Acuerdo sobre la Conservación de Albatros y Petreles	**Decimocuarta reunión del Comité Asesor** *Lima, Perú, 12 - 16 de agosto de 2024* **Informe del Grupo de Trabajo sobre Captura Secundaria de Aves Marinas** ***Grupo de Trabajo sobre Captura Secundaria de Aves Marinas***

Informe de la Duodécima reunión del Grupo de Trabajo sobre Captura Secundaria de Aves Marinas, Lima, Perú, 5 al 7 de agosto de 2024

1. INTRODUCCIÓN

En el presente informe, se documentan las deliberaciones y las recomendaciones efectuadas durante la Duodécima Reunión del Grupo de Trabajo sobre Captura Secundaria de Aves Marinas (GdTCS12), celebrada en Lima, Perú, del 5 al 7 de agosto de 2024.

El Cocoordinador del GdTCS, Igor Debski (Nueva Zelanda), dio la bienvenida a todos los miembros y observadores del GdTCS (**ANEXO 1**) a la Duodécima Reunión del GdTCS. Presentó al Cocoordinador del GdTCS Sebastián Jiménez (Uruguay) y a los Vicecoordinadores Dimas Gianuca (BLI) y Megan Tierney (Reino Unido).

2. MIEMBROS DEL GDTCS

El Cocoordinador dio la bienvenida al siguiente nuevo miembro que se une al grupo desde la GdTCS11: Cristóbal Anguita (Chile), en sustitución de Jorge Azócar (Chile). Yann Rouxel (BLI) también sustituyó a Rory Crawford (BLI). El GdTCS agradeció a Jorge Azócar y Rory Crawford sus aportes de los años anteriores. El Cocoordinador señaló que las Partes pueden designar a miembros del Grupo de Trabajo en cualquier momento. Los miembros actuales del GdTCS se encuentran indicados en el **ANEXO 1**.

3. APROBACIÓN DE LA AGENDA

El Cocoordinador presentó la agenda y los documentos correspondientes. La reunión aprobó la agenda (**SBWG12 Doc 01 Rev 1**).

4. DEFINICIÓN Y CRITERIOS DE LAS RECOMENDACIONES SOBRE MEJORES PRÁCTICAS DEL ACAP PARA MITIGAR LA CAPTURA SECUNDARIA DE AVES MARINAS

El Cocoordinador señaló que este punto de la agenda sirve de recordatorio para revisar continuamente la definición y los criterios de las recomendaciones sobre mejores prácticas del ACAP a fin de garantizar que dichas recomendaciones sigan siendo adecuadas para su finalidad. También se sugirió que el GdTCS estudiara la posibilidad de crear un documento simplificado e independiente en el que se describieran claramente los criterios y los pasos que debe dar un proponente para que el ACAP considere y apruebe cualquier medida como recomendación sobre mejores prácticas.

En **SWBG12 Inf 01** se describieron bases de datos ensambladas de métodos de mitigación para especies en riesgo expuestas a pesquerías de palangre pelágico, de atún con red de cerco y con redes de enmalle de deriva, y se definieron aportes clave para realizar evaluaciones de estrategias de gestión exhaustivas de la captura secundaria multiespecie, que luego permiten simular los resultados de estrategias alternativas para determinar cuál cumple mejor los objetivos.

En el anexo 7 de **SBWG12 Inf 01** se incluyó una Decisión o Resolución preliminar sobre evaluaciones de estrategias de gestión holísticas de captura secundaria para ayudar a las organizaciones regionales de ordenación pesquera a identificar elementos candidatos para su posible inclusión en las medidas. El documento se presentó ante varias OROP, cuya respuesta ha sido positiva. El GdTCS recibió de buen grado el documento y señaló que podría serle útil considerar cómo podría aplicarse el proceso si el ACAP planeara revisar o añadir a los criterios que utiliza para evaluar si se debe considerar y adoptar una medida de mitigación como recomendación sobre mejores prácticas. El GdTCS acordó seguir de cerca la aplicación de la Resolución y, en su próxima reunión, estudiar si el ACAP debería modificar su estrategia de comunicación para transmitir los enfoques de las evaluaciones de estrategias de gestión a las OROP.

5. MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE ARRASTRE

5.1. Revisión de los avances recientes en investigación sobre medidas de mitigación y actualización de las recomendaciones sobre mejores prácticas

En **SBWG12 Doc 05**, se proporcionó una versión enmendada con control de cambios de las recomendaciones sobre mejores prácticas para la mitigación de la captura secundaria de aves marinas en pesquerías de arrastre, refrendada por la CA13. Los cambios mejoraron la claridad de las recomendaciones y la coherencia con los documentos de recomendaciones para los demás tipos de artes de pesca industrial, e incluyeron una sección resumida sobre medidas de mitigación no recomendadas. El GdTCS aprobó los cambios sugeridos y, considerando la nueva información presentada, identificó varios otros cambios, en particular:

(i) separar las recomendaciones sobre medidas de mitigación para reducir las colisiones con cables en medidas sobre la reducción de la extensión aérea de los cables (por ejemplo, pastecas) y medidas que disuaden a las aves de acercarse a los cables (por ejemplo, líneas espantapájaros, LEP);

(ii) modificar la medida general de mitigación de vedas espaciotemporales para que esta refleje no solo que es necesario tener en cuenta que dichas vedas no desplazan el riesgo a las zonas adyacentes, sino también que, como consecuencia, el riesgo no se desplaza a otros métodos de pesca.

En **SBWG12 Doc 16** se informó sobre el desarrollo de medidas de mitigación de cables de seguimiento de las redes en buques de arrastre continuo en las pesquerías de kril que operan en el Área de la Convención de la CCRVMA. Una reciente derogación de la prohibición de la CCRVMA de utilizar cables de seguimiento de las redes ha permitido a los buques de arrastre continuo llevar a cabo pruebas de medidas de mitigación de la captura secundaria de aves marinas para este "tercer cable". En el documento se informó de las pruebas realizadas en tres buques noruegos que pescaban kril. El GdTCS recibió de buen grado el informe y reconoció que algunas de las recomendaciones actuales sobre mejores prácticas para pesquerías de arrastre pueden no ser viables para los arrastreros continuos, por lo que acordó modificarlos en caso necesario, diferenciando entre el uso de artes de arrastre tradicionales y continuos. El GdTCS recomendó que se siguiera estudiando esta cuestión durante la próxima revisión intersesional de las recomendaciones sobre mejores prácticas. El GdTCS también observó que no estaba claro dónde se hacían las pruebas notificadas en relación con la distribución de las especies incluidas en el ACAP, y se planteó la preocupación de que, en caso de que tales operaciones tuvieran lugar en aguas de importancia para las especies del ACAP, dichas pesquerías podrían suponer un riesgo considerable. El GdTCS concluyó que, en esta fase, no se disponía de pruebas suficientes para evaluar las medidas de mitigación propuestas, pero acordó que debían anotarse como "en fase de desarrollo" y animar a seguir trabajando en este ámbito. El GdTCS expresó su preocupación por la posibilidad de que el "agua de cola" vertida por los buques de arrastre continuo que pescan kril actúe como atrayente para las aves marinas, aumentando así la posibilidad de interacciones, y recomendó que se siguiera investigando sobre este tema.

En **SBWG12 Inf 03** se informó de las investigaciones sobre medidas de mitigación para reducir la mortalidad causada por los cables de seguimiento de las redes a través de: 1) el uso de un nuevo material ("Dynice") para construir el cable; y 2) la configuración de LEP para cubrir el punto de entrada del cable en el agua y reducir los enredos. La tasa de colisión de aves marinas con cables construidos con el nuevo material fue inferior a la de las colisiones con cables de acero tradicionales, aunque las razones de ello aún no están claras. Las adaptaciones del diseño de las LEP destinadas a reducir los enredos con los cables de seguimiento de las redes (así como los posibles daños) requieren más experimentación para corroborar su eficacia en la reducción del índice de impacto. El GdTCS acogió con satisfacción la labor en curso para mejorar el diseño y la eficacia de las LEP, y espera recibir más actualizaciones.

En **SBWG12 Inf 08** se describe un dispositivo electrónico de monitoreo del cumplimiento de las LEP (https://imveloblue.co.za/electronic-monitoring-imvelo-bsl/). El dispositivo mide continuamente la tensión ejercida por una LEP al arrastrarla por el agua y transmite después datos de tensión en tiempo real de forma inalámbrica. El dispositivo se encuentra en desarrollo desde 2020 y actualmente está en su fase final de producción. Más allá de poder integrarse con los sistemas de monitoreo electrónico de los que ya disponen los buques, el dispositivo mejora la seguridad al reducir la necesidad de que los miembros de la tripulación controlen físicamente las LEP, y podría utilizarse en todos los buques de pesca industrial que implementen LEP. El GdTCS acogió con satisfacción la actualización sobre el desarrollo del dispositivo de monitoreo electrónico de las LEP y lo añadió como un método de monitoreo electrónico que podría utilizarse para supervisar la implementación de LEP en los documentos de recomendaciones sobre mejores prácticas para pesquerías de arrastre, palangre demersal y palangre pelágico, señalando que, si bien este dispositivo puede monitorear el uso, no supervisará las especificaciones de las LEP.

En **SBWG12 Inf 19** se informó sobre los experimentos para generar pruebas sobre las normas mínimas y la eficacia de las medidas de mitigación adaptadas para sonar de red y cables de arrastre en pesquerías de arrastre demersal chilenas. El uso de un sistema combinado de cortinas en las flotas de arrastreros fresqueros, conformado por cortinas de sonar de red y deflectores de aves accionados por motor, dio como resultado una reducción de >90 % en las colisiones de nueve especies de aves marinas, incluidas cinco especies amparadas por el ACAP. El GdTCS señaló la importancia de esta labor, el importante potencial de aplicación a otras flotas y que, una vez finalizado el trabajo, los resultados pueden considerarse para su inclusión en el documento de recomendaciones sobre mejores prácticas. El GdTCS también tomó nota de que este proyecto cuenta con el apoyo de una pequeña subvención del ACAP, lo que demuestra el valor de este programa para avanzar en este ámbito.

En **SBWG12 Inf 07** también se informó sobre el desarrollo de las medidas de mitigación en relación con los cables de seguimiento de las redes y el asunto se consideró en el punto de la agenda n.° 15.

5.2. Prioridades de investigación sobre mitigación

Tras revisar las prioridades, el GdTCS recomendó que las más importantes para la investigación sobre la reducción de la captura secundaria de aves marinas en las pesquerías de arrastre son:

Mitigación en el uso de cables: desarrollo y prueba continuos de opciones de mitigación para reducir las interacciones de las aves marinas con los cables, en particular las aplicables a los cables de seguimiento de las redes, incluidos dispositivos disuasorios novedosos (como las cortinas para aves), materiales novedosos para los cables y formas de reducir la extensión aérea, así como la consideración de las pesquerías que utilizan una serie de prácticas operativas diferentes;

Interacciones con los cables: determinar las relaciones entre la abundancia de aves marinas, las interacciones con los cables y las tasas de mortalidad —mediante la cuantificación del nivel de mortalidad no detectada u oculta—, incluida la posibilidad de hacer un monitoreo electrónico (ME) de los golpes producidos con los cables;

Enredo con las redes: seguir desarrollando y probando opciones para reducir las interacciones de las aves marinas con los artes de arrastre para reducir el enredo o la captura de aves marinas en las redes durante el calado y el virado;

Vertido: evaluar más a fondo el nivel de atracción para las aves del agua de cola u otros vertidos que normalmente no se consideran parte del vertido de despojos o de los descartes.

