous-marins de pose d'appâts** : évaluation des performances avec des lignes de branchement lestées ou non.

**Combinaisons de mesures d'atténuation** : évaluer l'efficacité de diverses combinaisons utilisant simultanément deux méthodes d'atténuation issues des bonnes pratiques (pose de nuit, lestage des lignes de branchement et dispositifs d'effarouchement des oiseaux), comme le prévoient les mesures existantes de conservation des oiseaux de mer établies par les Organisations régionales de la gestion des pêches (ORGP). Continuer à évaluer l'efficacité de l'utilisation simultanée des trois mesures d'atténuation recommandées dans les bonnes pratiques de l'ACAP, notamment les taux de capture comparatifs aussi bien pour les captures accessoires que pour les espèces ciblées.

**Matériaux de lestage** : développement et évaluation de matériaux alternatifs ne dépendant pas du plomb et permettant d'atteindre les taux d'immersion recommandés pour les lignes de branchement.

**Technologies nouvelles/émergentes** : continuer à développer des technologies nouvelles et/ou émergentes. Envisager également des innovations en matière de contrôle indépendant des activités de pêche.

**Écologie sensorielle** : encourager et initier des recherches destinées à examiner les capacités sensorielles des oiseaux de mer (systèmes visuels, acoustiques et olfactifs) afin d'alimenter le développement de technologies et de mesures d'atténuation sûres basées sur la sensorialité comme alternative aux approches par tâtonnements. Cette priorité de recherche trouve des applications dans l'élaboration d'options d'atténuation pour un large éventail de méthodes de pêche.

**Capture d'oiseaux vivants à la palangre** : étudier la nature et l'étendue de la capture d'oiseaux vivants à la palangre dans les pêcheries pélagiques.

**Technologies d'atténuation du virage** : développer des méthodes permettant de minimiser l'accrochage d'oiseaux de mer lors de la récupération des hameçons. Encourager la poursuite des recherches visant à atténuer les captures accessoires sur les navires de petite taille lors du virage.

**Fermetures temporaires** : mettre à jour les cartes de suivi des oiseaux de mer et de chevauchement des efforts de pêche afin de faire progresser les options de gestion des différentes périodes/zones.

**Lanceurs d'appâts** : mener une enquête visant à définir les possibilités de l'utilisation des lanceurs d'appâts et leurs caractéristiques opérationnelles susceptibles d'influer sur le risque de captures accessoires.

**Masse et conception des hameçons** : étudier les modifications de la masse et de la conception des hameçons afin de déterminer si elles permettent de réduire le risque de mortalité des oiseaux de mer dans les pêcheries palangrières sans affecter négativement les taux de capture des espèces ciblées. Des recherches supplémentaires sur l'efficacité du Hookpod-mini (50 g) sont encouragées.

Jonathon Barrington et Sebastián Jiménez restent les responsables du GTCA concernant les recommandations sur l'atténuation des prises accessoires dans les pêcheries palangrières pélagiques.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Approuve l'étude actualisée et les Conseils en matière de bonnes pratiques visant à réduire les conséquences de la pêche à la palangre pélagique sur les oiseaux de mer figurant à l'**ANNEXE 4**. Ces mises à jour améliorent la clarté et la cohérence du document et reflètent les dernières recherches présentées à la GTCA12. Ces modifications comprennent la définition d'un critère de taux d'immersion pour les bonnes pratiques en matière de lestage des lignes de branchement, et la clarification de l'utilisation de poids attachés ou intégrés à l'hameçon, ainsi que de matériaux de lestage.

2. Encourage la mise en œuvre des priorités de recherche pour l'atténuation des captures accessoires dans les pêcheries palangrières pélagiques telles qu'identifiées à la Section 7.2.

3. Encourage les Parties et les autres parties prenantes à recueillir des estimations supplémentaires des taux de captures accessoires d'oiseaux de mer dans le cadre de conceptions alternatives de lestage des lignes de branchement.

## 8. PÊCHE ARTISANALE ET DE PETITE ÉCHELLE

### 8.1 Examen des évolutions récentes en matière de recherche sur l'atténuation et mise à jour des conseils de la boîte à outils

Le document **SBWG12 Inf 09** décrit un projet dans le cadre duquel les journaux de bord des navires, des entretiens avec l'équipage et des données provenant d'enquêtes scientifiques ont été utilisés pour évaluer les risques que posaient, pour les oiseaux de mer, une flotte diversifiée de pêche à la ligne de petite échelle dans le sud et le sud-est du Brésil. Les résultats indiquent que les pêcheries brésiliennes de petite échelle peuvent constituer une menace considérable pour les oiseaux de mer, y compris les espèces inscrites à l'ACAP. Le GTCA a noté que ces résultats corroboraient les conclusions présentées à la GTCA11 (SWBG11 Inf 22) et appuyaient les recommandations de la GTCA11 pour ces pêcheries. Le GTCA a pris note des préoccupations exprimées dans le document concernant les définitions de la pêche de petite échelle de l'ACAP, et de la référence au PAN-Oiseaux de mer du Brésil, qui comprend une action visant à interagir avec les pêcheries de petite échelle afin d'améliorer la manipulation des oiseaux accidentellement capturés (voir également la Section 12). Le GTCA a également noté que le projet a été financé par une petite subvention de l'ACAP.

Le document **SBWG12 Inf 14** décrit des travaux de test des mesures d'atténuation des captures accessoires d'oiseaux de mer dans la pêche artisanale à la palangre ciblant les requins dans le sud du Pérou, qui coïncide avec des densités élevées d'espèces inscrites à l'ACAP. Le document décrit la première phase d'expérimentation de cette pêche, des travaux supplémentaires testant les mesures d'atténuation étant actuellement en cours et devant s'achever en octobre 2024. Le GTCA a noté qu'il n'y avait eu aucune capture accessoire au cours des 10 sorties de pêche contrôlées, un résultat partiellement influencé par les lignes de branchement lestées (émerillon plombé de 60 g à 0,5 m de l'hameçon) et le dispositif

d'effarouchement des oiseaux utilisé, ainsi que par la faible densité d'oiseaux de mer au large du Pérou au printemps et en été, lorsque ces sorties ont été effectuées. Le GTCA s'est félicité des informations utiles sur les rassemblements d'oiseaux de mer, les engins de pêche et les opérations de pêche dans ces pêcheries, ainsi que sur les mesures d'atténuation réalisables.

Le document **SBWG12 Inf 15** présente l'utilisation d'informations sur la distribution spatiale de l'effort de pêche des petites pêcheries péruviennes à filets maillants et à palangres pélagiques, combinée à des données sur la distribution des oiseaux de mer obtenues par des comptages lors de croisières scientifiques, afin d'évaluer la concomitance entre ces pêcheries et les albatros *Thalassarche salvini*, *Thalassarche bulleri*, *Thalassarche eremita* et *Thalassarche melanophris*. Le document fournit de précieuses informations, spécifiques aux espèces, sur la concomitance spatio-temporelle de la distribution des espèces d'albatros avec chaque pêcherie : cela permet de tirer d'utiles conclusions sur les interactions positives et négatives avec ces pêcheries, notamment concernant le risque de captures accessoires.

Le document **SBWG12 Inf 16** décrit les zones potentielles d'interaction entre les albatros et la pêche au coryphène (mahi mahi) au large de la côte péruvienne. Les données proviennent de pêcheurs et de croisières de recherche. Le document indique que la densité des opérations de pêche varie en fonction de la distance au large, de la saison et de la latitude. En raison de ces variations, le chevauchement avec les albatros *Phoebastria irrorata*, *T. eremita*, *T. melanophris*, *T. bulleri* et *T. salvini* a également fluctué. Le GTCA a noté que les données provenaient de croisières de recherche menées entre la côte et 100 miles nautiques au large, et que des données spatiales plus représentatives (en particulier au large) permettraient d'obtenir des résultats plus solides. Le GTCA a encouragé l'intégration des informations présentées dans le document au projet d'évaluation des risques du courant de Humboldt, qui vient d'être lancé. L'article note que les données GPS de l'albatros *P. irrorata* pourraient être utilisées pour explorer davantage la concomitance avec les pêcheries.

Le document **SBWG12 Inf 17** décrit une approche innovante, actuellement en cours, dans la collecte de données sur les captures accessoires d'oiseaux de mer directement auprès des pêcheurs artisanaux par filets maillants sur la côte péruvienne, via WhatsApp et communications radio. Le document décrit également l'utilisation de WhatsApp et des réseaux sociaux pour informer les pêcheurs sur les questions de conservation et sur la manipulation en toute sécurité des oiseaux de mer, mais également comme ressource pour l'identification des oiseaux de mer. L'article présente des données recueillies auprès de pêcheurs et de croisières de recherche pour décrire la répartition des albatros, qui varie en fonction d'El Niño et de La Niña. Le GTCA a noté qu'il s'agissait d'une innovation intéressante pour les pêcheries de petite échelle, pour lesquelles il est difficile d'embarquer des observateurs à bord des navires. Le GTCA a noté qu'il serait utile que les documents qui évaluent la concomitance entre les captures accessoires d'oiseaux de mer et les pêcheries contribuent à la recherche décrivant les nombres et les taux de captures accessoires, dans la mesure du possible.

## 8.2 Priorités en matière de recherches sur l'atténuation

Le GTCA a souligné que les priorités de la pêche de petite échelle en matière de recherche sur les mesures d'atténuation pourraient coïncider avec les priorités identifiées pour la pêche démersale à la palangre. En conséquent, il a été suggéré de regrouper toutes les priorités de recherche en une seule liste, ce qui éviterait les doublons et permettrait d'établir des priorités

entre les différentes méthodes. Le GTCA a convenu que ce travail serait entrepris intersessions et présenté à la GTCA13.

Il a été noté que les priorités de recherche peuvent être élaborées à partir de la catégorisation des méthodes décrites dans la boîte à outils pour l'atténuation des captures accessoires d'oiseaux de mer par les pêcheries artisanales. Le GTCA a souligné que la pêche au coryphène (mahi-mahi) nécessitait davantage de recherche sur l'atténuation des captures accidentelles d'oiseaux de mer.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Note les progrès réalisés pour alimenter la boîte à outils d'atténuation des captures accessoires d'oiseaux de mer (**CC11 Doc 06 ANNEXE 6**) pour la pêche artisanale et de petite échelle ainsi que les plans visant à achever le processus au cours de la prochaine période intersession, après quoi elle sera disponible sur le site web de l'ACAP.

2. Note que les Présidents du GTCA regrouperont toutes les priorités en matière de recherche sur l'atténuation en vue de leur examen par la GTCA13, qui s'alignera sur le processus de normalisation et d'amélioration de la cohérence entre les Conseils en matière de bonnes pratiques pour chaque type d'engin de pêche.

## 9. ATTÉNUATION DES CAPTURES ACCESSOIRES D'OISEAUX DE MER DANS LES PÊCHERIES A LA SENNE COULISSANTE

### 9.1 Examen des évolutions récentes en matière de recherche sur l'atténuation et mise à jour des conseils de la boîte à outils

Le document **SBWG12 Inf 11** présente des lignes directrices actualisées pour la manipulation et le sauvetage des oiseaux de mer à bord de la flotte de petite échelle de senneurs de maquereaux opérant dans le centre-sud du Chili. Le document souligne l'ajout de lignes directrices générales sur la pêche, de détails sur la manipulation des oiseaux de mer à bord en tenant compte de la sécurité de l'équipage, de partenariats avec les pêcheurs visant à développer des outils permettant de manipuler les oiseaux de mer en toute sécurité, et d'une collaboration avec les centres de rééducation des oiseaux de mer. Les senneurs de maquereaux ont mis en place des stations de récupération des oiseaux de mer à bord (destinées aux individus trempés/stressés qui ont été secourus), garantissant un niveau limité de lumière et de bruit, peu de circulation des personnes et l'absence d'hydrocarbures. Les nouvelles directives relatives à la manipulation des oiseaux de mer suivent les procédures panzootiques H5N1de l'ACAP et sont conformes aux réglementations relatives à la pêche à la senne coulissante et aux réglementations nationales chiliennes relatives à la conservation des manchots et des Procellariiformes. Le GTCA s'est félicité des nouvelles lignes directrices ainsi que de la collaboration avec les pêcheurs et avec le GTSPC. Le GTCA a noté que les schémas de manipulation des oiseaux de mer étaient très clairs, que le texte d'accompagnement était simple et que les lignes directrices s'appliquaient également à la

manipulation des oiseaux de mer dans toute pêcherie, à bord des navires de croisière et sur les plateformes éclairées qui attirent les oiseaux de mer (par exemple, les phares et autres types de plateformes en mer). Le GTCA a encouragé la poursuite des travaux sur ces documents, afin de les intégrer aux lignes directrices de l'ACAP.

Le document **SBWG12 Inf 12** présente la mise à jour de la boîte à outils destinée à atténuer les interactions avec les oiseaux de mer pendant les opérations de pêche à la senne coulissante, actualisée par rapport ) la version originale présentée dans le document SBWG10 Doc 19. Cette nouvelle boîte à outils fournit des recommandations sur les mesures d'atténuation des captures accessoires et facilite la consultation pour la prise de décision. Le document détaille les phases d'une opération de pêche à la senne coulissante, les mesures d'atténuation des captures accessoires pouvant être appliquées à chacune des phases et leur efficacité (c'est-à-dire si la mesure potentielle est basée sur une évaluation systématique ou si elle nécessite des essais supplémentaires). Cette approche facilite non seulement la prise de décision, mais encourage également le suivi de la mise en œuvre et la poursuite des recherches. Le travail sur la boîte à outils est en cours ; elle vise à encourager la collaboration entre les pêcheries à senne coulissante opérant à l'échelle mondiale et ciblant une variété d'espèces de poissons. La GTCA12 a félicité les auteurs pour la manière dont ils ont présenté les recommandations et pour le processus d'élaboration à long terme de ces conseils, et a noté que le travail était encore en cours. Le GTCA a également noté que la boîte à outils peut être appliquée à n'importe quelle pêcherie à senne coulissante.

## 9.2 Priorités en matière de recherches sur l'atténuation

Il a été noté que les priorités de recherche peuvent être élaborées à partir de la catégorisation des méthodes décrites dans la boîte à outils pour l'atténuation des captures accessoires d'oiseaux de mer par les pêcheries à senne coulissante.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Approuve la mise à jour de la boîte à outils pour les conseils sur la réduction des captures accessoires d'oiseaux de mer dans les pêcheries à la senne coulissante, présentée dans le document **SBWG12 Inf 12** ; cette boîte à outils sera également reformatée pour servir de ressource sur la réduction des captures accessoires, publiée sur le site web de l'ACAP.
2. Note les résultats obtenus dans l'élaboration de mesures d'atténuation des captures accessoires d'oiseaux de mer pour les opérations de pêche à la senne coulissante, et encourage les parties à mener d'autres études expérimentales.
3. Note la possibilité de développer les éléments présentés dans le document **SBWG12 Inf 11** pour en faire des lignes directrices de l'ACAP.

# 10. ATTENUATION DES CAPTURES ACCESSOIRES D'OISEAUX DE MER DANS D'AUTRES PECHERIES INDUSTRIELLES

## 10.1 Examiner les développements récents dans le domaine de la recherche sur l'atténuation et réfléchir aux priorités à donner aux suites de la recherche

Il n'y avait pas de documents à examiner sous ce point de l'ordre du jour.

## 10.2 Évaluation des risques et élaboration de conseils de l'ACAP à destination de toute autre pêcherie concernée

Aucun document n'a été examiné au titre de ce point de l'ordre du jour et aucune autre pêcherie n'a été identifiée en vue de l'élaboration de conseils de l'ACAP.

# 11. INDICATEURS DE PERFORMANCE DE L'ACAP : ATELIER SUR LES DONNEES RELATIVES AUX CAPTURES ACCESSOIRES D'OISEAUX DE MER

## 11.1 Atelier sur les données relatives aux captures accessoires d'oiseaux de mer

Le document **SBWG12 Doc 04** présente un atelier sur les données relatives aux captures accessoires d'oiseaux de mer qui s'est tenu le 4 août 2024, juste avant la GTCA12. L'atelier visait à comprendre et résoudre les difficultés rencontrées dans la communication des indicateurs de captures accessoires d'oiseaux de mer de l'ACAP, et à examiner les menaces en mer pesant sur les albatros et les pétrels. La GTCA12 a examiné le premier élément dans le cadre de ce point de l'ordre du jour et le second dans le cadre du point 14 de l'ordre du jour. En examinant les recommandations de l'atelier, le GTCA a noté que les niveaux de déclaration des Parties restaient faibles et qu'il était donc peu probable que des données détaillées sur les captures accessoires puissent être utilisées comme indicateur de performance pour l'ACAP. Une amélioration des liens entre agences de pêche et agences environnementales pourrait à terme améliorer la collecte et la déclaration des données sur les captures accessoires d'oiseaux de mer ; en attendant, il serait dans l'intérêt de l'ACAP de se concentrer sur la collecte de mesures plus simples. Par conséquent, des indicateurs de réponse simplifiés sur la mise en œuvre de l'atténuation ont été envisagés, par exemple le caractère obligatoire de l'atténuation est obligatoire. Le Groupe de travail a convenu que de telles mesures devraient devenir prioritaires afin de faire progresser le développement des indicateurs de captures accessoires pour l'ACAP. Il a été reconnu qu'un projet ACAP pourrait aider les Parties à établir des rapports portant sur des indicateurs simplifiés. Le GTCA a fait part de ses préoccupations concernant le déroulement de l'atelier, notamment les difficultés liées à l'absence d'interprétation et à la réunion de deux groupes ne parlant pas la même langue. Il a également été noté que la fourniture de services d'interprétation lors des futurs ateliers aurait des implications financières.

## 11.2 Révision des lignes directrices pour la collecte des données des observateurs et du suivi électronique

Le document **SBWG12 Doc 15** fait état de différences dans les interactions entre le pétrel *Procellaria parkinsoni* et les navires de pêche à la palangre de fond, à l'aide d'observateurs embarqués et du suivi électronique. Les résultats ont montré que les captures estimées de *Procellaria parkinsoni* étaient plus faibles lorsque les données des observateurs et les données de suivi électronique étaient combinées, par rapport aux seules données des observateurs. Le GTCA a pris note des résultats de la recherche et a recommandé une révision des orientations de l'ACAP sur la collecte et l'évaluation des données relatives aux captures accessoires d'oiseaux de mer afin de refléter les conclusions de l'étude.

Le document **SBWG12 Inf 18** utilise des modèles bayésiens de séries temporelles pour estimer les captures accessoires d'une espèce d'albatros en danger. Tout en notant les avantages de cette technique avancée, le GTCA a souligné qu'il ne fallait pas sous-estimer l'importance de la collecte de données.

Le GTCA a convenu que tant le programme d'observation de l'ACAP que les lignes directrices en matière de suivi électronique seraient révisés pendant l'intersession. Ce passage en revue pourrait inclure l'élaboration d'orientations sur les méthodes d'estimation des captures accessoires pour ces données, une fois qu'elles auront été collectées. Il a été noté que l'utilisation de l'intelligence artificielle (IA) pour analyser les images des caméras de suivi électronique suscite un intérêt croissant, et que la disponibilité d'images pour entraîner ces systèmes est actuellement un facteur limitant, qui pourrait être surmonté par une coopération accrue.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

En ce qui concerne les indicateurs et la collecte de données de l'ACAP, le GTCA recommande que le Comité consultatif :

1. Accepte de donner la priorité à la collecte de données de réponse simples sur la mise en œuvre de l'atténuation des captures accessoires d'oiseaux de mer dans les pêcheries nationales aussi bien que dans celles des ORGP.

2. Encourage les Parties à communiquer des informations détaillées sur les captures accessoires d'oiseaux de mer lorsque cela est possible et, en particulier, sur les taux de captures accessoires d'oiseaux de mer et l'effort de pêche total.

3. Accepte le développement d'un projet financé par l'ACAP pour soutenir la communication de données concernant les indicateurs de captures accessoires.

4. Note que des services d'interprétation simultanée pourraient améliorer les futurs ateliers, nécessitant toutefois des ressources supplémentaires dans le budget de l'ACAP.

En ce qui concerne les observateurs et le suivi électronique, le GTCA recommande que le Comité consultatif :

1. Note qu'un processus intersession est prévu pour mettre à jour les lignes directrices de l'ACAP en matière de collecte de données pour les programmes d'observation et le suivi électronique.

2. Encourage les Parties à collaborer et à partager les données des programmes d'intelligence artificielle (IA) qui viennent améliorer l'identification des mesures d'atténuation des captures accessoires.

## 12. FAO PAI/PAN-OISEAUX DE MER

### 12.1 Examen de l'état d'avancement de la mise en œuvre du PAN-oiseaux de mer

Le document **SBWG12 Doc 11** présente une actualisation du Plan d'action régional entre l'Argentine et l'Uruguay visant à réduire l'interaction des oiseaux de mer avec les pêcheries opérant dans la zone du Traité du Río de la Plata et sa façade maritime, et adopté par la Commission du Traité en juin 2022 (voir SBWG11 Inf 03). Le Plan d'action régional a été présenté à la FAO en septembre 2022. En mai 2024, la Commission technique mixte s'est réunie pour examiner les activités pour 2024 et 2025, notamment l'élaboration d'un plan de recherche. Le GTCA a félicité l'Argentine et l'Uruguay pour les progrès réalisés dans la mise en œuvre de leur Plan d'action régional et a noté que la recommandation proposée serait examinée lors de la réunion conjointe GTCA12/GTSPC8 (**CC14 Doc 13**).

Le document **SBWG12 Inf 05** décrit comment le Plan d'action national du Brésil pour la conservation des albatros et des pétrels (PLANACAP) aborde les menaces qui pèsent sur ces espèces. Une révision du PLANACAP en 2024 a conduit à un nouveau cycle d'activités, tenant compte des conseils et des lignes directrices les plus récents de l'ACAP. À terme, le quatrième cycle de PLANACAP vise à réduire encore la mortalité des albatros et des pétrels en se concentrant sur quatre objectifs spécifiques : comprendre et atténuer les interactions avec la pêche, suivre les effets des projets offshore, traiter les questions liées aux agents pathogènes, à la pollution et au changement climatique, et enfin améliorer la politique publique et l'éducation en matière d'environnement. Le GTCA a salué le travail du Brésil dans ce domaine. En réponse à une suggestion de se concentrer sur les principales priorités, il a été noté que ce Plan a été lancé en 2006, lors de la deuxième réunion du Comité consultatif (CC2) à Brasilia. Depuis lors, des réunions annuelles ont été organisées pour suivre ses progrès. En outre, il a été souligné que le Plan s'aligne sur l'Annexe 2, Plan d'action de l'Accord, et que sa mise en œuvre soutient directement les objectifs plus larges de l'Accord au Brésil.

Le document **SBWG12 Inf 06** examine comment le Chili a, depuis 2012, développé et mis en œuvre un processus de diagnostic, de réduction et de contrôle des déchets et des captures accessoires dans ses pêcheries nationales. Ce processus a nécessité les efforts conjoints des agences de réglementation, de recherche et de contrôle, ainsi qu'une collaboration avec les pêcheurs. Durant ces 12 années, le Chili a adopté une législation en 2014, 2019 et 2021 afin de mettre en place des mesures d'atténuation des captures accessoires pour les flottes industrielles et artisanales de pêche à la palangre et de pêche au chalut, en rendant obligatoire l'utilisation de dispositifs de dissuasion, l'application de codes de bonnes pratiques de pêche et la déclaration dans les journaux de bord, entre autres. L'ensemble de ces mesures a permis

de réduire considérablement le nombre de captures accessoires. Le Chili a noté que le développement du suivi électronique a considérablement contribué aux observations et au respect de la conformité, mais fait cependant remarquer que la mise en œuvre du suivi électronique dans les flottes artisanales et l'utilisation des images à des fins autres que la conformité posent encore des problèmes. Le Chili a remercié l'ACAP pour tout le travail qu'elle accomplit, y compris l'octroi de petites subventions. Le GTCA a félicité le Chili pour le travail accompli depuis 2012, notant qu'il peut être considéré comme une véritable victoire pour l'ACAP et les espèces inscrites à l'ACAP.

Au cours de la discussion, l'élaboration et la mise à jour d'autres Plans d'action nationaux ont été décrites. La Nouvelle-Zélande a fait le point sur la mise en œuvre de son PAN en 2022. Cela a entraîné une révision des réglementations relatives à la pêche à la palangre pélagique en 2023, qui a conduit à une décision de la Nouvelle-Zélande en 2024 d'exiger l'application des Conseils de l'ACAP en matière de bonnes pratiques dans ses pêcheries à la palangre pélagique, qui entreront en vigueur en octobre 2024. L'Espagne améliore actuellement son Plan d'action pour les observateurs, visant à atteindre une couverture de 10 % d'observateurs sur l'ensemble de la flotte espagnole, bien qu'il ait été noté que ce niveau ne serait pas spécifique aux seules observations d'oiseaux de mer. L'Australie a présenté son approche intégrée : le PAN-Oiseaux de mer (dont la révision est prévue), le Plan national de rétablissement des albatros et des pétrels et le Plan d'élimination de la menace pour les oiseaux de mer, qui a été révisé en 2023. L'Australie a reporté son projet de mise à jour du Plan d'élimination de la menace liée aux débris marins en attendant l'élaboration du Traité mondial contre la pollution plastique. L'Afrique du Sud a indiqué avoir récemment achevé le passage en revue de son PAN-Oiseaux de mer ; elle espère avoir, dès la fin du mois d'août, un document à présenter à son Ministre pour approbation. L'Afrique du Sud a indiqué que, dans le cadre de l'actualisation de son plan, elle s'était appuyée sur les Conseils de l'ACAP en matière de bonnes pratiques, sur ses données de pêche les plus récentes et sur les systèmes de collecte de données et de gestion de l'information.

Le GTCA s'est félicité de ces mises à jour et a décidé de recommander à la CC14 de féliciter les Parties qui ont élaboré ou mis à jour leur PAN et/ou leur Plan d'action régional et d'encourager les autres Parties à suivre cet exemple.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Encourage les Parties à mettre en œuvre des Plans d'action nationaux ou régionaux pour lutter contre les captures accessoires d'oiseaux de mer et à fournir des mises à jour lors de chaque réunion du GTCA.

2. Encourage les Parties qui n'ont pas encore élaboré de Plans nationaux à le faire sans plus attendre.

## 13. AMELIORATION DE LA MISE EN ŒUVRE DES BONNES PRATIQUES EN MATIERE D'ATTENUATION DES CAPTURES ACCESSOIRES

Le GTCA a accueilli favorablement le document **SBWG12 Doc 14**, qui fait le point sur le développement d'une boîte à outils pour une pêche sans danger pour les oiseaux de mer (Seabird-Safe Fishing Toolkit), une ressource en ligne conçue pour fournir aux entreprises de produits de la mer les moyens de pratiquer une pêche sûre pour les oiseaux de mer, en s'appuyant sur les préoccupations des consommateurs de produits de la mer en matière de développement durable. Cette boîte à outils a été élaborée en collaboration avec des experts en science de l'atténuation, des entreprises de produits de la mer et des ONG, afin d'utiliser les données disponibles pour développer et définir des catégories simples : 1) zones océaniques où vivent les oiseaux de mer ; 2) efficacité des mesures d'atténuation pour réduire les captures d'oiseaux de mer ; 3) sécurité pour les oiseaux de mer de certaines pêcheries ; et 4) degré de confiance dans la mise en œuvre des mesures. Les options d'atténuation sont basées sur les Conseils de l'ACAP en matière de bonnes pratiques. Dans un premier temps, l'accent est mis sur la pêche à la palangre pélagique, mais l'action pourrait être étendue à d'autres engins de pêche et à d'autres espèces de la mégafaune. Les sociétés de pêche pourraient utiliser la boîte à outils pour déterminer le niveau de risque de leur lieu de pêche, les mesures d'atténuation appropriées pour réduire ce risque et les approches disponibles pour contrôler la conformité. Le GTCA a noté que la boîte à outils pourrait être une ressource très utile pour les organismes de certification MSC afin d'évaluer si les pêcheries candidates sont sûres pour les oiseaux de mer, et déterminer les mesures qui peuvent être mises en place si elles ne le sont pas. Le GTCA a recommandé à l'ACAP de promouvoir l'utilisation de cette boîte à outils pour renforcer les efforts visant à adopter les bonnes pratiques de l'ACAP en matière de mesures d'atténuation.

Le document **SBWG12/PaCSW8 Inf 12** fait le point sur les travaux entrepris pour définir les zones océaniques à risque utilisées dans la boîte à outils pour une pêche sans danger pour les oiseaux de mer (**SBWG12 Doc 14**), et décrit les méthodes utilisées. La boîte à outils comprend un zonage des océans mondiaux en fonction des espèces d'oiseaux de mer présentes, de leur statut et de leur vulnérabilité aux captures accessoires lors de la pêche à la palangre. Les couches cartographiques constitutives ont permis d'identifier les zones de l'océan Pacifique où : 1) les oiseaux de mer dont le statut de conservation est élevé sont présents (couche des espèces menacées) ; 2) la diversité des espèces est élevée (couche de la diversité des espèces) ; et 3) les pétrels *Procellaria* sont présents (couche des pétrels *Procellaria*). Les zones océaniques globales initiales fournissent une évaluation et une catégorisation complètes mais simples du risque relatif de captures accessoires pour les espèces inscrites à l'ACAP dans l'ensemble du Pacifique. Les limites actuelles des données et des méthodes sont examinées, de même que les futurs progrès potentiels pour améliorer l'évaluation. Les auteurs ont l'intention d'améliorer continuellement les données d'entrée et les méthodes utilisées pour décrire les zones océaniques et souhaitent une collaboration active avec les chercheurs et autres personnes impliquées dans la collecte et l'analyse des données sur la répartition des oiseaux de mer. Il a été noté que les cartes actuelles des espèces sont organisées en une couche unique qui inclut toutes les classes d'âge et de sexe pour chaque espèce aux fins de la boîte à outils, et que ces cartes constitueront une ressource précieuse. L'outil pourrait être élargi pour inclure d'autres couches.

Le document **SBWG12 Doc 18** explore les facteurs influençant l'adoption des stratégies d'atténuation des captures accessoires pour protéger la mégafaune marine (dont les oiseaux

de mer), en mettant plus particulièrement l'accent sur la dynamique sociale et comportementale en jeu, fondée sur l'étude du cas de la flotte chalutière hauturière commerciale de fond de l'Argentine. Des entrevues ont été menées avec les principaux intervenants argentins afin de recueillir leurs opinions et leurs perceptions concernant les captures accessoires et leur atténuation dans les pêcheries commerciales : (1) selon la perception dominante, les équipages hésitent à utiliser des mesures d'atténuation (MA) – les dirigeants et les pêcheurs ont toutefois des points de vue divergents ; (2) la perception que les techniques et/ou technologies d'atténuation sont pesantes et inefficaces constitue le principal obstacle à la mise en œuvre des MA ; et (3) les participants suggèrent que l'amélioration des mesures de gouvernance stratégique et la promotion de la collaboration entre les différentes parties prenantes pourraient favoriser l'adoption des MA. Le GTCA a noté que l'étude souligne l'importance de prendre en compte la dynamique sociale dans la résolution des problèmes de captures accessoires pour la mégafaune marine et l'utilisation de mesures d'atténuation dans le cadre de la pêche commerciale en eaux profondes. Ce document est le fruit d'un détachement ACAP pour travailler avec des spécialistes en sciences sociales au CSIRO et à l'Université James Cook en Australie, afin d'incorporer à ces travaux les dernières méthodes scientifiques en date. Le GTCA a salué ces travaux et a réaffirmé son intérêt pour l'application d'approches en sciences sociales permettant de comprendre les points de vue et les réseaux de communication des parties prenantes, dans le but d'encourager l'utilisation de bonnes pratiques en matière d'atténuation dans leurs pêcheries. Le GTCA a soutenu la recommandation que l'ACAP considère les mérites de l'incorporation formelle de la dimension humaine des captures accessoires et de l'adoption de mesures d'atténuation dans le Programme de travail du CC.

