Acuerdo sobre la Conservación de Albatros y Petreles

Decimotercera Reunión del Comité Asesor

Edimburgo, Reino Unido, 22 - 26 de mayo 2023

Informe del Grupo de Trabajo sobre Captura Secundaria de Aves Marinas

Grupo de Trabajo sobre Captura Secundaria de Aves Marinas

1. INTRODUCCIÓN 3
2. MIEMBROS DEL GDTCS 3
3. APROBACIÓN DE LA AGENDA 3
4. DEFINICIÓN Y CRITERIOS DE LAS RECOMENDACIONES SOBRE MEJORES PRÁCTICAS DEL ACAP PARA MITIGAR LA CAPTURA SECUNDARIA DE AVES MARINAS 3
5. MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE ARRASTRE 4
5.1. Revisión de los avances recientes en investigación sobre medidas de mitigación y actualización de las recomendaciones sobre mejores prácticas 4
5.2. Actualización de las fichas informativas de mitigación 5
5.3. Prioridades de investigación sobre mitigación 5
6. MITIGACIÓN DE CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE PALANGRE DEMERSAL 6
6.1 Revisión de los avances recientes en investigación sobre medidas de mitigación y actualización de las recomendaciones sobre mejores prácticas 6
6.2 Actualización de las fichas informativas de mitigación 8
6.3 Prioridades de la investigación sobre mitigación 8
7. MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE PALANGRE PELÁGICO 9
7.1 Revisión de los avances recientes en investigación sobre medidas de mitigación y actualización de las recomendaciones sobre mejores prácticas 9
7.2 Actualización de las fichas informativas de mitigación 11
7.3 Prioridades de investigación sobre mitigación 11
8. PESQUERÍAS ARTESANALES Y DE PEQUEÑA ESCALA 13
8.1 Revisión de los avances recientes en la investigación sobre medidas de mitigación y actualización de las recomendaciones sobre la caja de herramientas 13
9. MITIGACIÓN DE CAPTURA SECUNDARIA DE AVES MARINAS EN PESQUERÍAS DE CERCO 15
9.1 Revisión de los avances recientes en la investigación sobre medidas de mitigación y actualización de las recomendaciones sobre la caja de herramientas 15

10. MITIGACIÓN DE CAPTURA SECUNDARIA DE AVES MARINAS EN OTRAS PESQUERÍAS 15

10.1 Análisis de avances recientes en investigaciones sobre mitigación y de prioridades para futuras investigaciones 15

11. INDICADORES DE DESEMPEÑO DEL ACAP: TALLER SOBRE DATOS DE CAPTURA SECUNDARIA DE AVES MARINAS 15

11.1 Taller sobre datos de captura secundaria de aves marinas 15

12. TÉCNICAS DE MONITOREO DE LA CAPTURA SECUNDARIA DE AVES MARINAS Y DEL USO DE LAS MEDIDAS DE MITIGACIÓN 17

12.1 Revisión del desarrollo de métodos o técnicas de monitoreo en relación con la captura secundaria de aves marinas y el uso de medidas de mitigación 17

13. PAI/PAN-AVES MARINAS DE LA FAO 19

13.1 Revisión del estado de implementación del PAN-Aves marinas 19

14. COORDINACIÓN DE ACTIVIDADES CON RELACIÓN A LAS OROP 20

14.1 Información actualizada sobre la aplicación de la estrategia de interacción con las OROP 20

15. MEJORA DE LA APLICACIÓN DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA SECUNDARIA DE AVES MARINAS 21

16. HERRAMIENTAS Y DIRECTRICES 24

16.1 Actualizaciones y nuevas directrices 24

16.2 Fichas informativas sobre mitigación 24

17. PROGRAMAS FINANCIADOS POR EL ACAP 25

17.1 Pequeñas subvenciones y pasantías 25

17.2 Prioridades de financiación para el período 2023-2025 25

18. PROGRAMA DE TRABAJO DEL GDTCS 25

18.1 Programa de Trabajo para el período 2023-2025 25

19. OTROS ASUNTOS 25

20. CONSIDERACIONES FINALES 25

ANEXO 1. LISTA DE PARTICIPANTES DE LA REUNIÓN GDTCS11 26

ANEXO 2. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA INCIDENTAL DE AVES MARINAS PARA PESQUERÍAS DE ARRASTRE PELÁGICO Y DEMERSAL 29