Igor Debski, Verónica Iriarte y Leandro Tamini siguen siendo los líderes del GdTCS en materia de mitigación de captura secundaria en las pesquerías de arrastre.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Refrendar la revisión actualizada y las recomendaciones de mejores prácticas para reducir el impacto de las pesquerías de arrastre pelágico y demersal en las aves marinas, incluidas en el **ANEXO 2**. Estas actualizaciones proporcionan mayor claridad y uniformidad en el documento y reflejan las últimas investigaciones presentadas a la GdTCS12. Si bien los cambios no suponen ninguna modificación sustancial de las recomendaciones sobre mejores prácticas, incluyen una referencia a varias opciones de mitigación que se están

desarrollando para los cables de seguimiento de las redes, cuando no se pueda eliminar su uso.

2. Fomentar la implementación de las prioridades de investigación identificadas en la Sección 5.2 a fin de mejorar la mitigación de la captura secundaria en las pesquerías de arrastre.

6. MITIGACIÓN DE CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE PALANGRE DEMERSAL

6.1 Revisión de los avances recientes en investigación sobre medidas de mitigación y actualización de las recomendaciones sobre mejores prácticas

En **SBWG12 Doc 06**, se proporcionó una versión enmendada con control de cambios de las recomendaciones sobre mejores prácticas para la mitigación de la captura secundaria de aves marinas en pesquerías de palangre demersal, refrendada por la CA13. Si bien no se han introducido cambios sustanciales en las recomendaciones para las pesquerías de palangre demersal, se han realizado más esfuerzos para garantizar la coherencia y la accesibilidad de los documentos de recomendaciones sobre mejores prácticas en todos los tipos de artes industriales (arrastre, palangre demersal y palangre pelágico). La GdTCS12 apoyó una acción propuesta para convertir los tres documentos de recomendaciones a un formato normalizado y más fácil de usar. De ello se encargarán los Coordinadores del GdTCS y los responsables de cada tipo de arte durante el período intersesional. El GdTCS identificó un pequeño número de otros cambios en las recomendaciones de mejores prácticas para mejorar aún más la coherencia de la redacción y la claridad de los consejos.

En **SBWG12 Doc 13** se documentó el desarrollo de flotadores con peso junto con la manipulación de los regímenes de lastrado de brazoladas y las configuraciones de líneas espantapájaros para hundir los anzuelos cebados a 5 m dentro de la extensión aérea de la línea espantapájaros en las pesquerías de palangre demersal de Nueva Zelanda. Los flotadores con peso consistían en dos flotadores unidos al palangre a través de una cuerda de 7 m lastrada en el extremo más bajo para contrarrestar la flotabilidad de uno de los flotadores. Además, se aumentó la masa de brazolada, se redujo el espaciado y se maximizó la extensión aérea de las líneas espantapájaros. La configuración no dificultó las operaciones. Los flotadores con peso funcionaron bien, no se enredaron con frecuencia y demostraron ser fáciles de lanzar y recuperar. La escasez y la irregularidad de las tasas de captura impidieron llegar a conclusiones firmes sobre la influencia en los índices de captura de especies objetivo. Se identificaron opciones para que los pescadores variaran aún más la flotación sin perjudicar las tasas de hundimiento. El GdTCS acogió con satisfacción este avance que aborda vacíos de conocimiento y desafíos actuales, y destacó su importancia para las pesquerías que utilizan palangre demersal con flotadores a nivel mundial, incluidas las pesquerías de palangre demersal con flotadores de pequeñas embarcaciones. El GdTCS sugirió que se siguiera investigando el impacto en las tasas de captura de las especies objetivo y si se había producido alguna pérdida de cebo. Este método figuró en el documento de recomendaciones sobre mejores prácticas como opción en fase de desarrollo. El GdTCS animó a que en el futuro se informara sobre los nuevos trabajos en este tema.

En **SBWG12 Doc 17** se presentaron resultados de análisis de mortalidad incidental de aves marinas en pesquerías argentinas de palangre demersal, teniendo en cuenta la estratificación espacial y temporal del esfuerzo pesquero e incorporando, por primera vez, cifras de mortalidad críptica. Se estimaron las posibles mortalidades anuales para el período 2005-2009 de dos especies del ACAP: 686 (95 % I.C.: 582-800) *Thalassarche melanophris* y 2278 (95% I.C.: 1981-2606) *Procellaria aequinoctialis*. Los niveles de mortalidad de ambas especies en la pesquería dirigida principalmente al abadejo fueron un orden de magnitud superiores a los de otros dos estratos dirigidos a la raya y la merluza negra. Se destacó que, si bien el esfuerzo pesquero de la pesquería de palangre de Argentina se había reducido progresivamente hasta niveles insignificantes en los últimos años, existe la posibilidad de que las circunstancias económicas favorezcan el crecimiento de esta flota palangrera demersal en el futuro. El GdTCS recibió con beneplácito este trabajo y tomó nota de las estimaciones de mortalidad de aves marinas y el hecho de que abordó la estratificación espacial y temporal, así como la mortalidad críptica; el GdTCS tendrá en cuenta estas cifras actualizadas en futuras revisiones. El GdTCS también tomó nota de que esta labor había contado con el apoyo de una pequeña subvención del ACAP, lo que demuestra el valor de este programa para avanzar en este ámbito.

El documento **SBWG12 Inf 08** también se debatió en el punto de la agenda n.° 5.2**.** El GdTCS señaló que, en el caso de la pesca con palangre demersal, el dispositivo electrónico de monitoreo de la tensión puede utilizarse para confirmar tanto la implementación de líneas espantapájaros como el calado nocturno.

6.2 Prioridades de investigación sobre mitigación

El GdTCS confirmó las siguientes prioridades de investigación sobre medidas de mitigación para pesquerías de palangre demersal:

Mejores tasas de hundimiento: seguir identificando medidas de mitigación que mejoren la tasa de hundimiento de los anzuelos cebados en los palangres con flotadores, incluidas la reducción del número de anzuelos colocados cerca de los flotadores y la forma, el diseño de los pesos para lograr mayores tasas de hundimiento, así como el uso de flotadores con peso. Sintetizar la experiencia y la información de otras pesquerías de palangre demersal con flotadores para contribuir al desarrollo de las recomendaciones para este tipo de arte.

Dispositivos de mitigación durante el virado: continuar con los estudios sobre mitigación durante el virado en pesquerías demersales (y pelágicas), incluidos los ensayos en el mar para verificar la eficacia en diversas operaciones de embarcaciones.

Durante el período intersesional, los coordinadores del GdTCS y los líderes de cada tipo de arte intentarán combinar todas las prioridades de investigación en materia de mitigación para su consideración en la GdTCS13, lo que se alineará con el proceso de normalización y mejora de la coherencia entre los tres documentos de recomendaciones sobre mejores prácticas.

Ed Melvin, Juan Pablo Seco Pon y Megan Tierney siguen siendo los líderes del GdTCS en materia de recomendaciones para la mitigación de la captura secundaria en pesquerías de palangre demersal.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Refrendar la revisión actualizada y las recomendaciones de mejores prácticas para reducir el impacto de las pesquerías de palangre demersal en las aves marinas, incluidas en el **ANEXO 3**. Estas actualizaciones reflejan las últimas investigaciones presentadas ante la GdTCS12. Si bien los cambios no introducen ninguna modificación sustancial en las recomendaciones sobre mejores prácticas, actualizan la investigación en curso para pesquerías de palangre demersal con flotadores y aportan una mayor coherencia.

2. Cabe destacar que los Coordinadores y responsables de cada tipo de arte del GdTCS convertirán los tres documentos de recomendaciones a un formato normalizado y más fácil de usar para su consideración en la GdTCS13.

3. Fomentar la implementación de las prioridades de investigación identificadas en la Sección 6.2 a fin de mejorar la mitigación de la captura secundaria en las pesquerías de palangre demersal.

7. MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE PALANGRE PELÁGICO

7.1 Revisión de los avances recientes en investigación sobre medidas de mitigación y actualización de las recomendaciones sobre mejores prácticas

En **SBWG12 Doc 07** se presentaron una serie de propuestas de modificación del documento de recomendaciones del ACAP sobre la mitigación en pesquerías de palangre pelágico, tras la revisión rutinaria del período entre sesiones. Se identificaron varias nuevas enmiendas propuestas.

En **SBWG12 Doc 09** se explicó por qué es lógico y apropiado que se acepten 50 g, incluido el peso del anzuelo, como configuración mínima recomendada para el lastrado de brazoladas, ya que el peso permitido adicional de 40 g a una distancia de hasta 0,5 m podría añadirse en el anzuelo. Así, por ejemplo, un anzuelo pesado de 50 g podría servir como opción de lastrado de brazoladas, en lugar de superar esa cantidad si se añadieran 40 g en el anzuelo o a la altura de este. La colocación de pesos en el anzuelo presenta la ventaja de evitar cualquier retraso en el perfil de hundimiento de la brazolada, en comparación con los pesos más alejados del anzuelo, y el anzuelo pesado de 50 g propuesto logra una tasa de hundimiento equivalente a las configuraciones de lastrado de brazoladas recomendadas por el ACAP. La GdTCS12 debatió los posibles efectos de la integración de lastre en el anzuelo, incluidos los peligros para la tripulación en caso de disparos de línea y el riesgo para las especies vulnerables, como los cetáceos, los tiburones y las tortugas marinas, en caso de que los peces arranquen anzuelos si se integra en el anzuelo lastre de plomo en lugar de materiales no tóxicos. Se observó que una ventaja de seguridad de un anzuelo pesado es que en caso de que los peces arranquen anzuelos no hay peso que retroceda. El GdTCS debatió la recomendación de no utilizar plomo al añadir peso al anzuelo y de utilizar en su lugar materiales no tóxicos, en parte para evitar la contaminación de los alimentos humanos. El GdTCS acordó actualizar las recomendaciones sobre mejores prácticas para indicar que los anzuelos con un peso total mínimo de 50 g cumplirían con la tasa de hundimiento de las configuraciones de lastrado de brazoladas recomendadas por el ACAP, es decir, 0,5 m/s.

En **SBWG12 Doc 19** se señaló que las recomendaciones actuales sobre mejores prácticas de lastrado de brazoladas no tienen en cuenta los materiales utilizados en el lastrado, lo que puede influir en gran medida en su desempeño a la hora de hundir los anzuelos fuera del alcance de las aves marinas, y que son preferibles los pesos de alta densidad y masa pero de bajo volumen. El GdTCS debatió opciones para abordar las cuestiones planteadas y tomó nota de que en algunas pesquerías se utilizan luces y otros accesorios como alternativa al lastrado de brazoladas, y que las mejores prácticas actuales en configuraciones de lastrado de brazoladas del ACAP alcanzaban en condiciones controladas experimentalmente una tasa de hundimiento de 0,5 m/s. El GdTCS tomó nota de que esta velocidad de hundimiento ayudó a garantizar que los anzuelos cebados alcanzaran los 5 m de profundidad dentro de la extensión aérea de las líneas espantapájaros. El GdTCS acordó actualizar sus orientaciones para indicar que las mejores prácticas en configuraciones de lastrado de brazoladas deben seleccionarse entre las que hayan alcanzado una tasa de hundimiento mínima de 0,5 m/s a 5 m de profundidad en condiciones controladas experimentalmente y destacar que no se recomienda el uso de luces u otros accesorios a menos que cumplan el criterio de la tasa de hundimiento.