Le document **SBWG12 Inf 13** présente le projet REDUCE qui vise à minimiser les captures accidentelles d'espèces en danger, menacées et protégées dans les pêcheries industrielles de l'UE opérant dans l'est de l'océan Atlantique central. Le projet se concentre sur les flottes de senneurs, de palangriers et de chalutiers, en particulier en Espagne, en France et au Portugal, qui contribuent de manière significative aux captures accessoires dans ce point chaud de la biodiversité. REDUCE utilisera des approches scientifiques interdisciplinaires pour améliorer le suivi des pêcheries, comprendre la dynamique des captures accessoires et élaborer des stratégies d'atténuation efficaces. Le GTCA a noté que le projet REDUCE en est à ses premiers stades de mise en œuvre et qu'il se concentre principalement sur le développement technologique à ce stade, en utilisant une approche universitaire. Le GTCA a souhaité être tenu au courant de l'avancement du projet.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Soutienne la promotion par l'ACAP de la boîte à outils pour une pêche sans danger pour les oiseaux de mer, y compris par le biais du site web de l'ACAP, afin de renforcer les efforts visant à adopter les meilleures pratiques de l'ACAP en matière de mesures d'atténuation.

2. Note l'incorporation dans le Programme de travail du CC de l'étude de la dimension humaine des captures accessoires et de l'adoption de mesures d'atténuation en tant qu'approche pertinente pour améliorer cette adoption.

# 14. ACTIONS PRIORITAIRES DE CONSERVATION EN MER

## 14.1 Examen des pêcheries prioritaires et rapport sur l'atelier préalable à la réunion

Le document **SBWG12 Doc 04** rend compte d'un atelier qui s'est tenu le 4 août 2024, juste avant la GTCA12. L'atelier a examiné, entre autres, les pêcheries prioritaires pour les actions de conservation des espèces inscrites à l'ACAP. Cela s'appuyait sur un cadre élaboré et accepté par la réunion des parties (RdP) (MoP4 Inf 06 Rev 1). Ce cadre est étayé par des informations sur les pêcheries (fournies par des experts et par les Parties), y compris celles opérant en dehors des Zones économiques exclusives (ZEE), ainsi que sur la taille et les tendances des populations d'albatros et de pétrels qui pourraient être affectées par ces pêcheries. Les pêcheries « prioritaires » ont été définies comme les 10 % les plus importantes de toutes les pêcheries évaluées. Vingt-cinq pêcheries et 28 populations d'oiseaux de mer ont été définies comme cibles d'action prioritaires lors de la dernière itération (2021) de la procédure de hiérarchisation (Tableau 3, **CC14 Doc 18**).

Le GTCA a convenu que la liste complète actuelle des pêcheries doit être entièrement revue et mise à jour par les Parties (par l'intermédiaire de leurs points de contact). Plusieurs omissions possibles dans la liste actuelle des pêcheries prioritaires pour les actions de conservation sont actuellement examinées par le Secrétariat. Il a été convenu qu'une approche par étapes pourrait être utilisée pour mettre à jour les pêcheries : 1) les Parties, les États de l'aire de répartition et les observateurs des économies membres de l'APEC devraient être invités à mettre à jour les informations sur leurs pêcheries dès que possible ; 2) les informations sur les pêcheries gérées par les ORGP devraient être mises à jour à l'aide de documents accessibles au public, en notant que l'ACAP a conclu des protocoles d'accord ou des accords similaires avec la plupart des ORGP concernées ; et 3) un processus supplémentaire serait nécessaire pour les autres États qui n'interagissent pas actuellement avec l'ACAP. Il a été noté que si la capacité permettait de mettre à jour au moins les pêcheries d'observation des Parties et des États de l'aire de répartition au cours des prochains mois, une nouvelle version des pêcheries prioritaires pourrait être fournie à la RdP8. Une mise à jour pourrait également avoir lieu au cours de la prochaine période intersessions de la RdP. Il a été convenu que l'ensemble des espèces inscrites à l'ACAP potentiellement affectées par une pêcherie devraient être listées dans le tableau des pêcheries « hautement prioritaires », plutôt qu'uniquement les espèces associées au score le plus élevé.

Le GTCA s'est félicité de cette inclusion par l'atelier d'actions identifiées pouvant être mises en place par l'ACAP et ses Parties pour réduire les captures accidentelles d'oiseaux de mer dans ces pêcheries prioritaires. À l'issue du processus de hiérarchisation, il peut s'avérer nécessaire d'identifier des actions supplémentaires, en particulier si d'autres pêcheries sont classées comme « hautement prioritaires pour une action de conservation ».

Le document **SBWG12 Inf 04** décrit des observations limitées d'interactions de chalutage par l'Espagne et l'Uruguay sur une partie du plateau continental en haute mer dans l'Atlantique sud-ouest. Le GTCA a accueilli favorablement ce document, notant que cette zone n'est actuellement réglementée par aucun organisme national ou international et qu'on estime à 350 le nombre de navires de pêche d'une variété de métiers et d'États du pavillon qui pourraient utiliser la zone. Le GTCA a noté que les interactions dans cette zone pourraient constituer une menace considérable pour plusieurs populations d'espèces inscrites à l'ACAP.

En l'absence d'informations concrètes, le GTCA a encouragé les Parties et les observateurs à fournir davantage d'informations sur les pêcheries dans cette zone à la GTCA13.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Examine et approuve les actions prioritaires de conservation en mer identifiées pour l'ACAP et les Parties à l'ACAP (**ANNEXE 5**).
2. Note l'approche progressive proposée pour mettre à jour les pêcheries prioritaires, en commençant par les pêcheries des Parties, des États de l'aire de répartition et des économies membres de l'APEC ayant le statut d'observateur, suivies des pêcheries des pays non Parties et des pêcheries des ORGP.
3. Demande aux Parties et aux Observateurs des Etats de l'aire de répartition et des économies membres de l'APEC d'examiner et de mettre à jour la liste des pêcheries qui les concernent et qui doivent être utilisées dans le cadre de priorisation, de mettre à jour les scores pour chacune de ces pêcheries et d'identifier d'autres actions possibles pour l'ACAP ou les Parties à l'ACAP pour les pêcheries hautement prioritaires.
4. Note les interactions potentiellement graves entre les pêcheries et les oiseaux de mer dans la zone de haute mer non réglementée du sud-ouest de l'Atlantique.
5. Encourage les Parties et autres à fournir au GTCA des documents décrivant l'activité de pêche et toute autre information pertinente sur cette zone de l'Atlantique du Sud-Ouest.

## 15. OUTILS ET LIGNES DIRECTRICES

### 15.1 Mises à jour et nouvelles lignes directrices

Il n'y avait pas de documents soumis sous ce point de l'ordre du jour. Les lignes directrices relatives au programme d'observation et à la collecte de données de suivi électroniques ont été examinées au point 11.2 de l'ordre du jour. Les recommandations pour de nouvelles lignes directrices potentielles permettant de soutenir la stratégie d'interaction avec les ORGP ont été discutées lors de la réunion conjointe GTCA12/GTSPC8 (**CC14 Doc 13**).

### 15.2 Fiches pratiques sur l'atténuation

Le document **SBWG12 Doc 08** fait le point sur l'état d'avancement de la fiche d'information concernant les dispositifs d'effarouchement des oiseaux sur les palangriers pélagiques pour les navires <35m. Les fiches pratiques pour les navires ≥35m et pour les dispositifs d'effarouchement des oiseaux pour la palangre démersale doivent être terminées en priorité, tout comme plusieurs autres qui n'ont pas encore été converties au nouveau format simplifié : lestage des palangres démersales, collisions avec les funes et enchevêtrement dans les chaluts.

Le document **SBWG12 Inf 07** fournit des informations sur les possibilités de collision et/ou d'enchevêtrement des oiseaux de mer avec les câbles associés aux opérations de pêche des chalutiers chiliens. Des informations ont été fournies sur les différents câbles utilisés dans ces pêcheries au chalut, en particulier sur leurs caractéristiques spécifiques de construction et de fonctionnement. Le document fournit des infographies sur les mesures d'atténuation utilisées par la flotte chilienne de grands chalutiers-usines. Des informations supplémentaires sont en cours de collecte afin de vérifier que ces mesures d'atténuation sont efficaces et qu'elles répondent aux critères de bonnes pratiques de l'ACAP. Les auteurs étudieront les moyens de communiquer ces mesures aux non-Parties par le biais de boîtes à outils. Le GTCA a accueilli favorablement la présentation de ce travail et a noté que son contenu peut faciliter le développement d'une fiche d'information simplifiée sur les mesures d'atténuation des captures accessoires d'oiseaux de mer concernant les collisions avec les câbles de contrôle des filets dans les pêcheries au chalut. Le GTCA a noté la possibilité d'utiliser des mesures d'atténuation instantanées pendant les opérations de virage (par exemple des mesures de dissuasion acoustiques ou des pulvérisations d'eau) lorsque les oiseaux de mer peuvent se prendre les plumes dans les torons métalliques (fune ou câble de contrôle des filets) lorsque ces derniers s'ouvrent et se ferment en raison de l'oscillation de la tension. Le Chili note que d'autres mesures d'atténuation sont en cours d'élaboration et qu'elles feront l'objet d'un rapport à la GTCA13.

José Carlos Báez, Sebastián Jiménez et Jonathon Barrington ont accepté de rédiger la fiche d'information sur la pêche à la senne coulissante. Les graphiques présentés dans le document **SBWG12 Inf 12** et d'autres documents de référence seront traduits en anglais pour faciliter la production de cette fiche d'information. Un soutien supplémentaire de la part d'experts de la pêche à la senne coulissante péruvienne serait le bienvenu.

Leandro Tamini a accepté de diriger la rédaction de la fiche d'information sur le chalutage démersal et pélagique.

Verónica Iriarte a accepté de diriger la rédaction de la fiche d'information sur l'enchevêtrement dans les filets de chaluts démersaux et pélagiques.

Dimas Gianuca a accepté de contacter les experts concernés pour les fiches d'information sur la pondération des lignes de pêche démersale à la palangre.

**RECOMMANDATIONS AU COMITÉ CONSULTATIF**

Le GTCA recommande que le Comité consultatif :

1. Soutienne la mise à jour progressive des fiches pratiques sur l'atténuation restantes conformément au nouveau format simplifié, dans l'ordre de priorité défini par la GTCA12.
2. Note l'état d'avancement de la mise à jour de la fiche d'information sur l'atténuation concernant les dispositifs d'effarouchement des oiseaux dans les pêcheries palangrières pélagiques (navires <35m).

## 16. PROGRAMME DE TRAVAIL DU GTCA

### 16.1 Programme de travail 2023-2025

Les tâches pertinentes pour le Groupe de travail sur les captures accessoires d'oiseaux de mer détaillées dans le Programme de travail 2023-2025 du Comité consultatif approuvé par la RdP7 **(CC14 Doc 22**) ont été examinées à la suite des discussions de la GTCA12. Une version actualisée du Programme de travail a été préparée pour examen par le Comité consultatif.

### 16.2 Projet de Programme de travail 2026-2028

Les tâches pertinentes pour le Groupe de travail sur les captures accessoires d'oiseaux de mer dans le projet de Programme de travail 2026-2028 du Comité consultatif (**CC14 Doc 23**) ont été examinées à la suite des discussions de la GTCA12. Une version actualisée du Programme de travail a été préparée pour examen par le Comité consultatif.

## 17. QUESTIONS DIVERSES

Aucune question n'a été soulevée au titre de ce point de l'ordre du jour.

## 18. REMARQUES FINALES

Le Co-Organisateur Sebastián Jiménez a remercié les auteurs des documents soumis à examen, ainsi que les Membres et les Observateurs pour leur précieuse contribution à la réunion. Le Co-Organisateur a également remercié le secrétariat de l'ACAP et l'équipe de soutien technique pour l'organisation et le déroulement de la réunion. Il a remercié les interprètes pour leurs précieux efforts au cours de la réunion, ainsi que le pays hôte, le Pérou, pour la qualité des lieux et des équipements mis à disposition pour la réunion.

## ANNEXE 1. LISTE DES PARTICIPANTS ET PARTICIPANTES À LA RÉUNION GTCA12

| **SBWG Members** | |
|---|---|
| Igor Debski | SBWG Co-convenor, Department of Conservation, New Zealand |
| Sebastián Jiménez | SBWG Co-convenor, Dirección Nacional de Recursos Acuáticos, Uruguay |
| Dimas Gianuca | SBWG Co-viceconvenor, BirdLife International |
| Megan Tierney | Joint Nature Conservation Committee, United Kingdom |
| Luis Adasme | Instituto de Fomento Pesquero, Chile |
| Cristóbal Anguita | Universidad de Chile |
| José Carlos Báez | Spanish Oceanographic Institute |
| Jonathon Barrington | Department of Climate Change, Energy, the Environment and Water, Australian Antarctic Division, Australia |
| Nigel Brothers | Humane Society International Australia |
| Andrés Domingo | Dirección Nacional de Recursos Acuáticos, Uruguay |
| Marco Favero | Instituto de Investigaciones Marinas y Costeras, CONICET, Argentina |
| Elisa Goya | Instituto del Mar del Peru (IMARPE), Peru |
| Eric Gilman | The Safina Centre |
| Verónica Iriarte | United Kingdom |
| Ed Melvin | University of Washington, USA |
| Tatiana Neves | Projeto Albatroz, Brazil |
| Cristián Suazo | Albatross Task Force - Chile, BirdLife International |
| Mark Tasker | Joint Nature Conservation Committee, United Kingdom/ TWG Convenor |
| Helen Wade | BirdLife International |

| **Advisory Committee Members, Representatives and Advisors** | |
|---|---|
| Regina Aguilar | Advisor, Peru |
| Eve Arbodela | Advisor, Peru |
| Angel Banfi | Alternate Representative, Argentina |
| Jairo Calderón | Advisor, Peru |
| Jennifer Chauca | Advisor, Peru |
| Luis Cocas | Advisor, Chile |
| Mike Double | AC Chair |
| Johannes Fischer | Advisor, New Zealand |
| William Gibson | Advisor, New Zealand |
| Gustavo Jimenez | Advisor, Ecuador |

| | |
|---|---|
| Julio Limache | Advisor, Peru |
| Eduardo Lopez | Advisor, Peru |
| Mandi Livesey | Alternate Representative, Australia |
| Verónica López | Advisor, Chile |
| Makhudu Masotla | Alternate Representative, South Africa |
| María Andrea Meza | Alternate Representative, Peru |
| Helena Moreno | Alternate Representative, Spain |
| Sihle Victor Ngcongo | Advisor, South Africa |
| Manuel Ochoa | Advisor, Peru |
| Javier Quiñones | Advisor, Peru |
| Giancarlo Ríos | Advisor, Peru |
| Gersson Román | Advisor, Peru |
| Cynthia Romero | Advisor, Peru |
| Christian Sevilla | Advisor, Ecuador |
| Patricia Pereira Serafini | PaCSWG Co-convenor |
| Richard Phillips | PaCSWG Vice-convenor |
| Cesar Mauricio Zamora Ramos | Advisor, Peru |
| **Observers** | |
| Gabriel Canani | AATM-FURG/Projeto Albatroz, Brazil |
| Ana Carneiro | BirdLife International |
| Thomas Clay | Environmental Defense Fund |
| Tzung-Su Ding | Chinese Taipei |
| Esteban Frere | BirdLife International |
| Kathryn Huyvaert | American Bird Conservancy |
| Andrea Sánchez-Tapia | Global Fishing Watch |
| Giovanny Suárez Espín | American Bird Conservancy |
| Leandro Tamini | BirdLife International |
| Desmond Tom | Namibia |
| SachikoTsuji | NRIFR, Japan |

| | |
|---|---|
| **ACAP Secretariat** | |
| Christine Bogle | Executive Secretary |
| Wiesława Misiak | Science Officer |
| Bree Forrer | Communications Advisor |

| |
|---|
| **Interpreters** |
| Cecilia Alal |

| | |
|---|---|
| Sandra Hale | |

| **Non-attending SBWG members** | |
|---|---|
| Joanna Alfaro-Shigueto | ProDelphinus, Peru |
| Barry Baker | Institute for Marine and Antarctic Studies (IMAS), Australia |
| Johannes De Goede | Department of Environment, Forestry and Fisheries, South Africa |
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| Marco Herrera | Insituto Público de Investigaciones en Acuacultura y Pesca, Ecuador |
| Svein Løkkeborg | Institute of Marine Research, Norway |
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| Jeffry Mangel | ProDelphinus, Peru |
| Alexandre Marques | Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, Brazil |
| Ken Morgan | Emeritus, Environment and Climate Change Canada |
| Gabriela Navarro | Subsecretaría de Pesca y Acuicultura, Argentina |
| Graham Robertson | Unaffiliated |
| Yann Rouxel | BirdLife International |
| Juan Pablo Seco Pon | SBWG Co-viceconvenor, Instituto de Investigaciones Marinas y Costeras, CONICET-UNMDP, Argentina |
| Barbara Wienecke | Department of the Environment and Energy, Australian Antarctic Division, Australia |
| Anton Wolfaardt | Unaffiliated |

**ANNEXE 2. PASSAGE EN REVUE PAR L'ACAP DES MESURES D'ATTÉNUATION DE LA CAPTURE ACCESSOIRE D'OISEAUX DE MER DANS LA PÊCHE AU CHALUT PÉLAGIQUE ET DÉMERSALE**

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Review of Mitigation Measures and Best Practice Advice for Reducing the Impact of Pelagic and Demersal Trawl Fisheries on Seabirds

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## INTRODUCTION

The incidental mortality of seabirds in trawl fisheries continues to be a serious global concern, especially for threatened albatrosses and petrels. In trawl fisheries, birds foraging on discards or offal may be injured or killed on collision with net monitoring and warp cables, dragged underwater and drowned when their wings become entangled around the warp, or become entangled in nets during shooting and hauling.

There have been considerable efforts internationally to develop mitigation measures to avoid or minimise the risk of incidental catch of seabirds in trawl fisheries. Although the focus of efforts to mitigate seabird bycatch was initially directed at longline fisheries, trawl fleets have also now been shown to incidentally kill large numbers of seabirds. The FAO Best Practice Guidelines for IPOA/NPOA-Seabirds were amended in 2009 to include trawl fisheries in addition to longline fisheries (FAO 2009), demonstrating increased serious concern and awareness of seabird mortality in global trawl fisheries. Although most mitigation measures are broadly applicable, the application and specifications of some will vary with local methods and gear configurations. ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in trawl fisheries (see review section below) and this document is a summary of the advice informed by the review.

This document provides advice about best practices for reducing the impact of trawl fishing on seabirds. The ACAP review process recognises that factors such as safety, practicality and the characteristics of the fishery should also be taken into account when considering the efficacy of seabird bycatch mitigation measures and consequently in the development of advice and guidelines on best practice.

This document also provides information regarding measures that are currently under active development, and which show promise as future best practices in trawl fisheries. ACAP will

continue to monitor the development of these practices and the results of scientific research about their effectiveness.

The document comprises two components. The first component provides a summary of ACAP's advice regarding best practice measures for reducing seabird bycatch in pelagic and demersal trawl fisheries, and the second component outlines the review of mitigation measures that have been assessed for these fisheries.

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Summary Advice for Reducing the Impact of Pelagic and Demersal Trawl Fisheries on Seabirds

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## BEST PRACTICE MEASURES

Seabird mortality in trawl fisheries occurs when birds collide with cables as they feed on fish processing waste (offal) and discards or are entangled in trawl nets as they attempt to forage on captured fish or fish parts. Cable strikes, including collisions with net monitoring cables[1], warp cables[2] and paravanes are associated with the discards and fish waste discharged by vessels. It is recognized that larger seabirds (albatrosses and giant petrels) with long wingspans are most vulnerable to cable strike mortalities; however, smaller seabirds can also suffer cable strike mortalities. Although in many fisheries vessels are required to discard prohibited fish species whole and unprocessed, vessels that catch fish for delivery for shoreside processing (catcher vessels) and do not produce offal, are in general are less associated with cable strikes. Seabird net mortalities can occur in catcher-processor (vessels that catch and process fish on board) and catcher vessels trawl operations.

Trawl fisheries are extremely diverse and encompass pelagic trawling for schooling off-bottom species and demersal trawling for fish species on the sea floor. In general, trawl fisheries range from high volume fisheries that land and process hundreds of tonnes of fish 24 hours a day continuously for weeks, to lower volume fisheries that fish for shorter time periods producing little to no waste. Because fish waste drives cable strikes, and can attract birds that may then interact with the net, management of offal discharge and discards[3] is considered the primary means to reduce cable strikes and net entanglements. However, fishery and vessel characteristics dictate the extent to which offal can be managed and the method that might be employed. Where the opportunity for fish waste management is limited or impractical, cable strikes can be prevented by protecting trawl cables with mitigation devices. Birds can also be attracted to the net during hauling by fish in the net, creating risk of net entanglement. Net entanglements can be prevented by reducing the time the net is exposed on the surface of the water. The following measures have been shown to be effective at reducing seabird bycatch in trawl fisheries and are recommended as best practice measures:

[1] The net monitoring cable connects the echo-sounder or net-sounder on the headline of the trawl net to the vessel.

[2] The warp cables or trawl warps are the cables used to tow nets.

[3] Offal discharge refers to the disposal at sea of any fish waste resulting from processing, including heads, guts and frames. Fish discards refers to any unwanted whole fish (and or benthic material)

## Measures to reduce general attractiveness to seabirds

### *Management of offal and discards*

In all cases, the discharge of offal and discards is the most important factor attracting seabirds to the stern of trawl vessels, where they are at risk of cable and net interactions. Managing offal discharge and discards while fishing gear is deployed has been shown to reduce seabird attendance of vessels and consequent risk of interactions and bycatch. The following offal and discard management measures, in order of their effectiveness in reducing bird attendance, are recommended:

1. **Retention of waste** – No discharge during fishing trips (full retention) should occur. When this is impracticable, no discharge should occur during fishing activity (when cables or net are in the water);
2. **Mealing waste** – Where retention of waste is impracticable, converting offal into fish meal, and retaining all waste material with any discharge restricted to liquid discharge / sump water;
3. **Batching waste** – Where meal production and retention of offal and discards are impracticable, waste should be stored temporarily for two hours or longer before strategically discharging it in batches;
4. **Mincing of waste** – Where retention, mealing or batching is impracticable, reduce waste to smaller particles (currently only recommended as a mitigation for bycatch of large *Diomedea* spp.).

## Measures to reduce cable strikes

Where the opportunity for fish waste management is limited or impractical, cable strikes can be prevented by reducing the aerial extent of cables and deterring seabirds from interacting with them. The following measures are recommended:

### *Warp cables*

**1**. Deploy bird scaring lines (BSLs) while fishing to deter birds away from warp cables.

### *Net monitoring cables*

Net monitoring cables should not be used (wireless systems can be used instead). Where this is impracticable:

**1**. Deploy bird scaring lines specifically positioned to deter birds away from net monitoring cables while fishing; and

**2**. Install a snatch block at the stern of a vessel to draw the net monitoring cable close to the water and thus reduce its aerial extent.

## Measures to reduce net entanglement

Recognising that even with management of offal and discards there may be risk of net entanglement, the following further measures are recommended:

**1**. Clean nets after every haul to remove entangled fish (“stickers”) and benthic material to discourage bird attendance during gear shooting;

**2**. Minimise the time the net is on the water surface. Maintenance of winches and good deck practices minimises shooting and hauling times. During turns the net should be maintained at depth (e.g. 50-100 m) or, if required, bring the net to the surface with doors up (wing ends and net mouth closed); and

**3**. For pelagic trawl gear, apply net binding to large meshes in the wings (120–800 mm), together with a minimum of 400 kg weight incorporated into the net belly prior to setting.

Further measures include avoiding peak areas and periods of seabird foraging activity. It is important to note that there is no single solution to reduce or avoid incidental mortality of seabirds in trawl fisheries, and that the most effective approach is to use the measures listed above in combination. Net entanglements during the haul remain the most difficult interactions to prevent. The ACAP review of seabird bycatch mitigation measures for pelagic and demersal trawl fisheries is presented in the following section.

## MITIGATION MEASURES UNDER DEVELOPMENT OR THAT REQUIRE FURTHER INVESTIGATION

For traditional trawlers a range of mitigation options are under development to both reduce the aerial extent of net monitoring cables and deter birds away from them. This includes the use of floated weights to reduce aerial extent in a demersal trawl fishery (Garcia et al 2024), a Combined Curtain System to deter birds from cables in a demersal trawl fishery (Suazo et al 2024) and use of novel materials to reduce the interaction with cables in a mid-water trawl fishery (Tamini et al 2024).

For continuous krill trawl fisheries, where the fishing gear configuration results in limited aerial extent of net monitoring cables, a modified bird baffler and sock are being developed to deter birds from net monitoring cables (Moir et al 2024).

## MITIGATION MEASURES THAT ARE NOT RECOMMENDED

ACAP considers that the following measures lack scientific substantiation as technologies or procedures for reducing the impact of pelagic and demersal trawl fisheries on seabirds.

**Warp scarers**: Insufficient evidence to recommend as an effective measure at this time.

**Bird bafflers**: Insufficient evidence to recommend as an effective measure at this time.

**Cones on warp cables**: Insufficient evidence to recommend as an effective measure at this time.

**Warp boom**: Insufficient evidence to recommend as an effective measure at this time.

**Warp deflector**: Insufficient evidence to recommend as an effective measure at this time.

**Minimise pooling area**: Insufficient evidence to recommend as an effective measure at this time.

**Reduced mesh size**: Insufficient evidence to recommend as an effective measure at this time.

**Net jackets**: Unproven and not recommended as a mitigation method at this time.

**Acoustic deterrents**: Unproven and not recommended as a primary mitigation method at this time.

**Net restrictor**: Unproven and not recommended as a primary mitigation method at this time.

**Lasers**: High energy lasers are strongly discouraged due to ongoing concerns regarding safety to both humans and birds.

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Review of Seabird Bycatch Mitigation Measures for Pelagic and Demersal Trawl Fisheries

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 – 16 August 2024*

## INTRODUCTION

A range of technical and operational mitigation methods have been designed or adapted for use in trawl fisheries. In all cases, the discharge of offal and discards is the most important factor attracting seabirds to the stern of trawl vessels, where they are at risk of cable and net interactions. Managing offal discharge and discards while fishing gear is deployed has been shown to reduce seabird attendance of vessels and consequent risk of interactions and bycatch. Even with management of offal and discards there may be risk of cable strikes and net entanglement. Other mitigation measures have been developed to address these risks. Apart from being technically effective at reducing seabird bycatch, mitigation methods should be easy and safe to implement, cost effective, enforceable and should not reduce catch rates of target species.

The feasibility, effectiveness and specifications of mitigation measures may vary by area, seabird assemblages, fishery, vessel size, and gear configuration. Some of the mitigation methods are well established and explicitly prescribed in trawl fisheries; however, additional measures are undergoing further testing and refinements.

The Seabird Bycatch Working Group (SBWG) of ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in trawl fisheries. This document is a distillation of that review.

## THE ACAP REVIEW PROCESS

At each of its meetings, the ACAP SBWG considers any new research or information pertaining to seabird bycatch mitigation in trawl fisheries. The following criteria are used by ACAP to guide the assessment process, and to determine whether a particular fishing technology or measure can be considered best practice to reduce the incidental mortality of albatrosses and petrels in fishing operations.

**Best Practice Seabird Bycatch Mitigation Criteria and Definition**

**i.** Individual fishing technologies and techniques should be selected from those shown by experimental research to significantly[4] reduce the rate of seabird incidental mortality[5] to the lowest achievable levels. Experimental research yields definitive results when performance of candidate mitigation technologies is compared to a control (no deterrent), or to status quo in the fishery. When testing relative performance of mitigation approaches, analysis of fishery observer data can be plagued with a myriad of confounding factors. Where a significant relationship is demonstrated between seabird behaviour and seabird mortality in a particular system or seabird assemblage, significant reductions in seabird behaviours, such as the rate of seabirds attacking baited hooks, can serve as a proxy for reduced seabird mortality. Ideally, where simultaneous use of fishing technologies and practices is recommended as best practice, research should demonstrate significantly improved performance of the combined measures.

**ii.** Fishing technologies and techniques, or a combination thereof, should have clear and proven specifications and minimum performance standards for their deployment and use. Examples would include: specific bird scaring line designs (lengths, streamer length and materials; etc.), number (one vs. two) and deployment specifications (such as aerial extent and timing of deployment); night fishing defined by the time between the end of nautical dusk and start of nautical dawn; and, line weighting configurations specifying mass and placement of weights or weighted sections.

**iii.** Fishing technologies and techniques should be demonstrated to be practical, cost effective and widely available. Commercial fishing operators are likely to select for seabird bycatch reduction measures and devices that meet these criteria including practical aspects concerning safe fishing practices at sea.

**iv.** Fishing technologies and techniques should, to the extent practicable, maintain catch rates of target species. This approach should increase the likelihood of acceptance and compliance by fishers.

**v.** Fishing technologies and techniques should, to the extent practicable, not increase the bycatch of other taxa. For example, measures that increase the likelihood of catching other protected species such as sea turtles, sharks and marine mammals, should not be considered best practice (or only so in exceptional circumstances).

**vi.** Minimum performance standards and methods of ensuring compliance should be provided for fishing technologies and techniques, and clearly specified in fishery regulations. Relatively simple methods to check compliance should include, but not be limited to, port inspections of branch lines to determine compliance with branch line weighting, determination of the presence of davits (tori poles) to support bird scaring lines, and inspections of bird scaring lines for conformance with design requirements. Compliance monitoring and reporting should be a high priority for enforcement authorities.

[4] Any use of the word 'significant' in this document is meant in the statistical context.

[5] This may be determined by either a direct reduction in seabird mortality or by reduction in seabird attack rates, as a proxy.

On the basis of these criteria, the scientific evidence for the effectiveness of mitigation measures or fishing technologies/techniques in reducing seabird bycatch is assessed, and explicit information is provided on whether the measure is recommended as being effective, and thus considered best practice, or not. The ACAP review also provides notes and caveats for each measure, together with information on performance standards and further research needs. Following each meeting of ACAP's SBWG and Advisory Committee, this review document and ACAP's best practice advice is updated (if required). A summary of ACAP's current best practice advice for trawl fisheries is provided in the preceding section of this document.

## SEABIRD BYCATCH MITIGATION FACT SHEETS

A series of seabird bycatch mitigation fact sheets have been developed by ACAP and BirdLife International to provide practical information, including illustrations, on seabird bycatch mitigation measures (https://www.acap.aq/bycatch-mitigation/bycatch-mitigation-fact-sheets) The sheets, which include information on the effectiveness of the specific measure, their limitations and strengths and best practice recommendations for their effective adoption, are linked to the ACAP review process, and are updated following ACAP reviews. Links to the available fact sheets are provided in the relevant sections below.

## 1. MITIGATION MEASURES TO REDUCE GENERAL ATTRACTIVENESS TO SEABIRDS

### Management of offal and discards[6]

In all cases, the discharge of offal and discards is the most important factor attracting seabirds to the stern of trawl vessels, where they are at risk of cable and net interactions (Wienecke & Robertson 2002; Sullivan *et al.* 2006a; Favero *et al*. 2011).

Managing offal discharge and discards while fishing gear is in the water has been shown to reduce seabird attendance of vessels and consequent risk of interactions and bycatch. The following offal and discard management measures, in order of their effectiveness in reducing bird attendance, are recommended:

1. **Retention of waste** – No discharge during fishing trips (full retention) should occur. When this is impracticable, no discharge should occur during fishing activity (when cables or net are in the water);
2. **Mealing waste** – Where retention of waste is impracticable, converting offal into fish meal, and retaining all waste material with any discharge restricted to liquid discharge / sump water;
3. **Batching waste** – Where meal production and retention of offal and discards are impracticable, waste should be stored temporarily for two hours or longer before strategically discharging it in batches;
4. **Mincing of waste** – Where retention, mealing or batching is impracticable, reduce waste to smaller particles (currently only recommended as a mitigation for bycatch of large *Diomedea* spp.)