ANEXO 3. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA INCIDENTAL DE AVES MARINAS PARA PESQUERÍAS DE PALANGRE DEMERSAL 55

ANEXO 4. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA INCIDENTAL DE AVES MARINAS PARA PESQUERÍAS DE PALANGRE PELÁGICO 58

Informe de la Decimoprimera Reunión del Grupo de Trabajo sobre Captura Secundaria de Aves Marinas, Edimburgo, Reino Unido, 15 al 17 de mayo de 2023

1. INTRODUCCIÓN

En el presente informe, se documentan las deliberaciones y las recomendaciones efectuadas durante la Decimoprimera Reunión del Grupo de Trabajo sobre Captura Secundaria de Aves Marinas (GdTCS11), celebrada en Edimburgo, Reino Unido, del 15 al 17 de mayo de 2023.

El Cocoordinador del GdTCS, Igor Debski (Nueva Zelandia), dio la bienvenida a todos los miembros y observadores del GdTCS (**ANEXO 1**) a la Decimoprimera Reunión del GdTCS. Presentó al Cocoordinador del GdTCS Sebastián Jiménez (Uruguay) y a los Vicecoordinadores Juan Pablo Seco Pon (Argentina) y Dimas Gianuca (Brasil).

2. MIEMBROS DEL GdTCS

El Cocoordinador dio la bienvenida a los siguientes nuevos miembros que se sumaron al grupo desde la GdTCS10: José Carlos Báez (España), Caroline Fox (Canadá), Verónica Iriarte (Reino Unido) y Helen Wade (BirdLife International). El GdTCS agradeció a Roberto Sarralde y Stephanie Prince por sus aportes de 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 Coordinador presentó la agenda y los documentos correspondientes. La reunión aprobó la agenda (**SBWG11 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. No hubo documentos por examinar en relación con este punto de la agenda.

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 **SBWG11 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 arrastre, refrendada por la CA12. Su objetivo era mejorar la claridad de las recomendaciones y la coherencia con los documentos de recomendaciones para otros métodos de pesca. En los cambios se proponía usar un lenguaje coherente sobre la gestión del vertido de despojos y descartes (gestión de desechos de pescado) y el riesgo de captura en redes, así como trasladar las recomendaciones sobre el dispositivo Tamini Tabla a la sección sobre normas mínimas para líneas espantapájaros e introducir una sección “Otras consideraciones”.

La GdTCS11 refrendó los cambios sugeridos e identificó algunas mejoras menores adicionales para actualizar las referencias y aportar más claridad. Esto incluía señalar claramente la oportunidad de utilizar la transmisión inalámbrica en lugar de cables para el monitoreo de las redes, ya que se ha demostrado que dichos cables generan la mayoría de las colisiones con cables en diversas pesquerías de arrastre. Se informó a la GdTCS11 que la pasteca desarrollada en Alaska ya no se utilizaba comúnmente debido al desgaste excesivo del cable. La GdTCS11 también recordó que el Grupo de Trabajo sobre Mortalidad Incidental Causada por la Pesca (GdT-IMAF) de la Comisión para la Conservación de los Recursos Vivos Marinos Antárticos (CCRVMA) había considerado recientemente nuevas técnicas de mitigación desarrolladas para el cable de monitoreo de las redes utilizado en los buques de arrastre continuo de kril y acogería con beneplácito un documento de quienes participen activamente en esta labor para su examen en una reunión futura.

En **SBWG11 Doc 11**, se describieron investigaciones para determinar si los láseres causan lesiones oculares en aves. Los resultados sugieren que los láseres de una producción de energía similar a los que se sabe que se utilizan en la pesca pueden causar lesiones en dos especies de paseriformes. A partir del estudio, se observó que, si las aves marinas se expusieran a láser, sería probable que se obtuvieran resultados similares a los observados en los paseriformes en términos de lesión ocular.