El GdTCS actualizó las recomendaciones para pesquerías de palangre pelágico, en particular:

(i) indicar que las mejores prácticas de lastrado de brazoladas deben alcanzar una tasa de hundimiento mínima en condiciones controladas experimentalmente de 0,5 m/s a 5 m de profundidad, basándose en SBWG7 Doc 07;

(ii) indicar que, cuando el lastre esté fijado o integrado en el anzuelo, se necesitará un peso total mínimo de 50 g para alcanzar este criterio de tasa de hundimiento;

(iii) evitar el uso de plomo cuando este pueda ser ingerido (por ejemplo, unido al anzuelo o integrado en él).

No se recomienda el uso de dispositivos de iluminación u otros accesorios de pesca como lastres, a menos que cumplan el criterio de la tasa de hundimiento. En **SBWG12 Doc 12** se utilizó un enfoque de modelado de metarregresión de red bayesiana multinivel para llevar a cabo una síntesis de las pruebas disponibles y, así, evaluar la eficacia relativa que tienen los diseños alternativos de lastrado de palangre pelágico en la mitigación de la captura secundaria de aves marinas. El modelado indicó que las tasas de captura de aves marinas variaban entre los diseños evaluados, y que algunos diseños reducían significativamente las tasas de captura secundaria de aves marinas, en comparación con un diseño de referencia sin lastrado de brazoladas a menos de 5 m del anzuelo. La GdTCS12 observó que la metarregresión se basó en un pequeño número de estudios y en un conjunto limitado de pesquerías, y que la realización de más estudios que tuvieran en cuenta diversas variables que afectaban a las tasas de captura secundaria de aves marinas, como las diferencias regionales y los diferentes ensamblajes de aves marinas, ayudaría a mejorar la fiabilidad de los análisis. El GdTCS tomó nota de la posible utilidad de la metodología para evaluar las mejores prácticas sobre medidas de mitigación y animó a seguir investigando.

En **SBWG12 Doc 10** se describió el desarrollo de un enfoque de modelado de evaluaciones de riesgo ecológico (EASI-Fish) utilizado para evaluar diferentes combinaciones y especificaciones entre las especificaciones actuales de la CICAA y las recomendaciones sobre mejores prácticas del ACAP, incluyendo los dispositivos de protección de anzuelos. El GdTCS señaló que el cambio de la medida de mitigación de la captura secundaria de aves marinas de la CICAA para pesquerías de palangre pelágico en el Atlántico Sur por una que aplique las recomendaciones sobre mejores prácticas del ACAP probablemente reduciría la mortalidad de aves marinas de forma significativa con respecto al enfoque actual, en el que se permite a los operadores seleccionar dos de las tres medidas de mitigación posibles. La GdTCS12 también tomó nota de que hacer obligatoria la aplicación simultánea de las tres medidas de mitigación del ACAP, o el uso de dispositivos de protección de anzuelos, probablemente reduciría aún más la mortalidad de aves marinas, en comparación con las medidas existentes. La GdTCS12 tomó nota además de que no se esperaba que ninguna de las enmiendas evaluadas a la medida de mitigación de la captura secundaria de aves marinas de la CICAA afectara significativamente las tasas de captura de las especies objetivo o de otras especies de captura secundaria no retenidas. La GdTCS12 felicitó a los autores por la elaboración de gráficos de fácil acceso que pueden utilizarse para demostrar la eficacia relativa de las combinaciones de medidas de mitigación a públicos como la CICAA. La GdTCS12 señaló que existían algunas limitaciones en el enfoque de modelado, pero que este estaba diseñado para resaltar las diferencias relativas entre las diferentes opciones de mitigación de la captura secundaria de aves marinas consideradas por la CICAA. El GdTCS acogió con satisfacción el desarrollo del enfoque de modelado de evaluaciones de riesgo ecológico y animó a seguir investigando.

En **SBWG12 Inf 02** se proporcionó información actualizada sobre los avances en el desarrollo de un anzuelo pesado para su uso en pesquerías de palangre pelágico que contó con el apoyo de una pequeña subvención del ACAP.

El documento **SBWG12 Inf 08** también se debatió en el punto de la agenda n.° 5.2**.** El GdTCS señaló que, en el caso de la pesca con palangre pelágico, el dispositivo de monitoreo de la tensión puede utilizarse para confirmar tanto la implementación de líneas espantapájaros como el calado nocturno.

En **SBWG12 Inf 10** se informó sobre las pruebas realizadas en el mar en una pesquería de palangre sudafricana en las que se comparó el uso de un dispositivo de protección de anzuelos (Hookpod-mini) y de pesas Lumo Lead durante las operaciones de calado diurno. No se observaron capturas secundarias ni enredos de aves marinas en ninguno de los dos enfoques, y el estudio concluyó que los Hookpod-mini se enredaban significativamente más con los artes de pesca, con una CPUE total de especies objetivo de atún inferior a la del arte de control, mientras que no se encontraron diferencias en la CPUE de especies no objetivo. La GdTCS12 tomó nota de que la fijación del Hookpod-mini a 3 m del anzuelo podía haber provocado los problemas de enredo, que el uso de barras luminosas confundía los resultados y que los intervalos de confianza asociados a la CPUE eran demasiado grandes para estar seguros de que el dispositivo de protección del anzuelo afectara a las tasas de captura.

7.2 Prioridades de investigación sobre mitigación

Tras revisar las prioridades, el GdTCS recomendó que las más importantes para la investigación sobre la reducción de la captura secundaria de aves marinas en las pesquerías de palangre pelágico eran:

Brazoladas lastradas: realizar más investigaciones de campo colaborativas en lo referido a la relación entre las recomendaciones sobre mejores prácticas del ACAP actuales relativas a los regímenes de lastrado de brazoladas y la mortalidad de aves marinas resultante o las tasas de ataques de aves marinas, los efectos en las tasas de captura de especies objetivo, la captura secundaria de otras especies (por ejemplo, las tortugas marinas) y los aspectos en materia de seguridad asociados al uso del lastrado de brazoladas. Llevar a cabo investigaciones adicionales para investigar el efecto de la longitud total de las brazoladas en las tasas de hundimiento.

Lastrado de brazoladas optimizado para pesquerías de alta mar: En rangos de poca profundidad, las tasas de hundimiento rápidas son convenientes para la conservación de las aves marinas y son particularmente importantes en caso de que no se utilicen líneas espantapájaros o que no se realice el calado nocturno. Debe utilizarse una tasa de hundimiento mínima de ≥ 0,5 m/s a 5 m de profundidad (determinada en condiciones controladas) para aportar a la elaboración de los nuevos regímenes de lastrado. Un solo peso —o una versión mejorada del sistema de doble peso existente— representaría la opción de lastrado preferida. Se alienta la formulación de un enfoque multidisciplinario, que pueda incluir miembros clave de la industria pesquera, ingenieros marítimos y otras partes, según se considere apropiado.

Dispositivos de protección de anzuelos: realizar más investigaciones de campo para evaluar las contribuciones relativas de las tasas de hundimiento y los componentes de los dispositivos de protección de anzuelos a la hora de reducir la captura secundaria, incluidos los enredos. En las investigaciones sobre dispositivos de protección de anzuelos, también debería investigarse la duración a largo plazo y las tasas de falla, así como la posibilidad de incrementar la profundidad —o el tiempo— de protección que ofrecen. Se alienta a seguir investigando la eficacia del Hookpod-mini (48 g). Las investigaciones sobre el rendimiento de dispositivos de protección de anzuelos deberían recoger datos sobre los ataques de las aves marinas a los anzuelos cebados para evaluar el riesgo de enredo o de que estos se traguen junto con el cebo.

Líneas espantapájaros: en materia de investigaciones sobre líneas espantapájaros, continúa siendo sumamente prioritario generar configuraciones de líneas espantapájaros adecuadas para las embarcaciones más pequeñas y elaborar métodos que minimicen la posibilidad de enredo de la parte sumergida de esas líneas con los flotadores del palangre, a la vez que se genera la suficiente tensión para maximizar la extensión aérea de la línea. Asimismo, siguen teniendo prioridad las actividades de investigación para evaluar lo siguiente: la colocación tanto de una como de dos líneas espantapájaros y comparar la efectividad en cada caso; las distintas características del diseño de estas líneas —longitud, configuraciones y materiales de las cintas—; los métodos para lograr que el virado y el almacenamiento sean efectivos.

Horario: determinar la efectividad relativa de las líneas espantapájaros y del lastrado de brazoladas durante la noche con una descripción del comportamiento nocturno de las aves marinas.

Dispositivos de calado de cebo subacuático: evaluar el rendimiento con brazoladas lastradas y no lastradas.

Combinaciones de medidas de mitigación: evaluar la efectividad y la naturaleza aditiva del uso simultáneo de distintas combinaciones de dos métodos de mitigación considerados mejores prácticas (calado nocturno, lastrado de brazoladas y líneas espantapájaros), tal como lo requieren las medidas vigentes de conservación de aves marinas en las Organizaciones Regionales de Ordenación Pesquera (OROP). Continuar la evaluación de la efectividad y la naturaleza aditiva del uso simultáneo de las tres medidas de mitigación según las mejores prácticas del ACAP, incluidas las tasas de captura comparativas tanto de captura secundaria como de la especie objetivo.

Materiales de lastrado: desarrollo y evaluación de materiales de lastrado alternativos que no dependan del plomo y que alcancen las tasas de hundimiento recomendadas.

Tecnologías novedosas/emergentes: continuar desarrollando tecnologías novedosas o emergentes. Considerar también la innovación en el monitoreo independiente de las actividades pesqueras.

Ecología sensorial: fomentar e iniciar la realización de investigaciones para estudiar las capacidades sensoriales de las aves marinas —sistema visual, acústico y olfativo— a fin de fundamentar el desarrollo de tecnologías y medidas de mitigación seguras basadas en la ecología sensorial de las aves como alternativas a los métodos de ensayo y error. Esta prioridad de investigación tiene aplicación en el desarrollo de opciones de mitigación en una amplia gama de métodos de pesca y en instalaciones de turbinas eólicas de alta mar.

Captura de aves vivas durante el virado: investigar la naturaleza y extensión de la captura de aves vivas durante el virado en las pesquerías de palangre pelágico.

Tecnologías de mitigación durante el virado: elaborar métodos que minimicen los enganches de las aves marinas durante la recuperación de anzuelos. Fomentar nuevas investigaciones para mitigar la captura secundaria en embarcaciones pequeñas durante el virado.

Vedas espaciotemporales: actualizar los mapas de superposición entre el esfuerzo pesquero y el seguimiento de las aves marinas para avanzar con las distintas opciones de ordenación espaciotemporal.