[6] Offal discharge refers to the disposal at sea of any fish waste resulting from processing, including heads, guts and frames. Fish discards refers to any unwanted whole fish (and or benthic material).

## 1.1 Retaining waste

***ACAP advice***

**Proven and recommended** as the most effect mitigation method for both pelagic and demersal trawl fisheries. No discharge during fishing trips (full retention) should occur. When this is impracticable, no discharge should occur during fishing activity (when cables or net are in the water).

***Scientific evidence for effectiveness in trawl fisheries***

Repeated studies have shown that in the absence of offal discharge / fish discards seabird interactions and mortality levels are negligible (Sullivan *et al*. 2006a; Watkins *et al*. 2008; Melvin *et al*. 2010; Abraham & Thompson 2009). Storage of all fish discard and offal, either for processing or for controlled release when cables and net are not in the water, has resulted in significant reductions in the attendance of all groups of seabirds (Abraham *et al.* 2009).

***Notes and Caveats***

Retrofitting of fish waste storage tanks may not be a viable option for existing vessels due to associated space requirements (Munro 2005).

### *Minimum standards*

Any discharge is restricted to times when cables and net are out of the water.

***Need for combination***

Should be used in combination with additional mitigation methods to mitigate interactions with cables (if birds are still attending the vessel) and net.

***Implementation monitoring***

On-board observers or electronic monitoring. Potential for at-sea surveillance (of discharge or bird attendance).

***Research needs***

None identified.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1627-fs-13-trawl-fisheries-warp-strike/file

## 1.2 Mealing waste

***ACAP advice***

**Proven and recommended** as a mitigation method for both pelagic and demersal trawl fisheries when retention of waste is impracticable.

***Scientific evidence for effectiveness in trawl fisheries***

Mealing resulted in significant reduction in the number of seabird species feeding behind vessels, relative to the discharge of unprocessed fish waste (Abraham *et al.* 2009; Wienecke & Robertson 2002; Favero *et al*. 2011) or minced waste (Melvin *et al.* 2010).

***Notes and Caveats***

Good evidence from a number of fisheries that fish meal processing and reducing discharge to sump water is highly effective in reducing seabird bycatch. Retrofitting of meal plants may not be a viable option for existing vessels due to associated space requirements (Munro 2005).

***Minimum standards***

Any discharge is restricted to liquid discharge / sump water.

***Need for combination***

Should be used in combination with additional mitigation methods to mitigate interactions with cables (if birds are still attending the vessel) and net.

***Implementation monitoring***

Port-based inspection of meal plants, on-board observers or electronic monitoring. Potential for at-sea surveillance (of discharge or bird attendance).

***Research needs***

Investigate through robust trialling the extent to which reduced seabird abundance affects seabird interaction rates.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1627-fs-13-trawl-fisheries-warp-strike/file

## 1.3 Batching waste

***ACAP advice***

**Proven and recommended** as a mitigation method for both pelagic and demersal trawl fisheries where meal production and retention of offal and discards are impracticable.

***Scientific evidence for effectiveness in trawl fisheries***

Batching (temporary storage and periodic, controlled and fast release of discards / discharge during trawling) has been trialled by several Parties (Jimenéz *et al.* 2022; Kuepfer *et al*. 2022; Pierre *et al*. 2010; Pierre *et al*. 2012b). Results showed that batching can significantly reduce numbers of seabirds and associated bycatch risk, although adequate storage period and minimal duration of batching events are important.

***Notes and Caveats***

Effectiveness of batching relies on minimising the frequency of discharges and efficient (fast) dumping of batched material. Retrofitting of fish waste storage tanks may not be a viable option for existing vessels due to associated space requirements (Munro 2005).

***Minimum standards***

Recommended when full retention or mealing is not possible. Where feasible, batch waste for at least 2 hours, preferably 4 hours or longer.

***Need for combination***

Should be used in combination with additional mitigation methods to mitigate interactions with cables and net.

***Implementation monitoring***

Port-based inspection of fish waste storage and discharge system, on-board observers or electronic monitoring. Potential for at-sea surveillance (of discharge or bird attendance).

***Research needs***

Investigate through robust trialling the extent to which reduced seabird abundance affects seabird interaction rates.

Identify threshold where increased storage is compromised by increased batching (discharging) period required.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1627-fs-13-trawl-fisheries-warp-strike/file

## 1.4 Mincing of waste

***ACAP advice***

**Insufficient evidence to recommend this as a primary mitigation measure** to reduce general attractiveness to seabirds in pelagic and demersal trawl fisheries at this time, however it is recommended as a mitigation for bycatch of large *Diomedea* spp. where retention, mealing or batching is impracticable.

***Scientific evidence for effectiveness in trawl fisheries***

Mincing waste to maximum 25 mm significantly reduced the number of large albatrosses (*Diomedea* spp.) attending vessels but had no effect on other groups of seabirds (Abraham *et al*. 2009; Abraham 2010). Pierre *et al.* (2012a) showed that whilst reduced particle size (10-40 mm and 30-60 mm) reduced seabird attendance compared with untreated waste, the effect was lowest for small albatross species, and not significant for the 10-40 mm treatment.

***Notes and Caveats***

Bottom trawled material, such as rocks, may impact the feasibility of mincing.

***Minimum standards***

None established. Insufficient evidence to recommend this as a primary measure at present.

***Need for combination***

Should be used in combination with additional mitigation methods to mitigate interactions with cables and net.

***Implementation monitoring***

Port-based inspection of mincing systems, on-board observers or electronic monitoring. Potential for at-sea surveillance (of discharge or bird attendance).

***Research needs***

At present only demonstrated to be effective against large *Diomedea* spp. albatrosses. Efficacy with *Thalassarche* spp. albatrosses needs to be proven before measure can be recommended (Abraham *et al*. 2009).

# 2. MITIGATION MEASURES TO REDUCE CABLE STRIKES

## 2.1 MITIGATION MEASURES TO REDUCE THE AERIAL EXTENT OF CABLES

### 2.1.1 Snatch block

***ACAP advice***

**Recommended** as a mitigation measure to reduce the aerial extent of net monitoring cables, when their use cannot be avoided, in pelagic and demersal trawl fisheries.

***Scientific evidence for effectiveness in trawl fisheries***

A snatch block, placed on the stern of a vessel to draw the third-wire close to the water to reduce its aerial extent, reduced seabird strikes, although performance varied by vessel (Melvin *et al*. 2010).

***Notes and Caveats***

Melvin *et al.* (2010) were confident that third-wires can be pulled closer to the water or submerged at the stern to make this measure highly effective, but noted that, as third-wires are fragile and expensive, any snatch block-like system should aim to minimise cable wear. Recommended on the basis that reducing the aerial extent of monitoring cables should reduce the risk of seabird strikes with these cables.

***Minimum standards***

None established.

***Need for combination***

Should be combined with offal/discard management and BSL specifically positioned to deter birds away from net monitoring cables while fishing.

***Implementation monitoring***

Port-based inspection, on-board observer or electronic monitoring.

***Research needs***

Needs to be trialled in a range of fisheries and areas to further demonstrate efficacy. Development of technical specifications is also required.

## 2.2 MITIGATION MEASURES TO DETER BIRDS AWAY FROM CABLES

### 2..2.1 Bird Scaring Lines (BSL) to reduce interaction with warp and net monitoring cables

***ACAP advice***

**Proven and recommended** as a mitigation measure to deter birds away from warp cables, and net monitoring cables where their use cannot be avoided, for pelagic and demersal trawl fisheries.

***Scientific evidence for effectiveness in trawl fisheries***

Attachment of a bird scaring line (BSL) to both the port and starboard sides of a vessel, above and outside of the warp blocks, greatly reduces the access of birds to the danger zone where warps enter the water (Watkins *et al.* 2006; Reid & Edwards 2005; Melvin *et al*. 2010, Tamini *et al.* 2015). An off-setting towed device has been demonstrated to improve BSL performance (Tamini *et al.* 2015).

***Notes and Caveats***

Effectiveness is reduced in strong cross winds and rough seas, when BSLs are deflected away from warps (Sullivan & Reid 2003; Crofts 2006a, 2006b). This can be alleviated in part by towing a buoy or cone attached to the end of lines to create tension and keep lines straight (Sullivan *et al*. 2006a; Cleal *et al.* 2013). Hard wearing and non-tangling materials and design can improve performance (Cleal *et al.* 2013), including the use of semi rigid streamers, particularly those constructed from Kraton. BSLs cannot be deployed while the warp cable is being set, or remain in place during hauling, leaving periods when warps are not protected. Bird mortality as a result of entanglement with the BSL is known to occur (Snell *et al.* 2011; Kuepfer 2016).

***Minimum standards***

BSL are recommended even when appropriate offal discharge and fish discard management practices are in place (Melvin *et al*. 2010). A BSL should be fitted to the outside of both the starboard and the port-side cable. The main line should extend beyond the warp-water interface and should maintain its tension under normal tow speed. Streamer lines should be

attached at maximum 5 m intervals and should be long enough to extend beyond the point at which warp and net monitoring cables reach the water's surface. It is recommended that for every metre of block height, 5 m of backbone be deployed and 1.2 kg of terminal object drag weight be used. An off-setting towed device (Tamini Tabla) has been developed in Argentina (Tamini *et al.* 2023a). This device is attached to the terminal end of the BSL and has a buoyant upper board with three 45° vertical keels, which are weighted for stability. Under forward motion of the vessel, the keels cause the device to move outward of the trawl cables and therefore maintain the BSL from entangling with trawl cables. BSLs should be deployed once the trawl doors are submerged and retrieved as net hauling commences. Where the use of a net monitoring cable cannot be avoided, bird scaring lines should be specifically positioned above the net monitoring cable (Tamini *et al.* 2023b).

***Need for combination***

Should be used in combination with offal/discard management.

***Implementation monitoring***

On-board observers, electronic monitoring (cameras), at-sea surveillance or an electronic BSL compliance monitoring device (Ngcongo & Miranda 2024; https://imveloblue.co.za/electronic-monitoring-imvelo-bsl/).

***Research needs***

Further research is required on reducing the entanglement risk of birds in the BSL.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1627-fs-13-trawl-fisheries-warp-strike/file

## 2..2.2 Warp scarers

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

Warp scarers (weighted devices attached to each warp with clips or hooks, allowing the device to slide up and down the warp freely and stay aligned with each warp) create a protective area around the warp (see Bull 2009, Fig.2; Sullivan *et al*. 2006a).

Warp scarers have been shown to reduce contact rates but not significantly, and were not as effective as BSLs (Sullivan *et al*. 2006b, Abraham *et al*., cited in Bull 2009).

***Notes and Caveats***

Attachment to the warp eliminates problems associated with crosswinds as the mitigation devices do not behave independently of warps. Warp scarers cannot be deployed while the warp cable is being set, or remain in place during hauling, leaving periods when warps are not protected.

Concerns have been raised regarding associated practicality and safety issues (Melvin *et al.* 2004; Sullivan *et al.* 2006a; Abraham *et al.*, cited in Bull 2009).

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

None identified.

## 2..2.3 Bird bafflers

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

Bird bafflers comprise two booms attached to both stern quarters of a vessel. Two of these booms extend out from the sides of the vessel and the other two extend backwards from the stern. Dropper lines are attached to the booms, to create a curtain to deter seabirds from the warp-water interface zone (see Bull 2009, Fig.3; Sullivan *et al.* 2006a).

Generally, bird bafflers are not regarded as providing as much protection to the warp cables as BSLs or warp scarers (Sullivan *et al.* 2006a), because they don't tend to extend beyond the warp-water interface area, hence leaving the most dangerous part of the warp exposed.

***Notes and Caveats***

Various designs exist including the Brady Baffler and "curtain baffler" (Cleal *et al*. 2013).

While bafflers were designed to minimise warp interactions, the Brady Baffler has been used (inappropriately) within CCAMLR icefish fisheries to mitigate net entanglements where they have been found to be consistently ineffective (Sullivan *et al*. 2009).

The great variability in the design and deployment of bird bafflers may influence their overall effectiveness. Designs may also be very vessel-specific to ensure adequate coverage of the warp-water interface. In contrast to some other warp mitigation methods bird bafflers can remain deployed during the full duration of fishing activities.

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

The full range of baffler designs have not been experimentally tested. Trials should be conducted in a range of fisheries and areas to demonstrate efficacy.

## 2.2.4 Cones on warp cables

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

A plastic cone attached to each warp cable reduced the number of birds entering the warp-water interface in Argentine Hake Trawl Fishery by 89% and no seabirds were killed while cones were attached to the warp (Gonzalez-Zevallos *et al.* 2007).

***Notes and Caveats***

Applicable for small vessels.

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

Needs to be trialled in a range of fisheries and areas to demonstrate efficacy.

## 2.2.5 Warp boom

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

A boom with streamers extending to the water forward of the stern and warps can divert birds feeding on offal away from the warps; however, Melvin *et al*. (2010) did not identify a statistically significant reduction is seabird interactions with the warp.

***Notes and Caveats***

None.

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Research needs***

Longer-term studies are required to identify effectiveness including work to identify suitable configuration and materials.

## 2.2.6 Warp deflector

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

The *warp deflector,* consisting of a pinkie buoy clipped to each of the warp cables and connected back to the vessel via a retrieval line, is designed to hang at the warp-water interface to deflect birds away from the danger area. The device was found to significantly reduce heavy interactions of shy-type albatross (*Thalassarche*) with trawl warps by Pierre *et al.* (2014). The authors, however, urged for wider testing of the device to support results. Kuepfer (2017) identified numerous practical issues which impacted on the safe and effective deployment of the device in non-experimental conditions.

***Notes and Caveats***

The east Australia trawl fishery found the device to be impractical and of limited effectiveness, and therefore the warp deflector is now no longer accepted as a stand-alone mitigation measure.

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

None identified.

## 3. MITIGATION MEASURES TO REDUCE NET ENTANGLEMENTS

The range of mitigation measures available to prevent net entanglements is limited, and most have not been adequately (and quantitatively) tested. Consequently, there is a need to identify and test measures aimed at addressing the problem of seabirds becoming entangled in nets of trawl vessels, particularly during hauling operations.

### 3.1 Net cleaning

***ACAP advice***

**Recommended** for reducing bycatch during both shooting and hauling of trawl gear in both pelagic and demersal trawl fisheries.

***Scientific evidence for effectiveness in trawl fisheries***

Removal from nets of all fish 'stickers' and other material is a critical step to reducing net entanglement during shooting (Hooper *et al*. 2003; Sullivan *et al.* 2009).

***Notes and Caveats***

None.

***Minimum standards***

Remove all stickers from net prior to shooting gear.

***Need for combination***

Should be used in combination with net binding and net weights to minimise the time net is on water's surface during both setting and hauling (Sullivan *et al.* 2009), as well as in combination with waste management to avoid the discharge of waste during shooting thereby minimising the attraction of seabirds to the stern of the vessel.

***Implementation monitoring***

On-board observers or electronic monitoring.

***Research needs***

None identified.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1713-fs-14-trawl-fisheries-net-entanglement/file

## 3.2 Net binding

***ACAP advice***

**Recommended** for reducing bycatch when shooting gear in pelagic trawl fisheries.

***Scientific evidence for effectiveness in trawl fisheries***

Shown to be a highly effective mitigation measure in CCAMLR icefish trawl fishery, reducing seabird bycatch to minimal levels (Sullivan *et al.* 2009).

***Notes and Caveats***

Not suitable for demersal trawl gear (Iriarte *et al*. 2023).

Sisal string has been used to bind the sections of the net which pose the greatest threat to seabirds prior to shooting (Sullivan *et al*. 2004). Bindings are simply tied onto the net to prevent the net from lofting and the mesh opening as the tension created by the vessel speed of between 1-3 knots is lost due to waves and swell action. Once shot-away, the net remains bound on the surface until it sinks. Once the trawl doors are paid away and the net has sunk beyond the diving depth of seabirds the force of the water moving the doors apart is sufficient to break the bindings and the net spreads into its standard operational position.

***Minimum standards***

3–ply sisal string (typical breaking strength of c.110 kg), or a similar inorganic material should be applied to the net on the deck, at intervals of approximately 5 m to prevent net from spreading and lofting at the surface. Net binding should be applied to mesh ranging from 120–800 mm as these are known to cause the majority of seabird entanglements (Sullivan *et al*. 2010). When applying string, tie an end to the net to prevent string from slipping down the net and ensure it can be removed when net is hauled.

***Need for combination***

Should be used in combination with net cleaning and net weights to minimise the time the net is on the surface (Sullivan *et al*. 2009), as well as in combination with waste management to avoid the discharge of waste during shooting thereby minimising the attraction of seabirds to the stern of the vessel.

***Implementation monitoring***

On-board observer or electronic monitoring.

***Research needs***

None identified.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1713-fs-14-trawl-fisheries-net-entanglement/file

## 3.3 Net weighting

***ACAP advice***

**Recommended** for reducing bycatch during both shooting and hauling in both pelagic and demersal trawl fisheries.

***Scientific evidence for effectiveness in trawl fisheries***

Evidence suggests net weighting on or near the cod end increases the angle of ascent of the net during hauling operations, thus reducing the time the net is on the water's surface. In addition, good deck practices to minimise the time that the net is on the water's surface have been the key factors in reducing seabird entanglements during hauling in South Atlantic trawl fisheries (Hooper *et al.* 2003; Sullivan *et al.* 2009).

***Notes and Caveats***

All attempts should be made to retrieve the net as quickly as possible.

***Minimum standards***

None established.

***Need for combination***

Should be used in combination with net binding and net cleaning to minimise the time the net is on the water's surface during both setting and hauling (Sullivan *et al.* 2009), as well as in combination with waste management to avoid the discharge of waste during shooting and hauling thereby minimising the attraction of seabirds to the stern of the vessel.

***Implementation monitoring***

On-board observers or electronic monitoring.

***Research needs***

Development of minimum standards for amount and placement of weight (cod end, wings, footrope, mouth, belly), to build on work to date in CCAMLR trawl fisheries (Sullivan *et al*. 2009).

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1713-fs-14-trawl-fisheries-net-entanglement/file

## 3.4 Minimise pooling area

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

Trials summarised by Steele-Mortimer & Wells (2023) indicate the merits of turning the vessel to close the net (by bunching it against a stern quarter of the trawl ramp) as a mitigation approach. While there is no empirical evidence that operations to close the headline of the net will reduce net entanglements, it is logical that minimising the surface area of the exposed risk will reduce risk.

***Notes and Caveats***

Some vessels may be unable to turn the vessel while hauling for operational reasons (i.e. the structure of the vessel doesn't allow for it, limited sea space, or vessel which directly haul nets onto a net drum).

***Minimum standards***

None established.

***Need for combination***

Should be used in combination with good net cleaning and other applicable best practice measures.

***Implementation monitoring***

None established.

***Research needs***

Further testing, preferably in a range of fisheries, to determine quantitatively if measure is effective.

## 3.5 Reduced mesh size

***ACAP advice***

**Insufficient evidence to recommend as an effective measure at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

Roe (2005) reported on the use of reduced mesh size from 200 to 140 mm in the pelagic icefish fishery in CCAMLR waters, but did not quantify the effectiveness of the measure.

***Notes and Caveats***

Theoretically this measure could be effective in reducing the incidence of seabird entanglements in net; however, measure may be impractical and lead to higher bycatch of

smaller sized fish. Reduced mesh size was believed to have caused severe damage to the net because of increased water pressure during trawling (Roe 2005), although the use of chain weights in the net may also have been influential.

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

Thorough testing in a range of fisheries is required to determine if measure is practical and effective, as well as to identify potential impact on target catch and bycatch species.

## 3.6 Net jackets

***ACAP advice***

**Unproven and not recommended as a mitigation method at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

Free-floating panels of net attached to the most dangerous mesh sizes have been trialled in CCAMLR's icefish trawl fishery, with uncertain efficiency (Sullivan *et al*. 2009).

***Caveats /Notes***

Found to cause serious drag and subsequent damage to the net. Drag also slows vessel speed and increases fuel consumption (Sullivan *et al*. 2009).

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

Efficacy of measure remains to be demonstrated.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1713-fs-14-trawl-fisheries-net-entanglement/file

## 3.7 Acoustic deterrents

***ACAP advice***

**Unproven and not recommended as a primary mitigation method at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

The use of acoustic 'scaring' devices on nine vessels in CCAMLR trawl fisheries indicated that loud noises (bells and flares/fireworks) had limited effect and birds quickly became habituated to the sound, no longer causing an aversion response (Sullivan *et al*. 2009).

***Notes and Caveats***

May be a useful back-up measure for circumstances when another measure is needed immediately (Sullivan *et al*. 2009).

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

None identified.

## 3.8 Net restrictor

***ACAP advice***

**Unproven and not recommended as a primary mitigation method at this time**.

***Scientific evidence for effectiveness in trawl fisheries***

The net restrictor was identified as a potential mitigation device in response to observed net captures in the New Zealand scampi trawl fishery, where multiple nets are deployed adjacently (Pierre *et al.* 2013). The net restrictor acts to restrict the opening of the net on haul when captures tend to occur. Video footage confirmed that the restrictor was effective in reducing the size of the net opening at hauling; although empirical testing of the device has not been conducted.

***Notes and Caveats***

May be a useful measure in demersal trawl fisheries where multiple nets are deployed adjacently, and nets (particularly the middle net) are liable to billow open at or near the surface on haul.

***Minimum standards***

Not applicable, as not recommended.

***Need for combination***

Not applicable, as not recommended.

***Implementation monitoring***

Not applicable, as not recommended.

***Research needs***

At-sea testing required to determine effectiveness.

## 4. GENERAL MEASURES

### 4.1 Time-Area closures

***ACAP advice***

**Recommended** as a general mitigation measure but need to be aware of displacing the risk to adjacent areas (Copello et al 2016) or other fishing methods (Baez et al 2014).

***Scientific evidence for effectiveness in trawl fisheries***

Avoiding fishing at peak areas and during periods of intense foraging activity has been used effectively to reduce bycatch in longline fisheries. The principles are directly transferrable to trawl and other net fisheries.

In some studies, longline-associated mortality has been almost exclusively within the breeding season of seabirds. Several studies have also shown that proximity to breeding colonies is an important determinant of seabird bycatch rates (Moreno *et al.* 1996; Nel *et al*. 2002) and temporal closures around breeding areas contributed to a substantial reduction in seabird bycatch (Croxall & Nicol 2004).

***Notes and Caveats***

An important and effective management response, especially for high risk areas, and when other measures prove ineffective. There is a risk that temporal/spatial closures could displace fishing effort into neighbouring or other areas which may not be as well regulated, thus leading to increased incidental mortality elsewhere.

***Minimum standards***

None established.

***Need for combination***

Must be combined with other recommended measures, both in the specific areas when the fishing season is opened, and also in adjacent areas to ensure displacement of fishing effort does not merely lead to a spatial shift in the incidental mortality.

***Implementation monitoring***

VMS/AIS systems or at-sea surveillance.

***Research needs***

Further information about the seasonal variability in patterns of species abundance around trawl fisheries is required.

# 5. OTHER CONSIDERATIONS

## 5.1 Lasers

***ACAP advice***

**High energy lasers are strongly discouraged.**

***Scientific evidence for effectiveness in trawl fisheries***

Available evidence shows that high energy lasers (Class 4 lasers, the highest class in terms of laser hazards) are ineffective at deterring seabirds from danger areas around fishing vessels (Melvin *et al.* 2016) and likely damage seabird visual systems with negative effects on foraging behaviour of laser exposed seabirds (Fernandez-Juricic, 2023).

***Notes and Caveats***

Concerns are ongoing regarding the safety (to both humans and birds) and efficacy of laser technology of unknown energy levels as a seabird bycatch mitigation tool, as they continue to be used currently in various fisheries. Available evidence shows that high energy lasers are no longer marketed for fishery applications. Currently evidence is lacking on the possibility that lasers of lower energy levels delivered in different ways (scanning, blinking, wave-length, etc.) could be used safely and be effective in some applications.

***Minimum standards***

Not applicable, as strongly discouraged.

***Need for combination***

Not applicable, as strongly discouraged.

***Implementation monitoring***

Not applicable, as strongly discouraged.

***Research needs***

As high energy lasers continue to be used in some fisheries, we encourage reporting of the extent and output power levels of laser use by ACAP Parties, including any information on effectiveness, as well as bird welfare effects.

## REFERENCES

Abraham, E.R. 2010: *Mincing offal to reduce the attendance of seabirds at trawlers*. Report prepared by Dragonfly for Department of Conservation, Wellington, New Zealand. 28 pp.

Abraham, E.; and Pierre, J. 2007. Mincing, mealing and batching: waste management strategies aimed at reducing seabird interactions with trawl vessels. WG-FSA-07-42, SC-CAMLR XXVII, Hobart, Australia

Abraham, E.R.; Pierre, J.P.; Middleton, D.A.J.; Cleal, J.; Walker, N.A.; Waugh, S.M. 2009. Effectiveness of fish waste management strategies in reducing seabird attendance at a trawl vessel. *Fisheries Research* **95**: 210–219.

Abraham, E.R.; Thompson, F.N. 2009: Warp strike in New Zealand trawl fisheries, 2004-05 to 2006-07. *New Zealand Aquatic Environment and Biodiversity Report No.* ***33***. 21 pp.

Baez, J.C., Garcıa-Barcelona, S., Mendoza, M. Ortiz de Urbina, J.M., Real, R., Macıas, D. 2014. Cory's shearwater by-catch in the Mediterranean Spanish commercial longline fishery: implications for management. *Biodiversity Conservation* DOI 10.1007/s10531-014-0625-6.Bull, L.S. 2009. New mitigation measures reducing seabird bycatch in trawl fisheries. *Fish and Fisheries* **10**: 408–427.

Copello, S; Blanco, G,; Seco Pon, JP, & Quintana F. 2016. Exporting the problem: issues with fishing closures in seabird conservation. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, La Serena, Chile, 2-4 May 2016 SBWG7 Doc 17 Rev 1,Cleal, F.V.; Pierre, J.P.; Clement, G. 2013. Warp strike mitigation devices in use on trawlers ≥ 28 m in length operating in New Zealand fisheries. Research report for the Department of Conservation, Wellington, New Zealand.

Crofts, S. 2006a. Environmental effects and practicality of paired tori-line performance: testing buoys vs cones. Falklands Conservation, Stanley, Falkland Islands, 23 pp.

Crofts, S. 2006b. Seabird interactions in the Falkland Islands Loligo Trawl Fishery 2005/2006. Falklands Conservation, Stanley, Falkland Islands, 22 pp.

Crofts, S. 2006c. Preliminary assessment: seabird interactions in the Pelagic Southern Blue-whiting (Micromesistius australis) Surimi Fishery in the Falkland Waters – December 2006. Falklands Conservation, Stanley, Falkland Islands, 15 pp.

Croxall, J.P. and Nicol, S. 2004. Management of Southern Ocean fisheries: global forces and future sustainability. *Antarctic Science* **16**: 569–584.

Fernandez-Juricic, E. 2023. Laser technology for seabird bycatch prevention in commercial fisheries. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, United Kingdom, 15-17 May 2023, SBWG11 Doc 11.

FAO 2009. Best Practices to Reduce Incidental Catch of Seabirds in Capture Fisheries. Rome: Food and Agriculture Organization of the United Nations. 49 pp.

Favero, M.; Blanco, G.; Garcia, G.; Copello, S.; Seco Pon, J.P.; Frere, E.; Quintana, F.; Yorio, P.; Rabuffetti, F.; Canete, G.; Gandini, P. 2011. Seabird mortality associated with ice

trawlers in the Patagonian shelf: effect of discards on the occurrence of interactions with fishing gear. *Animal Conservation* **14**: 131–139.Garcia, M., Cocas, L, Adasme, L. & Melo, T. 2024. Mitigation of seabird bycatch in Chilean trawl fisheries - FACT SHEET. Agreement on the Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Inf 07.

Gonzalez-Zevallos, D. and Yorio, P. 2006. Seabird use of discards and incidental captures at the Argentine hake trawl fishery in the Golfo San Jorge, Argentina. *Marine Ecology Progress Series* **316**: 175–183.

Gonzalez-Zevallos, D.; Yorio, P.; Caille, G. 2007. Seabird mortality at trawler warp cables and a proposed mitigation measure: A case of study in Golfo San Jorge, Patagonia, Argentina. *Biological Conservation* **136**: 108–116.

Hooper, J.; Agnew, D.; Everson, I. 2003. Incidental mortality of birds on trawl vessels fishing for icefish in Subarea 48.3. WG-FSA-03/79, SC-CAMLR XXII, Hobart, Australia.

Iriarte, V.; Shcherbich, Z.; Arkhipkin, A. 2023. Net binding trials to mitigate seabird entanglement during bottom trawl shooting. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, United Kingdom, 15-17 May 2023, SBWG11 Inf 10.

Jiménez, S.; Páez, E.; Forselledo, R.; Loureiro, A.; Troncoso, P.; Domingo, A. 2022. Predicting the relative effectiveness of different management scenarios at reducing seabird interactions in a demersal trawl fishery. *Biological Conservation* **267**: 109487

Kuepfer A. 2016. An Assessment of Seabird Bycatch in Falkland Islands Trawl Fisheries, July 2015 to June 2016. Falkland Islands Fisheries Department, Stanley, Falkland Islands, 33 pp.

Kuepfer; A. 2017. The Warp Deflector (pinkie system): Practical implications of a physical seabird bycatch mitigation device trialled in the Falkland Islands trawl fishery. Agreement on the Conservation of Albatrosses and Petrels, Eighth Meeting of the Seabird Bycatch Working Group, Wellington, New Zealand 4-6 September 2017, SBWG8 Inf 17.

Kuepfer, A.; Sherley, R.B.; Brickle, P.; Arkhipkin, A.; Votier, S.C. 2022. Strategic discarding reduces seabird numbers and contact rates with trawl fishery gears in the Southwest Atlantic. *Biological Conservation* **266**: 109461.

Melvin, E.F.; Dietrich, K.S.; Fitzgerald, S.; Cardoso, T. 2010. Reducing seabird strikes with trawl cables in the Pollock Catcher-Processor Fleet in the Eastern Bering Sea. *Polar Biology* **34**: 215–226.

Melvin, E.F.; Dietrich, K.S. Thomas, T. 2004. Pilot Tests of Techniques to Mitigate Seabird Interactions with Catcher Processor Vessels in the Bering Sea Pollock Trawl Fishery: Final Report. Washington Sea Grant, Seattle, WA. WSG-AS 05-05.

Melvin, E.F.; Asher, W.E.; Fernandez-Juricic, E.; Lim, A. 2016. Results of initial trials to determine if laser light can prevent seabird bycatch in North Pacific Fisheries. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, La Serena, Chile, 2 - 4 May 2016, SBWG7 Inf 12.

Mori,J.C, Viney, B., Mackey, K. & Krafft, B.A. 2024. Developing Net Monitoring Cable Mitigation Measures on Continuous Trawl Vessels. Agreement on the Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Doc 16.

Moreno, C.A.; Rubilar, P.S.; Marschoff, E.; Benzaquen, L. 1996. Factors affecting the incidental mortality of seabirds in the *Dissostichus eleginoides* fishery in the south-west Atlantic (Subarea 48.3, 1995 season). *CCAMLR Science* **3**: 79–91.

Munro, G.M. 2005. Waste Discard Management in the Falkland Islands Trawl Fishery. *In:* Falklands Conservation, Stanley, Falkland Islands, 61pp.