La GdTCS11 manifestó serias preocupaciones con respecto a la salud de las aves marinas en relación con la promoción permanente de la tecnología láser, así como por el incremento del uso de esta tecnología para mitigar la captura secundaria de aves marinas; por otro lado, señaló que les compete a los fabricantes de dichas tecnologías la responsabilidad de demostrar que este tipo de dispositivos no son perjudiciales para las aves antes de promocionar su uso a nivel comercial. La GdTCS11 recordó asimismo que a partir de los resultados de una investigación realizada en Alaska se determinó que los láseres eran de eficacia limitada como técnica de mitigación de la captura secundaria de aves marinas, en particular, durante el día. La GdTCS11 tomó nota de que en varias pesquerías de todo el mundo se usaban actualmente varios productos láser y recomendó que se actualizaran las recomendaciones de mejores prácticas del ACAP para indicar claramente que se debe desalentar enfáticamente el uso de láseres de alta energía.

En **SBWG11 Doc 17 Rev 1** se describió el trabajo realizado en Nueva Zelandia para comprender la mitigación de la captura en pesquerías de arrastre. Este punto constituía una prioridad para la industria y los organismos gubernamentales, y el Programa Net Capture trabajaba en colaboración para garantizar que se tuvieran en cuenta todos los instrumentos y enfoques de mitigación posibles. Se daba también prioridad a las ideas para seguir trabajando sobre la base de la viabilidad (es decir, la mitigación debía ser práctica dentro de los límites reglamentarios, así como segura). Otras posibles opciones se clasificaron en tres temas: atracción, disuasión o prevención. Se llegó a la conclusión de que los intentos de minimizar la atracción general de los buques o de utilizar elementos de disuasión visuales o sonoros no eran viables para la pesquería de arrastre de calamar de Nueva Zelandia. El enfoque más plausible para reducir las capturas internas en las redes (a las que se atribuye aproximadamente el 44 % de las capturas) fue la prevención, mediante la reducción de la superficie que abarca la relinga hasta el final de las alas (denominada área de agrupamiento) en los últimos momentos del virado.

La GdTCS11 recibió de buen grado esta investigación señalando que las capturas en redes en la pesca de arrastre han sido un área de investigación prioritaria durante varios años. Se tomó nota de que, en otras pesquerías de arrastre de las Partes del ACAP, se planteaban dificultades similares, por ejemplo, las descriptas en **SBWG11 Inf 10**. La GdTCS11 recomendó agregar “minimización del área de agrupamiento” como una de las opciones de mitigación descriptas en la sección de revisión de las recomendaciones sobre mejores prácticas, señalando que esta técnica no era factible para algunos buques y operaciones pesqueras, y que actualmente no hay pruebas suficientes sobre la eficacia de este método para reconocerlo como mejor práctica. La GdTCS11 alentó a realizar más pruebas para cuantificar la efectividad.

La GdTCS11 recibió de buen grado el documento **SBWG11 Inf 10,** en el que se informó de ensayos que mostraron la ineficacia de la atadura de redes como medida de mitigación en una pesquería de arrastre demersal. También se destacó el posible efecto del tamaño de malla en la captura.

En **SBWG11 Inf 07**, **SBWG11 Inf 17** y **SBWG11 Inf 20,** se proporcionó información valiosa sobre la eficacia de las líneas espantapájaros y la gestión de los despojos en diversas pesquerías de arrastre.

La GdTCS11 tomó nota de que estos estudios brindaban más apoyo a las recomendaciones actuales sobre mejores prácticas.

En **SBWG11 Inf 20** se proporcionó información actualizada sobre nuevos avances con el dispositivo Tamini Tabla, que ahora está disponible comercialmente.

5.2. Actualización de las fichas informativas de mitigación

La GdTCS11 tomó nota de que la actualización planificada de las fichas informativas de mitigación para pesquerías de arrastre debe reflejar los detalles de las recomendaciones sobre mejores prácticas más recientes, derivadas de esta reunión.

5.3. Prioridades de investigación sobre mitigación

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

Mitigación en el uso de cables: desarrollo continuo de opciones de mitigación para reducir las interacciones de las aves marinas con los cables, en particular con los cables de monitoreo de redes; y en 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 las colisiones 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;

Innovación: investigar técnicas innovadoras.