Máquinas lanzadoras de cebo: realizar un estudio para caracterizar el alcance del uso de las máquinas lanzadoras de cebos y sus atributos operativos que pueden influir en el riesgo de captura secundaria de aves marinas.

Masa y diseño de los anzuelos: investigar si los cambios en la masa y el diseño de los anzuelos pueden reducir la posibilidad de mortalidad de las aves marinas en la pesca con palangre sin afectar negativamente a las tasas de captura de especies objetivo o de otras especies capturadas incidentalmente. Se alienta a seguir investigando la eficacia del anzuelo pesado (50 g).

Jonathon Barrington y Sebastián Jiménez siguen siendo los líderes del GdTCS en la elaboración de recomendaciones en materia de mitigación de la captura secundaria en pesquerías de palangre pelágico.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Refrendar la revisión actualizada y las recomendaciones de mejores prácticas para reducir el impacto de las pesquerías de palangre pelágico en las aves marinas, incluidas en el **ANEXO 4**. Estas actualizaciones proporcionan mayor claridad y uniformidad en el documento y reflejan las últimas investigaciones presentadas a la GdTCS12. Estos cambios incluyen la definición de un criterio de tasa de hundimiento para las mejores prácticas de lastrado de brazoladas y una mayor aclaración sobre el uso de lastres fijados o integrados en el anzuelo, así como sobre los materiales de lastrado.
2. Fomentar la implementación de las prioridades de investigación identificadas en la Sección 7.2 a fin de mejorar la mitigación de la captura secundaria en las pesquerías de palangre pelágico.
3. Alentar a las Partes y a otras partes interesadas a recopilar estimaciones adicionales de las tasas de captura secundaria de aves marinas de diseños alternativos de lastrado de brazoladas.

8. PESQUERÍAS ARTESANALES Y DE PEQUEÑA ESCALA

8.1 Revisión de los avances recientes en la investigación sobre medidas de mitigación y actualización de las recomendaciones sobre la caja de herramientas

En **SBWG12 Inf 09** se describió un proyecto que utilizó bitácoras, entrevistas con la tripulación y datos de estudios científicos para evaluar el riesgo para las aves marinas de una variada flota de pequeña escala de línea y anzuelo en el sur y sudeste de Brasil. Los resultados indican que las pesquerías de pequeña escala brasileñas pueden suponer una amenaza considerable para las aves marinas, incluidas las especies del ACAP. El GdTCS señaló que estos resultados corroboraban las conclusiones presentadas ante la GdTCS11 (SWBG11 Inf 22) y respaldaban las recomendaciones de la GdTCS11 para estas pesquerías. El GdTCS tomó nota de la preocupación expresada en el documento sobre las definiciones del ACAP de las pesquerías de pequeña escala, y la referencia al PAN-Aves marinas de Brasil, que incluye medidas para colaborar con la pesca a pequeña escala con el fin de mejorar la manipulación de las aves capturadas incidentalmente (véase también la Sección 12). El GdTCS también señaló que el proyecto estaba financiado por una pequeña subvención del ACAP.

En **SBWG12 Inf 14** se describió el trabajo de prueba de las medidas de mitigación de la captura secundaria de aves marinas en la pesquería artesanal de palangre dirigida a los tiburones en el sur de Perú, donde la pesquería se superpone con altas densidades de especies del ACAP. En el documento se describe la primera fase de los experimentos en esta pesquería, con nuevas pruebas de medidas de mitigación ahora en curso y cuya finalización está prevista para octubre de 2024. El GdTCS observó que no hubo captura secundaria durante los 10 viajes de pesca supervisados, lo que se debió en parte al uso de brazoladas lastradas (destorcedores de plomo de 60 g a 0,5 m del anzuelo) y líneas espantapájaros, así como a la baja densidad de aves marinas frente a Perú durante la primavera y el verano, cuando se realizaron los viajes. El GdTCS acogió con satisfacción la útil información sobre las agregaciones de aves marinas, los artes de pesca y las operaciones pesqueras en estas pesquerías, así como sobre las medidas de mitigación viables.

En **SBWG12 Inf 15** se utilizó información sobre la distribución espacial del esfuerzo pesquero de las pesquerías artesanales peruanas de redes de enmalle y de palangre pelágico, en combinación con datos de distribución de aves marinas obtenidos mediante conteos de aves marinas durante cruceros científicos, para evaluar la superposición entre los albatros *Thalassarche salvini*, *Thalassarche bulleri*, *Thalassarche eremita* y *Thalassarche melanophris* con estas pesquerías. El documento proporcionó información valiosa, específica para cada especie, sobre la superposición espaciotemporal de la distribución de especies de albatros con cada pesquería, lo que resulta útil para hacer inferencias sobre las interacciones positivas y negativas con estas pesquerías, incluido el riesgo de captura secundaria.

En **SBWG12 Inf 16** se describieron las posibles áreas de interacción entre los albatros y la pesquería de mahi-mahi frente a la costa peruana. Los datos proceden de pescadores y cruceros de investigación. En el documento se señaló que la densidad de las operaciones pesqueras variaba en función de la distancia a la costa, la estación del año y la latitud. Debido a esta variación, también varió la superposición con el *Phoebastria irrorata*, el *T. eremita*, el *T. melanophris*, el *T. bulleri* y el *T. salvini*. El GdTCS señaló que los datos procedían de cruceros de investigación realizados entre la costa y 100 millas náuticas mar adentro, y que si se contara con datos espaciales más representativos (sobre todo de mar adentro) se obtendrían resultados más sólidos. El GdTCS animó a integrar la información presentada en el documento en el proyecto de evaluación de riesgos de la corriente de Humboldt, recientemente iniciado. En el documento se señaló que los datos de GPS del *P. irrorata* pueden utilizarse para explorar más a fondo la superposición con las pesquerías.

En **SBWG12 Inf 17** se describió un enfoque innovador en curso para recopilar datos de captura secundaria de aves marinas directamente de los pescadores artesanales costeros que usan redes de enmalle en Perú a través de WhatsApp y comunicaciones por radio. En el documento también se describe el uso de WhatsApp y las redes sociales para educar a los pescadores en temas de conservación y manipulación segura de aves marinas, y como recurso para la identificación de aves marinas. En el documento se presentaban datos obtenidos de pescadores y cruceros de investigación para describir la distribución de los albatros, que variaba en función de El Niño y La Niña. El GdTCS tomó nota de que se trataba de una innovación interesante para las pesquerías de pequeña escala, en las que es difícil embarcar observadores. El GdTCS señaló que sería útil que los trabajos que evalúan la superposición de la captura secundaria de aves marinas con las pesquerías contribuyeran a la investigación que describe las cifras y tasas de captura secundaria, siempre que sea posible.

8.2 Prioridades de investigación sobre mitigación

El GdTCS destacó que puede haber superposición entre las prioridades de las pesquerías de pequeña escala para la investigación de medidas de mitigación y las identificadas para las pesquerías de palangre demersal. Se propuso reunir todas las prioridades de investigación en una sola lista, lo que evitaría superposiciones y permitiría establecer prioridades entre los distintos métodos. El GdTCS acordó que esta labor se llevaría a cabo en el período intersesional y se presentaría ante la GdTCS13.

Se tomó nota de que las prioridades de investigación pueden inferirse de la categorización de los métodos de mitigación descritos en la caja de herramientas de mitigación de la captura secundaria de aves marinas para la pesca artesanal. El GdTCS destacó que la pesquería de mahi-mahi es una pesquería que requiere un mayor esfuerzo de investigación para mitigar la captura secundaria de aves marinas.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Tomar nota de los nuevos avances realizados para rellenar la caja de herramientas de mitigación de la captura secundaria de aves marinas (**CA11 Doc 06 ANEXO 6**) para la pesca artesanal y a pequeña escala y los planes para completar el proceso durante el próximo período intersesional, tras lo cual se la facilitará en el sitio web del ACAP.
2. Tomar nota de que los Coordinadores del GdTCS combinarán todas las prioridades de investigación en materia de mitigación para su consideración en la GdTCS13, lo que se alineará con el proceso de normalización y mejora de la coherencia entre los documentos de recomendaciones sobre mejores prácticas para cada tipo de arte de pesca.

9. MITIGACIÓN DE CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE CERCO

9.1 Revisión de los avances recientes en la investigación sobre medidas de mitigación y actualización de las recomendaciones sobre la caja de herramientas

En **SBWG12 Inf 11** se presentaron directrices actualizadas para la manipulación y el rescate de aves marinas a bordo de la flota cerquera de jurel de pequeña escala que opera en la zona centro-sur de Chile. En el documento se destacó la inclusión de directrices generales sobre la pesquería, detalles sobre la manipulación de aves marinas a bordo teniendo en cuenta la seguridad de la tripulación, asociaciones con pescadores para desarrollar herramientas que permitan manipular las aves marinas de forma segura y la colaboración con centros de rehabilitación de aves marinas. Los cerqueros de jurel han implementado estaciones de recuperación de aves marinas a bordo (es decir, para los individuos rescatados empapados/estresados), que garantizan bajos niveles de luz y ruido, un tránsito reducido de personas y la ausencia de hidrocarburos. Las nuevas directrices para la manipulación de aves marinas siguen los procedimientos del ACAP ante la panzootia de H5N1 y cumplen la normativa de la pesca con red de cerco, así como la normativa nacional chilena para la conservación de pingüinos y procelariiformes. El GdTCS acogió con satisfacción las nuevas directrices, así como la colaboración con los pescadores y con el GdTPEC. El GdTCS tomó nota de la gran claridad de los diagramas de manipulación de aves marinas, de la sencillez del texto que los acompaña y de que las directrices eran aplicables a la manipulación de aves marinas por igual en cualquier pesquería, crucero y plataforma de iluminación que atraen a las aves marinas (por ejemplo, faros y otros tipos de plataformas marinas). El GdTCS animó a seguir desarrollando estos materiales para convertirlos en directrices del ACAP.

En **SBWG12 Inf 12** se presentó la versión actualizada de la caja de herramientas para mitigar las interacciones con las aves marinas durante las operaciones de pesca con red de cerco, lo cual actualiza la versión original presentada en SBWG10 Doc 19. La nueva caja de herramientas ofrece recomendaciones sobre medidas de mitigación de la captura secundaria y facilita la consulta para la toma de decisiones. En el documento se detallan las fases de una operación de pesca con red de cerco, las medidas disponibles de mitigación de la captura secundaria que pueden aplicarse a cada una de las fases y su estado de eficacia (es decir, si la posible medida se basa en una evaluación sistemática o necesita pruebas adicionales). Este planteamiento no solo facilita la toma de decisiones, sino que fomenta además el seguimiento de la implementación y la realización de nuevas investigaciones. La caja de herramientas es una labor en curso y pretende fomentar la colaboración entre las pesquerías de red de cerco que operan en todo el mundo y tienen como objetivo diversas especies de peces. La GdTCS12 felicitó a los autores por la forma de presentar las recomendaciones, el proceso de desarrollo a largo plazo en torno a estas recomendaciones, y señaló que se trataba de una labor en curso. El GdTCS señaló que la caja de herramientas puede aplicarse a cualquier pesquería de red de cerco.