Ngcongo, S.V. & Miranda, N.A.F. 2024. Update on EM device for improving compliance with bird scaring line measures in longline and trawl fisheries. Agreement on the Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Inf 08.

Nel, D. C.; Ryan, P.G.; Watkins, B.P. 2002. Seabird mortality in the Patagonian toothfish longline fishery around the Prince Edward Islands, 1996-2000. *Antarctic Science* **14**: 151–161.

Pierre, J.P.; Abraham, E.R.; Middleton, D.A.J.; Cleal, J.; Bird, R.; Walker, N.A.; Waugh, S.M. 2010. Reducing interactions between trawl fisheries and seabirds: responses to foraging patches provided by fish waste batches. *Biological Conservation* **143**: 2779-2788.

Pierre, J.P.; Abraham, E.R.; Cleal, J.; Middleton, D.A.J. 2012a. Reducing effects of trawl fishing on seabirds by limiting foraging opportunities provided by fishery waste. *Emu* **112**: 244–254.

Pierre, J.P.; Abraham, E.R.; Richard, Y.; Cleal, J.; Middleton, D.A.J. 2012b. Controlling trawler waste discharge to reduce seabird mortality. *Fisheries Research* **131–133**: 30–38.

Pierre, J.P.; Cleal, F.V.; Thompson, F.N.; Butler, H.; Abraham, E.R. 2013. Seabird mitigation in New Zealand's scampi trawl fishery. Research report for the Department of Conservation, Wellington, New Zealand.

Pierre, J.; Gerner, M.; Penrose, L. 2014. Assessing the Effectiveness of Seabird Mitigation Devices in the Trawl Sectors of the Southern and Eastern Scalefish and Shark Fishery in Australia. 28 pp.

Reid, T. and Edwards, M. 2005. Consequences of the introduction of Tori lines in relation to seabird mortality in the Falkland Islands trawl fishery, 2004/2005. Falklands Conservation, Stanley, Falkland Islands, 41 pp.

Roe, J.O. 2005. Mitigation trials and recommendations to reduce seabird mortality in the pelagic icefish (*Champsocephalus gunnari*) fishery (Sub-area 48.3). WG-FSA-05/ 59, SC-CAMLR XXIV. CCAMLR, Hobart, Australia, 18 pp.

Snell, K.R.S.; Brickle, P.; Wolfaardt, A.C. 2011. Refining Tori lines to further reduce seabird mortality associated with demersal trawlers in the South Atlantic. *Polar Biology* **35**: 677–687.

Steele-Mortimer, B.; Wells, R. 2023. Net Capture Programme: Investigating new tools to mitigate seabird net captures in demersal and pelagic trawl fisheries. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, United Kingdom, 15-17 May 2023, SBWG11 Doc 17 Rev 1.

Suazo, C. G.; Ortiz Soazo, P.; Frere, E.; Hidalgo, M.; Fernández, F.; Rouxel, Y. ; Yates, O. 2024. Minimum standards for mitigation measures with curtain systems in demersal trawl fisheries. Agreement on the Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Inf 19.

Sullivan, B.; Clark, J.; Reid, K.; Reid, E. 2009. Development of effective mitigation to reduce seabird mortality in the icefish (*Champsocephalus gunnari*) trawl fishery in Subarea 48.3. CCAMLR Working Group on Incidental Mortality Associated with Fishing. WG-IMAF-09/15.

Sullivan, B.; Liddle G.M.; Munro, G.M. 2004. Mitigation trials to reduce seabird mortality in pelagic trawl fisheries (Subarea 48.3). WG-FSA-04/80. CCAMLR, Hobart.

Sullivan, B.J.; Brickle, P.; Reid, T.A.; Bone, D.; Middleton, D.A.J. 2006b. Mitigation of seabird mortality on factory trawlers: trials of three devices to reduce warp cable strikes. *Polar Biology* **29**: 745–753.

Sullivan, B.J. and Reid, T.A. 2003. Seabird mortality and Falkland Island trawling fleet 2002/03. WG-FSA-03/91. CCAMLR, Hobart.

Sullivan, B.J.; Reid, T.A.; Bugoni, L. 2006a. Seabird mortality on factory trawlers in the Falkland Islands and beyond. *Biological Conservation* **131**: 495–504.

Tamini, L. L.; Chavez, L. N.; Dellacasa, R. F.; Marinao, C. J.; Frere, E. 2024. Advances in mitigating seabirds interactions with the net monitoring cable. Agreement on the Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Inf 03.

Tamini, L. L.; Chavez, L. N., Góngora, M. E.; Yates, O.; Rabuffetti, F. L.; Sullivan, B. J. 2015. Estimating mortality of black-browed albatross (*Thalassarche melanophris*, Temminck, 1828) and other seabirds in the Argentinean factory trawl fleet and the use of bird-scaring lines as a mitigation measure. *Polar Biology* **38(11)**:1867-1879

Tamini, L. L.; Braun, S.; Chavez, L. N.; Dellacasa, R. F. & E. Frere. 2023a. La Tamini Tabla: desarrollo y diseño final. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, UK, 15 - 17 May 2023. SBWG11 Inf 20 Rev 1

Tamini, L. L.; Dellacasa, R. F.; Chavez, L. N.; Marinao, C. J.; Góngora, M. E., Crawford, R.; Frere, E. 2023b. Bird scaring lines reduce seabird mortality in mid-water and bottom trawlers in Argentina. *ICES Journal of Marine Science* **80 (9)**: 2393–2404.

Watkins, B. P.; Petersen, S. L.; Ryan, P. G. 2008. Interactions between seabirds and deep-water hake trawl gear: an assessment of impacts in South African waters. *Animal Conservation* **11**:247-254

Weimerskirch, H.; Capdeville, D.; Duhamel, G. 2000. Factors affecting the number and mortality of seabirds attending trawlers and long-liners in the Kerguelen area. *Polar Biology* **23**: 236–249.

Wienecke, B. and Robertson, G. 2002. Seabird and seal-fisheries interactions in the Australian Patagonian toothfish *Dissostichus eleginoides* trawl fishery. *Fisheries Research* **54**: 253–265.

**ANNEXE 3. PASSAGE EN REVUE PAR L'ACAP DES MESURES D'ATTÉNUATION DE LA CAPTURE ACCESSOIRE D'OISEAUX DE MER DANS LA PÊCHE À LA PALANGRE DÉMERSALE**

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Review of Mitigation Measures and Best Practice Advice for Reducing the Impact of Demersal Longline Fisheries on Seabirds

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## INTRODUCTION

The incidental mortality of seabirds, mostly albatrosses and petrels, in longline fisheries continues to be a growing global concern. This was a major reason for the establishment of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). Many mitigation methods to reduce and eliminate seabird bycatch have been developed and tested over the last 20 plus years, especially for demersal longline fisheries. Demersal longline fisheries are those in which baited hooks are set on, or near the sea floor using a variety of systems and configurations. These include systems that deploy a single hookline (manually baited or mechanically baited (single line) systems), and systems that include a second hauling line floated above a hookline or a cluster of baited hooks (Spanish and Chilean (trotline) systems). Single line hand-baiting systems store hooklines by a variety of means, while single line systems involve mechanical baiting and hooklines hung from racks. Although most mitigation measures are broadly applicable, the feasibility, design and effectiveness of some measures will be influenced by longlining method, gear configuration, and vessel size. It should be noted that most scientific literature relates to fleets of larger vessels, with artisanal fleets receiving less attention. Some of this advice may need to be modified for smaller vessels.

This document provides advice on best practices for reducing the impact of demersal longline fishing on seabirds. These best practice bycatch mitigation measures should be applied in areas where fishing effort overlaps with seabirds vulnerable to bycatch. The ACAP review process recognises that factors such as safety, practicality and the characteristics of the fishery should be taken into account when considering the efficacy of seabird bycatch mitigation measures and consequently in the development of advice and guidelines on best practice.

This document also provides information regarding measures that are currently under development, as well as those that are not recommended. ACAP considers some proposed mitigation measures ineffective, based on a lack of evidence. ACAP continually monitors the

development of these measures and results of scientific research about their effectiveness.

The document comprises two components. The first component provides a summary of ACAP's advice regarding best practice measures for reducing seabird bycatch in demersal longline fisheries, and the second component outlines the review of mitigation measures that have been assessed for demersal longline fisheries.

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Summary Advice for Reducing the Impact of Demersal Longline Fisheries on Seabirds

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## BEST PRACTICE MEASURES

The most effective measures to reduce incidental catch of seabirds in demersal longline fisheries are:

- Use of an appropriate **line weighting regime** to sink baited hooks as close to the vessel as possible to reduce their availability to seabirds.
- Actively deterring birds from baited hooks by means **of bird scaring lines**, and
- Setting longlines at **night**.

In cases where line weighting is integral to fishing gear, it has the advantage of consistent implementation, and compared to bird scaring lines and night setting, facilitates compliance and port monitoring. Further measures include bird deterrent curtains at the hauling bay, responsible offal management and avoiding peak areas and periods of seabird foraging activity. The Chilean (trotline) system (with appropriate line weighting and branch line length) inherently prevents albatross and petrel mortality given its rapid sinking of baited hooks, and is considered best practice mitigation for demersal longline fishing.

It is important to note that there is no single solution to reduce or avoid incidental mortality of seabirds, and that the most effective approach is to use the measures listed above in combination.

Best practice mitigation measures for demersal longline fisheries are listed individually below; The recommendations are categorised into general best practice measures (1), followed by best practice measures for line setting (2), and line hauling (3) operations.

## 1. BEST PRACTICE MEASURES - GENERAL

### 1.1 Area and seasonal closures

The temporary closure of important foraging areas (e.g. areas adjacent to important seabird colonies during the breeding season when large numbers of aggressively feeding seabirds are present) has been a very effective mechanism to reduce incidental mortality of seabirds in fisheries in those areas.

# 2. BEST PRACTICE MEASURES - LINE SETTING

## 2.1 Line weighting

Lines should be weighted to sink baited hooks rapidly out of the range of feeding seabirds as close to the vessel as possible. Weights should be deployed before line tension occurs to ensure that the line sinks rapidly and consistently.

### 2.1 a Weighted lines for Spanish gear

The use of steel weights is considered best practice, as they sink hooklines consistently. The mass should be a minimum of 5 kg at 40 m intervals.

Where steel weights are not used, longlines should be set with a minimum of 8.5 kg at 40 m intervals when using rocks, and a minimum of 6 kg at 20 m intervals when using concrete weights.

### 2.1 b Weighted lines for Chilean (trotline with nets) system gear

Line weights should conform to those for the Spanish system (see above).

### 2.1 c Weighted lines for autoline gear

Integrated weight (IW) longlines are designed with a lead core of 50 g/m. Their key characteristic is that they sink with a near-linear profile from the surface (minimal lofting in propeller turbulence) and are effective at sinking quickly out of reach of foraging seabirds. The mean sink rate of IW lines should be ≥ 0.24 m/s to 10 m depth.

Where practical, IW lines are preferred over externally weighted alternatives because of their linear sink profile from the surface and its ability to consistently achieve the minimum sink rate.

When using external weights instead of IW lines, the minimum average sink rate should be 0.3 m/s to 10 m depth. A faster sink rate is necessary with this configuration to minimise the lofting of sections of line between line weights in propeller turbulence. The sink rate can be achieved with a minimum of 5 kg at no more than 40 m intervals.

## 2.2 Night setting

Setting longlines at night (between the end of nautical twilight and before nautical dawn) is effective at reducing incidental mortality of seabirds because the majority of vulnerable seabirds are diurnal foragers.

## 2.3 Bird scaring lines

A bird scaring line is a line that runs from a high point at the stern of a vessel to a drag generating device at its in-water terminus. Drag created by a towed device or the in-water extent of the line, lifts the length of the line closest to the vessel into the air as the vessel travels forward setting gear. Importantly, it is this aerial extent with streamers attached that scares birds from baited hooks as they sink providing a physical deterrent over the area where baited hooks are sinking. It is essential that this aerial extent match the distance astern that

seabirds can access baited hooks. Weighted hooklines reduce this distance and make streamer lines more efficient at excluding foraging birds from hooks.

A weak link is recommended to allow the bird scaring line to break-away from the vessel in the event of an entanglement with the main line. The entangled bird scaring line can be recovered during the haul.

**Large vessels (≥24 m in length)**

Two (paired) bird scaring lines should be used simultaneously.

The design of the bird scaring lines should include the following specifications:

- The vessel attachment height should be at least 7 m above sea level.
- Streamers should be brightly coloured and reach the sea-surface in calm conditions, and placed at intervals of no more than 5 m.
- Sufficient drag must be created to maximise aerial extent and maintain the line directly over sinking baited hooks and astern of the vessel during crosswinds. This may be achieved using a towed devices or a bird scaring line a minimum of 150 m in length.

**Small vessels (<24 m in length)**

One or two (paired) bird scaring lines should be used.

The design of the bird scaring lines should include the following specifications:

- The attachment height should be at least 6 m above sea level.
- The lines should achieve an aerial extent of at least 75 m when setting at ≥ 4 knots, or 50 m if setting at speeds < 4 knots.
- Streamers should be brightly coloured and reach the sea-surface in calm conditions, and placed at intervals of no more than 5 m. Streamers may be modified over the first 15 m to avoid tangling.
- Sufficient drag must be created to maximise aerial extent and maintain the line directly behind the vessel during crosswinds. This may be achieved using either towed devices or a longer in-water sections.

### 2.4 Offal and discard discharge management

Seabirds are highly attracted to offal discharged from vessels. To prevent large numbers of seabirds attending line setting operations, offal and discards should be retained onboard prior to and during line setting.

## 3. BEST PRACTICE MEASURES - LINE HAULING

### 3.1. Bird Exclusion Device (BED)

Seabirds can be accidentally hooked as gear is retrieved. A Bird Exclusion Device (BED) consists of a horizontal support several metres above the water that encircles the entire hauling bay. Vertical streamers are positioned between the horizontal support and water surface. The BED configuration can also include a line of floats on the water surface connected

to the vertical streamers to stabilize movement in strong winds. This configuration is the most effective method to prevent birds entering the area around the hauling bay, either by swimming or by flying. BEDs are retrieved and stowed when not hauling. For small vessels (<20 m in length), where the application of mitigation devices requiring robust support structures and on-water sections can be challenging, the use of simple haul mitigation devices has been demonstrated to be both practical and effective at deterring birds from hauling points.

### 3.2. Offal and discard discharge management

During setting, offal and discards should always be retained onboard. During hauling offal and discards should be retained on board or released from the opposite side of the vessel to the hauling bay.

All hooks should be removed and retained on board before discards are discharged from the vessel.

## 4. OTHER RECOMMENDATIONS

### 4.1. Chilean method

The Chilean method of longline fishing was designed to prevent toothed whale depredation of fish. Because weights are deployed directly below the hooks, allowing hook-bearing lines to sink more rapidly beyond the foraging depths of seabirds than the traditional Spanish systems. The Chilean method is an inherently effective configuration for avoiding seabird bycatch . As this gear type deploys hook clusters, it is extremely important to remove and retain hooks from discards.

## 5. MITIGATION MEASURES UNDER DEVELOPMENT OR THAT REQUIRE FURTHER INVESTIGATION

**Underwater Line Setter:** an underwater setting device is under development in New Zealand inshore bottom longline fisheries. It operates by running the hookline through a set of rollers towed behind the vessel at depth. The device requires testing under commercial fishing conditions to determine effectiveness and optimal setting depths.

**Mitigation measures to increase sink rates of baited hooks on floated longlines**: Floated longlines partially suspend the hookline above the sea floor. During line setting, they are associated with elevated levels of seabird attacks on baited hooks at or near the surface during line setting compared to lines without floats. Further work is required to identify mitigation measures that increase the sink rate of baited hooks on floated longlines. Limited trials in NZ found that through the use of dropper floats, together with manipulation of line weighting regimes and bird scaring line configurations, improved sinking to depth within the aerial extent can be achieved in small vessel floated demersal longline fisheries (Goad et al. 2024).

## 6. MITIGATION MEASURES THAT ARE NOT RECOMMENDED

ACAP considers that the following measures lack scientific substantiation as technologies or procedures for reducing the impact of demersal longline fisheries on seabirds.

**Hook design** - insufficiently researched.

**Olfactory deterrents** - insufficiently researched.

**Underwater setting chutes** - insufficiently researched.

**Side setting** - insufficiently researched and operational difficulties.

**Blue-dyed bait, thawed bait** - not relevant in demersal longline gear.

**Use of a line setter** - insufficiently researched.

**Lasers** - High energy lasers are strongly discouraged due to ongoing concerns regarding safety to both humans and birds..

**Acoustic deterrents** - insufficiently researched.

The ACAP review of seabird bycatch mitigation measures for demersal longline fisheries is presented in the following section.

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Review of Seabird Bycatch Mitigation Measures for Demersal Longline Fisheries

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## INTRODUCTION

A range of technical and operational mitigation methods have been designed or adapted for use in demersal longline fisheries to reduce incidental mortality of seabirds. Operationally, peak areas and periods of seabird foraging activity should be avoided. Effective technical methods include actively deterring birds from, and minimising the visibility of, baited hooks. Vessels need to be made less attractive to birds, and the distance astern and time baited hooks are available to birds must be reduced. Mitigation methods need to be easy and safe to implement, cost effective, enforceable and should not reduce catch rates of target species or increase the bycatch rates of other protected species.

The feasibility, effectiveness and specifications of mitigation measures may vary by area, seabird assemblage, fishery, vessel size, and gear configuration.

The Seabird Bycatch Working Group (SBWG) of ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in demersal longline fisheries. This document is a distillation of that review. With the exception of the Chilean system, the combined use of weighted branch lines, bird scaring lines and night setting is considered best practice mitigation for reducing seabird bycatch in demersal longline fisheries.

## THE ACAP REVIEW PROCESS

At each of its meetings, the ACAP SBWG considers any new research or information pertaining to seabird bycatch mitigation in demersal longline fisheries. The following criteria are used by ACAP to guide the assessment process, and to determine whether a particular technology or measure can be considered best practice to reduce the incidental mortality of albatrosses and petrels in fishing operations.

**Best Practice Seabird Bycatch Mitigation Criteria and Definition**

**i.** Individual fishing technologies and techniques should be selected from those shown by experimental research to significantly[7] reduce the rate of seabird incidental mortality[8] to the lowest achievable levels. Experimental research yields definitive results when performance of candidate mitigation technologies is compared to a control (no deterrent), or to status quo in the fishery. When testing relative performance of mitigation approaches, analysis of fishery observer data can be plagued with a myriad of confounding factors. Where a significant relationship is demonstrated between seabird behaviour and seabird mortality in a particular system or seabird assemblage, significant reductions in seabird behaviours, such as the rate of seabirds attacking baited hooks, can serve as a proxy for reduced seabird mortality. Ideally, where simultaneous use of fishing technologies and practices is recommended as best practice, research should demonstrate significantly improved performance of the combined measures.

**ii.** Fishing technologies and techniques, or a combination thereof, should have clear and proven specifications and minimum performance standards for their deployment and use. Examples would include: specific bird scaring line designs (lengths, streamer length and materials; etc.), number (one vs. two) and deployment specifications (such as aerial extent and timing of deployment); night fishing defined by the time between the end of nautical dusk and start of nautical dawn; and, line weighting configurations specifying mass and placement of weights or weighted sections.

**iii.** Fishing technologies and techniques should be demonstrated to be practical, cost effective and widely available. Commercial fishing operators are likely to select for seabird bycatch reduction measures and devices that meet these criteria including practical aspects concerning safe fishing practices at sea.

**iv.** Fishing technologies and techniques should, to the extent practicable, maintain catch rates of target species. This approach should increase the likelihood of acceptance and compliance by fishers.

**v.** Fishing technologies and techniques should, to the extent practicable not increase the bycatch of other taxa. For example, measures that increase the likelihood of catching other protected species such as sea turtles, sharks and marine mammals, should not be considered best practice (or only so in exceptional circumstances).

**vi.** Minimum performance standards and methods of ensuring compliance should be provided for fishing technologies and techniques, and clearly specified in fishery regulations. Relatively simple methods to check compliance should include, but not be limited to, port inspections of branch lines to determine compliance with branch line weighting, determination of the presence of davits (tori poles) to support bird scaring lines, and inspections of bird scaring lines for conformance with design requirements. Compliance monitoring and reporting should be a high priority for enforcement authorities.

[7] Any use of the word 'significant' in this document is meant in the statistical context

[8] This may be determined by either a direct reduction in seabird mortality or by reduction in seabird attack rates, as a proxy

On the basis of these criteria, the scientific evidence for the effectiveness of mitigation measures or fishing technologies/techniques in reducing seabird bycatch is assessed, and explicit information is provided on whether the measure is recommended as being effective, and thus considered best practice, or not. The ACAP review also indicates whether the measure needs to be combined with additional measures, and provides notes and caveats for each measure, together with information on performance standards and further research needs. Following each meeting of ACAP's SBWG and Advisory Committee, this review document and ACAP's best practice advice, is updated (if required). A summary of ACAP's current best practice advice is provided in the preceding section of this document.

## SEABIRD BYCATCH MITIGATION FACT SHEETS

A series of seabird bycatch mitigation fact sheets have been developed by ACAP and BirdLife International to provide practical information, including illustrations, on seabird bycatch mitigation measures (https://www.acap.aq/bycatch-mitigation/bycatch-mitigation-fact-sheets). The sheets, which include information on the effectiveness of the specific measure, their limitations and strengths and best practice recommendations for their effective adoption, are linked to the ACAP review process, and are updated following ACAP reviews. Links to the available fact sheets are provided in the relevant sections below. The mitigation fact sheets are currently available in English, French, Spanish, Portuguese, Japanese, Korean, Simplified Chinese, Traditional Chinese, and Indonesian.

## BEST PRACTICE MEASURES

### 1. Area and seasonal closures

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended.** Must be combined with other measures, both in the specific areas when the fishing season is opened, and also in adjacent areas to ensure displacement of fishing effort does not lead to a spatial shift in the incidental mortality. A number of studies have reported marked seasonality in seabird bycatch rates, with the majority of deaths taking place during the breeding season (Moreno *et al.* 1996; Ryan *et al*. 1997; Ashford & Croxall 1998; Ryan & Purves 1998; Ryan & Watkins 1999; Ryan & Watkins 2000; Weimerskirch *et al*. 2000; Kock 2001; Nel *et al*. 2002; Ryan & Watkins 2002; Croxall & Nicol 2004; Reid *et al*. 2004; Delord *et al*. 2005). In some studies, mortality occurred almost exclusively within the breeding season. Several studies have also shown that proximity to breeding colonies is an important determinant of seabird bycatch rates (Moreno *et al*. 1996; Nel *et al*. 2002). The much higher rate of seabird bycatch during the breeding period led to the temporal closure of the fishery in CCAMLR sub-area 48.3 from 1998, which contributed to a ten-fold reduction in seabird bycatch (Croxall & Nicol 2004). Movement of fishing effort away from the Prince Edward Islands coincided with a reduction in seabird bycatch in the sanctioned Prince Edward Island fishery (Nel *et al*. 2002).

***Notes and Caveats***

It's difficult to separate the performance of a temporal/spatial closure from increased uptake/implementation of other mitigation measures. Likewise, some variation over time and space in the location of favoured foraging areas for seabirds is expected. However, closures

are clearly an important and effective management response, especially for high risk areas, and when other measures prove ineffective (Waugh 2008). There is a risk that temporal/spatial closures could displace fishing effort into neighbouring or other areas which may not be as well regulated, thus leading to increased incidental mortality elsewhere (Copello *et al.* 2016).

***Minimum standards***

Minimum standards are based on the overlap of albatrosses and petrels with fishing effort so can vary from area to area. For example, the area around South Georgia (Islas Georgias del Sur)[9] (CCAMLR Subarea 48.3) is closed for fishing between September and mid-April each year (which coincides with the breeding seasons of most seabirds at South Georgia (Islas Georgias del Sur)[3]), as provided for by CCAMLR Conservation Measures in force (CCAMLR 2019).

***Implementation monitoring***

Onboard or at-sea surveillance is required to assess implementation.

***Research needs***

Continued gathering of temporal and spatial information of seabirds and fishing effort, should be ongoing, especially for high risk areas (e.g. adjacent to important breeding colonies) and to better understand the effects of climate change on seabirds. In some studies, incidental mortality has been greatest during the chick-rearing period (Nel *et al*. 2002; Delord *et al*. 2005), whereas others have reported highest mortality during the incubation period (Reid *et al*. 2004). This difference likely relates to where the birds are foraging in relation to fishing effort at the time, and highlights the importance of understanding this interaction. Research is also required to determine the regional impact of closures on catches of target species.

## 2. Externally weighted lines:

## a) Spanish system

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended mitigation method**. Should be combined with other measures, especially effective bird scaring lines, offal management and/or night setting (Agnew *et al.* 2000; Robertson 2000; Robertson *et. al*. 2008a; 2008b; Moreno *et al*. 2006; Moreno *et al*. 2008).

***Notes and Caveats***

Spanish system longlines are buoyant and weights must be attached to sink gear to fishing depth. Longlines with externally added weights sink unevenly, faster at the weights than at the midpoint between weights. Although gear configuration and setting speed influence the sink profiles of the hook lines (Seco Pon *et al*. 2007), the principle determinants of sink rates are the mass of the weights and the distance between them (Robertson *et al*. 2008a). It is critical

[9] A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur e Islas Sandwich del Sur) and the surrounding maritime areas.

that line tension astern is eliminated to ensure the smooth flow of lines and hooks from gear baskets. This can be done by ensuring the correct packing of lines and snoods in baskets, preventing hooks snagging on snood baskets, and by ensuring that weights are released from the vessel before line tension occurs (Robertson *et al*. 2008a,b). Weights must be attached and removed for each set-haul cycle, which is onerous and potentially hazardous for crew members. Weights comprised of rocks enclosed in netting bags and concrete blocks deteriorate and require ongoing maintenance/replacement and monitoring to ensure weights are the required mass (Otley *et al*., 2007); weights made of solid steel are preferred, in terms of mass consistency, handling, maintenance and monitoring compliance (Robertson *et al*. 2008b, Paterson *et al*. 2017).

***Minimum standards***

Global minimum standards have not been established. Requirements vary by fishery. For example, CCAMLR minimum requirements for vessels using the Spanish method of longline fishing are 8.5 kg mass at 40 m intervals (if rocks are used), 6 kg mass at 20 m intervals for traditional (concrete) weights, and 5 kg weights at 40 m intervals for solid steel weights.

***Implementation monitoring***

Fishing gear is deployed manually. Weights are attached by hand during line setting and removed during line hauling. Distance between weights and the mass of the weight used may vary in accordance with fishing strategy and for operational reasons. Onboard monitoring is required to assess implementation.

***Research needs***

Sink rates and sink profiles of line weighting regimes may vary according to vessel type, setting speed and deployment position relative to propeller turbulence. It is important that the sink rate relationships of different line weighting regimes are understood for a particular fishery (or fishery method) and that testing confirms the effectiveness of the line weighting regime and the sink profile in reducing seabird mortality.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/762-fs-02-demersal-longline-line-weighting-external-weights/file

## 2. Externally weighted lines:

## b) Chilean method (trot line with nets)

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended mitigation method**. Although the Chilean method effectively prevents mortality as a sole measure given that hooks sink quickly from the surface, it is prudent to also deploy a bird scaring streamer line. This method (first tested on large longline vessels in 2005) is a variant of the traditional Spanish double line method of longlining and was developed in Chile to minimise depredation of Patagonian toothfish by toothed whales (Figure 1). This system makes use of net sleeves or ‘cachaloteras’ which envelop captured fish during hauling. Hooks are clustered on secondary lines to which weights are attached, resulting in very fast hook sink rates (mean: 0.8 m/s c.f. 0.15 m/s for the Spanish system) in

the first 15-20 m (the length of the secondary lines) of water column. The Chilean method has the capacity to reduce (or eliminate) seabird mortality to negligible levels (Moreno *et al*. 2006; Moreno *et al*. 2008; Robertson *et al*. 2008b). Because of its effectiveness in reducing impacts of toothed whales, this method is currently used in many longline fleets operating in South American waters (Moreno *et al*. 2008), as well as in the south west Atlantic.

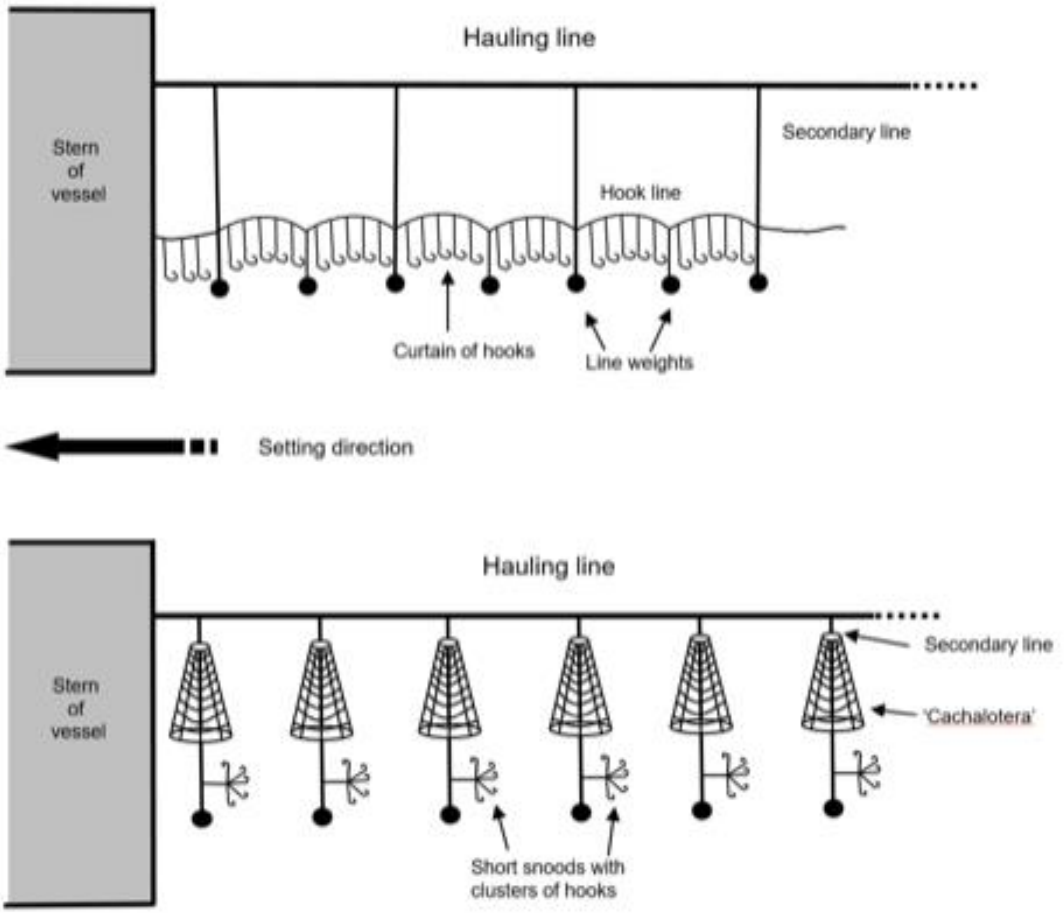


**Figure 1**. Typical configurations of the traditional Spanish double line system (a) and Chilean (trotline) system (b) showing differences in gear design and location of weights in relation to hooks. The open-ended secondary/connecting lines (not joined by a continuous hook line) and proximity of weights to hooks of the Chilean system enables hooks to sink rapidly with no lofting in propeller turbulence from the surface close to a vessel stern. Drawings not to scale.

### *Notes and Caveats*

This is a relatively new system, is possibly still in the evolutionary stages, and should be monitored and possibly refined. Concern has been raised about the excessive discarding of fish bycatch (e.g. grenadiers) with embedded hooks and the ingestion of these hooks by albatrosses especially with this gear type (Phillips *et al*. 2010). The solution to this problem is to stop hooks from being discarded. This is best achieved by banning the discarding of hooks as part of the licence conditions, as is already done in many fisheries, and also increasing awareness amongst fishers, observers, and operators to facilitate compliance with such a ban.