La GdTCS11 reiteró el beneficio de sintetizar la investigación acumulada para que los resultados puedan utilizarse a fin de proporcionar asesoramiento generalizado, así como para desarrollar directrices específicas para las pesquerías que resulten pertinentes para diferentes complejos de especies en diferentes regiones.

Se identificaron nuevos líderes del GdTCS en materia de mitigación de captura secundaria en las pesquerías de arrastre como Igor Debski, Verónica Iriarte y Leandro Tamini.

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 GdTCS11, pero no generan ningún cambio sustantivo en las recomendaciones sobre mejores prácticas.
2. Fomentar la implementación de las prioridades de investigación identificadas en la Sección 5.3 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

Se debatió el documento **SBWG11 Doc 11** en el punto 5 de la agenda. Se elaboraron directrices actualizadas sobre el uso de láseres en las recomendaciones sobre mejores prácticas para pesquerías de arrastre, palangre demersal y palangre pelágico.

En **SBWG11 Doc 21** se informó sobre ensayos hechos con dispositivos sencillos de mitigación durante el virado (un "dispositivo de disuasión" y un "colgante") en palangreros demersales y pelágicos pequeños en los que la concurrencia de aves en el área de alrededor del palangre se utilizó como indicador indirecto del riesgo de captura secundaria. Los resultados del modelo mostraron que los dispositivos de mitigación sirvieron para reducir el número de aves que se desplazaban al área inmediatamente cercana a la estación de virado. La recuperación de flotadores de superficie también redujo la concurrencia de aves al lado de la estación de virado. Con esta labor se demostró que los dispositivos simples y baratos de mitigación durante el virado pueden reducir el riesgo para las aves durante el virado del palangre, con un impacto mínimo en las operaciones pesqueras. Actualmente se está trabajando para ayudar a los operadores pesqueros de toda la flota a adoptar estos dispositivos de mitigación. También está prevista la realización de más ensayos en el mar para verificar la eficacia en una mayor variedad de operaciones efectuadas por las embarcaciones.

Se informó a la GdTCS11 que Nueva Zelandia había incorporado estos dispositivos en las normas nacionales de mitigación para embarcaciones pequeñas. Si bien estos sistemas se habían desarrollado para embarcaciones pequeñas, tras unos leves ajustes, serían adecuados para su uso en embarcaciones de cualquier tamaño. Los enfoques utilizados también podrían ser adecuados en pesquerías de línea de mano, siempre que el virado se limitase a una zona fija del buque. También serían útiles más investigaciones sobre la cantidad de peso utilizado para examinar el efecto que esto tendría en las interacciones durante el virado.

En **SBWG11 Inf 01** se analizó la velocidad de hundimiento de un palangre demersal con flotadores utilizado para capturar merluza europea (*Merluccius merluccius*) en muchas aguas marinas europeas y se descubrió que la velocidad media de hundimiento del palangre demersal con flotadores era sustancialmente más lenta que la de las mejores prácticas recomendadas por el ACAP. Por lo tanto, los anzuelos de los palangres demersales con flotadores quedaban muy expuestos a los ataques de aves marinas y, como resultado, presentaban un claro riesgo de captura secundaria. También se han registrado situaciones similares en Australia, así como en pesquerías de Nueva Zelandia y Sudáfrica, donde el uso de líneas verticales más largas para boyas ha mejorado las tasas de hundimiento. Se informó a la GdTCS11 que era necesario trabajar más para abordar estos desafíos, incluidas la consideración de la velocidad de calado, la configuración de los artes y las especies objetivo. La forma en que se almacenen los artes también puede ser pertinente para la implementación eficaz de artes lastrados.

En **SBWG11 Inf 12** se describieron los trabajos realizados para seguir desarrollando y ensayando dos dispositivos de calado submarino ("dispositivo de calado subacuático" y "depresor de línea") para su uso en pequeñas embarcaciones palangreras demersales en Nueva Zelandia. Se informó de avances prometedores, pero se necesita un mayor desarrollo para que estos dispositivos sean adecuados para una mayor utilización comercial.