9.2 Prioridades de investigación sobre mitigación

Se tomó nota de que las prioridades de investigación pueden inferirse de la categorización de los métodos de mitigación descritos en la caja de herramientas de mitigación de la captura secundaria de aves marinas para la pesca con red de cerco.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Refrendar la caja de herramientas actualizada para las recomendaciones sobre la mitigación de la captura secundaria de aves marinas en las pesquerías de red de cerco presentada en el documento **SBWG12 Inf 12**, cuyo formato se adaptará como recurso de mitigación de la captura secundaria en el sitio web del ACAP.
2. Tomar nota de los logros alcanzados en el desarrollo de medidas de mitigación de la captura secundaria de aves marinas en las operaciones de pesca con red de cerco y alentar a las Partes a realizar nuevos estudios experimentales.
3. Tomar nota de la posibilidad de desarrollar el material de **SBWG12 Inf 11** para convertirlo en directrices del ACAP.

10. MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS EN OTRAS PESQUERÍAS INDUSTRIALES

10.1 Revisión de avances recientes en investigaciones sobre mitigación y de prioridades para futuras investigaciones

No hubo documentos por examinar en relación con este punto de la agenda.

10.2 Evaluación de riesgos y formulación de recomendaciones del ACAP para otras pesquerías pertinentes

No hubo documentos que examinar en este punto de la agenda y no se identificaron otras pesquerías para la elaboración de recomendaciones del ACAP.

11. INDICADORES DE DESEMPEÑO DEL ACAP: TALLER SOBRE DATOS DE CAPTURA SECUNDARIA DE AVES MARINAS

11.1 Taller sobre datos de captura secundaria de aves marinas

En **SBWG12 Doc 04** se informó sobre un taller sobre datos de captura secundaría de aves marinas realizado el 4 de agosto de 2024, inmediatamente antes de la GdTCS12. El taller tuvo como objetivo comprender los desafíos experimentados en la presentación de los indicadores de captura secundaria de aves marinas del ACAP y encontrar soluciones a ellos, y a revisar las amenazas en el mar para albatros y petreles. La GdTCS12 examinó lo primero en este punto de la agenda y lo segundo en el punto de la agenda n.° 14. Al examinar las recomendaciones del taller, el GdTCS observó que, una vez más, los niveles de notificación de las Partes eran bajos y, por lo tanto, es poco probable que los datos detallados sobre captura secundaria puedan utilizarse como indicador de resultados para el ACAP. Con el tiempo, la mejora de los vínculos entre las pesquerías y las agencias ambientales podría aumentar la recopilación y notificación de datos sobre captura secundaria de aves marinas, pero mientras no se mejore la notificación, el ACAP se beneficiaría más de centrarse en la recopilación de métricas más sencillas. En ese sentido, se debatió la implementación de Indicadores de Respuesta simplificados, como determinar si la mitigación es obligatoria. El GdT acordó que esas métricas deberían ser prioritarias para avanzar en el desarrollo de indicadores de Captura Secundaria para el ACAP. Se reconoció que un proyecto del ACAP podría contribuir a apoyar la presentación de informes de las Partes en relación con indicadores simplificados. El GdTCS se mostró preocupado por el proceso del taller, incluidas las dificultades con la falta de interpretación y la coordinación de dos grupos separados, cada uno con su idioma. Además, se señaló que la prestación de servicios de interpretación durante los futuros talleres tendría repercusiones económicas.

11.2 Revisión de directrices para la recopilación de datos de observadores y ME

En **SBWG12 Doc 15** se informó sobre las diferencias en las interacciones del *Procellaria parkinsoni* con los buques de pesca con palangre de fondo, utilizando observadores a bordo y seguimiento electrónico. Los análisis mostraron que las capturas estimadas de *P. parkinsoni* fueron menores cuando se utilizaron los datos de los observadores y los datos de seguimiento electrónico combinados en comparación con los datos de los observadores solos. El GdTCS tomó nota de los resultados de la investigación y recomendó una revisión de las orientaciones del ACAP sobre la recopilación y evaluación de datos sobre captura secundaria de aves marinas para reflejar las conclusiones del estudio.

En **SBWG12 Inf 18** se utilizaron modelos bayesianos de series temporales para estimar la captura secundaria de una especie de albatros en peligro. Si bien el GdTCS tomó nota de las ventajas de esta técnica avanzada, insistió en que no debía subestimarse la importancia de la recopilación de datos.

El GdTCS acordó que tanto el programa de observadores del ACAP como las directrices de ME se revisaran durante el período intersesional. Esta revisión podría incluir la elaboración de orientaciones sobre los métodos de estimación de la captura secundaria para esos datos una vez recopilados. Se observó que existe un interés creciente por el uso de la inteligencia artificial (IA) para analizar las grabaciones de las cámaras de ME y que, en la actualidad, la disponibilidad de imágenes para entrenar dichos sistemas es un factor limitante que una mayor cooperación podría ayudar a superar.

RECOMENDACIONES AL COMITÉ ASESOR

En cuanto a los indicadores del ACAP y la recopilación de datos, el GdTCS recomienda que el Comité Asesor:

1. Acuerde priorizar la recopilación de datos de Respuesta sencillos acerca de la implementación de la mitigación de la captura secundaria de aves marinas en las pesquerías nacionales y de las OROP.
2. Aliente a las Partes a presentar, siempre que sea posible, información detallada acerca de la captura secundaria de aves marinas y, en particular, las tasas de captura secundaria de aves marinas y el esfuerzo pesquero total.
3. Acuerde el desarrollo de un proyecto financiado por el ACAP para apoyar la comunicación de datos relativos a los indicadores de captura secundaria.
4. Tome nota de que sería beneficioso contar con interpretación simultánea en talleres futuros, lo que requeriría más recursos en el presupuesto del ACAP.

En cuanto a los observadores y al monitoreo electrónico, el GdTCS recomienda que el Comité Asesor:

1. Tome nota de que está previsto un proceso intersesional para actualizar las directrices de recopilación de datos del ACAP tanto para los programas de observadores como para el monitoreo electrónico.
2. Anime a las Partes a colaborar y compartir datos de programas de inteligencia artificial (IA) que apoyen una mejor identificación de la mitigación de la captura secundaria.

12. PAN/PAI-AVES MARINAS DE LA FAO

12.1 Revisión del estado de implementación del PAN-Aves marinas

En **SBWG12 Doc 11** se proporcionó información actualizada sobre el Plan de Acción Regional de Argentina y Uruguay para reducir la interacción de las aves marinas con las pesquerías que operan en el Área del Tratado del Río de la Plata y su Frente Marítimo, que fue adoptado por la Comisión del Tratado en junio de 2022 (ver SBWG11 Inf 03). El Plan de Acción Regional se presentó ante la FAO en septiembre de 2022. En mayo de 2024, la Comisión Técnica Mixta se reunió para estudiar las actividades de 2024 y 2025, incluido el desarrollo de un plan de investigación. El GdTCS felicitó a Argentina y Uruguay por seguir avanzando en la implementación de su Plan de Acción Regional y señaló que la recomendación propuesta sería considerada durante la reunión conjunta GdTCS12/GdTPEC8 (**CA14 Doc 13**).

En **SBWG12 Inf 05** se describió cómo el Plan Nacional de Acción para la conservación de albatros y petreles (PLANACAP) de Brasil está abordando las amenazas a los albatros y petreles. Una revisión del PLANACAP realizada durante 2024 dio lugar a un nuevo ciclo de actividades, teniendo en cuenta las recomendaciones y directrices más recientes y actualizadas del ACAP. De cara al futuro, el cuarto ciclo del PLANACAP pretende seguir reduciendo la mortalidad de albatros y petreles centrándose en cuatro objetivos específicos: comprender y mitigar las interacciones de la pesca; vigilar los impactos de los proyectos en alta mar; abordar los problemas relacionados con los patógenos, la contaminación y el cambio climático; y mejorar la política pública y la educación ambiental. El GdTCS acogió con satisfacción el trabajo de Brasil en este ámbito. En respuesta a una sugerencia de concentrarse en las prioridades más importantes, se tomó nota de que este Plan se puso en marcha en 2006 durante la Segunda Reunión del Comité Asesor (CA2) en Brasilia. Desde entonces, se celebran reuniones anuales para supervisar sus avances. Además, se hizo hincapié en que el Plan se alinea con el Anexo 2, Plan de Acción del Acuerdo, y su implementación apoya directamente los objetivos más amplios del Acuerdo en Brasil.

En **SBWG12 Inf 06** se examinó cómo Chile había desarrollado e implementado, desde 2012, un proceso de diagnóstico, reducción y control de los descartes y la captura secundaria en sus pesquerías nacionales. Este proceso ha implicado los esfuerzos conjuntos de los organismos reguladores, de investigación y de control, junto con la colaboración con los usuarios de la pesca. Durante el período de 12 años, Chile había promulgado leyes en 2014, 2019 y 2021 para establecer medidas de mitigación de la captura secundaria tanto para el palangre industrial y artesanal como para las flotas de arrastre industrial, estableciendo el uso obligatorio de dispositivos disuasorios, la aplicación de códigos de buenas prácticas pesqueras y la notificación en las bitácoras, entre otras. Todo ello ha permitido reducir considerablemente la captura secundaria. Chile señaló que el desarrollo del monitoreo electrónico ha ayudado sustancialmente a las observaciones y al cumplimiento, pero señaló que aún existen desafíos para la implementación del ME en las flotas artesanales y el uso de las imágenes para fines distintos del cumplimiento. Chile expresó su agradecimiento al ACAP por toda su labor, incluida la concesión de las Pequeñas Subvenciones. El GdTCS felicitó a Chile por todo el trabajo realizado desde 2012 y señaló que esto puede considerarse una verdadera victoria para el ACAP y las especies que ampara.

Durante el debate, se describieron el desarrollo y las actualizaciones de otros Planes Nacionales de Acción. Nueva Zelanda examinó los progresos realizados en la aplicación de su PAN en 2022. Esto dio lugar a una revisión de la normativa sobre palangre pelágico en 2023, que condujo a la decisión de Nueva Zelanda en 2024 de exigir que se observen las recomendaciones sobre mejores prácticas del ACAP en sus pesquerías de palangre pelágico, lo cual entraría en vigor en octubre de 2024. España está mejorando actualmente su Plan de Acción para observadores, con el objetivo de alcanzar el 10 % de cobertura de observadores en toda la flota española, aunque se tomó nota de que este nivel no sería exclusivo de las observaciones de aves marinas. Australia informó sobre su enfoque integrado: el PAN-Aves marinas (programado para revisión); el Plan Nacional de Recuperación de Albatros y Petreles; y el Plan de mitigación de amenazas para aves marinas que fue revisado en 2023. Australia pospuso la actualización prevista de su Plan de mitigación de amenazas para los residuos marinos a la espera de que se desarrolle el Tratado mundial sobre la contaminación por plásticos. Sudáfrica informó que recientemente ha completado una revisión de su PAN-Aves marinas y espera tener listo un documento a finales de agosto de 2024 para presentarlo a su Ministro para su aprobación. Sudáfrica tomó nota de que para actualizar su plan se había basado en las recomendaciones sobre mejores prácticas del ACAP, en sus datos pesqueros más recientes y en los sistemas de recopilación de datos y de ME.