***Minimum standards***

Global standards not established.

***Implementation monitoring***

Weights need to be attached to hook-bearing secondary lines to sink. However, alternating between this fishing method and the traditional Spanish method within fishing trips is problematic. While this capacity exists the requirements for the Spanish system should apply (see “2a”, above). Onboard monitoring is required to assess implementation.

***Research needs***

Effective as a solitary measure against albatrosses and most likely effective against *Procellaria* spp. petrels due to the very rapid sink rates to depths beyond the known diving range of this group of seabirds. Research is required to determine effectiveness against *Puffinus* spp. shearwaters.

This is a relatively new fishing method and may be in the process of refinement. It is important to monitor changes to gear design, especially those likely to affect the sink rates of baited hooks.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1799-fs-04-demersal-longline-line-weighting-chilean-system/file

## 2. Externally weighted lines:

## c) Auto-bait

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended mitigation method.** Weights must be used in combination with an effective bird scaring line. In the Southern Hemisphere evidence in support of line weighting specifications (below) were developed based on matching or exceeding sink rates of external weight configurations to that of integrated weight lines, not to their effectiveness at deterring seabirds. Attachment of 5 kg weights at no more than 40 m intervals increased mean sink rate from 0.1 m/s (unweighted gear) to 0.3 m/s on the section of longline mid-way between line weights (Robertson 2000). This rate exceeds that of integrated with longlines, which have been thoroughly tested against seabirds (see below). Attachment of external weighs necessary in Antarctic toothfish fisheries to comply with the minimum sink rate (0.3 m/s) required by CCAMLR operating in high latitude areas in summer, where it was not possible to set lines at night.

***Notes and Caveats***

As for the Spanish system it is important to release that external weights from vessels in a manner that avoids line tension. Line tension astern may lift sections of the deployed longline already deployed out of the water farther from the vessel, and imperil seabirds.

***Minimum standards***

Minimum standards are informed by those currently applied to two Southern Hemisphere fisheries. CCAMLR requires as a minimum 5 kg mass at intervals no more than 40 m. It is also required that weights be released before line tension occurs. In the New Zealand fisheries, a minimum of 4 kg (metal weight) or 5 kg (non-metal weight) are required every 60 m if the hookline is 3.5 mm or greater in diameter, and a minimum of 0.7 kg of weight every 60m when the line is less than 3.5 mm diameter.

***Implementation monitoring***

Weights are attached to longlines manually. Onboard monitoring is required to assess implementation.

***Research needs***

Likely to be effective in deterring albatrosses and *Procellaria* spp. seabirds. Evidence is lacking for effectiveness against *Puffinus* spp. shearwaters.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/762-fs-02-demersal-longline-line-weighting-external-weights/file

## 3. Integrated weight longlines

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended mitigation method**. Should be used in combination with bird scaring lines, offal management and/or night setting. Apart from the practical advantages of integrated weight (IW) longlines – superior handling qualities and practically inviolable – the IW longlines sink more quickly and uniformly out of reach of most seabirds compared with externally weighted lines. IW longlines have been shown to reduce substantially mortality rates of surface foragers and diving seabirds, while not affecting catch rates of target species (Robertson *et al*. 2003; Robertson *et al.* 2006; Dietrich *et al*. 2008).

***Notes and Caveats***

Restricted to single line vessels. The sink rate of IW longlines can vary depending on vessel type, setting speed and deployment of line relative to propeller wash (Dietrich *et al.* 2008). Setting speed influences the extent of the seabird access window – the area in which most seabirds are still able to access the baited hooks in the absence of bird scaring lines (Dietrich *et al*. 2008). Use of IW lines is likely to increase the portion of the line on the seafloor, and may lead to increases in the bycatch of vulnerable fish, shark and ray species. This may be mitigated by placing a weight and a float on a 10 m line at the point of the dropper line attachment, thus ensuring the line sinks rapidly to 10 m, out of reach of vulnerable seabirds, but remains off the seabed (Petersen *et al.* 2009). The use of lead in fishing gear is prohibited in some fishery jurisdictions.

***Minimum standards***

Global minimum standards are evolving. CCAMLR and New Zealand currently require IW lines with a minimum lead core of 50 g/m in their single line demersal longline fisheries.

***Implementation monitoring***

Weight (lead core) is integrated into the fabric of the line, so compliance with weighting requirements is intrinsic to this measure. It is impractical to alter longlines when at sea, including for vessels with long transit times to fishing grounds (e.g. Antarctic and sub Antarctic fisheries). Port inspection of all longlines onboard prior to embarkation on fishing trips is considered adequate for to assess compliance.

***Research needs***

The relationship between line-weighting regime, setting speed, sink rates/profiles and the distance astern seabirds can access baited hooks should be investigated for other fisheries. Testing should prioritize determining the necessary aerial extent for bird scaring lines with these factors.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1504-fs-03-demersal-longline-integrated-weight-longlines/file

## 4. Night setting

***Scientific evidence for effectiveness in demersal longline fisheries***

**Proven and recommended mitigation method**. Should be used in combination with bird scaring lines and/or weighted lines, especially to reduce incidental mortality of birds that forage at night (Ashford *et al*. 1995; Cherel *et al*. 1996; Moreno *et al*. 1996; Barnes *et al*. 1997; Ashford & Croxall 1998; Klaer & Polacheck 1998; Weimerskirch *et al*. 2000; Belda & Sánchez 2001; Nel *et al*. 2002; Ryan & Watkins 2002; Sánchez & Belda 2003; Reid *et al*. 2004; Gómez Laich *et al.* 2006; Gladics *et. al*. 2017; Melvin *et.al*. 2019).

***Notes and Caveats***

Bright moonlight and deck lights reduce the effectiveness of this mitigation measure. Less effective for some crepuscular/nocturnal foragers such as the white-chinned petrel (Paterson *et al*. 2017) but more effective than setting during the day. Night setting increases the bycatch rate of Northern Fulmar *Fulmarus glacialis* (Gladics *et. al*. 2017; Melvin *et.al*. 2019). In order to maximise effectiveness of this mitigation measure, deck lights should be off or kept to an absolute minimum, and used in combination with additional mitigation measures, especially when setting in bright moonlight conditions. Night setting is not a practical option for fisheries operating at high latitudes during summer. Civil twilight was found equally effective as nautical twilight at reducing seabird mortalities in US west coast and Alaskan fisheries (Gladics *et. al*. 2017; Melvin *et.al*. 2019)

***Minimum standards***

Night is defined as the period between the times of nautical twilight (nautical dark to nautical dawn as set out in the Nautical Almanac tables for relevant latitude, local time and date.).

***Implementation monitoring***

Onboard monitoring or at-sea surveillance is required to assess implementation.

***Research needs***

Effect of night setting on catch rates of target species for different fisheries.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1824-fs-05-demersal-pelagic-longline-night-setting/file

## 5. Single bird scaring line

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended mitigation method**. It is the aerial extent of the line with streamers attached that is important for the prevention of birds interactions with baited hooks. Effectiveness of the streamer line is maximized when streamers are positioned above the sinking hook line, and the aerial extent matches the distance astern that seabirds can access baited hooks. Weighted longlines reduce this distance and make streamer lines more efficient at excluding foraging birds from hooks. Effectiveness is increased when using multiple bird scaring lines and when used in combination with other measures – e.g. night setting, appropriate weighting of line and offal management. The use of a single bird scaring line has been shown to be an effective mitigation measure in a range of demersal longline fisheries, especially when used properly (Moreno *et al.* 1996; Løkkeborg 1998, 2001; Melvin *et al.* 2001; Smith 2001; Løkkeborg & Robertson 2002; Løkkeborg 2003, Melvin *et. al*. 2004; Dietrich *et al*. 2008; Paterson *et al.* 2017; Melvin *et al*. 2019) and is suitable for small vessels under 24 m in length, with some modification (Melvin & Weinstein. 2004; Goad & Debski 2017).

***Notes and Caveats***

Effective only when streamers are positioned over sinking hooks and the aerial extent matches the distance astern that seabirds can access baited hooks. These are the most important factors influencing their performance. Single bird scaring lines can be less effective in strong crosswinds (Løkkeborg 1998; Brothers *et al.* 1999; Agnew *et al.* 2000; Melvin *et al.* 2001; Melvin *et al.* 2004). In the event of strong crosswinds, bird scaring lines should be deployed from the windward side. This problem can also be overcome by using paired bird scaring lines (see below). The effectiveness of the bird scaring lines is also dependent on the design, proper placement, as well as seabird species attending line setting (proficient divers are more difficult to deter than surface feeding birds). There have been a few incidents of birds becoming entangled in bird scaring lines (Otley *et al*. 2007). However, it must be stressed that the numbers are minuscule, especially when compared with the number of mortalities recorded in the absence of bird scaring lines. Bird scaring lines remain a highly effective mitigation measure, and efforts should be directed to further improve their effectiveness.

It is recommended to use a weak link to allow the bird scaring line to break-away from the vessel in the event of an entanglement with the main line (a secondary attachment between the bird scaring line and the vessel can be used to attach the break-away bird-scaring line to the mainline for subsequent retrieval during the haul).

***Minimum standards***

Current minimum standards vary. CCAMLR was the first conservation body that required all longline vessels in its area of application to use bird scaring lines (CCAMLR 2018). The bird scaring (streamer) line has gone on to become the most commonly applied mitigation measure in longline fisheries worldwide (Melvin *et al*. 2004). CCAMLR currently prescribes a range of specifications relating to the design and use of bird scaring lines. These include the minimum length of the line (150 m), the height of the attachment point on the vessel (7 m above the water), and details about streamer lengths and intervals between streamers. Other fisheries have adapted these measures. Some, such as those in New Zealand and Alaska have set explicit standards for the aerial coverage of the bird scaring lines, which varies according to the size and speed of the vessel and the sink rates of baited longlines.

For small vessels (<24 m), we recognise that the length of aerial extent will vary by setting speed, with 75 m being achievable for vessels setting at ≥ 4 knots, or 50 m if setting at speeds < 4 knots, that streamers may be modified over the first 15 m to avoid tangling, and that drag may be achieved using either towed devices or longer in-water sections (Goad & Debski 2017).

***Implementation monitoring***

Bird scaring lines are usually deployed and retrieved before and after each set (they are not a fixed part of fishing gear/operations). On-board observers, electronic monitoring (cameras), at-sea surveillance or an electronic BSL compliance monitoring device (Ngcongo & Miranda 2024; https://imveloblue.co.za/electronic-monitoring-imvelo-bsl/)..

***Research needs***

The use and specifications/performance standards are fairly well established in demersal longline fisheries. However, there is scope to improve further the effectiveness and practical use of bird scaring lines in individual fisheries and on individual vessels or vessel types.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1912-fs-01-demersal-longline-streamer-lines/file

## 6. Paired or multiple bird scaring lines

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended mitigation method**. Effectiveness is maximized when streamers are paired and deployed so that they bracket sinking baited hook lines, and the aerial extents of the lines cover the area astern where birds can access baited hooks. Effectiveness is further increased when used in combination with other measures – e.g. night setting, appropriate weighting of line and offal management. Several studies have shown that the use of two or more streamer lines is more effective at deterring birds from baited hooks than one streamer

line (Melvin *et al.* 2001; Sullivan & Reid 2002; Melvin 2003; Melvin *et al.* 2004; Reid *et al.* 2004). The combination of paired streamer lines and IW longlines is considered the most effective mitigation measure in demersal longline fisheries using single line systems (Dietrich *et al.* 2008).

***Notes and Caveats***

The likelihood of entanglement with gear is potentially increased compared to using a single bird scaring line. Towing an effective device that keeps lines from crossing surface gear may improve compliance with this measure. Manual retrieval of paired or multiple bird scaring lines requires more effort than a single line. This can be overcome by using winches to retrieve lines.

***Minimum standards***

Current minimum standards vary across fisheries. In Alaskan demersal longline fisheries paired streamer lines are required on larger vessels (≥ feet 16.8 m) and encouraged/recommended by CCAMLR, except in the French exclusive economic zone (CCAMLR Subarea 58.6 and Division 58.5.1), where paired streamer lines have been compulsory since 2005. Paired streamer lines have also been required in the Australian longline fisheries off Heard Island since 2003 (Dietrich *et al*. 2008)

***Implementation monitoring***

Bird scaring lines are typically deployed and retrieved before and after each set (they are not a fixed part of fishing gear/operations). Onboard monitoring or at-sea surveillance is required to assess implementation.

***Research needs***

Further trialling in fisheries which currently only use single streamer lines.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1912-fs-01-demersal-longline-streamer-lines/file

## 7. Haul bird exclusion devices (BED)

***Scientific evidence for effectiveness in demersal fisheries***

**Proven and recommended as a haul mitigation measure**. BEDs must be used in combination with line setting mitigation measures – bird scaring lines, line weighting, night setting and offal management. The use of a BED can effectively reduce the incidence of birds becoming foul hooked when the line is being hauled (Brothers *et al.* 1999; Sullivan 2004; Otley *et al*. 2007; Reid *et al*. 2010). For small vessels (<20 m in length), where the application of mitigation devices requiring robust support structures and on-water sections can be challenging, the use of simple haul mitigation devices has been demonstrated to be both practical and effective at deterring birds from hauling points (Goad *et al*. 2023).

***Notes and Caveats***

Some species, such as the Black-browed Albatross *Thalassarche melanophris* and Cape Petrel *Daption capense*, can become habituated to the curtain, so it is important to use it strategically – when there are high densities of birds around the hauling bay (Sullivan 2004).

***Minimum standards***

Standards are evolving. BEDs are required in high risk CCAMLR areas. The exact design is not specified, rather it is required that they fulfil two operational characteristics: 1) deter birds from flying into the area where the line is being hauled, and 2) prevent birds that are sitting on the surface from swimming into the hauling bay area). BEDs are required in the some UK longline fisheries (A. Wolfaardt pers. comm.).

***Implementation monitoring***

BEDs are usually deployed and retrieved before and after each set (they are not a fixed part of fishing gear/operations). Onboard monitoring or at-sea surveillance is required to assess implementation.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/1907-fs-12-demersal-pelagic-longline-haul-mitigation/file

## OTHER CONSIDERATIONS

### 8. Side-setting

***Scientific evidence for effectiveness in demersal fisheries***

**Not recommended as a specific mitigation measure at this time**. Not tested in demersal longline fisheries. For more detail see pelagic longline best practice advice

***Mitigation Fact Sheet (for pelagic longline vessels)***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/769-fs-09-pelagic-longline-side-setting/file

### 9. Underwater setting funnel/chute

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven and not recommended as a mitigation measure at this time**. An underwater setting funnel has been tested in demersal longline fisheries in Alaska, Norway and South Africa, with all studies showing a reduction in the mortality rate, although the extent of the reduction varied between studies (Løkkeborg 1998, 2001; Melvin *et al*. 2001; Ryan & Watkins 2002).

***Notes and Caveats***

Present design is mainly for a single line system. Results from studies to date have been inconsistent, likely due to the depth at which the device delivers the baited hooks and the diving ability of the seabirds in the fishing area studied. The pitch angles of the vessel, which are influenced by the loading of weight and sea conditions, affect the performance of the funnel (Løkkeborg 2001).

***Minimum standards***

Not yet established.

***Implementation monitoring***

Onboard monitoring or at-sea surveillance is required to assess implementation.

***Research needs***

Need to investigate improvements to the current design to increase the depth at which the line is set, especially during rough seas. Should also be tested with integrated weight lines to determine whether this improves bycatch reduction. Also need to investigate optimal use of device together with other mitigation measures (bird scaring lines and weighted lines).

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/766-fs-06-demersal-longline-underwater-setting-chute/file

## 10. Line-setter/shooter

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven and not recommended as a mitigation measure at this time.** Less used in demersal long-line fisheries; variation in the precise method of operation is cause of variation in efficacy. In Norway, no statistical differences were detected in catch rates of northern fulmars between sets with and without a line shooter (Løkkeborg & Robertson 2002; Løkkeborg 2003). In Alaska, use of a line shooter increased seabird bycatch due to the longline being suspended in the vessel's wake resulting in delayed sinking (Melvin *et. al*. 2001).

***Notes and Caveats***

Robertson *et al.* (2008c) found no significant difference between the sink rates of integrated weight longlines of single line vessels that were set with and without a line setter in the Ross Sea, and were doubtful that the use of line setters would lead to substantial reductions in interactions between seabirds and longlines. Unequivocal evidence of effectiveness in reducing seabird bycatch is lacking. Further refinement is needed.

***Minimum standards***

Not considered a mitigation measure at this time.

***Research needs***

Need to investigate whether refinement/modification of the device will be able to overcome the problem of propeller wash and ensure consistently rapid sink rates and significantly reduced seabird mortality.

***Mitigation Fact Sheet (for pelagic longline fisheries)***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/771-fs-11-pelagic-longline-bait-caster-and-line-shooter/file

## 11. Thawing bait

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven and not recommended as a primary mitigation measure in demersal longline fisheries.** See pelagic longline best practice advice for more information.

## 12. Olfactory deterrents

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven, and not recommended as a mitigation measure at this time**. Dripping shark liver oil on the sea surface behind vessels has been shown to effectively reduce the number of seabirds (restricted to burrow-nesting birds) attending vessels and diving for bait in New Zealand (Pierre & Norden 2006; Norden & Pierre 2007).

***Notes and Caveats***

The shark liver oil investigated did not deter albatrosses, giant petrels, or Cape petrels from boats (Norden & Pierre 2007). The potential impact of releasing large amounts of concentrated fish oil into the marine environment is unknown, as is the potential for contaminating seabirds attending vessels and the potential of seabirds to become habituated to the deterrent (Pierre & Norden 2006).

***Minimum standards***

No standards established.

***Implementation monitoring***

Onboard monitoring or at-sea surveillance of line setting operations is required to assess implementation.

***Research needs***

Testing should be extended to candidate/suitable species of conservation concern, such as white-chinned petrels *P. aequinoctialis* and sooty shearwaters *Ardenna grisea*. Research is also required to identify the key ingredients in the shark oil that are responsible for deterring seabirds, and the mechanism by which the birds are deterred. The potential “pollution” effects also need to be investigated.

## 13. Strategic management of offal discharge

***Scientific evidence for effectiveness in demersal fisheries***

**Not recommended as a primary mitigation measure**. Some studies have shown that dumping homogenised offal (which is generally more easily available and thus attractive to seabirds than bait) during setting attracts birds away from the baited line to the side of the vessel where the offal is being discharged, and thus reduces bycatch of seabirds on the baited hooks (Cherel *et al*. 1996; Weimerskirch *et al*. 2000).

***Notes and Caveats***

Although strategic offal discharge has been shown to be effective at reducing seabird bycatch around Kerguelen Island, there are many risks associated with the practice. Offal discharge needs to be continued throughout the setting operation so as to ensure the birds do not move on to the baited hooks. This will only be possible in fisheries where line setting is short, and there is sufficient offal to sustain the discharge during the entire line-setting period. This measure also has the potential to foul hook birds if offal is discharged with hooks. It is crucial, then, that all offal is checked for hooks before being discharged. Given these risks, and the fact that the presence of offal is a critical factor affecting seabird numbers attending vessels, most fisheries management regimes require that no offal can be discharged during line setting, and that if discarding is necessary at other times it should take place on the side of the vessel opposite to where the lines are being hauled.

***Minimum standards***

In CCAMLR demersal fisheries, discharge of offal is prohibited during line setting. During line hauling, storage of waste is encouraged, and if discharged must be discharged on the opposite side of the vessel to the hauling bay. A system to remove fish hooks from offal and fish heads prior to discharge is required. Similar requirements are prescribed by other demersal longline fisheries (e.g. some UK, South Africa and New Zealand).

***Implementation monitoring***

Requires offal discharge practices and events to be monitored onboard.

***Research needs***

Further information needed on opportunities to manage offal more effectively – considering both practical aspects and seabird bycatch mitigation – in the short and long term.

## 14. Blue-dyed bait

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven and not recommended as a mitigation measure at this time.** See pelagic longline fisheries best practice advice for more information.

***Mitigation Fact Sheet***

https://www.acap.aq/en/resources/bycatch-mitigation/mitigation-fact-sheets/770-fs-10-pelagic-longline-blue-dyded-bait-squid/file

## 15. Hook size and shape

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven and not recommended as a primary mitigation measure**. Must be used in combination with other mitigation measures – bird scaring lines, line weighting, night setting and offal management. Hook size was found to be an important determinant in seabird bycatch rates of Argentinean and Chilean longline vessels fishing in Subarea 48.3 in the 1995 season, with smaller hooks killing significantly more seabirds than larger hooks (Moreno *et al.* 1996).

***Notes and Caveats***

Other than the finding of Moreno *et al.* (1996), little or no work has been conducted to investigate the impact of hook design and shape on seabird bycatch levels.

***Minimum standards***

No global standard

***Implementation monitoring***

Port inspection of all hooks on board considered adequate for monitoring implementation.

***Research needs***

Determine impact on seabird bycatch and on catch of target species.

## 16. Lasers

**High Energy Lasers Strongly Discouraged**

***Scientific evidence for effectiveness in demersal longline fisheries***

Available evidence shows that high energy lasers (Class 4 lasers, the highest class in terms of laser hazards) are ineffective at deterring seabirds from danger areas around fishing vessels (Melvin *et al.* 2016) and likely damage seabird visual systems with negative effects on foraging behaviour of laser exposed seabirds (Fernandez-Juricic, 2023).

***Notes and Caveats***

Concerns are ongoing regarding the safety (to both humans and birds) and efficacy of laser technology of unknown energy levels as a seabird bycatch mitigation tool, as they continue to be used currently in various fisheries. Available evidence shows that high energy lasers are no longer marketed for fishery applications. Currently evidence is lacking on the possibility that lasers of lower energy levels delivered in different ways (scanning, blinking, wave-length, etc.) could be used safely and be effective in some applications.

***Minimum standards***

Not Applicable as strongly discouraged.

***Need for combination***

Not Applicable as strongly discouraged.

***Implementation monitoring***

Not Applicable as strongly discouraged.

***Research needs***

As high energy lasers continue to be used in some fisheries, we encourage reporting of the extent and output power levels of laser use by ACAP Parties, including any information on effectiveness, as well as bird welfare effects.

## MITIGATION MEASURES UNDER DEVELOPMENT OR WHICH REQUIRE FURTHER DEVELOPMENT OR INVESTIGATION

### 17. Underwater Line Setter

***Scientific evidence for effectiveness in demersal fisheries***

**Unproven and not recommended as a mitigation measure at this time**. A line setter was identified as a potential mitigation device in New Zealand inshore bottom longline fisheries, (Goad 2011). This line setter is an underwater setting device that involves running the hookline through a set of rollers towed behind the vessel at depth. Underwater line setting devices for demersal longline fisheries differ from those assessed for pelagic longline fisheries which involve a computer operated and hydraulically powered machine that deploys baited hooks individually underwater to a target depth.

***Notes and Caveats***

An initial prototype had been developed through a series of at-sea trials which were conducted during 2011. While these trials were encouraging, the issue of weights and floats fouling on the rollers require resolution (Goad 2011). A new prototype has been developed and refined in a flume tank (Baker and Frost 2013) for application in a range of demersal longline operations.

***Minimum standards***

Not considered a mitigation measure at this time.

***Research needs***

Resolution of mainline loss issues under flume tank conditions prior to further evaluation in at-sea trials.

### 18. Acoustic Deterrents

***Scientific evidence for effectiveness in demersal longline fisheries***

**Unproven and not recommended.** Published reports unavailable; however, anecdotal reports of using percussive sound as with an orchard cannon showed that birds initially disperse but quickly habituate; i.e., disperse and quickly return or ignore completely with continuous use (E. Melvin, pers comm.)

***Minimum standards***

Not Applicable.

***Need for combination***

Not Applicable.

***Implementation monitoring***

Not Applicable.

***Research needs***

Undefined

## 19. Mitigation measures to improve sink rates of baited hooks on floated longlines

Demersal longline vessels that use floated gear (which incorporates subsurface floats on the mainline to raise the hooks off the seabed) are particularly susceptible to seabird bycatch, with one study reporting that albatrosses attacked floated longlines at rates ten times more than longlines without floats (Gladics *et al.* 2017). The sink rate of the slowest sinking hooks, where seabird bycatch is most pronounced, is the key factor to consider when prescribing mitigation measures for demersal longline fisheries using floated gear. The slowest sink rates are associated with deployment of buoys in demersal fishing gear (Debski 2016). Increasing the length of buoy lines improves the sink rate (Debski 2016, Robertson et al 2021). Options to increase the sink rates of Merluza system gear include the use of longer float lines, equipping float lines with sinkers and the elimination of line tension astern.

## REFERENCES

Agnew, D.J., Black, A.D., Croxall, J.P. and Parkes, G.B. 2000. Experimental evaluation of the effectiveness of weighting regimes in reducing seabird by-catch in the longline toothfish fishery around South Georgia. *CCAMLR Science* **7**: 119-131.

Ashford, J.R., Croxall, J.P., Rubilar, P.S. and Moreno, C.A. 1995. Seabird interactions with longlining operations for *Dissostichus eleginoides* around South Georgia, April to May 1994. *CCAMLR Science* **2**: 111-121.

Ashford, J.R. and Croxall, J.P. 1998. An assessment of CCAMLR measures employed to mitigate seabird mortality in longline operations for *Dissostichus eleginoides* around South Georgia. *CCAMLR Science* **5**: 217-230.

Baker, G.B. and Frost, R. 2013. Development of the Kellian Line Setter for Inshore Bottom Longline Fisheries to reduce availability of hooks to seabirds. Preliminary report. Agreement on the Conservation of Albatrosses and Petrels, Fifth Meeting of the Seabird Bycatch Working Group, La Rochelle, France, 1 - 3 May 2013, SBWG5 Doc 10.

Barnes, K.N., Ryan, P.G. and Boix-Hinzen, C. 1997. The impact of the Hake *Merluccius* spp. longline fishery off South Africa on procellariiform seabirds. *Biological Conservation* **82**: 227-234.

Belda, E.J. and Sánchez, A. 2001. Seabird mortality on longline fisheries in the western Mediterranean: factors affecting bycatch and proposed mitigating measures. *Biological Conservation* **98**: 357-363.

Boggs, C.H. 2001. Deterring albatrosses from contacting baits during swordfish longline sets. Pages 79-94 in E. F. Melvin, and J. K. Parrish, editors. *Seabird Bycatch: Trends, Roadblocks and Solutions*. University of Alaska Sea Grant, AK-SG-01, Fairbanks, AK.

Brothers, N.P., Cooper, J. and Løkkeborg, S. 1999. *The incidental catch of seabirds by longline fisheries: worldwide review and technical guidelines for mitigation*. FAO Fisheries Circular 937.

Bull, L.S. 2007. Reducing seabird bycatch in longline, trawl and gillnet fisheries. *Fish and Fisheries* 8: 31-56.

CCAMLR 2018. Conservation Measure 25-02 Minimisation of the Incidental Mortality of Seabirds in the Course of Longline Fishing or Longline Fishing Research in the Convention Area. Available online < https://www.ccamlr.org/en/measure-25-02-2018>

CCAMLR 2019. Limits on the fishery for Dissostichus eleginoides in Statistical Subarea 48.3 in the 2019/20 and 2020/21 seasons. Available online < https://www.ccamlr.org/en/measure-41-02-2019>

Cherel, Y., Weimerskirch, H., and Duhamel,G. 1996. Interactions between longline vessels and seabirds in Kerguelen waters and a method to reduce seabird mortality. *Biological Conservation* **75**: 63 - 70.

Cocking, L.J., Double, M.C. Milburn, P.J. and Brando, V.E. 2008. Seabird bycatch mitigation and blue-dyed bait: A spectral and experimental assessment. *Biological Conservation* **141**: 1354-1364.

Copello, S., Blanco, G.S., Pon, J.P.S., Quintana, F. and Favero, M., 2016. Exporting the problem: Issues with fishing closures in seabird conservation. *Marine Policy*, 74: 120-127.

Croxall, J.P. and Nicol, S. 2004. Management of Southern Ocean fisheries: global forces and future sustainability. *Antarctic Science* **16**: 569-584.

Debski, I. 2016. Characterisation of subsurface float configurations used by New Zealand small vessel demersal longliners. Seventh Meeting of the Seabird Bycatch Working Group, La Serena, Chile, 2 - 4 May 2016, SBWG7 Inf 02.

Delord, K., Gasco, N., Weimerskirch, H., Barbraud, C. and Micol, T. 2005. Seabird mortality in the Patagonian Toothfish longline fishery around Crozet and Kerguelen Islands, 2001-2003. *CCAMLR Science* **12**: 53-80.

Dietrich, K.S., Melvin, E.F. and Conquest, L. 2008. Integrated weight longlines with paired streamer lines - best practice to prevent seabird bycatch in demersal longline fisheries. *Biological Conservation* **141**: 1793-1805.

Fernandez-Juricic, E. 2023. Laser technology for seabird bycatch prevention in commercial fisheries. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, United Kingdom, 15-17 May 2023, SBWG11 Doc 11.

Gladics, A. J., E. F. Melvin, R. M Suryan, T. P. Good, J. E. Jannot, and T.J. Guy. 2017. Fishery-specific solutions to seabird bycatch in the U.S. West Coast sablefish fishery. *Fisheries Research* 196: 85–95Gilman, E., Brothers, N. and Kobayashi, D.R. 2007. Comparison of three seabird bycatch avoidance methods in Hawaii-based pelagic longline fisheries. *Fisheries Science* **73**: 208-210.

Goad, D. 2011. Trialling the 'Kellian Device'. Setting bottom longlines underwater. Unpublished report by Vita Maris to New Zealand Department of Conservation. Vita Maris Ltd: Papamoa, New Zealand.

Goad, D. and Debski, I. 2017. Bird-scaring line designs for small longline vessels. Agreement on the Conservation of Albatrosses and Petrels, Eighth Meeting of the Seabird Bycatch Working Group, Wellington, New Zealand, 4 - 6 September 2017, SBWG8 Doc 12.

Gómez Laich A, Favero, M., Mariano-Jelicich, R., Blanco, G., Cañete, G., Arias, A., Silva Rodriguez, M.P., and Brachetta. H. 2006. Environmental and operational variability affecting

the mortality of Black-Browed Albatrosses associated to long-liners in Argentina. *Emu* **106**: 21-28.

Goad, D.; Peatman, T.; Plencner, T.; Debski, I. 2023. Haul mitigation for small longline vessels. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, United Kingdom, 15-17 May 2023, SBWG11 Doc 21

Klaer, N. and Polacheck. T. 1998. The influence of environmental factors and mitigation measures on bycatch rates of seabirds by Japanese longline vessels in the Australian region. *Emu* **98**: 305-306.

Kock, K.-H. 2001. The direct influence of fishing and fishery-related activities on non-target species in the Southern Ocean with particular emphasis on longline fishing and its impact on albatrosses and petrels - a review. *Reviews in Fish Biology and Fisheries* **11**: 31-56.

Løkkeborg, S. 1998. Seabird by-catch and bait loss in long-lining using different setting methods. *ICES Journal of Marine Science* **55**: 145-149.

Løkkeborg, S. 2001. Reducing seabird bycatch in longline fisheries by means of bird-scaring and underwater setting. Pages 33-41 *in* E. F. Melvin, and J. K. Parrish, editors. Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, AK.

Løkkeborg, S. 2003. Review and evaluation of three mitigation measures - bird-scaring line, underwater setting and line shooter - to reduce seabird bycatch in the north Atlantic longline fishery. *Fisheries Research* **60**: 11-16.

Løkkeborg, S., and G. Robertson. 2002. Seabird and longline interactions: effects of a bird-scaring streamer line and line shooter on the incidental capture of northern fulmars *Fulmarus glacialis*. *Biological Conservation* **106**: 359-364.