El GdTCS acogió con satisfacción estas actualizaciones y acordó recomendar a la CA14 que felicitara a las Partes que habían elaborado o actualizado su PAN o su plan de acción regional e instara a las demás Partes a seguir ese ejemplo.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Animar a las Partes a aplicar planes de acción nacionales o regionales para abordar la captura secundaria de aves marinas y proporcionar actualizaciones en cada reunión del GdTCS.
2. Animar a las Partes que aún no hayan desarrollado planes nacionales a que lo hagan urgentemente.

13. MEJORA DE LA APLICACIÓN DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS

El GdTCS acogió con satisfacción el documento **SBWG12 Doc 14**, que ofrecía información actualizada sobre el desarrollo de la caja de herramientas de pesca segura para las aves marinas, un recurso web diseñado para proporcionar a las empresas de mariscos recursos para lograr una pesca segura para las aves marinas tomando como base las preocupaciones de sostenibilidad de los consumidores de mariscos. La caja de herramientas se elaboró con expertos en ciencias de la mitigación, empresas de mariscos y ONG, con el fin de utilizar las pruebas disponibles para desarrollar y definir categorías sencillas para: 1) las zonas oceánicas de aves marinas; 2) la eficacia de las opciones de mitigación para reducir la captura de aves marinas; 3) la seguridad para las aves marinas de pesquerías específicas; y 4) el nivel de confianza en la aplicación de las medidas. Las opciones de mitigación se basan en las recomendaciones sobre mejores prácticas del ACAP. Inicialmente, el énfasis está en las pesquerías de palangre pelágico, pero podría ampliarse a otros artes de pesca y a otra megafauna. En última instancia, una empresa pesquera podría utilizar la caja de herramientas para determinar el nivel de riesgo de su lugar de pesca, las medidas de mitigación adecuadas para reducir ese riesgo y los enfoques disponibles para supervisar el cumplimiento. El GdTCS señaló que la caja de herramientas podría ser un recurso muy útil para que los organismos certificadores del MSC evalúen si las pesquerías candidatas son seguras para las aves marinas y las medidas que pueden adoptarse en caso contrario. El GdTCS recomendó que el ACAP promoviera el uso de la caja de herramientas de pesca segura para las aves marinas con el fin de mejorar los esfuerzos de adoptar las medidas de mitigación consideradas mejores prácticas del ACAP.

En **SBWG12/PaCSW8 Inf 12** se proporcionó una actualización sobre la labor realizada para desarrollar las zonas oceánicas de riesgo para las aves marinas utilizadas en la caja de herramientas de pesca segura para las aves marinas (**SBWG12 Doc 14**) y se describieron los métodos utilizados. La caja de herramientas incluye la zonificación de los océanos del mundo según las especies de aves marinas presentes, su estado de amenaza y su vulnerabilidad a la captura secundaria en la pesca con palangre. En las capas cartográficas constituyentes se identificaron zonas del océano Pacífico donde hay: 1) presencia de aves marinas en alto estado de conservación (capa de especies amenazadas); 2) alta diversidad de especies (capa de diversidad de especies); y 3) presencia de petreles *Procellaria* (capa de petreles *Procellaria*). Las zonas oceánicas generales iniciales proporcionan una evaluación y categorización exhaustivas, aunque sencillas, del riesgo relativo de captura secundaria para las especies del ACAP en todo el Pacífico. Se debaten las limitaciones actuales de los datos y métodos, así como los posibles desarrollos futuros para mejorar la evaluación. Los autores tienen la intención de mejorar continuamente los datos de entrada y los métodos utilizados para describir las zonas oceánicas y agradecen la colaboración activa con investigadores y otras personas que participaron en la recopilación y el análisis de datos sobre la distribución de aves marinas. Se observó que los mapas de especies actuales son una sola capa que incluye todas las clases de edad y sexos para cada especie a efectos de la caja de herramientas, y estos mapas serán un recurso valioso al que recurrir. La herramienta podría ampliarse para incluir más capas.

En **SBWG12 Doc 18** se exploraron los factores que influyen en la adopción de estrategias de mitigación de la captura secundaria para proteger la megafauna marina (incluidas las aves marinas), con un énfasis específico en las dinámicas sociales y de comportamiento involucradas y utilizando como caso de estudio la flota comercial argentina de arrastre de fondo en alta mar. A partir de entrevistas con partes interesadas clave de Argentina para recabar sus opiniones y percepciones sobre la captura secundaria y la mitigación en la pesca comercial: 1) prevalece la percepción de que las tripulaciones son reacias a utilizar las medidas de mitigación, aunque los ejecutivos y los pescadores tienen puntos de vista opuestos; 2) la principal barrera que impide la implementación de las medidas de mitigación es la percepción de que las técnicas o tecnologías de mitigación son engorrosas e ineficientes; y 3) los participantes sugieren que la mejora de las medidas estratégicas de gobernanza y la promoción de la colaboración entre las diferentes partes interesadas podrían mejorar la adopción de las medidas de mitigación. El GdTCS señaló que el estudio subraya la importancia de tener en cuenta la dinámica social a la hora de abordar los problemas de la captura secundaria de megafauna marina y el uso de medidas de mitigación en las pesquerías comerciales de aguas profundas. Este documento es fruto de una pasantía del ACAP para trabajar con especialistas en ciencias sociales de CSIRO y la Universidad James Cook de Australia, con el fin de incorporar a este trabajo los métodos más recientes con respaldo científico. El GdTCS elogió este trabajo y reafirmó su interés en aplicar enfoques de ciencias sociales para comprender las opiniones y las redes de comunicación de las partes interesadas en un esfuerzo por fomentar el uso de las mejores prácticas de mitigación de la captura secundaria de aves marinas en sus pesquerías. El GdTCS apoyó la recomendación de que el ACAP estudie la conveniencia de incorporar formalmente al Programa de Trabajo del CA la dimensión humana de la captura secundaria y la adopción de medidas de mitigación.

En **SBWG12 Inf 13** se presentó el proyecto REDUCE, cuyo objetivo es minimizar la captura secundaria de especies en peligro de extinción, amenazadas y protegidas (ETP) en las pesquerías industriales de la UE que operan en el Atlántico centro-oriental. El proyecto se centra en las flotas de red de cerco, palangre y arrastre, sobre todo de España, Francia y Portugal, que contribuyen significativamente a la captura secundaria en esta zona crítica de biodiversidad. REDUCE empleará enfoques científicos interdisciplinarios para mejorar el seguimiento de las pesquerías, comprender la dinámica de la captura secundaria y desarrollar estrategias eficaces de mitigación. El GdTCS señaló que el proyecto REDUCE se encuentra en sus primeras fases de implementación y que, por el momento, se centra principalmente en el desarrollo de tecnología mediante un enfoque académico. El GdTCS animó a que se le facilitara más información actualizada a medida que avanzara el proyecto.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Refrendar la promoción por parte del ACAP de la caja de herramientas de pesca segura para las aves marinas, incluso a través del sitio web del ACAP, para mejorar los esfuerzos de adoptar las medidas de mitigación consideradas mejores prácticas del ACAP.

2. Tomar nota de la incorporación al Programa de Trabajo del CA del estudio de la dimensión humana de la captura secundaria y la adopción de medidas de mitigación como enfoque pertinente para aumentar la adopción.

14. ACTIVIDADES PRIORITARIAS DE CONSERVACIÓN EN EL MAR

14.1 Revisión de las pesquerías prioritarias e informe en el taller previo a la reunión

En **SBWG12 Doc 04** se informó sobre un taller realizado el 4 de agosto de 2024, inmediatamente antes de la GdTCS12. En el taller se estudiaron, entre otros puntos, las pesquerías prioritarias para adoptar medidas de conservación de las especies del ACAP. Esto se basó en un marco desarrollado y aceptado por la Reunión de las Partes (RdP) (MoP4 Inf 06 Rev 1). El marco se basa en información sobre muchas pesquerías (suministrada por expertos y Partes), incluidas las que operan fuera de las zonas económicas exclusivas (ZEE), así como el tamaño y las tendencias de las poblaciones de albatros y petreles que podrían verse afectadas por esas pesquerías. Las pesquerías "prioritarias" se definieron como el 10 %

superior de todas las pesquerías evaluadas. Durante la iteración más reciente del proceso de priorización (2021), se identificaron veinticinco pesquerías y veintiocho poblaciones de aves marinas como objetivos prioritarios a la hora de tomar medidas (tabla 3 del documento **CA14 Doc 18**).

El GdTCS acordó que la actual lista completa de pesquerías debe ser revisada y actualizada por las Partes (a través de los puntos de contacto de las Partes). La Secretaría está investigando varias posibles omisiones en la lista actual de pesquerías prioritarias para adoptar medidas de conservación. Se acordó utilizar un enfoque por etapas para actualizar las pesquerías: 1) debe pedirse a las Partes y a los Estados del área de distribución y a los observadores de las economías miembros del APEC que actualicen la información sobre sus pesquerías lo antes posible; 2) la información sobre las pesquerías gestionadas por las OROP debe actualizarse utilizando los materiales disponibles públicamente, teniendo en cuenta que el ACAP ha celebrado MdE o acuerdos similares con la mayoría de las OROP pertinentes; y 3) sería necesario otro proceso para otros Estados que actualmente no interactúan con el ACAP. Se tomó nota de que si la capacidad permitiera actualizar al menos las pesquerías con observadores de las Partes y de los Estados del área de distribución en los próximos meses, se podría proporcionar una nueva versión de las pesquerías prioritarias a la RdP8. Alternativamente, podría realizarse una actualización durante el próximo periodo intersesional de la RdP. Se acordó que todas las especies del ACAP posiblemente afectadas por una pesquería deberían figurar en la tabla de pesquerías de "mayor prioridad" en lugar de solo las especies asociadas a las puntuaciones altas.

El GdTCS acogió con satisfacción la inclusión en el taller de las acciones identificadas que pueden emprender el ACAP y sus Partes para reducir la captura secundaria de aves marinas en estas pesquerías prioritarias. Una vez finalizado el proceso de priorización, puede que sea necesario identificar nuevas acciones, especialmente si otras pesquerías se clasifican como de "mayor prioridad para adoptar medidas de conservación".

En **SBWG12 Inf 04** se describieron observaciones limitadas de interacciones con arrastreros por parte de España y Uruguay sobre una parte de la plataforma continental en alta mar del sudoeste del océano Atlántico. El GdTCS acogió favorablemente este documento y tomó nota de que esta zona no está regulada actualmente por ningún organismo nacional o internacional, y que se calcula que unos 350 buques pesqueros de diversos Estados del pabellón y de métier pueden estar utilizando la zona. El GdTCS señaló que las interacciones en esta zona podrían suponer una amenaza considerable para varias poblaciones de especies del ACAP. A falta de información firme, el GdTCS animó a las Partes y Observadores a proporcionar más información sobre las pesquerías en esta zona ante la GdTCS13.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Analizar y refrendar las acciones prioritarias de conservación en el mar identificadas para el ACAP y sus Partes (**ANEXO 5**).

2. Tomar nota del enfoque por etapas propuesto para actualizar las pesquerías prioritarias, comenzando por las pesquerías de las Partes, de los Estados del área

de distribución y de los observadores de las economías miembros del APEC, seguidas de las pesquerías de Estados que no son Partes y las pesquerías de las OROP.

3. Solicitar a las Partes, a los Estados del área de distribución y a los observadores de las economías miembros del APEC que revisen y actualicen la lista de pesquerías pertinentes para ellos que se utilizarán en el marco de priorización, actualicen las puntuaciones de cada una de estas pesquerías e identifiquen otras posibles acciones para el ACAP o las Partes del ACAP para las pesquerías de mayor prioridad.
4. Tomar nota de las interacciones posiblemente graves de las pesquerías con las aves marinas en la zona no regulada de alta mar del sudoeste del océano Atlántico.
5. Animar a las Partes y a otros a proporcionar documentos al GdTCS que describan la actividad pesquera y cualquier otra información pertinente sobre esta zona del sudoeste del océano Atlántico.

15. HERRAMIENTAS Y DIRECTRICES

15.1 Actualizaciones y nuevas directrices

No se presentaron documentos en relación con este punto de la agenda. Las directrices para el programa de observadores y la recopilación de datos de ME se debatieron en el punto de la agenda n.° 11.2. Durante la reunión conjunta GdTCS12/GdTPEC8 (**CA14 Doc 13**) se debatieron las recomendaciones sobre posibles nuevas directrices para apoyar la estrategia de interacción con las OROP del ACAP.

15.2 Fichas informativas sobre mitigación

En **SBWG12 Doc 08** se ofreció una actualización del avance con la ficha informativa sobre líneas espantapájaros en los buques de palangre pelágico de <35 m. Las fichas para buques de ≥35 m y para líneas espantapájaros en el palangre demersal aún no se han completado y siguen siendo una prioridad, junto con varias otras fichas informativas que todavía no se han adaptado al nuevo formato simplificado: lastrado de palangre demersal, colisiones con los cables de arrastre y enredos con la red de arrastre.

En **GdTCS12 Inf 07** se proporcionó información sobre la posibilidad de colisión o enredo de aves marinas con los cables asociados a las operaciones de pesca de los arrastreros chilenos. Se facilitó información sobre los distintos cables utilizados en estas pesquerías de arrastre, en particular, sobre las características específicas de construcción y funcionamiento relacionadas con su función. En el documento se incluyeron infografías sobre las medidas de mitigación utilizadas por la flota chilena de grandes arrastreros factoría. Se está recopilando más información para verificar que estas medidas de mitigación son eficaces y pueden demostrar que cumplen los criterios de mejores prácticas del ACAP. Los autores investigarán la forma de comunicar estas medidas a los Estados que no son Partes a través de cajas de herramientas. El GdTCS acogió con satisfacción la presentación de este trabajo y señaló que su contenido puede facilitar la elaboración de una ficha informativa simplificada sobre medidas de mitigación de la captura secundaria de aves marinas por colisiones con cables de seguimiento de las redes en pesquerías de arrastre. El GdTCS señaló la posibilidad de utilizar medidas de mitigación instantáneas durante las operaciones de arrastre (por ejemplo, dispositivos disuasorios acústicos o rociadores de agua) cuando las aves marinas puedan enredarse por el plumaje al abrirse y cerrarse los cables (de arrastre o de seguimiento de las redes) debido a la oscilación de la tensión. Chile señaló que se estaban desarrollando más medidas de mitigación, las cuales se informarán ante la GdTCS13.

José Carlos Báez, Sebastián Jiménez y Jonathon Barrington aceptaron redactar la ficha informativa para pesquerías de red de cerco. Se traducirán al inglés los gráficos que aparecen en el documento **SBWG12 Inf 12** y otros materiales de referencia para apoyar la elaboración de esta ficha informativa. Se agradecería el apoyo adicional de expertos de la pesquería de cerco peruana.

Leandro Tamini aceptó dirigir la redacción de la ficha informativa sobre colisiones con los cables de arrastreros demersales y pelágicos.

Verónica Iriarte aceptó dirigir la redacción de la ficha informativa sobre el enredo en redes de arrastre demersales y pelágicas.

Dimas Gianuca aceptó ponerse en contacto con los expertos pertinentes para las fichas informativas de lastrado de brazoladas de palangre demersal.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Apoyar la adaptación de las fichas informativas sobre mitigación restantes al nuevo formato simplificado en un enfoque escalonado de acuerdo con la priorización identificada por la GdTCS12.
2. Tomar nota de los avances en la actualización de la ficha informativa sobre mitigación relativa a líneas espantapájaros en pesquerías de palangre pelágico (buques <35 m).

16. PROGRAMA DE TRABAJO DEL GDTCS

16.1 Programa de Trabajo para el período 2023-2025

Las tareas pertinentes para el Grupo de Trabajo sobre Captura Secundaria de Aves Marinas incluidas en el Programa de Trabajo del Comité Asesor para el período 2023-2025 aprobado por la RdP7 (**CA14 Doc 22**) fueron analizadas tras las deliberaciones llevadas adelante durante la GdTCS12. Se preparó una versión actualizada del Programa de Trabajo para su consideración por parte del Comité Asesor.

16.2 Programa de Trabajo preliminar para el período 2026-2028

Las tareas pertinentes para el Grupo de Trabajo sobre Captura Secundaria de Aves Marinas incluidas en el Programa de Trabajo preliminar del Comité Asesor para el período 2026-2028

(**CA14 Doc 23**) fueron analizadas tras las deliberaciones llevadas adelante durante la GdTCS12. Se preparó una versión actualizada del Programa de Trabajo para su consideración por parte del Comité Asesor.

17. OTROS ASUNTOS

No se plantearon temas en este punto de la agenda.

18. CONSIDERACIONES FINALES

El Cocoordinador, Sebastián Jiménez, agradeció a los autores de los documentos presentados para su consideración, y a los Miembros y Observadores por sus valiosos aportes a la Reunión. También agradeció a la Secretaría del ACAP y al equipo de apoyo técnico por la organización y el desarrollo de la Reunión. Dio las gracias a las intérpretes por sus valiosos esfuerzos durante la reunión y a los anfitriones de Perú por proporcionar una sede e instalaciones excelentes.

ANEXO 1. LISTA DE PARTICIPANTES DE LA REUNIÓN GdTCS12

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
Caroline Fox	Environment and Climate Change Canada
Marco Herrera	Insituto Público de Investigaciones en Acuacultura y Pesca, Ecuador
Svein Løkkeborg	Institute of Marine Research, Norway
Amanda Kuepfer	Exeter University, United Kingdom
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

ANEXO 2. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS PARA PESQUERÍAS DE ARRASTRE PELÁGICO Y DEMERSAL

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

[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)

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:

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.

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[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;

[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).

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.)

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.

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ANEXO 3. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS PARA PESQUERÍAS DE PALANGRE DEMERSAL

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.

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[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

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[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.

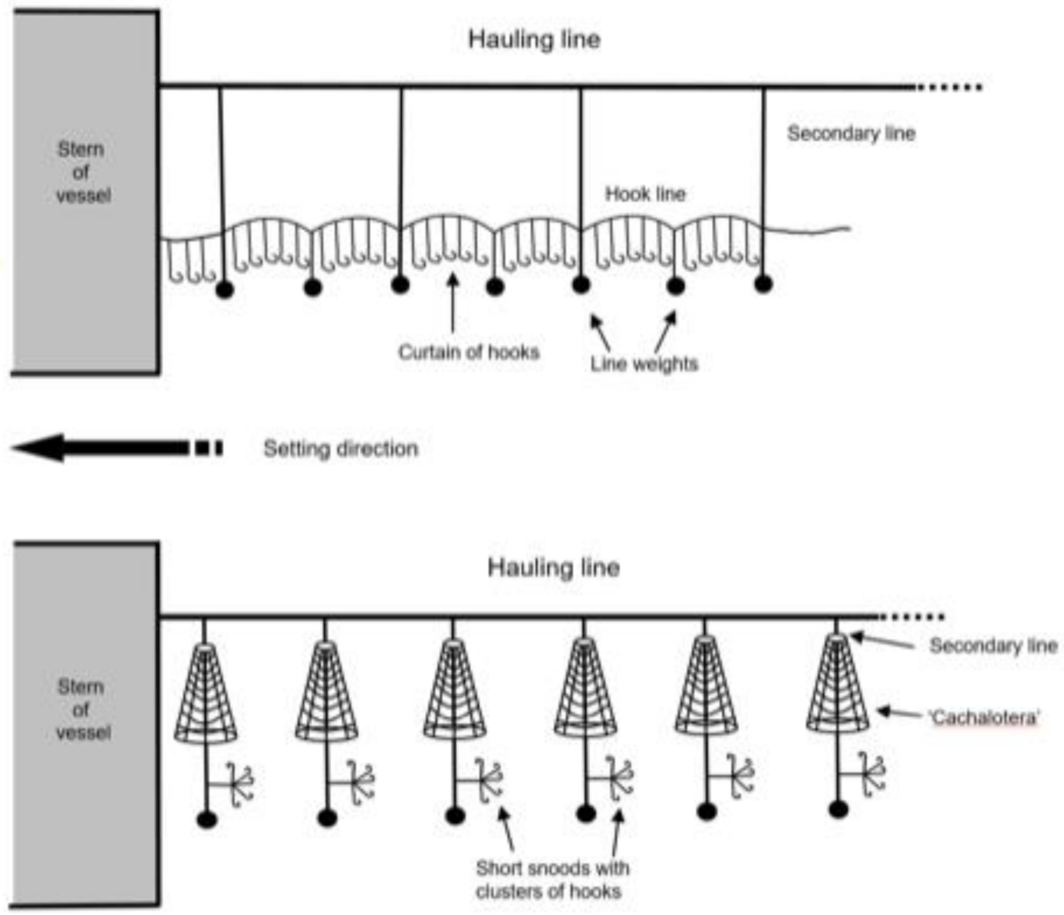

Figure 1. Typical configurations of the traditional Spanish double line system (a) and Chilean (trotline) system (b) showing differences in gear design and location of weights in relation to hooks. The open-ended secondary/connecting lines (not joined by a continuous hook line) and proximity of weights 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.

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ANEXO 4. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS PARA PESQUERÍAS DE PALANGRE PELÁGICO

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.

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[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

Compliance monitoring and reporting should be a high priority for enforcement authorities.

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.

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ANEXO 5. ACTIVIDADES PRIORITARIAS DE CONSERVACIÓN EN EL MAR POR PESQUERÍAS CON MEDIDAS PARA EL ACAP O PARTES DEL ACAP

Prioridades de 2021 del ACAP para actividades de conservación en el mar por pesquería. Esta tabla contiene únicamente las pesquerías identificadas como la mayor amenaza para las especies del ACAP (el 10 % superior de todas las pesquerías consideradas). El marco completo de priorización solo incluyó aquellas pesquerías que fueron notificadas por las Partes o los Estados del área de distribución, y, por lo tanto, la cantidad de pesquerías posibles que podrían evaluarse probablemente sea mayor que la aquí indicada. Se resaltan las poblaciones de mayor prioridad del ACAP.