Melvin, E.F. 2003. Streamer lines to reduce seabird bycatch in longline fisheries. Washington Sea Grant Program WSG-AS 00-33.

Melvin, E.F., Parrish, J.K., Dietrich, K.S. and Hamel, O.S. 2001. Solutions to seabird bycatch in Alaska's demersal longline fisheries. Washington Sea Grant Program. Project A/FP-7. WSG-AS 01-01. University of Washington, Seattle WA.

Melvin, E.F., Sullivan, B., Robertson, G. and Wienecke, B. 2004. A review of the effectiveness of streamer lines as a seabird by-catch mitigation technique in longline fisheries and CCAMLR streamer line requirements. *CCAMLR Science* **11**:189-201.

Melvin, E.F., Asher, W.E., Fernandez-Juricic, E. and Lim, A. 2016. Results of initial trials to determine if laser light can prevent seabird bycatch in North Pacific Fisheries. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, La Serena, Chile, 2 - 4 May 2016, SBWG7 Inf 12.

Melvin, E.F., K. S. Dietrich, R. M. Suryan and S. Fitzgerald. 2019. Lessons from seabird conservation in Alaska longline fisheries. Conservation Biology Vol 33, No. 4, 842–852.

Moreno, C.A., Rubilar, P.S., Marschoff, E. and Benzaquen, L. 1996. Factors affecting the incidental mortality of seabirds in the *Dissostichus eleginoides* fishery in the south-west Atlantic (Subarea 48.3, 1995 season). *CCAMLR Science* **3**:79-91.

Moreno, C.A., Arata, J.A., Rubilar, P., Hucke-Gaete, R. and Robertson, G. 2006. Artisanal longline fisheries in Southern Chile: Lessons to be learned to avoid incidental seabird mortality. *Biological Conservation* **127**:27-37.

Moreno, C.A., Castro, R., Mujica, L.J. and Reyes, P. 2008. Significant conservation benefits obtained from the use of a new fishing gear in the Chilean Patagonian Toothfish Fishery. *CCAMLR Science* **15**: 79-91.

Nel, D.C., Ryan, P.G. and Watkins, B.P. 2002. Seabird mortality in the Patagonian toothfish longline fishery around the Prince Edward Islands, 1996-2000. *Antarctic Science* **14**:151-161.

Ngcongo, S.V. & Miranda, N.A.F. 2024. Update on EM device for improving compliance with bird scaring line measures in longline and trawl fisheries. Agreement on the

Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Inf 08.

Norden, W.S., and Pierre, J.P. 2007. Exploiting sensory ecology to reduce seabird by-catch. *Emu* **107**:38-43.

Otley, H.M., Reid, T.A. and Pompert, J. 2007. Trends in seabird and Patagonian toothfish *Dissostichus eleginoides* longliner interactions in Falkland Island waters, 2002/03 and 2003/04. *Marine Ornithology* **35**:47-55.

Paterson, J.R.B., Yates, O., Holtzhausen, H., Reid, T., Shimooshili, K., Yates, S., Sullivan, B.J. and Wanless, R.M. 2017. Seabird mortality in the Namibian demersal longline fishery and recommendations for best practice mitigation measures. *Oryx*, 1-10. doi:10.1017/S0030605317000230

Petersen, S.L., Honig, M.B., Ryan, P.G., Underhill, L.G. and Goren, M., 2009. Seabird bycatch in the demersal longline fishery off southern Africa. *African Journal of Marine Science*, 31(2): 205-214.

Phillips, R.A, Ridley, C., Reid, K., Pugh, P.G.A., Tuck, G.N. and Harrison, N. 2010. Ingestion of fishing gear and entanglements of seabirds: monitoring and implications for management. *Biological Conservation* **143**: 501-512.

Pierre, J.P. and Norden, W.S. 2006. Reducing seabird bycatch in longline fisheries using a natural olfactory deterrent. *Biological Conservation* **130**: 406-415.

Reid, E., B. Sullivan and J. Clark. 2010. Mitigation of seabird captures during hauling in CCAMLR longline fisheries. *CCAMLR Science* **17**: 155-162.

Reid, T.A., Sullivan, B.J., Pompert, J., Enticott, J.W. and Black, A.D. 2004. Seabird mortality associated with Patagonian Toothfish (*Dissostichus eleginoides*) longliners in Falkland Islands waters. *Emu* **104**: 317-325.

Robertson, G. 2000. Effect of line sink rate on albatross mortality in the Patagonian toothfish longline mortality. *CCAMLR Science* **7**: 133-150.

Robertson, G., Candy, S.G. and Suazo, C.G. 2021. The industrial demersal floated longline system for Austral Hake and Congrio in Chile: initial sink rates and effect of added floats. SBWG10 Doc 15. Agreement on the Conservation of Albatrosses and Petrels, Tenth Meeting of Seabird Bycatch Working Group, Virtual meeting 17-19 August 2021.

Robertson, G., Moe, E., Haugen, R. and Wienecke, W. 2003. How fast do demersal longlines sink? *Fisheries Research* **62**:385-388.

Robertson, G., McNeill, M., Smith, N., Wienecke, B., Candy, S. and Olivier, F. 2006. Fast sinking (integrated weight) longlines reduce mortality of white-chinned petrels (*Procellaria aequinoctialis*) and sooty shearwaters (*Puffinus griseus*) in demersal longline fisheries. *Biological Conservation* **132**: 458-471.

Robertson, G., Moreno, C.A., Crujeiras, J., Wienecke, B., Gandini, P.A., McPherson, G. and Seco Pon, J.P. 2008a. An experimental assessment of factors affecting the sink rates of Spanish-rig longlines to minimize impacts on seabirds. *Aquatic conservation: marine and freshwater ecosystems* **17**:S102-S121.

Robertson, G., Moreno, C.A., Gutiérrez, E., Candy, S.G., Melvin, E.F. and Seco Pon, J.P. 2008b. Line weights of constant mass (and sink rates) for Spanish-rig Patagonian toothfish longline vessels. *CCAMLR Science* **15**: 93-106.

Robertson, G., Williamson, J., McNeill, M., Candy, S.G. and Smith, N. 2008c. Autoliners and seabird by-catch: do line setters increase the sink rate of integrated weight longlines? *CCAMLR Science* **15**: 107-114.

Ryan, P.G., Boix-Hinzen, C., JEnticott, J.W., Nel, D.C., Wanless, R. and Purves, M. 1997. Seabird mortality in the longline fishery for Patagonian Toothfish at the Prince Edward Islands: 1996 - 1997. CCAMLR-WG-FSA 97/51. CCAMLR, Hobart.

Ryan, P.G., and Purves, M. 1998. Seabird bycatch in the Patagonian toothfish fishery at Prince Edward Islands: 1997-1998. CCAMLR-WG-FSA 98/36. CCAMLR, Hobart.

Ryan, P.G., and Watkins, B.P. 1999. Seabird by-catch in the Patagonian toothfish longline fishery at the Prince Edward Islands: 1998-1999. CCAMLR-WG-FSA 99/22. CCAMLR, Hobart.

Ryan, P. and Watkins, B. 2000. Seabird by-catch in the Patagonian toothfish longline fishery at the Prince Edward Islands: 1999 - 2000. CCAMLR-WG-FSA 00/30. CCAMLR, Hobart.

Ryan, P.G. and Watkins, B.P. 2002. Reducing incidental mortality of seabirds with an underwater longline setting funnel. *Biological Conservation* **104**:127-131.

Sánchez, A. and Belda, E.J. 2003. Bait loss caused by seabirds on longline fisheries in the northwestern Mediterranean: is night setting an effective mitigation measure? *Fisheries Research* **60**:99-106.

Seco Pon, J. P., Gandini, P.A. and Favero, M. 2007. Effect of longline configuration on seabird mortality in the Argentine semi-pelagic Kingclip *Genypterus blacodes* fishery. *Fisheries Research* **85**:101-105.

Smith, N.W.M. 2001. Longline sink rates of an autoline vessel, and notes on seabird interactions. *Science for Conservation* **183**. Department of Conservation, Wellington.

Sullivan, B. 2004. Falkland Islands FAO National Plan of Action for Reducing Incidental catch of seabirds in Longline Fisheries. Royal Society for the Protection of Birds.

Sullivan, B. and Reid. T.A. 2002. Seabird interactions/mortality with longliners and trawlers in Falkland Island waters 2001/02. Falklands Conservation, Stanley, Falkland Islands.

Waugh S.M., Baker G.B., Gales R., Croxall J.P. 2008. CCAMLR process of risk assessment to minimise the effects of longline fishing mortality on seabirds. *Marine Policy* 32: 442–454. doi: 10.1016/j.marpol.2007.08.011

Weimerskirch, H., Capdeville, D. and Duhamel, G. 2000. Factors affecting the number and mortality of seabirds attending trawlers and long-liners in the Kerguelen area. *Polar Biology* **23**:236-249.

***Other references and resources***

Løkkeborg, S. 2008. Review and assessment of mitigation measures to reduce incidental catch of seabirds in longline, trawl and gillnet fisheries. FAO Fisheries and Aquaculture Circular, No. 1040. Rome.

Løkkeborg, S. 2011. Best practices to mitigate seabird bycatch in longline, trawl and gillnet fisheries - efficiency and practical applicability. *Marine Ecology Progress Series* **435**: 285-303.

**ANNEXE 4. PASSAGE EN REVUE PAR L'ACAP DES MESURES D'ATTÉNUATION DE LA CAPTURE ACCESSOIRE D'OISEAUX DE MER DANS LA PÊCHE À LA PALANGRE PÉLAGIQUE**

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Review of mitigation measures and Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## INTRODUCTION

The incidental mortality of seabirds in pelagic longline fisheries continues to be a serious global concern, especially for threatened albatrosses and petrels. The need for international cooperation in addressing this concern was a major reason for establishing the Agreement on the Conservation of Albatrosses and Petrels (ACAP). In pelagic longline fisheries seabirds are killed when they become hooked or entangled and drowned while foraging for baits on longline hooks as the gear is deployed. Seabirds can also be hooked or entangled as the gear is hauled; however, many of these seabirds can be released alive with careful handling.

There have been significant efforts internationally to develop mitigation measures to avoid or minimise the risk of incidental catch of seabirds in longline fisheries. Although most mitigation measures are broadly applicable, the application and specifications of some will vary with local methods and gear configurations. ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in pelagic longline fisheries (see review section below) and this document is a summary of the advice informed by the review. Most of this scientific literature relates to large vessels, with lesser research attention given to small vessels and gear configurations and methods used in artisanal or semi-industrial fleets. Seabird bycatch mitigation advice for these fisheries is currently under development.

This document provides advice about best practices for reducing the impact of pelagic longline fishing on seabirds. ACAP's best practice advice is that the simultaneous use of weighted branch lines, bird scaring lines and night setting is the most effective approach to mitigate seabird bycatch in pelagic longline fisheries. Three hook-shielding devices, the 'Hookpod-LED', 'Hookpod-mini' and the 'Smart Tuna Hook', and one underwater bait setting device, the 'Underwater Bait Setter (Skadia Technologies)' have recently been assessed and on the basis of this assessment have been included in the list of best practice measures for mitigating seabird bycatch in pelagic longline fisheries. These best practice bycatch mitigation measures

should be applied in areas where fishing effort overlaps with seabirds vulnerable to bycatch to reduce the incidental mortality to the lowest possible levels. The ACAP review process recognises that factors such as safety, practicality and the characteristics of the fishery should also be considered when assessing the efficacy of seabird bycatch mitigation measures and consequently in the development of advice and guidelines on best practice.

This document also provides information regarding measures that are currently under active development, and which show promise as future best practices in pelagic longline fisheries. ACAP will continue to monitor the development of these improving practices and the results of scientific research about their effectiveness.

Additionally, this document provides information about mitigation measures that are not recommended. A wide range of potential seabird bycatch mitigation measures have been proposed over time; however, not all of these have proven effective. ACAP considers that certain mitigation measures are ineffective, based either on scientific studies, or a lack of evidence in substantiation of claims made about the mitigation measure.

The document comprises two components. The first component provides a summary of ACAP's advice regarding best practice measures for reducing seabird bycatch in pelagic longline fisheries, and the second component outlines the review of mitigation measures that have been assessed for pelagic longline fisheries.

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Summary Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## BEST PRACTICE MEASURES

ACAP recommends that the most effective way to reduce seabird bycatch in pelagic longline fisheries is to use the following three best practice measures **simultaneously: branch line weighting, night setting and bird scaring lines**. Alternatively, the use of an assessed hook-shielding device or underwater bait setting device is recommended. A hook-shielding device encases the point and barb of baited hooks until a prescribed depth or immersion time has been reached, and an underwater bait setting device deploys encapsulated baited hooks at the stern of the vessel releasing the baited hooks at a pre-determined depth. These devices are designed to release baited hooks at a depth beyond the diving range of most seabirds to avoid or minimise the risk of seabirds gaining access to the hook and becoming hooked during line setting.

The simultaneous use of the three ACAP recommended mitigation measures optimise seabird bycatch reduction in longline fisheries. All three recommended measures are demonstrated to be effective; however, each have limitations when used alone. There is a period of time when hooks are accessible to birds even when branch lines are weighted. Night setting used alone is less effective at reducing seabird bycatch for nocturnally active birds and during bright moon light conditions. Bird scaring lines used alone can rarely protect baited hooks beyond the aerial extent of the line. Consequently, the simultaneous use of the three ACAP recommended seabird bycatch mitigation measures compensate for these limitations.

## 1. Branch line weighting

Branch lines should be weighted to sink the baited hooks rapidly out of the diving range of feeding seabirds. Studies have demonstrated that branch line weighting where there is more mass closer to the hooks, sink most rapidly and consistently; thereby, dramatically reducing seabird attacks on baits and most likely reducing mortalities. Studies of a range of weighting regimes, including placing weights at the hook, have shown no negative effect on target catch rates. Continued refinement of branch line weighting configurations (mass, number and position of weights and materials) with regard to effectively reducing seabird bycatch and safety concerns through controlled research and application in fisheries, is encouraged.

Increased weighting will shorten but not eliminate the distance behind the vessel in which birds can be caught. Branch line weighting has been shown to improve the effectiveness of other mitigation methods such as night setting and bird scaring lines, in reducing seabird bycatch. Priority should be accorded to branch line weighting, providing certain pre-conditions can be met, among other things: (a) weighting regime adequately specified; (b) safety issues adequately addressed; and (c) issues concerning application to artisanal fisheries being considered.

Best practice branch line weighting should achieve a sink rate of 0.5m/s to 5 m depth. The following configurations have been demonstrated, under controlled conditions and with metal materials, to meet this standard:

**(a)** 40 g or greater attached within 0.5 m of the hook; or

**(b)** 60 g or greater attached within 1 m of the hook; or

**(c)** 80 g or greater attached within 2 m of the hook.

When weighting is attached to, or integrated into the hook, a minimum of total weight of 50 g is sufficient to achieve a sink rate of 0.5 m/s to 5 m depth. Branch line weighting is integral to the fishing gear and, compared to bird scaring lines and night setting, has the advantage of being more consistently implemented, hence facilitating compliance and port monitoring. It is recommended to avoid the use of lead when the lead may be ingested (e.g. attached to or integrated into the hook). The use of lighting devices or other fishing accessories as weights is not recommended unless they achieve the sink rate criterion.

## 2. Night setting

Setting longlines at night (defined as the time between the end of nautical twilight and before nautical dawn as set out in the Nautical Almanac tables for relevant latitude, local time and date) is highly effective at reducing incidental mortality of seabirds because the majority of vulnerable seabirds are inactive at night. However, night setting is not as effective for crepuscular/ nocturnal foragers (e.g. White-chinned Petrels *Procellaria aequinoctialis*). The effectiveness of this measure may be reduced during bright moonlight and when using intense deck lights, and is less practical in high latitudes during summer, when the time between nautical dusk and dawn is limited.

Night setting is recognised as consistently defined, widely reflected in conservation and management measures and has benefit as a primary mitigation measure, as it has the potential for compliance monitoring through VMS and other tools.

## 3. Bird scaring lines

Properly designed and deployed bird scaring lines (BSLs) deter birds from sinking baits, dramatically reducing seabird attacks and related mortalities. A bird scaring line runs from a high point at the stern to a device or mechanism that creates drag at its terminus. Brightly coloured streamers hanging from the aerial extent of the line scare birds from flying to and under the line, preventing them from reaching the baited hooks.

BSLs should be the lightest practical strong fine line. Lines should be attached to the vessel with a barrel swivel to minimise rotation of the line from torque created as it is dragged behind the vessel. Long streamers should be attached with a swivel to prevent them from rolling up onto the BSL. Towed objects should be attached at the terminus of the BSL to increase drag. BSLs are at risk of tangling with float lines leading to lost bird scaring lines, interruptions in vessel operations and in some cases lost fishing gear. Alternatives, such as adding short streamers to the in-water portion of the line, can enhance drag while minimising tangles with float lines. Weak links (breakaways) should be incorporated into the in-water portion of the line for safety reasons and to minimize operational problems associated with lines becoming tangled.

It is recommended to use a weak link to allow the BSL to break-away from the vessel in the event of a tangle with the main line, and, a secondary attachment between the bird scaring line and the vessel to allow the tangled BSL to be subsequently attached to mainline and recovered during the haul.

Sufficient drag must be created to maximise aerial extent and maintain the line directly behind the vessel during crosswinds. To avoid tangling, this is best achieved using a long in-water section of rope or monofilament.

Given operational differences in pelagic longline fisheries due to vessel size and gear type, bird scaring lines specifications have been divided into recommendations for vessels greater than 35 metres and those less than 35 metres in length.

## 3. a) Recommendations for vessels ≥35 m total length

Simultaneous use of two BSLs, one on each side of the sinking longline, provides maximum protection from bird attacks under different wind conditions. The setup for BSLs should be as follows:

- BSLs should be deployed to maximise the aerial extent, which is a function of vessel speed, height of the attachment point to the vessel, drag, and weight of bird scaring line materials.
- To achieve a minimum recommended aerial extent of 100 m, BSLs should be attached to the vessel such that they are suspended from a point a minimum of 8 m above the water at the stern.
- BSLs should contain a mix of brightly coloured long and short streamers placed at intervals of no more than 5 m. Long streamers should be attached to the line with swivels to prevent streamers from wrapping around the line. All long streamers should reach the sea-surface in calm conditions.
- Baited hooks should be deployed within the area bounded by the two BSLs. If using bait-casting machines, they should be adjusted so as to land baited hooks within the area bounded by the BSLs.

If large vessels use only one BSL, it should be deployed windward of the sinking baits. If baited hooks are set outboard of the wake, the BSL attachment point to the vessel should be positioned several metres outboard of the side of the vessel that baits are deployed.

### 3. b) Recommendations for vessels <35 m total length

Two designs have been shown to be effective:

**1.** a design with a mix of long and short streamers, that includes long streamers placed at 5 m intervals over at least the first 55 m of the BSL. Streamers may be modified over the first 15 m to avoid tangling, and

**2.** a design that does not include long streamers. Short streamers (no less than 1 m in length) should be placed at 1 m intervals along the length of the aerial extent.

In all cases, streamers should be brightly coloured. To achieve a minimum recommended aerial extent of 75 m, BSLs should be attached to the vessel such that they are suspended from a point a minimum of 6 m above the water at the stern.

## 4. Hook-shielding devices

Hook-shielding devices encase the point and barb of baited hooks to prevent seabird attacks during line setting until a prescribed depth is reached (a minimum of 10 metres), or until after a minimum period of immersion has occurred (a minimum of 10 minutes) that ensures that baited hooks are released beyond the foraging depth of most seabirds. The following performance requirements are used by ACAP to assess the efficacy of hook-shielding devices in reducing seabird bycatch:

**(a)** the device shields the hook until a prescribed depth of 10 m or immersion time of 10 minutes is reached;

**(b)** the device meets current recommended minimum standards for branch line weighting described in Section 1; and

**(c)** experimental research has been undertaken to allow assessment of the effectiveness, efficiency and practicality of the technology against the ACAP best practice seabird bycatch mitigation criteria developed for assessing and recommending best practice advice on seabird bycatch mitigation measures.

Devices assessed as having met the performance requirements listed above will be considered best practice. At this time, the following devices have been assessed as meeting these performance requirements and are therefore considered to represent best practice:

**1.** '**Hookpod-LED**' – 68 g minimum weight that is positioned at the hook, encapsulating the barb and point of the hook during setting, and remains attached until it reaches 10 m in depth, when the hook is released (Barrington 2016a, Sullivan *et al*. 2018).

**2.** **'Hookpod-mini'** – 48 g minimum weight that is positioned at the hook, encapsulating the barb and point of the hook during setting, and remains attached until it reaches 10 m in depth, when the hook is released (Goad *et al.* 2019, Gianuca *et al.* 2021, Sullivan & Barrington 2021).

**3.** '**Smart Tuna Hook**' – 40 g minimum weight that is positioned at the hook, encapsulating the barb and point of the hook during setting, and remains attached for a minimum period of 10 minutes after setting, when the hook is released (Baker *et al*. 2016, Barrington 2016b)

The assessment of these devices as best practice is conditional on continuing to meet the above performance requirements.

## 5. Underwater Bait Setting devices

Underwater Bait Setting devices deploy baited hooks at a pre-determined depth immediately at the stern of the vessel. Underwater Bait Setting devices deploy baited hooks individually underwater down a track fitted to the fishing vessel's transom enclosed in a capsule or similar device to eliminate any visual stimulus for seabirds following the vessel. The capsule is pulled quickly underwater to a predetermined target depth that can be adjusted in response to the dive capabilities of seabirds attending the vessel during line setting to prevent interactions. The following performance requirements are used by ACAP to assess the efficacy of underwater bait setting devices in reducing seabird bycatch:

**(a)** the device deploys encapsulated hooks in a vertical manner at the stern of the vessel until a minimum prescribed depth of 5 m is reached;

**(b)** branch lines meet current recommended minimum standards for branch line weighting described in Section 1; and

**(c)** experimental research has been undertaken to allow assessment of the effectiveness, efficiency and practicality of the technology against the ACAP best practice seabird bycatch mitigation criteria developed for assessing and recommending best practice advice on seabird bycatch mitigation measures.

Devices assessed as having met the performance requirements listed above will be considered best practice. At this time, the following device has been assessed as meeting these performance requirements and is therefore considered to represent best practice:

1. **'Underwater Bait Setter (Skadia Technologies)'** – a computer operated and hydraulically powered machine that deploys baited hooks individually underwater in a capsule, and where recommended minimum standards for branch line weighting are met. The capsule is pulled down a removable track fitted to the vessel's transom and then catapulted to a target depth. The capsule descends along the track at 6 $m.sec^{-1}$ and thereafter at ≥3 $m.sec^{-1}$ (Robertson *et al.* 2015, Robertson *et al*. 2018, Barrington 2021).

The assessment of an Underwater Bait Setting device as best practice is conditional on the device continuing to meet the above performance requirements.

## 6. Time-Area fishery closures

The temporary closure of important seabird foraging areas (e.g. areas adjacent to important seabird colonies during the breeding season or highly productive waters when large numbers of aggressively feeding seabirds are present) to fishing will eliminate incidental mortality of seabirds in that area.

### OTHER RECOMMENDATIONS

**Side-setting with line weighting and bird curtain (North Pacific):** Research conducted in the North Pacific indicates that side-setting was more effective than other simultaneously trialled mitigation measures, including setting chutes and blue-dyed bait (Gilman *et al.,* 2003b). It should be noted that these tests were conducted in a single pilot scale trial of 14 days in the

Hawaiian pelagic longline fishery for tuna and swordfish with an assemblage of surface-feeding seabirds. This method requires testing in the Southern Ocean with deeper-diving species and at a larger spatial scale, before it can be considered as a recommended approach beyond the pilot fishery.

Side-setting **must** be used in combination with ACAP best practice recommendations for line weighting in order to increase sink rates forward of the vessel's stern, and hooks should be cast well forward of the setting position, but close to the hull of the vessel, to allow hooks time to sink as far as possible before they reach the stern. Bird curtains, a horizontal pole with vertical streamers, positioned aft of the setting station, may deter birds from flying close to the side of the vessel. The combined use of side-setting, line weighting and a bird curtain should be considered as a single measure.

**Mainline tension:** Setting longlines into propeller turbulence (wake) should be avoided because it slows the sink rates of baited hooks.

**Live vs. dead bait:** Use of live bait should be avoided. Individual live baits can remain near the water surface for extended periods, thus increasing the likelihood of seabird captures.

**Hook mass and design:** Changes to hook mass and design may reduce the chance of seabird mortality in longline fisheries but have not been adequately studied.

**Bait hooking position:** Baits hooked in either the head (fish), or tail (fish and squid) are recommended because they sink significantly faster than baits hooked in the mid-back (fish) or upper mantle (squid).

**Offal and discard discharge management:** Offal and discards should not be discharged during line setting. During line hauling, offal and used baits should preferably be retained or discharged on the opposite side of the vessel from that on which the line is hauled. All hooks should be removed and retained on board before discards are discharged from the vessel.

## MITIGATION MEASURES THAT ARE NOT RECOMMENDED

ACAP considers that the following measures lack scientific substantiation as technologies or procedures for reducing the impact of pelagic longlines on seabirds.

**Line shooters:** No experimental evidence of effectiveness in pelagic longline fisheries.

**Olfactory deterrents:** No evidence of effectiveness in pelagic longline fisheries.

**Blue dyed bait:** No experimental evidence of effectiveness in pelagic longline fisheries. Insufficiently researched.

**Bait thaw status:** No evidence that the thaw status of baits has any effect on the sink rate of baited hooks set on weighted lines.

**Laser technology:** There is currently no evidence of effectiveness, and serious concerns remain regarding the potential impacts on the health of individual birds.

The ACAP review of seabird bycatch mitigation measures for pelagic longline fisheries is presented in the following section.

Agreement on the Conservation of Albatrosses and Petrels

# ACAP Review of Seabird Bycatch Mitigation Measures for Pelagic Longline Fisheries

*Reviewed at the Fourteenth Meeting of the Advisory Committee*
*Lima, Peru, 12 - 16 August 2024*

## INTRODUCTION

A range of technical and operational mitigation methods have been designed or adapted for use in pelagic longline fisheries to reduce incidental mortality of seabirds. Operationally, peak areas and periods of seabird foraging activity should be avoided. Effective technical methods include actively deterring birds from, and minimising the visibility of, baited hooks. Vessels need to be made less attractive to birds, and the distance astern and time baited hooks are available to birds should be reduced. Mitigation methods need to be easy and safe to implement, cost effective, enforceable and should not reduce catch rates of target species or increase the bycatch rates of other protected species.

The feasibility, effectiveness and specifications of mitigation measures may vary by area, seabird assemblage, fishery, vessel size, and gear configuration. Some of the mitigation methods are well established and explicitly prescribed in pelagic longline fisheries; however, additional measures are undergoing further testing and refinements.

The Seabird Bycatch Working Group (SBWG) of ACAP has comprehensively reviewed the scientific literature dealing with seabird bycatch mitigation in pelagic fisheries and this document is a distillation of that review. Currently, simultaneous use of weighted branch lines, bird scaring lines and night setting, or use of one of the assessed hook-shielding and underwater bait setting devices, is considered best practice mitigation for reducing seabird bycatch in pelagic longline fisheries. Three hook-shielding devices (the ‘Hookpod-LED’, the ‘Hookpod-mini’ and the ‘Smart Tuna Hook’) and one underwater bait setting device (the ‘Underwater Bait Setter (Skadia Technologies)’) have been assessed.

## THE ACAP REVIEW PROCESS

At each of its meetings, the ACAP SBWG considers any new research or information pertaining to seabird bycatch mitigation in pelagic longline fisheries. The following criteria are used by ACAP to guide the assessment process, and to determine whether a particular fishing technology or measure can be considered best practice to reduce the incidental mortality of albatrosses and petrels in fishing operations.

**Best Practice Seabird Bycatch Mitigation Criteria and Definition**

**i.** Individual fishing technologies and techniques should be selected from those shown by experimental research to significantly[10] reduce the rate of seabird incidental mortality[11] to the lowest achievable levels. Experimental research yields definitive results when performance of candidate mitigation technologies is compared to a control (no deterrent), or to status quo in the fishery. When testing relative performance of mitigation approaches, analysis of fishery observer data can be plagued with a myriad of confounding factors. Where a significant relationship is demonstrated between seabird behaviour and seabird mortality in a particular system or seabird assemblage, significant reductions in seabird behaviours, such as the rate of seabirds attacking baited hooks, can serve as a proxy for reduced seabird mortality. Ideally, where simultaneous use of fishing technologies and practices is recommended as best practice, research should demonstrate significantly improved performance of the combined measures.

**ii.** Fishing technologies and techniques, or a combination thereof, should have clear and proven specifications and minimum performance standards for their deployment and use. Examples would include: specific bird scaring line designs (lengths, streamer length and materials; etc.), number (one vs. two) and deployment specifications (such as aerial extent and timing of deployment); night fishing defined by the time between the end of nautical dusk and start of nautical dawn; and, line weighting configurations specifying mass and placement of weights or weighted sections.

**iii.** Fishing technologies and techniques should be demonstrated to be practical, cost effective and widely available. Commercial fishing operators are likely to select for seabird bycatch reduction measures and devices that meet these criteria including practical aspects concerning safe fishing practices at sea.

**iv.** Fishing technologies and techniques should, to the extent practicable, maintain catch rates of target species. This approach should increase the likelihood of acceptance and compliance by fishers.

**v.** Fishing technologies and techniques should, to the extent practicable not increase the bycatch of other taxa. For example, measures that increase the likelihood of catching other protected species such as sea turtles, sharks and marine mammals, should not be considered best practice (or only so in exceptional circumstances).

**vi.** Minimum performance standards and methods of ensuring compliance should be provided for fishing technologies and techniques, and clearly specified in fishery regulations. Relatively simple methods to check compliance should include, but not be limited to, port inspections of branch lines to determine compliance with branch line weighting, determination of the presence of davits (tori poles) to support bird scaring lines, and inspections of bird scaring lines for conformance with design requirements. Compliance monitoring and reporting should be a high priority for enforcement authorities.

[10] Any use of the word 'significant' in this document is meant in the statistical context

[11] This may be determined by either a direct reduction in seabird mortality or by reduction in seabird attack rates, as a proxy

On the basis of these criteria, the scientific evidence for the effectiveness of mitigation measures or fishing technologies/techniques in reducing seabird bycatch is assessed, and explicit information is provided on whether the measure is recommended as being effective, and thus considered best practice, or not. The ACAP review also indicates whether the measure needs to be combined with additional measures, and provides notes and caveats for each measure, together with information on performance standards and further research needs. Following each meeting of ACAP's SBWG and Advisory Committee, this review document and ACAP's best practice advice, is updated (if required). A summary of ACAP's current best practice advice is provided in the preceding section of this document.

## SEABIRD BYCATCH MITIGATION FACT SHEETS

A series of seabird bycatch mitigation fact sheets have been developed by ACAP and BirdLife International to provide practical information, including illustrations, on seabird bycatch mitigation measures (https://www.acap.aq/resources/bycatch-mitigation/mitigation-fact-sheets). The sheets, which include information on the effectiveness of the specific measure, their limitations and strengths and best practice recommendations for their effective adoption, are linked to the ACAP review process, and are updated following ACAP reviews. Links to the available fact sheets are provided in the relevant sections below. The mitigation fact sheets are currently available in English, French, Spanish, Portuguese, Japanese, Korean, Simplified Chinese, Traditional Chinese, and Indonesian.

## BEST PRACTICE MEASURES

### 1. Branch line weighting

***Scientific evidence for effectiveness in pelagic fisheries***

**Proven and recommended mitigation method**. Should be used in combination with night setting and bird scaring lines (Brothers 1991; Boggs 2001; Sakai *et al*. 2001; Brothers *et al*. 2001; Anderson & McArdle 2002; Hu *et al*. 2005; Melvin *et al*. 2013; 2014, Jiménez *et al*. 2017; 2019; Santos *et al*. 2019).