Pesquería	Población afectada (grupo de islas de reproducción)	Actividades del ACAP/Partes/otros
Angola, palangre pelágico	*Diomedea dabbenena*, isla de Gough	El ACAP interactuará con la Comisión de la Corriente de Benguela, con la ayuda de Sudáfrica, para plantear la cuestión y abogar por el uso de la mitigación.
Argentina, arrastre demersal	*Diomedea sanfordi*, islas Chatham	La Parte implementará las recomendaciones de mejores prácticas del ACAP. Es necesario considerar la mejora de las recomendaciones sobre cables de seguimiento de redes. Mejorar la cobertura y la capacidad de los observadores a bordo mediante el monitoreo humano y electrónico.
	Macronectes giganteus, islas de los Estados y Observatorio	
	Diomedea exulans Georgias del Sur (South Georgia)[1]	
Australia, arrastre demersal	*Procellaria parkinsoni*, islas Gran Barrera y Barrera Pequeña	La Parte implementará las recomendaciones de mejores prácticas del ACAP.
	Thalassarche carteri, isla Ámsterdam	
	Thalassarche cauta, isla Albatros	
	Thalassarche cauta, Pedra Branca	

Pesquería	**Población afectada (grupo de islas de reproducción)**	**Actividades del ACAP/Partes/otros**
Australia, red de enmalle	*Procellaria parkinsoni*, islas Gran Barrera y Barrera Pequeña	La Parte del ACAP estudiará vedas espaciotemporales. Fomentar que las Partes del ACAP notifiquen la captura secundaria de aves marinas. Desarrollo de opciones de mitigación y recomendaciones del ACAP para la pesca con red de enmalle.
	Thalassarche carteri, isla Ámsterdam	
	Thalassarche cauta, Pedra Branca	
	Phoebetria fusca, islas Crozet	
Australia, arrastre pelágico	*Procellaria parkinsoni*, islas Gran Barrera y Barrera Pequeña	La Parte implementará las recomendaciones de mejores prácticas del ACAP.
Brasil, palangre demersal	*Diomedea sanfordi*, islas Chatham	La Parte implementará las recomendaciones de mejores prácticas del ACAP, realizará pruebas en el mar para adaptar las medidas de mitigación a la realidad de la flota, implementará el monitoreo a bordo (humano y electrónico, por ejemplo, cámaras) y creará regulaciones para mitigar la captura secundaria de aves marinas.
	Diomedea dabbenena, isla de Gough	
	Diomedea exulans Georgias del Sur (South Georgia)[1]	
Brasil, palangre pelágico	*Thalassarche chlororhynchos*, Tristán da Cunha	La Parte implementará las recomendaciones de mejores prácticas del ACAP y el monitoreo a bordo (humano y electrónico, por ejemplo, cámaras), así como mecanismos para supervisar y hacer cumplir eficazmente la normativa nacional vigente.
	Diomedea sanfordi, islas Chatham	
	Diomedea dabbenena, isla de Gough	
	Diomedea exulans Georgias del Sur (South Georgia)[1]	
	Procellaria aequinoctialis Georgias del Sur (South Georgia)[1]	

Pesquería	**Población afectada (grupo de islas de reproducción)**	**Actividades del ACAP/Partes/otros**
Brasil, palangre pelágico (flota Itaipava)	*Diomedea dabbenena*, isla de Gough	La definición de pesquería debe revisarse y actualizarse. La Parte implementará las recomendaciones de mejores prácticas del ACAP.
	Diomedea exulans Georgias del Sur (South Georgia)[1]	
	Thalassarche chlororhynchos, Tristán da Cunha	
	Procellaria aequinoctialis Georgias del Sur (South Georgia)[1]	
Namibia, arrastre demersal	*Thalassarche chlororhynchos*, Tristán da Cunha	El ACAP interactuará con la Comisión de la Corriente de Benguela, con la ayuda de Sudáfrica, para plantear la cuestión y abogar por el uso de la mitigación. Animar a Namibia a unirse al ACAP y aprobar las recomendaciones sobre mejores prácticas. Animar a BLI a utilizar los programas existentes para apoyar la implementación de medidas de mitigación de la captura secundaria.
Namibia, palangre pelágico	*Thalassarche cauta*, Pedra Branca	El ACAP interactuará con la Comisión de la Corriente de Benguela, con la ayuda de Sudáfrica, para plantear la cuestión y abogar por el uso de la mitigación. Animar a Namibia a unirse al ACAP y aprobar las recomendaciones sobre mejores prácticas. Animar a BLI a utilizar los programas existentes para apoyar la implementación de medidas de mitigación de la captura secundaria.

Pesquería	**Población afectada (grupo de islas de reproducción)**	**Actividades del ACAP/Partes/otros**
Namibia, arrastre pelágico	*Thalassarche cauta*, Pedra Branca	El ACAP interactuará con la Comisión de la Corriente de Benguela, con la ayuda de Sudáfrica, para plantear la cuestión y abogar por el uso de la mitigación. Animar a Namibia a unirse al ACAP y aprobar las recomendaciones sobre mejores prácticas. Animar a BLI a utilizar los programas existentes para apoyar la implementación de medidas de mitigación de la captura secundaria.
Perú, palangre demersal	*Procellaria parkinsoni*, islas Gran Barrera y Barrera Pequeña	La Parte del ACAP debe seguir desarrollando opciones de mitigación adecuadas e implementar un programa de observadores a bordo y bitácoras electrónicas normalizadas. El ACAP priorizará el apoyo al desarrollo y la implementación de medidas de mitigación, por ejemplo, a través del proceso de pequeñas subvenciones.
Perú, palangre pelágico	*Procellaria parkinsoni*, islas Gran Barrera y Barrera Pequeña	La Parte ACAP debe seguir desarrollando opciones de mitigación adecuadas e implementar un programa de observadores a bordo y bitácoras electrónicas normalizadas. El ACAP priorizará el apoyo al desarrollo y la implementación de medidas de mitigación, por ejemplo, a través del proceso de pequeñas subvenciones.
	Procellaria cinerea, todos los sitios	
España, palangre demersal	*Puffinus mauretanicus,* archipiélago de las islas Baleares	La Parte implementará las recomendaciones de mejores prácticas del ACAP. La Parte del ACAP implementará el plan de acción para las especies y las AMP.

Pesquería	Población afectada (grupo de islas de reproducción)	Actividades del ACAP/Partes/otros
España, palangre pelágico	*Puffinus mauretanicus*, archipiélago de las islas Baleares	La Parte implementará las recomendaciones de mejores prácticas del ACAP. La Parte del ACAP implementará el plan de acción para las especies y las AMP.
España, red de cerco	*Puffinus mauretanicus*, archipiélago de las islas Baleares	La Parte del ACAP implementará y seguirá mejorando, cuando sea adecuado, las recomendaciones sobre mitigación que está elaborando el ACAP. La Parte del ACAP implementará el plan de acción para las especies y las AMP
España, arrastre	*Puffinus mauretanicus*, archipiélago de las islas Baleares	La Parte del ACAP implementará las recomendaciones sobre mejores prácticas o desarrollará opciones de mitigación adecuadas si estas no resultan prácticas. La Parte del ACAP implementará el plan de acción para las especies y las AMP
Uruguay, arrastre demersal	*Diomedea sanfordi*, islas Chatham	La Parte implementará las recomendaciones de mejores prácticas del ACAP.
OROP		
CCSBT, palangre pelágico	*Diomedea antipodensis*, islas Auckland	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Thalassarche melanophris, islas Antípodas	
	Thalassarche melanophris, isla Campbell	
	Thalassarche melanophris, islas Crozet	
	Thalassarche melanophris Georgias del Sur (South Georgia)[1]	

Pesquería	Población afectada (grupo de islas de reproducción)	Actividades del ACAP/Partes/otros
	Procellaria parkinsoni, islas Gran Barrera y Barrera Pequeña	
	Thalassarche chrysostoma Georgias del Sur (South Georgia)[1]	
	Procellaria cinerea, todos los sitios	
	Thalassarche carteri, isla Ámsterdam	
	Thalassarche carteri, isla Crozet	
	Macronectes halli, islas del Príncipe Eduardo	
	Diomedea sanfordi, islas Chatham	
	Phoebetria fusca, islas Crozet	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Phoebetria fusca, islas del Príncipe Eduardo	
	Macronectes giganteus, islas del Príncipe Eduardo	
	Diomedea dabbenena, isla de Gough	
	Diomedea exulans, islas Kerguelen	
	Diomedea exulans Georgias del Sur (South Georgia)[1]	
	Procellaria aequinoctialis Georgias del Sur (South Georgia)[1]	
CIAT, palangre pelágico	*Phoebastria immutabilis*, Pacífico Central, Laysan	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Phoebastria irrorata, islas Galápagos	

Pesquería	**Población afectada (grupo de islas de reproducción)**	**Actividades del ACAP/Partes/otros**
ICCAT, palangre pelágico	*Thalassarche chlororhynchos*, Tristán da Cunha	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Thalassarche melanophris Georgias del Sur (South Georgia)[1]	
	Thalassarche chrysostoma Georgias del Sur (South Georgia)[1]	
	Procellaria cinerea, todos los sitios	
	Diomedea sanfordi, islas Chatham	
	Diomedea dabbenena, isla de Gough	
	Diomedea exulans Georgias del Sur (South Georgia)[1]	
	Procellaria aequinoctialis Georgias del Sur (South Georgia)[1]	
IOTC, palangre pelágico	*Thalassarche chrysostoma* Georgias del Sur (South Georgia)[1]	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Procellaria cinerea, todos los sitios	
	Thalassarche carteri, isla Ámsterdam	
	Thalassarche carteri, isla Crozet	
	Thalassarche carteri, islas del Príncipe Eduardo	
	Macronectes halli, islas del Príncipe Eduardo	
	Thalassarche cauta, Pedra Branca	
	Phoebetria fusca, islas Crozet	
	Phoebetria fusca, islas del Príncipe Eduardo	

Pesquería	Población afectada (grupo de islas de reproducción)	Actividades del ACAP/Partes/otros
	Macronectes giganteus, islas del Príncipe Eduardo	
	Diomedea dabbenena, isla de Gough	
	Diomedea exulans, islas Kerguelen	
SEAFO, arrastre demersal	*Thalassarche melanophris* Georgias del Sur (South Georgia)[1]	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
SPRFMO, arrastre demersal	*Procellaria parkinsoni*, islas Gran Barrera y Barrera Pequeña	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Diomedea sanfordi, islas Chatham	
WCPFC, palangre pelágico	*Diomedea antipodensis*, islas Antípodas	El ACAP y las Partes implementarán la estrategia de interacción con las OROP del ACAP.
	Diomedea antipodensis, islas Auckland	
	Thalassarche melanophris, islas Antípodas	
	Thalassarche melanophris, isla Campbell	
	Procellaria parkinsoni, islas Gran Barrera y Barrera Pequeña	
	Procellaria cinerea, todos los sitios	
	Phoebastria immutabilis, Pacífico Central, Laysan	
	Diomedea sanfordi, islas Chatham	

[1] Existe una disputa entre el Gobierno de la República Argentina y el Gobierno del Reino Unido de Gran Bretaña e Irlanda del Norte en relación a la soberanía de las islas Malvinas (Falkland Islands), islas Georgias del Sur e islas Sándwich del Sur (South Georgia and the South Sandwich Islands) y áreas marítimas circundantes.