***Notes and Caveats***

Branch lines should be weighted to sink the baited hooks rapidly out of the diving range of feeding seabirds. Studies have demonstrated that branch line weighting where there is more mass closer to the hooks, results in hooks sinking most rapidly and consistently (Gianuca *et al*. 2011; Robertson *et al*. 2010a; 2013; Barrington *et al*. 2016), and reduces seabird attacks on baits (Gianuca *et al*. 2011; Ochi *et al*. 2013; Jiménez *et al*. 2019) as well as seabird mortalities (Jiménez *et al*. 2017; 2019; Santos *et al*. 2019). Studies of a range of weighting regimes have shown no negative effect on target catch rates (Jiménez *et al*. 2013; 2017; 2019; Robertson *et al*. 2013; Gianuca *et al*. 2013; Santos *et al.* 2019). However, an experimental weighted fishing hook, with a mass of 32 g added to the shank of the hook, showed a decrease in the catch rates of pooled retained species (Gilman *et al.* 2022).

Increased weighting will shorten but not eliminate the distance behind the vessel in which birds can be caught. Branch line weighting has been shown to improve the effectiveness of other mitigation methods such as night setting and bird scaring lines, in reducing seabird bycatch

(Brothers 1991; Boggs 2001; Sakai *et al*. 2001; Anderson & McArdle 2002; Gilman *et al.* 2003a, Hu *et al*. 2005; Melvin *et al*. 2013; 2014). Branch line weighting is integral to the fishing gear and, compared to bird scaring lines and night setting, has the advantage of being more consistently implemented, hence facilitating compliance and port monitoring. On this basis it is important to enhance the priority accorded to branch line weighting, providing certain pre-conditions can be met, among other things: (a) that the weighting regime is adequately specified; and (b) safety issues are adequately addressed.

***Minimum standards***

On the basis of sink-rate data (Barrington *et al*. 2016) and seabird attack and bycatch rates (Gianuca *et al*. 2011; Jiménez *et al*. 2019; Santos *et al*. 2019), best practice branch line weighting should achieve a sink rate of 0.5m/s to 5 m depth. The following configurations have been demonstrated, under controlled conditions and with metal materials, to meet this standard

**(a)** 40 g or greater attached within 0.5 m of the hook;

**(b)** 60 g or greater attached within 1 m of the hook;

**(c)** 80 g or greater attached within 2 m of the hook.

When weighting is attached to, or integrated into the hook, a minimum of total weight of 50 g is sufficient to achieve a sink rate of 0.5 m/s to 5 m depth. Branch line weighting is integral to the fishing gear and, compared to bird scaring lines and night setting, has the advantage of being more consistently implemented, hence facilitating compliance and port monitoring. It is recommended to avoid the use of lead when the lead may be ingested (e.g. attached to or integrated into the hook). The use of lighting devices or other fishing accessories as weights is not recommended unless they achieve the sink rate criterion.

***Need for combination***

Should be combined with bird scaring lines and night setting. There is a period of time when hooks are accessible to birds even when branch lines are weighted.

***Implementation monitoring***

**Vessels carrying out short fishing trips (lasting up to a few weeks):** Line weights crimped into branch lines are very difficult to remove at sea. Inspection before departure from port of all gear bins on vessels is therefore considered an acceptable form of implementation monitoring.

**Vessels carrying out long fishing trips (lasting months):** It is possible to remove and/or re-configure gear at sea. Consequently, implementation monitoring requires using appropriate methods (e.g., observer inspection of line setting operations; video surveillance; at-sea compliance checks). Video surveillance may be possible, subject to the mainline setter being fitted with motion sensors to trigger cameras.

***Research needs***

Continued refinement of branch line weighting configurations (mass, number and position of weights and materials) with regard to effectively reducing seabird bycatch and safety concerns, through controlled research and application in fisheries, is encouraged. Improving

branch line weighting for high seas fisheries, with hook sink rates consistent with ACAP's Best Practice advice on branch line weighting, remains as a research priority. Studies should also include evaluations of the effects of branch line weighting on the catch rate of target and bycatch species and provide data that allow evaluation of the relative safety and practicality attributes of various weighting configurations.

***Mitigation Fact Sheet***

https://www.acap.aq/bycatch-mitigation/bycatch-mitigation-fact-sheets

## 2. Night setting

***Scientific evidence for effectiveness in pelagic fisheries***

**Proven and recommended mitigation method**. Should be used in combination with weighted branch lines and bird scaring lines (Duckworth 1995; Gales *et al.* 1998; Klaer & Polacheck 1998; Brothers *et al*. 1999; McNamara *et al*. 1999; Gilman *et al*. 2005; 2023; Baker & Wise 2005; Jiménez *et al*. 2009; 2014; 2020; Melvin *et al*. 2013; 2014; Rollinson *et al*. 2016; Rollinson 2017; Melvin *et al.* 2023, Meyer & MacKenzie 2022).

***Notes and Caveats***

Setting longlines at night (defined as the time between the end of nautical twilight and before nautical dawn as set out in the Nautical Almanac tables for relevant latitude, local time and date) is highly effective at reducing incidental mortality of seabirds because the majority of vulnerable seabirds are inactive at night. For example, a Pacific Ocean albacore tuna longline fishery had dramatically lower albatross bycatch rates when making sets completely at night compared to sets made partially in the daytime, with no reduction in the target species catch rate (Gilman *et al*. 2023). Night setting is not as effective for crepuscular/ nocturnal foragers (e.g. White-chinned Petrels *Procellaria aequinoctialis*). Consequently, night setting should be used in combination with branch line weighting and bird scaring lines (Klaer & Polacheck 1998; Brothers *et al*. 1999; McNamara *et al*. 1999; Gilman *et al*. 2005; Baker & Wise 2005; Jiménez *et al*. 2009; 2014; 2020; Melvin *et al*. 2013; 2014). The effectiveness of this measure may be reduced during bright moonlight and when using intense deck lights, and is less practical in high latitudes during summer, when the time between nautical dusk and dawn is limited.

***Minimum standards***

No setting should take place between nautical dawn and nautical dusk. Nautical dawn and nautical dusk are defined as set out in the Nautical Almanac tables for relevant latitude, local time and date. Setting longlines across night and day does not represent night setting: either when setting commences at night and finishes after the nautical dawn, or when setting commences prior to the nautical dusk and continues into the night.

***Need for combination***

Should be used in combination with bird scaring lines and branch line weighting. Night setting used alone is less effective at reducing seabird bycatch for nocturnally active birds and during bright moon light conditions.

***Implementation monitoring***

Requires Vessel Monitoring Systems (VMS) or fishery observers. Vessel speed and direction vary between transiting, line setting, line hauling and when vessels are stationary on fishing grounds. VMS-derived assessment of vessel activity in relation to time of nautical dawn and dusk are considered acceptable for implementation monitoring. Alternatively, VMS-linked sensors fitted to mainline setting and hauling drum could be used to indicate compliance, as could sensors to trigger video surveillance cameras. This facility is currently unavailable and requires development.

***Research needs***

Assessing the effectiveness of bird scaring lines and branch line weighting at night needs to be determined, possibly by way of using thermal or night vision technologies.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/1824-fs-05-demersal-pelagic-longline-night-setting/file

## 3.a Bird scaring lines for vessels ≥35 m in total length

***Scientific evidence for effectiveness in pelagic fisheries***

**Proven and recommended mitigation method**. Should be used in combination with branch lines weighting and night setting. (Imber 1994; Uozumi & Takeuchi 1998; Brothers *et al.* 1999; Klaer & Polacheck 1998; McNamara *et al.* 1999; Boggs 2001; CCAMLR 2002; Minami & Kiyota 2004; Melvin 2003; Rollinson *et al*. 2016; Rollinson 2017). For vessels ≥35 m in length, the use of two bird scaring lines (BSLs) is considered best practice. BSLs with the appropriate aerial extent can be more easily rigged on large vessels. Two BSLs are considered to provide better protection of baited hooks in crosswinds than single BSLs (Melvin *et al*. 2004; 2013; 2014; Sato *et al*. 2013). Hybrid BSLs (with long and short streamers) are more effective than BSLs with short streamers only in deterring diving seabirds (e.g. White-chinned Petrels *Procellaria aequinoctialis*, Melvin *et al*. 2010; 2013; 2014).

***Notes and Caveats***

Properly designed and deployed BSLs deter birds from sinking baits, dramatically reducing seabird attacks and related mortalities. A bird scaring line runs from a high point at the stern to a device or mechanism that creates drag at its terminus. Brightly coloured streamers hanging from the aerial extent of the line scare birds from flying to and under the line, preventing them from reaching the baited hooks. It is important to note that the BSLs only provide protection to the baited hooks within the area protected by its aerial extent. This is why it is particularly important to use BSLs in combination with branch line weighting (and night setting), which ensure that the baited hooks have sunk beneath the diving depth of most seabirds beyond the aerial extent of the BSLs. The presence of diving species increases the vulnerability of surface foragers (e.g., albatrosses) due to secondary interactions (i.e. albatrosses attacking baited hooks that are brought back to the surface by diving birds).

BSLs should be the lightest practical strong fine line. Lines should be attached to the vessel with a barrel swivel to minimise rotation of the line from torque created as it is dragged behind the vessel. Long streamers should be attached with a swivel to prevent them from rolling up onto the BSL. BSLs are at risk of tangling with float lines leading to lost BSLs, interruptions in vessel operations and in some cases lost fishing gear.

BSLs potentially increase the likelihood of entanglements, particularly if the attachment points on davits (tori poles) are insufficiently outboard of vessels. To achieve a minimum aerial extent BSLs should be attached to the vessel such that it is suspended from a point a minimum of 8 m above the water at the stern. Attaching towed objects to the terminus of the in-water extent of bird scaring lines to increase drag has proven problematic in pelagic longline fisheries, as float lines tend to tangle with bird scaring lines. For this reason, the addition of short streamers woven into the in-water extent of the bird scaring line or lengthening or increasing the diameter of the in-water extent, are encouraged to increased drag while minimizing tangles. Weak links (breakaways) should be incorporated into the in-water portion of the line for safety reasons and to minimize operational problems associated with lines becoming tangled.

***Minimum standards***

Simultaneous use of two BSLs, one on each side of the sinking longline, provides maximum protection from bird attacks under different wind conditions (Melvin *et al.* 2004; 2013; 2014; Sato *et al*. 2013). The setup for BSLs should be as follows:

- BSLs should be deployed to maximise the aerial extent, which is a function of vessel speed, height of the attachment point to the vessel, drag, and weight of bird scaring line materials.
- To achieve a minimum recommended aerial extent of 100 m, BSLs should be attached to the vessel such that they are suspended from a point a minimum of 8 m above the water at the stern.
- BSLs should contain a mix of brightly coloured long and short streamers placed at intervals of no more than 5 m. Long streamers should be attached to the line in a way that prevent streamers from wrapping around the line (e.g. using unweighted swivels). All long streamers should reach the sea-surface in calm conditions.
- Baited hooks should be deployed within the area bounded by the two BSLs. If using bait-casting machines, they should be adjusted so as to land baited hooks within the area bounded by the BSLs.

If large vessels use only one BSL, it should be deployed windward of the sinking baits. If baited hooks are set outboard of the wake, the BSL attachment point to the vessel should be positioned several meters outboard of the side of the vessel that baits are deployed.

***Need for combination***

Should be used in combination with appropriate branch line weighting and night setting. BSLs used alone can rarely protect baited hooks beyond the aerial extent of the line.

***Implementation monitoring***

On-board observers, electronic monitoring (cameras), at-sea surveillance or an electronic BSL compliance monitoring device (Ngcongo & Miranda 2024; https://imveloblue.co.za/electronic-monitoring-imvelo-bsl/).

***Research needs***

Developing methods that minimise entanglements of the in-water portion of BSLs with longline floats remains the highest priority for research on bird-scaring lines. Other research priorities include: (1) evaluating the effectiveness of one vs. two BSLs; and, (2) BSLs design features including streamer lengths, configurations and materials.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/1497-fs-07a-pelagic-longline-streamer-lines-vessels-35-m/file

## 3.b Bird scaring lines for vessels <35m in total length

***Scientific evidence for effectiveness in pelagic fisheries***

**Proven and recommended mitigation method**. For vessels <35 m in length, a single BSL in combination with night setting and appropriate branch line weighting, has been found to be effective for mixed and short BSLs (ATF 2011; Domingo *et al.* 2017, Gianuca *et al.* 2011, Meyer & MacKenzie 2022).

***Notes and Caveats***

Vessels <35 m total length should deploy BSLs with a minimum aerial extent of 75 m. To achieve this minimum aerial extent, BSLs should be attached to the vessel such that it is suspended from a point a minimum of 6 m above the water at the stern. Sufficient drag must be created to maximise aerial extent and maintain the line directly behind the vessel during crosswinds. This may be achieved using either towed devices or longer in-water sections (Goad & Debski 2017). Diving species increase vulnerability of surface foragers (albatrosses) due to secondary interactions.

***Minimum standards***

To achieve a minimum recommended aerial extent of 75 m, BSLs should be attached to the vessel such that they are suspended from a point a minimum of 6 m above the water at the stern. Short streamers (>1 m) should be placed at 1 m intervals along the length of the aerial extent. Two designs have been shown to be effective:

(i) a mixed design that includes long and short streamers. Long streamers should be placed at 5 m intervals over at least the first 55 m of the BSL (Domingo *et al*. 2017). Streamers may be modified over the first 15 m to avoid tangling (Goad & Debski 2017); and,

(ii) a design that only includes short streamers. In all cases, BSLs should be brightly coloured and the lightest practical strong fine line. Lines should be attached to the vessel with a barrel swivel to minimise rotation of the line from torque (created as it is dragged behind the vessel).

Sufficient drag must be created to maximise aerial extent and maintain the line directly behind the vessel during crosswinds. To avoid tangling, this is best achieved using a long in-water section of rope or monofilament. Alternatively, short streamers can be tied into the line to

'bristle' the line (creating a bottlebrush like configuration) to generate drag while minimising the chance of fouling streamer lines on float lines.

To minimise safety and operational problems it is recommended to use a weak link to allow the bird scaring line to break-away from the vessel in the event of a tangle with the main line, and, a secondary attachment between the bird scaring line and the vessel to allow the tangled bird scaring line to be subsequently attached to mainline and recovered during the haul (Goad & Debski 2017).

***Need for combination***

Should be used with appropriate branch line weighting and night setting. BSLs used alone can rarely protect baited hooks beyond the aerial extent of the line.

***Implementation monitoring***

On-board observers, electronic monitoring (cameras), at-sea surveillance or an electronic BSL compliance monitoring device (Ngcongo & Miranda 2024; https://imveloblue.co.za/electronic-monitoring-imvelo-bsl/).

***Research needs***

Developing methods that minimise entanglements of the in-water portion of BSLs with longline floats remains the highest priority for research on bird-scaring lines. Other research priorities include: (i) evaluating the effectiveness of one vs. two BSL, (ii) BSL design features including steamer lengths, configurations and materials, especially for very small vessels.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/1867-fs-07b-pelagic-longline-streamer-lines-vessels-less-than-35-m/file

## 4. Hook-shielding devices

***Scientific evidence for effectiveness in pelagic longline fisheries***

**Proven and recommended mitigation method**. Hook-shielding devices encase the point and barb of baited hooks to prevent seabird attacks during line setting until a prescribed depth is reached (a minimum of 10 meters), or until after a minimum period of immersion has occurred (a minimum of 10 minutes) that ensures that baited hooks are released beyond the foraging depth of most seabirds. The following performance requirements are used by ACAP to assess the efficacy of hook-shielding devices in reducing seabird bycatch:

**(a)** the device shields the hook until a prescribed depth of 10 m or immersion time of 10 minutes is reached

**(b)** the device meets current recommended minimum standards for branch line weighting described in Section 1

**(c)** experimental research has been undertaken to allow assessment of the effectiveness, efficiency and practicality of the technology against the ACAP best practice seabird

bycatch mitigation criteria developed for assessing and recommending best practice advice on seabird bycatch mitigation measures

At this time, the 'Hookpod-LED' (Sullivan *et al*. 2018, Barrington 2016a), 'Hookpod-mini' (Goad *et al.* 2019, Gianuca *et al.* 2021, Sullivan & Barrington 2021) and the 'Smart Tuna Hook' (Baker *et al*. 2016, Barrington 2016b) have been assessed as having met the performance requirements and are therefore considered to represent best practice.

***Notes and Caveats***

The assessment of these three devices as best practice is conditional on continuing to meet the above performance requirements.

***Minimum standards***

**'Hookpod-LED'** – 68 g minimum weight that is positioned at the hook, encapsulating the barb and point of the hook during setting, and remains attached until it reaches 10 m in depth, when the hook is released.

**'Hookpod-mini'** – 48 g minimum weight that is positioned at the hook, encapsulating the barb and point of the hook during setting, and remains attached until it reaches 10 m in depth, when the hook is released.

**'Smart Tuna Hook'** – 40 g minimum weight that is positioned at the hook, encapsulating the barb and point of the hook during setting, and remains attached for a minimum period of 10 minutes after setting, when the hook is released.

***Need for combination***

Both of these assessed hook-shielding devices have been designed as stand-alone measures that do not need to be combined with other mitigation measures. However, it is useful to note that they integrate two performance components: i) protecting and ii) increasing the sink rate of the baited hooks to reduce the opportunities for seabirds to access them.

***Implementation monitoring***

A combination of port-based inspections and vessel-based monitoring and surveillance (e.g. observer inspection of line setting operations; video surveillance; at-sea compliance checks) will be required to assess use and compliance.

***Research needs***

Conduct further field research to evaluate the relative contributions of the sink rates and hook protection components of hook-shielding devices in reducing seabird bycatch.

***Mitigation Fact Sheet***

https://acap.aq/resources/bycatch-mitigation/mitigation-fact-sheets/3517-pelagic-longline-hook-sheilding/file

## 5. Underwater Bait Setting devices

***Scientific evidence for effectiveness in pelagic longline fisheries***

**Proven and recommended mitigation method**. Underwater Bait Setting devices deploy baited hooks at a pre-determined depth immediately at the stern of the vessel. Underwater Bait Setting devices deploy baited hooks individually underwater down a track fitted to the fishing vessel's transom in a vertical manner enclosed in a capsule or similar device to eliminate any visual stimulus for seabirds following the vessel. The capsule is pulled quickly underwater to a predetermined target depth that can be adjusted in response to the dive capabilities of seabirds attending the vessel during line setting to prevent interactions. The following performance requirements are used by ACAP to assess the efficacy of underwater bait setting devices in reducing seabird bycatch:

**(a)** the device deploys encapsulated hooks in a vertical manner at the stern of the vessel until a minimum prescribed depth of 5 m is reached;

**(b)** branch lines meet current recommended minimum standards for branch line weighting described in Section 1; and

**(c)** experimental research has been undertaken to allow assessment of the effectiveness, efficiency and practicality of the technology against the ACAP best practice seabird bycatch mitigation criteria developed for assessing and recommending best practice advice on seabird bycatch mitigation measures.

At this time, the 'Underwater Bait Setter (Skadia Technologies)' (Robertson *et al.* 2015, Robertson *et al*. 2018, Barrington 2021) has been assessed as having met the performance requirements and are therefore considered to represent best practice.

***Notes and Caveats***

The assessment of this devices as best practice is conditional on continuing to meet the above performance requirements.

***Minimum standards***

**'Underwater Bait Setter (Skadia Technologies)'** – a computer operated and hydraulically powered machine that deploys baited hooks individually underwater in a capsule, and where recommended minimum standards for branch line weighting are met. The capsule is pulled down a removable track fitted to the vessel's transom and then catapulted to a target depth. The capsule descends along the track at 6 $m.sec^{-1}$ and thereafter at ≥3 $m.sec^{-1}$.

***Need for combination***

The assessed underwater bait setting device has been assessed on the basis that branch lines meet current recommended minimum standards for branch line weighting. However, it is useful to note that the device integrates two performance components: i) protecting and ii) increasing the sink rate of the baited hooks to reduce the opportunities for seabirds to access them.

***Implementation monitoring***

A combination of port-based inspections and vessel-based autonomous data collection and surveillance (e.g. observer inspection of line setting operations; autonomous electronic surveillance and data collection; at-sea compliance checks) will be required to assess use and compliance.

***Research needs***

Conduct further field research to evaluate the effect of shallow set (e.g. 4-5 m depth) baits and deep-set baits (e.g. 6-10 m depth) on seabird ship-following behaviour and attacks on bait with an Underwater Bait Setter (Skadia Technologies) in *constant* use. This was not assessed by Robertson et al. (2018) who set alternate groups of hooks underwater and groups of hooks at the surface to compare relative effects). Conduct further field research to evaluate the performance of the Underwater Bait Setter (Skadia Technologies) with unweighted branch lines.

## 6. Time - Area closures

***Scientific evidence for effectiveness in pelagic fisheries***

**Proven and recommended mitigation method**. Avoiding fishing in peak areas and/or during periods of intense foraging activity, has been used effectively to reduce rapidly and substantially bycatch in longline fisheries.

***Notes and Caveats***

This is an important and effective management response, especially for high-risk areas, and when other measures prove ineffective**.** Although this can be highly effective in targeted locations and/or during a specific season, time-area closures may displace fishing effort into areas that are not as well regulated, leading to greater incidental mortality levels.

***Minimum standards***

None defined, but highly recommended.

***Need for combination***

Must be combined with other measures, both in the targeted areas when they are subsequently opened again for fishing, and also in adjacent areas to ensure displacement of fishing effort does not merely lead to a spatial shift in the incidental mortality.

***Implementation monitoring***

Vessels equipped with VMS combined with monitoring of activities by appropriate management authority is considered appropriate monitoring. Areas/seasons should be patrolled to ensure effectiveness if Illegal, Unreported and Unregulated (IUU) fishing activities are suspected.

***Research needs***

Further research is required on the seasonal variability in patterns of seabird distribution and behaviour in relation to fisheries, including whether closing areas to fishing causes a shift in the distribution of seabirds to adjacent areas.

## OTHER CONSIDERATIONS

## 7. Side-setting with line weighting and bird curtain

***Scientific evidence for effectiveness in pelagic fisheries***

Shown to be more effective than other simultaneously tested mitigation measures, including setting chutes and blue dyed bait, on relatively small vessels in the Hawaiian pelagic longline tuna and swordfish fisheries (Gilman *et al*. 2003b). **Effectiveness in southern hemisphere fisheries has not been researched and consequently it is not recommended as a proven mitigation measures in these fisheries at this time** (Brothers & Gilman 2006; Yokota & Kiyota 2006).

***Notes and Caveats***

Hooks must be sufficiently below the surface and protected by a bird curtain by the time they reach the stern of the vessel. In Hawaii, side-setting trials were conducted with a bird curtain and 45-60 g weighted swivels placed within 0.5 m of hooks. Japanese research concludes it must be used in combination with other measures (Yokota & Kiyota 2006). The Hawaiian trial was conducted in an area with an assemblage of largely surface-feeding seabirds, and this measure requires testing in other fisheries and areas where seabird abundance is higher and secondary ingestion (hooks retrieved by diving birds and secondarily – subsequently - attacked by surface foragers) is more important. Hence, it cannot be recommended for use in other fisheries at this time.

***Minimum standards***

Clear definition of side setting is required. Hawaiian definition is a minimum of only 1 m forward of the stern, which is likely to reduce effectiveness. The distance forward of the stern refers to the position from which baits are manually deployed. Baited hooks must be thrown by hand forward of the bait deployment location if they are to be afforded “protection” by being close to the side of the vessel.

***Need for combination***

Lines set from the side of vessels must be appropriately weighted in accordance with ACAP best practice advice and protected by an effective bird curtain.

***Implementation monitoring***

Requires fisheries observers or video surveillance.

***Research needs***

Currently untested in Southern Hemisphere fisheries against assemblages of diving seabirds (e.g. *Procellaria* sp. Petrels and *Puffinus* sp. Shearwaters) and albatrosses - urgent need for research.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/769-fs-09-pelagic-longline-side-setting/file

## 8. Blue dyed bait

***Scientific evidence for effectiveness in pelagic fisheries***

**Unproven and not recommended as a mitigation method** (Boggs 2001; Gilman *et al*. 2003b; Minami & Kiyota 2001; Minami & Kiyota 2004; Lydon & Starr 2005, Cocking *et al*. 2008; Ochi *et al.* 2011).

***Notes and Caveats***

The available data suggest only effective with squid bait (Cocking *et al*. 2008). Onboard dyeing requires labour and is difficult under stormy conditions. Results are inconsistent across studies.

***Minimum standards***

Mix to standardised colour placard or specify (*e.g.* use 'Brilliant Blue' food dye [Colour Index 42090, also known as Food Additive number E133] mixed at 0.5% for minimum 20 minutes).

***Need for combination***

Must be combined with bird scaring lines or night setting.

***Implementation monitoring***

The current practice of dyeing bait on board vessels at sea requires observer presence or video surveillance to monitor implementation. Assessment of implementation in the absence of on-board observers or video surveillance requires baits be dyed on land and monitored through port inspection of all bait on vessels prior to departure on fishing trips.

***Research needs***

Further testing is needed in the Southern Ocean.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/770-fs-10-pelagic-longline-blue-dyded-bait-squid/file

## 9. Line shooter

***Scientific evidence for effectiveness in pelagic fisheries***

**Unproven and not recommended as a mitigation measure** (Robertson *et al*. 2010b).

***Notes and Caveats***

Use of a line shooter to set gear deep cannot be considered a mitigation measure. Mainline set into propeller turbulence with a line shooter without tension astern (e.g. slack), as is the case in deep setting, significantly slows the sink rates of hooks (Robertson *et al*. 2010b).

***Minimum standards***

Not Applicable.

***Need for combination***

Not Applicable.

***Implementation monitoring***

Not Applicable.

***Research needs***

Not Applicable.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/771-fs-11-pelagic-longline-bait-caster-and-line-shooter/file

## 10. Bait caster

***Scientific evidence for effectiveness in pelagic fisheries***

**Unproven and not recommended as a mitigation measure** (Duckworth 1995; Klaer & Polacheck 1998).

***Notes and Caveats***

Not a mitigation measure unless bait casting machines are available with the capability to control the distance at which baits are cast. This is necessary to allow accurate delivery of baits under a bird scaring line. Current machines (without variable power control) likely to deploy baited hooks well beyond the streaming position of bird scaring lines, increasing risks to seabirds. Few commercially available machines have variable power control. Needs more development.

***Minimum standards***

Not Applicable.

***Need for combination***

Not Applicable.

***Implementation monitoring***

Not Applicable

***Research needs***

Develop (and implement) casting machine with a variable power control.

***Mitigation Fact Sheet***

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/771-fs-11-pelagic-longline-bait-caster-and-line-shooter/file

## 11. Underwater setting chute

***Scientific evidence for effectiveness in pelagic fisheries***

**Unproven and not recommended as a mitigation measure** (Brothers 1991; Boggs 2001; Gilman *et al*. 2003a; Gilman *et al*. 2003b; Sakai *et al*. 2004; Lawrence *et al*. 2006).

***Notes and Caveats***

In pelagic fisheries, existing equipment is not yet sturdy enough for large vessels in rough seas. Problems with malfunctions and performance inconsistencies have been reported (e.g. Gilman *et al*. 2003a, and Australian trials cited in Baker & Wise 2005).

***Minimum standards***

Not yet established

***Need for combination***

Not recommended for general application at this time.

***Implementation monitoring***

Not Applicable.

***Research needs***

Design problems to overcome.

## 12. Strategic offal discharge

***Scientific evidence for effectiveness in pelagic fisheries***

**Unproven and not recommended as a primary mitigation measure in pelagic longline fisheries, but should be considered good practice** (McNamara *et al*. 1999; Cherel *et al*. 1996).

***Notes and Caveats***

This should be considered a supplementary measure (i.e. used in addition to primary best practice mitigation measures). Offal attracts birds to vessels, and also conditions birds to attend vessels. Where practical, the discharge of offal should be eliminated or restricted to periods when not setting or hauling. Strategic discharge during line setting (dumping of homogenised offal to the side of the vessel during setting to attract birds to this area and away from the baited hooks, Cherel *et al.* 1996) can increase interactions and should be discouraged. Offal retention and/or incineration may be impractical on small vessels.

***Minimum standards***

Not yet established for pelagic fisheries. In the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), discharge of offal is prohibited during line setting for demersal longline fisheries. During line hauling, storage of waste is encouraged, and if discharged must be discharged on the opposite side of the vessel to the hauling bay.

***Need for combination***

Must be combined with other measures.

***Implementation monitoring***

Requires offal discharge practices and events to be monitored by fisheries observers or video surveillance.

***Research needs***

Further information needed on opportunities and constraints for the application of offal management in pelagic fisheries (short and long term).

## 13. Live bait

***Scientific evidence for effectiveness in pelagic fisheries***

**Not recommended, as use of live bait may lead to increased rates of seabird bycatch** (Robertson *et al*. 2010a; Trebilco *et al*. 2010).

***Notes and Caveats***

Live fish bait sinks significantly slower than dead bait (fish and squid), increasing the exposure of baits to seabirds. Use of live bait is associated with higher seabird bycatch rates.

***Minimum standards***

Not Applicable.

***Need for combination***

Not Applicable.

***Implementation monitoring***

Not Applicable.

***Research needs***

Not Applicable.

## 14. Bait thaw status – use of thawed baits rather than frozen baits

***Scientific evidence for effectiveness in pelagic fisheries***

**Unproven and not recommended as a primary mitigation measure** (Brothers 1991; Duckworth 1995; Klaer & Polacheck 1998; Brothers *et al*.1999; Robertson & van den Hoff 2010).

***Notes and Caveats***

Thawed baits are believed to sink faster than frozen baits. However, Robertson & van den Hoff (2010) concluded that the bait thaw status has no practical bearing on seabird mortality in pelagic fisheries. Baits cannot be separated from others in frozen blocks of bait, and hooks cannot be inserted into baits unless they are partially thawed (it is not practical for fishers to use fully frozen baits). Partially thawed baits sink at similar rates to fully thawed baits.

***Minimum standards***

Not Applicable.

***Need for combination***

Not Applicable.

***Implementation monitoring***

Not Applicable.

***Research needs***

Not Applicable.

## 15. Haul Mitigation

***Scientific evidence for effectiveness in pelagic fisheries***

Strategies to reduce seabird hooking during the haul have yet to be developed and properly tested for pelagic longline fisheries.

***Notes and Caveats***

The development and testing of seabird bycatch mitigation measures in pelagic longline fisheries has focussed almost exclusively on how to minimise or prevent bycatch during setting

operations. Although some measures, such as Bird Curtains, have been designed and tested in demersal longline fisheries to reduce the incidence of haul captures, these methods are not directly transferable to pelagic longline fisheries.

***Need for combination***

No information

***Research needs***

Developing methods that minimize seabird hooking during line hauling in pelagic longline fisheries remains an urgent research priority.

***Minimum standards***

No information

***Implementation monitoring***

No information

***Mitigation Fact Sheet***

Note that this fact sheet is directed mostly at haul mitigation in demersal longline fisheries, and is not directly applicable to pelagic longline fisheries.

https://www.acap.aq/en/bycatch-mitigation/bycatch-mitigation-fact-sheets/1907-fs-12-demersal-pelagic-longline-haul-mitigation/file

## 16. Lasers

### High Energy Lasers Strongly Discouraged

***Scientific evidence for effectiveness in pelagic longline fisheries***

Available evidence shows that high energy lasers (Class 4 lasers, the highest class in terms of laser hazards) are ineffective at deterring seabirds from danger areas around fishing vessels (Melvin *et al.* 2016) and likely damage seabird visual systems with negative effects on foraging behaviour of laser exposed seabirds (Fernandez-Juricic, 2023).

***Notes and Caveats***

Concerns are ongoing regarding the safety (to both humans and birds) and efficacy of laser technology of unknown energy levels as a seabird bycatch mitigation tool, as they continue to be used currently in various fisheries. Available evidence shows that high energy lasers are no longer marketed for fishery applications. Currently evidence is lacking on the possibility that lasers of lower energy levels delivered in different ways (scanning, blinking, wave-length, etc.) could be used safely and be effective in some applications.

***Minimum standards***

Not applicable as strongly discouraged.

***Need for combination***

Not applicable as strongly discouraged.

***Implementation monitoring***

Not applicable as strongly discouraged.

***Research needs***

As high energy lasers continue to be used in some fisheries, we encourage reporting of the extent and output power levels of laser use by ACAP Parties, including any information on effectiveness, as well as bird welfare effects.

## REFERENCES

Anderson, S. and McArdle, B., 2002. Sink rate of baited hooks during deployment of a pelagic longline from a New Zealand fishing vessel. *New Zealand Journal of Marine and Freshwater Research* **36**: 185–195.

ATF, 2011. Developments in experimental mitigation research – Pelagic longline fisheries in Brazil, South Africa and Uruguay. Agreement on the Conservation of Albatrosses and Petrels, Fourth Meeting of the Seabird Bycatch Working Group, Guayaquil, Ecuador, 22 - 24 August 2011, SBWG4 Doc 09.

Baker, G.B., Candy, S.G. and Rollinson D., 2016. Efficacy of the 'Smart Tuna Hook' in reducing bycatch of seabirds in the South African Pelagic Longline Fishery. Abstract only. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, 2 - 4 May 2016, La Serena, Chile, SBWG7 Inf 07.

Baker, G.B. and Wise, B.S., 2005. The impact of pelagic longline fishing on the flesh-footed shearwater *Puffinus carneipes* in Eastern Australia. *Biological Conservation* **126**: 306–316.

Barrington, J.H.S., 2016a. 'Hook Pod' as best practice seabird bycatch mitigation in pelagic longline fisheries. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, 2 - 4 May 2016, La Serena, Chile, SBWG7 Doc 10.

Barrington, J.H.S., 2016b. 'Smart Tuna Hook' as best practice seabird bycatch mitigation in pelagic longline fisheries. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, 2 - 4 May 2016, La Serena, Chile, SBWG7 Doc 09.

Barrington, J.H.S., Robertson, G. and Candy S.G., 2016. Categorising branch line weighting for pelagic longline fishing according to sink rates. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, La Serena, Chile, 2 - 4 May 2016, SBWG7 Doc 07.

Barrington, J.H.S., 2021. Underwater Bait Setting as best practice seabird bycatch mitigation in pelagic longline fisheries. Agreement on the Conservation of Albatrosses and Petrels,

Tenth Meeting of the Seabird Bycatch Working Group, virtual meeting, 17–19 August 2021, SBWG10 Doc 12.

Boggs, C.H., 2001. Deterring albatrosses from contacting baits during swordfish longline sets. In: Melvin, E. and Parrish, J.K. (Eds.), *Seabird Bycatch: Trends, Roadblocks and Solutions*. University of Alaska Sea Grant, Fairbanks, Alaska, pp. 79–94.

Brothers, N.P., 1991. Approaches to reducing albatross mortality and associated bait loss in the Japanese long-line fishery. *Biological Conservation* **55**: 255–268.

Brothers, N. and Gilman, E., 2006. Technical assistance for Hawaii-based pelagic longline vessels to modify deck design and fishing practices to side set. Prepared for the National Marine Fisheries Service, Pacific Islands Regional Office, Blue Ocean Institute, September 2006.

Brothers, N., Gales, R. and Reid, T., 1999. The influence of environmental variables and mitigation measures on seabird catch rates in the Japanese tuna longline fishery within the Australian Fishing Zone 1991-1995. *Biological Conservation* **88**: 85–101.

Brothers, N., Gales, R. and Reid, T., 2001. The effect of line weighting on the sink rate of pelagic tuna longline hooks, and its potential for minimising seabird mortalities. CCSBT-ERS/0111/53.

CCAMLR, 2002. Report of the working group on fish stock assessment. Report of the twenty-first meeting of the Scientific Committee of the Commission for the Conservation of Marine Living Resources. Commission for the Conservation of Antarctic Marine Living Resources, Hobart.

Cherel, Y., Weimerskirch, H. and Duhamel, G., 1996. Interactions between longline vessels and seabirds in Kerguelen waters and a method to reduce seabird mortality. *Biological Conservation* **75**: 63–70.

Claudino dos Santos, R.C., Silva-Costa, A., Sant'Ana, R., Gianuca, D., Yates, O., Marques, C. and Neves, T., 2016. Comparative trials of Lumo Leads and traditional line weighting in the Brazilian pelagic longline fishery. Abstract only. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, 2 - 4 May 2016, La Serena, Chile, SBWG7 Doc 14.

Cocking, L.J., Double, M.C., Milburn, P.J. and Brando, V.E., 2008. Seabird bycatch mitigation and blue-dyed bait: A spectral and experimental assessment. *Biological Conservation* **14**: 1354–1364.

Domingo, A., Jiménez, S., Abreu, M., Forselledo, R. and Yates, O., 2017. Effectiveness of tori line use to reduce seabird bycatch in pelagic longline fishing. *PLoS ONE* **12**: e0184465.

Duckworth, K., 1995. Analysis of factors which influence seabird bycatch in the Japanese southern bluefin tuna longline fishery in New Zealand waters, 1989–1993. New Zealand Fisheries Assessment Research Document 95/26.

Fernandez-Juricic, E. 2023. Laser technology for seabird bycatch prevention in commercial fisheries. Agreement on the Conservation of Albatrosses and Petrels, Eleventh Meeting of the Seabird Bycatch Working Group, Edinburgh, United Kingdom, 15-17 May 2023, SBWG11 Doc 11.

Gales, R., Brothers, N. and Reid, T., 1998. Seabird mortality in the Japanese tuna longline fishery around Australia, 1988-1995. *Biological Conservation* **86**: 37–56.

Gianuca, D., Canani, G., Silva-Costa, A., Milbratz, S. and Neves, T., 2021. Trialling the new Hookpod-mini, which releases the hook at 20 m depth, in pelagic longline fisheries off southern Brazil. Agreement on the Conservation of Albatrosses and Petrels, Tenth Meeting of Seabird Bycatch Working Group, virtual meeting, 17–19 August 2021, SBWG10 Inf 16.

Gianuca, D., Peppes, F., César, J., Marques, C., Neves, T., 2011. The effect of leaded swivel position and light toriline on bird attack rates in Brazilian pelagic longline. Agreement on the Conservation of Albatrosses and Petrels, Fourth Meeting of the Seabird Bycatch Working Group, Guayaquil, Ecuador, 22 - 24 August 2011, SBWG4 Doc 40 Rev 1.

Gianuca, D., Peppes, F.V., César, J.H., Sant'Ana, R. and Neves, T., 2013. Do leaded swivels close to hooks affect the catch rate of target species in pelagic longline? A preliminary study of southern Brazilian fleet. Agreement on the Conservation of Albatrosses and Petrels, Fifth Meeting of the Seabird Bycatch Working Group, La Rochelle, France, 1 - 3 May 2013, SBWG5 Doc 33.

Gilman, E., Boggs, C. and Brothers, N., 2003a. Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery. *Ocean and Coastal Management* **46**: 985–1010.

Gilman, E., Brothers, N., Kobayashi, D.R., Martin, S., Cook, J., Ray, J., Ching, G. and Woods, B., 2003b. Performance assessment of underwater setting chutes, side setting, and blue-dyed bait to minimise seabird mortality in Hawaii longline tuna and swordfish fisheries. Final report. Western Pacific Regional Fishery Management Council. Honolulu, Hawaii, USA. 42 p.

Gilman, E., Brothers, N. and Kobayashi, D., 2005. Principles and approaches to abate seabird bycatch in longline fisheries. *Fish and Fisheries* **6**: 35–49.

Gilman, E., Musyl, M., Wild, M., Rong, H. and Chaloupka, M. 2022. Investigating weighted fishing hooks for seabird bycatch mitigation. *Scientific Reports* **12**: 2833.

Gilman, E., Evans, T., Pollard, I. and Chaloupka, M., 2023. Adjusting time-of-day and depth of fishing provides an economically viable solution to seabird bycatch in an albacore tuna longline fishery. *Scientific Reports* **13**: 2621.

Goad, D. and Debski, I., 2017. Bird-scaring line designs for small longline vessels. Agreement on the Conservation of Albatrosses and Petrels, Eighth Meeting of the Seabird Bycatch Working Group, Wellington, New Zealand, 4 - 6 September 2017, SBWG8 Doc 12.

Goad, D., Debski, I. and Potts, J., 2019. Hookpod-mini: a smaller potential solution to mitigate seabird bycatch in pelagic longline fisheries. *Endangered Species Research* **39**: 1–8.

Hu, F., Shiga, M., Yokota, K., Shiode, D., Tokai, T., Sakai, H. and Arimoto, T., 2005. Effects of specifications of branch line on sinking characteristics of hooks in Japanese tuna longline. *Nippon Suisan Gakkaishi* **71**: 33–38.

Imber, M.J., 1994. Report on a tuna long-lining fishing voyage aboard Southern Venture to observe seabird by-catch problems. Science & Research Series 65. Department of Conservation, Wellington, New Zealand.

Jiménez, S., Domingo, A. and Brazeiro, A., 2009. Seabird bycatch in the Southwest Atlantic: Interaction with the Uruguayan pelagic longline fishery. *Polar Biology* **32**: 187–196.

Jiménez, S., Domingo, A., Abreu, M., Forselledo, R. and Pons, M., 2013. Effect of reduced distance between the hook and weight in pelagic longline branchlines on seabird attack and bycatch rates and on the catch of target species. Agreement on the Conservation of Albatrosses and Petrels, Fifth Meeting of the Seabird Bycatch Working Group. La Rochelle, France, 1 - 3 May 2013, SBWG5 Doc 49.

Jiménez, S., Phillips, R.A., Brazeiro, A., Defeo, O. and Domingo, A., 2014. Bycatch of great albatrosses in pelagic longline fisheries in the southwest Atlantic: Contributing factors and implications for management. *Biological Conservation* **171**: 9–20.

Jiménez, S., Forselledo, R. and Domingo, A., 2017. Effect of reduced distance between the hook and weight in pelagic longline branch-lines on seabird attack and bycatch rates and on the catch of target species. Abstract only. Agreement on the Conservation of Albatrosses and Petrels, Eighth Meeting of the Seabird Bycatch Working Group, 4 - 6 September 2017, Wellington, New Zealand, SBWG8 Inf 27 Rev 1.

Jiménez, S., Domingo, A., Forselledo, R., Sullivan, B.J. and Yates, O., 2019. Mitigating bycatch of threatened seabirds: the effectiveness of branch line weighting in pelagic longline fisheries. *Animal Conservation* **22**: 376–385.

Jiménez, S., Domingo, A., Winker, H., Parker, D., Gianuca, D., Neves, T., Coelho, R. and Kerwath, S., 2020. Towards mitigation of seabird bycatch: Large-scale effectiveness of night setting and Tori lines across multiple pelagic longline fleets. *Biological Conservation* **247**: 108642.

Klaer, N. and Polacheck, T., 1998. The influence of environmental factors and mitigation measures on by-catch rates of seabirds by Japanese longline fishing vessels in the Australian region. *Emu* **98**: 305–316.

Lawrence, E., Wise, B., Bromhead, D., Hindmarsh, S., Barry, S., Bensley, N. and Findlay, J., 2006. Analyses of AFMA seabird mitigation trials – 2001 to 2004. Bureau of Rural Sciences. Canberra.

Lydon, G. and Starr, P., 2005. Effect of blue dyed bait on incidental seabird mortalities and fish catch rates on a commercial longliner fishing off East Cape, New Zealand. Unpublished Conservation Services Programme Report, Department of Conservation, New Zealand. 12 pp.

McNamara, B., Torre, L. and Kaaialii, G., 1999. Hawaii longline seabird mortality mitigation project. Western Pacific Regional Fishery Management Council, Honolulu, Hawaii, USA.

Melvin, E.F., 2003. Streamer lines to reduce seabird bycatch in longline fisheries. Washington Sea Grant Program, WSG-AS 00-33.

Melvin, E.F., Sullivan, B., Robertson, G. and Wienecke, B., 2004. A review of the effectiveness of streamer lines as a seabird bycatch mitigation technique in longline fisheries and CCAMLR streamer line requirements. *CCAMLR Science* **11**: 189–201.

Melvin, E.F., Guy, T.J. and Reid, L.B., 2010. Shrink and Defend: A Comparison of Two Streamer Line designs in the 2009 South Africa Tuna Fishery. Agreement on the

Conservation of Albatrosses and Petrels, Third Meeting of the Seabird Bycatch Working Group, Mar del Plata, Argentina, 8 – 9 April 2010, SBWG3 Doc 13 Rev 1.

Melvin, E.F., Guy, T.J. and Reid, L.B., 2011. Preliminary report of 2010 weighted branch line trials in the tuna joint venture fishery in the South African EEZ. Agreement on the Conservation of Albatrosses and Petrels, Fourth Meeting of the Seabird Bycatch Working Group, Guayaquil, Ecuador, 22 – 24 August 2011, SBWG4 Doc 07.

Melvin, E.F., Guy, T.J. and Reid, L.B., 2013. Reducing seabird bycatch in the South African joint venture tuna fishery using bird-scaring lines, branch line weighting and nighttime setting of hooks. *Fisheries Research* **147**: 72–82.

Melvin, E.F., Guy, T.J. and Reid, L.B., 2014. Best practice seabird bycatch mitigation for pelagic longline fisheries targeting tuna and related species. *Fisheries Research* **149**: 5–18.

Melvin, E.F., Asher, W.E., Fernandez-Juricic, E. and Lim, A., 2016. Results of initial trials to determine if laser light can prevent seabird bycatch in North Pacific Fisheries. Agreement on the Conservation of Albatrosses and Petrels, Seventh Meeting of the Seabird Bycatch Working Group, La Serena, Chile, 2 – 4 May 2016, SBWG7 Inf 12.

Melvin, E.F., Wolfaardt, A., Crawford, R., Gilman, E. and Suazo, C.G. (2023). Bycatch reduction. In Conservation of Marine Birds. pp. 457–496. Academic Press.

Meyer, S. and MacKenzie, D. 2022. Factors affecting protected species captures in domestic surface longline fisheries. *New Zealand Aquatic Environment and Biodiversity Report* **No. 296**. 84 p. Available for download here.

Minami, H. and Kiyota, M., 2001. Effect of blue-dyed bait on reducing incidental take of seabirds. CCSBT-ERS/0111/61.

Minami, H. and Kiyota, M., 2004. Effect of blue-dyed bait and tori-pole streamer on reduction of incidental take of seabirds in the Japanese southern bluefin tuna longline fisheries. CCSBT-ERS/0402/08.

Ngcongo, S.V. & Miranda, N.A.F. 2024. Update on EM device for improving compliance with bird scaring line measures in longline and trawl fisheries. Agreement on the Conservation of Albatrosses and Petrels, Twelfth Meeting of the Seabird Bycatch Working Group, Lima, Peru, 5-7 August 2024, SBWG12 Inf 08.

Ochi, D., Sato, N. and Minami, H., 2011. A comparison of two blue-dyed bait types for reducing incidental catch of seabirds in the experimental operations of the Japanese southern bluefin tuna longline. WCPFC-SC7/EB-WP-09.

Ochi, D., Sato, N., Katsumata, N., Guy, T., Melvin, E.F. and Minami, H., 2013. At-sea experiment to evaluate the effectiveness of multiple mitigation measures on pelagic longline operation in western North Pacific. WCPFC-SC9/EB-WP-11.

Robertson, G. and van den Hoff, J., 2010. Static water trials of the sink rates of baited hooks to improve understanding of sink rates estimated at sea. Agreement on the Conservation of Albatrosses and Petrels, Third Meeting of the Seabird Bycatch Working Group, Mar del Plata, Argentina, 8 – 9 April 2010, SBWG3 Doc 31.

Robertson, G., Ashworth, P., Ashworth, P., Carlyle, I. and Candy, S.G., 2015. The development and operational testing of an underwater bait setting system to prevent the

mortality of albatrosses and petrels in pelagic longline fisheries. *Open Journal of Marine Science* **5**: 1–12.

Robertson, G., Ashworth, P., Ashworth, P., Carlyle, I., Jiménez, S., Forselledo, R., Domingo, A. and Candy, S.G., 2018. Setting baited hooks by stealth (underwater) can prevent the mortality of albatrosses and petrels in pelagic fisheries. *Biological Conservation* **225**: 134–143.

Robertson, G., Candy, S.G., Wienecke, B. and Lawton, K., 2010a. Experimental determinations of factors affecting the sink rates of baited hooks to minimize seabird mortality in pelagic longline fisheries. *Aquatic Conservation: Marine and Freshwater Ecosystems* **20**: 632–643.

Robertson, G., Candy, S.G. and Wienecke, B., 2010b. Effect of line shooter and mainline tension on the sink rates of pelagic longlines and implications for seabird interactions. *Aquatic Conservation: Marine and Freshwater Ecosystems* **20**: 419–427.

Robertson, G., Candy, S. and Hall, S., 2013. New branch line weighting regimes to reduce the risk of seabird mortality in pelagic longline fisheries without affecting fish catch. *Aquatic Conservation: Marine and Freshwater Ecosystems* **23**: 885–900.

Rollinson, D.P., Wanless, R.M., Makhado, A.B. and Crawford, R.J.M., 2016. A review of seabird bycatch mitigation measures, including experimental work, within South Africa's tuna longline fishery. IOTC-2016-SC19-13 Rev_1.

Rollinson, D.P., 2017. Understanding and mitigating seabird bycatch in the South African pelagic longline fishery. Thesis presented for the degree of Doctor of Philosophy. University of Cape Town.

Sakai, H., Fuxiang, H. and Arimoto, T., 2004. Underwater setting device for preventing incidental catches of seabirds in tuna longline fishing. CCSBT-ERS/0402/Info06.

Sakai, H., Hu, F. and Arimoto, T., 2001. Basic study on prevention of incidental catch of seabirds in tuna longline. CCSBT-ERS/0111/62.

Santos, R.C., Silva-Costa, A., Sant'Ana, R., Gianuca, D., Yates, O., Marques, C. and Neves, T. 2019. Improved line weighting reduces seabird bycatch without affecting fish catch in the Brazilian pelagic longline fishery. *Aquatic Conservation: Marine and Freshwater Ecosystems* **29**: 442–449

Sato, N., Minami, H., Katsumata, N., Ochi, E. and Yokawa, K., 2013. Comparison of the effectiveness of paired and single tori lines for preventing bait attacks by seabirds and their bycatch in pelagic longline fisheries. *Fisheries Research* **140**: 14–19.

Sullivan, B. and Barrington J.H.S., 2021. Hookpod-mini as best practice seabird bycatch mitigation in pelagic longline fisheries. Agreement on the Conservation of Albatrosses and Petrels, Tenth Meeting of the Seabird Bycatch Working Group, virtual meeting, 17–19 August 2021, SBWG10 Doc 13.

Sullivan, B.J., Kibel, B., Kibel, P., Yates, O., Potts, J.M., Ingham, B., Domingo, A., Gianuca, D., Jiménez, S., Lebepe, B., Maree, B.A., Neves, T., Peppes, F., Rasehlomi, T., Silva-Costa, A. and Wanless, R.M., 2018. At-sea trialling of the Hookpod: a 'one-stop' mitigation solution for seabird bycatch in pelagic longline fisheries. *Animal Conservation* **21**: 159–167.

Trebilco, R., Gales, R., Lawrence, E., Alderman, R., Robertson, G. and Baker, G.B., 2010. Characterizing seabird bycatch in the eastern Australian tuna and billfish pelagic longline fishery in relation to temporal, spatial and biological influences. *Aquatic Conservation: Marine and Freshwater Ecosystems* **20**: 531–542.

Uozumi, Y. and Takeuchi, Y. 1998. Influence of tori pole on incidental catch rate of seabirds by Japanese southern bluefin tuna longline fishery in high seas. CCSBT-WRS/9806/9 revised.

Yokota, K. and Kiyota, M., 2006. Preliminary report of side-setting experiments in a large sized longline vessel. Second meeting of the WCPFC Ecosystem and Bycatch SWG, Manila, Philippines, 10 August 2006. WCPFC-SC2-2006/EB WP-15.

## ANNEXE 5. ACTIONS PRIORITAIRES DE L'ACAP EN MATIÈRE DE CONSERVATION EN MER PAR PÊCHERIES, AVEC DES ACTIONS POUR L'ACAP OU LES PARTIES À L'ACAP

*Actions prioritaires de l'ACAP en matière de conservation en mer par pêcheries - 2021 Ce tableau ne contient que les pêcheries identifiées comme étant la plus grande menace pour les espèces inscrites à l'ACAP (10 % de toutes les pêcheries considérées). Le cadre de hiérarchisation complet n'inclut que les pêcheries pour lesquelles les Parties ou les États de l'aire de répartition ont fourni des informations. Il est dès lors possible que le nombre de pêcheries qui pourraient être évaluées soit supérieur au nombre de pêcheries actuellement incluses. Les populations hautement prioritaires de l'ACAP sont surlignées.*

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| Angola Palangre pélagique | *Diomedea dabbenena* Île Gough | Avec l'aide de l'Afrique du Sud, l'ACAP doit engager le dialogue avec la Commission du courant de Benguela, afin de soulever la question des mesures d'atténuation et de plaider en faveur de leur utilisation. |
| Argentine Chalut démersal | *Diomedea sanfordi* Îles Chatham | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques.<br>Nécessité de prendre en considération l'amélioration des conseils sur les câbles de surveillance des filets.<br>Améliorer la couverture et la capacité des observateurs à bord grâce au suivi humain et électronique. |
| | *Macronectes giganteus* Islas de los Estados & Observatorio | |
| | *Diomedea exulans* GS (SG/IGS)[1] | |
| Australie Chalut démersal | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques. |
| | *Thalassarche carteri* Île Amsterdam | |
| | *Thalassarche cauta* Île Albatross | |
| | *Thalassarche cauta* Pedra Branca | |

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| Australie Filet maillant | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | La Partie à l'ACAP doit envisager des fermetures temporelles et spatiales.<br>Encourager la déclaration des captures accessoires d'oiseaux de mer par la Partie à l'ACAP.<br>Développement d'options d'atténuation et de conseils de l'ACAP pour les pêcheries à filets maillants. |
| | *Thalassarche carteri* Île Amsterdam | |
| | *Thalassarche cauta* Pedra Branca | |
| | *Phoebetria fusca* Îles Crozet | |
| Australie Chalut pélagique | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques. |
| Brésil Palangre démersale | *Diomedea sanfordi* Îles Chatham | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques, mener des essais en mer pour adapter les mesures d'atténuation à la réalité de la flotte, mettre en œuvre la surveillance à bord (humaine et électronique, par exemple des caméras) et créer des réglementations afin d'atténuer les captures accessoires d'oiseaux de mer. |
| | *Diomedea dabbenena* Île Gough | |
| | *Diomedea exulans* GS (SG/IGS)[1] | |
| Brésil Palangre pélagique | *Thalassarche chlororhynchos* Tristan da Cunha | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques et la surveillance à bord (humaine et électronique, par exemple, des caméras), ainsi que des mécanismes de contrôle et d'application efficaces de la réglementation nationale en vigueur. |
| | *Diomedea sanfordi* Îles Chatham | |
| | *Diomedea dabbenena* Île Gough | |
| | *Diomedea exulans* GS (SG/IGS)[1] | |
| | *Procellaria aequinoctialis* GS (SG/IGS)[1] | |
| Brésil Palangre pélagique (flotte Itaipava) | *Diomedea dabbenena* Île Gough | La définition de la pêcherie doit être passée en revue et mise à jour. La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques. |
| | *Diomedea exulans* GS (SG/IGS)[1] | |
| | *Thalassarche chlororhynchos* Tristan da Cunha | |
| | *Procellaria aequinoctialis* GS (SG/IGS)[1] | |

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| Namibie Chalut démersal | *Thalassarche chlororhynchos* Tristan da Cunha | Avec l'aide de l'Afrique du Sud, l'ACAP doit engager le dialogue avec la Commission du courant de Benguela, afin de soulever la question des mesures d'atténuation et de plaider en faveur de leur utilisation.<br>Encourager la Namibie à adhérer à l'ACAP et à adopter les Conseils en matière de bonnes pratiques.<br>Encourager le Brésil à utiliser les programmes existants pour soutenir la poursuite de la mise en œuvre de l'atténuation des captures accessoires. |
| Namibie Palangre pélagique | *Thalassarche cauta* Pedra Branca | Avec l'aide de l'Afrique du Sud, l'ACAP doit engager le dialogue avec la Commission du courant de Benguela, afin de soulever la question des mesures d'atténuation et de plaider en faveur de leur utilisation.<br>Encourager la Namibie à adhérer à l'ACAP et à adopter les Conseils en matière de bonnes pratiques.<br>Encourager le Brésil à utiliser les programmes existants pour soutenir la poursuite de la mise en œuvre de l'atténuation des captures accessoires. |
| Namibie Chalut pélagique | *Thalassarche cauta* Pedra Branca | Avec l'aide de l'Afrique du Sud, l'ACAP doit engager le dialogue avec la Commission du courant de Benguela, afin de soulever la question des mesures d'atténuation et de plaider en faveur de leur utilisation.<br>Encourager la Namibie à adhérer à l'ACAP et à adopter les Conseils en matière de bonnes pratiques.<br>Encourager le Brésil à utiliser les programmes existants pour soutenir la poursuite de la mise en œuvre de l'atténuation des captures accessoires. |

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| Pérou Palangre démersale | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | La Partie à l'ACAP doit poursuivre le développement d'options d'atténuation appropriées et mettre en œuvre un programme d'observateurs à bord, ainsi que des journaux de bord électroniques standardisés.<br>L'ACAP doit donner la priorité au soutien de l'élaboration et de la mise en œuvre des mesures d'atténuation, par exemple par le biais du processus de petites subventions. |
| Pérou Palangre pélagique | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | La Partie à l'ACAP doit poursuivre le développement d'options d'atténuation appropriées et mettre en œuvre un programme d'observateurs à bord, ainsi que des journaux de bord électroniques standardisés.<br>L'ACAP doit donner la priorité au soutien de l'élaboration et de la mise en œuvre des mesures d'atténuation, par exemple par le biais du processus de petites subventions. |
| | *Procellaria cinerea* Tous les sites | |
| Espagne Palangre démersale | Puffinus mauretanicus Archipel des Baléares | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques.<br>La Partie à l'ACAP doit mettre en œuvre le plan d'action pour les espèces et les AMP. |
| Espagne Palangre pélagique | *Puffinus mauretanicus* Archipel des Baléares | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques.<br>La Partie à l'ACAP doit mettre en œuvre le plan d'action pour les espèces et les AMP. |
| Espagne Senne coulissante | *Puffinus mauretanicus* Archipel des Baléares | La Partie à l'ACAP doit mettre en œuvre et améliorer, le cas échéant, les conseils en matière d'atténuation élaborés par l'ACAP.<br>La Partie à l'ACAP doit mettre en œuvre le plan d'action pour les espèces et les AMP. |

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| Espagne Chalut | *Puffinus mauretanicus* Archipel des Baléares | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques ou développer des options d'atténuation appropriées si les conseils ne peuvent être mis en place.<br>La Partie à l'ACAP doit mettre en œuvre le plan d'action pour les espèces et les AMP. |
| Uruguay Chalut démersal | *Diomedea sanfordi* Îles Chatham | La Partie à l'ACAP doit mettre en œuvre les Conseils en matière de bonnes pratiques. |
| **ORGP** | | |
| CCSBT Palangre pélagique | *Diomedea antipodensis* Îles Auckland | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Thalassarche melanophris* Îles Antipodes | |
| | *Thalassarche melanophris* Île Campbell | |
| | *Thalassarche melanophris* Îles Crozet | |
| | *Thalassarche melanophris* GS (SG/IGS)[1] | |
| | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | |
| | *Thalassarche chrysostoma* GS (SG/IGS)[1] | |
| | *Procellaria cinerea* Tous les sites | |
| | *Thalassarche carteri* Île Amsterdam | |
| | *Thalassarche carteri* Îles Crozet | |
| | *Macronectes halli* Îles du Prince-Édouard | |
| | *Diomedea sanfordi* Îles Chatham | |
| | *Phoebetria fusca* Îles Crozet | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Phoebetria fusca* Îles du Prince-Édouard | |

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| | *Macronectes giganteus* Îles du Prince-Édouard | |
| | *Diomedea dabbenena* Île Gough | |
| | *Diomedea exulans* Îles Kerguelen | |
| | *Diomedea exulans* GS (SG/IGS)[1] | |
| | *Procellaria aequinoctialis* GS (SG/IGS)[1] | |
| IATCC Palangre pélagique | *Phoebastria immutabilis* Pacifique central (Laysan) | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Phoebastria irrorata* Îles Galápagos | |
| CICTA Palangre pélagique | *Thalassarche chlororhynchos* Tristan da Cunha | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Thalassarche melanophris* GS (SG/IGS)[1] | |
| | *Thalassarche chrysostoma* GS (SG/IGS)[1] | |
| | *Procellaria cinerea* Tous les sites | |
| | *Diomedea sanfordi* Îles Chatham | |
| | *Diomedea dabbenena* Île Gough | |
| | *Diomedea exulans* GS (SG/IGS)[1] | |
| | *Procellaria aequinoctialis* GS (SG/IGS)[1] | |
| CTOI Palangre pélagique | *Thalassarche chrysostoma* GS (SG/IGS)[1] | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Procellaria cinerea* Tous les sites | |
| | *Thalassarche carteri* Île Amsterdam | |
| | *Thalassarche carteri* Îles Crozet | |
| | *Thalassarche carteri* Îles du Prince-Édouard | |
| | *Macronectes halli* Îles du Prince-Édouard | |

| Pêcherie | Population touchée (groupe d'îles de reproduction) | Actions pour l'ACAP/ les Parties/ autres |
|---|---|---|
| | *Thalassarche cauta* Pedra Branca | |
| | *Phoebetria fusca* Îles Crozet | |
| | *Phoebetria fusca* Îles du Prince-Édouard | |
| | *Macronectes giganteus* Îles du Prince-Édouard | |
| | *Diomedea dabbenena* Île Gough | |
| | *Diomedea exulans* Îles Kerguelen | |
| SEAFO Chalut démersal | *Thalassarche melanophris* GS (SG/IGS)[1] | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| ORGPPS Chalut démersal | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Diomedea sanfordi* Îles Chatham | |
| WCPFC Palangre pélagique | *Diomedea antipodensis* Îles Antipodes | L'ACAP et les Parties doivent mettre en œuvre la stratégie d'interaction avec les ORGP de l'ACAP. |
| | *Diomedea antipodensis* Îles Auckland | |
| | *Thalassarche melanophris* Îles Antipodes | |
| | *Thalassarche melanophris* Île Campbell | |
| | *Procellaria parkinsoni* Îles de la Grande et de la Petite Barrières | |
| | *Procellaria cinerea* Tous les sites | |
| | *Phoebastria immutabilis* Pacifique central (Laysan) | |
| | *Diomedea sanfordi* Îles Chatham | |

[1] Il existe un différend entre les gouvernements de l'Argentine et du Royaume-Uni de Grande-Bretagne et d'Irlande du Nord concernant la souveraineté des Îles Falkland (Falkland Islands/Islas Malvinas), de la Géorgie du Sud et îles Sandwich du Sud (South Georgia and the South Sandwich Islands/Islas Georgias del Sur e Islas Sándwich del Sur) et les zones marines environnantes.