En **SBWG11 Inf 13** se informó sobre un proyecto centrado en la flota de palangreros demersales de aguas poco profundas de Nueva Zelandia, donde se sabe que los tiempos de hundimiento hasta la profundidad varían con la configuración de los artes, la posición de los pesos en la línea y las condiciones ambientales. A partir de las pruebas, se demostró que en una serie de configuraciones de artes se logró la profundidad de hundimiento requerida, y esto se comunicó a los pescadores a través de una infografía. Actualmente se está trabajando para ampliar este enfoque a otras pesquerías objetivo, incluidos los métodos de palangre demersal

con flotadores dirigidos al rufo antártico (*Hyperoglyphe antarctica*) y la maruca (*Molva molva*) en aguas más profundas. Se informó a la GdTCS11 que Nueva Zelandia esperaba presentar un documento sobre mejores prácticas ante la próxima reunión del GdTCS.

La GdTCS11 tomó nota de que el lenguaje utilizado en las recomendaciones de mejores prácticas del ACAP difiere sustancialmente al describir enfoques de mitigación similares para artes de palangre tanto demersales como pelágicos. Hubo acuerdo en trabajar en el período entre sesiones para armonizar el texto de recomendaciones sobre mejores prácticas en ambos tipos de artes a fin de garantizar que el lenguaje sea coherente en todo momento.

6.2 Actualización de las fichas informativas de mitigación

La GdCTS11 tomó nota de que no era necesario actualizar las fichas informativas de mitigación.

6.3 Prioridades de la 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 y el diseño de los pesos para lograr mayores tasas de hundimiento. 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) de embarcaciones pequeñas, incluidos los ensayos en el mar para verificar la eficacia en diversas operaciones de embarcaciones.

Ed Melvin y Juan Pablo Seco Pon 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 GdTCS11, pero no generan ningún cambio sustantivo en las recomendaciones de mejores prácticas.

2. Fomentar la implementación de las prioridades de investigación identificadas en la sección 6.3 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 **SBWG11 Doc 07**, se presentó 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 otras enmiendas propuestas.

La GdTCS11 actualizó las recomendaciones para pesquerías de palangre pelágico:

(i) tomando nota de la investigación de una pesquería relativa a que el uso de anzuelos lastrados afectaba negativamente las tasas de captura de las especies objetivo;

(ii) explicando por qué deben usarse en combinación el calado nocturno, el lastrado de brazoladas y las líneas espantapájaros;

(iii) desalentando enérgicamente el uso de láseres de alta energía como medida de mitigación de la captura secundaria de aves marinas (basándose en **SBWG11 Doc 11**);

(iv) observando pruebas que sugieren que, en algunas pesquerías, el cambio del calado diurno al nocturno en profundidad puede servir para mantener los índices de captura objetivo al tiempo que se reduce significativamente el riesgo de captura secundaria de aves marinas en comparación con el calado parcialmente diurno en profundidad (basado en **SBWG11 Doc 10**);

(v) resaltando la importancia de la extensión aérea cuando se utilizan líneas espantapájaros.

La GdTCS11 debatió la divergencia entre las recomendaciones de mejores prácticas del ACAP que sugieren el uso del calado nocturno, el lastrado de brazoladas y las líneas espantapájaros, y los enfoques adoptados por las OROP, que solo estipulan el uso de dos de las tres medidas de mejores prácticas. La GdTCS11 recomendó que se realizaran labores intersesionales para revisar la gama de medidas de mitigación de la captura secundaria de aves marinas utilizadas por las OROP y considerar si dos de tres mejores prácticas en medidas de mitigación podrían priorizarse y, de ser así, en qué circunstancias. La GdTCS11 también debatió la inclusión de información sobre la justificación y la tasa de hundimiento de las recomendaciones existentes en materia de lastrado de brazoladas del ACAP.

En **SBWG11 Doc 10** se examinaron, mediante un estudio observacional, los efectos del horario y la profundidad relativa de la pesca en las tasas de captura de aves marinas y especies objetivo para una pesquería de palangre pelágico del océano Pacífico dirigida al atún blanco (*Thunnus alalunga*). Los resultados de modelado indicaron que el calado nocturno en profundidad tenía tasas significativamente más bajas de captura secundaria de albatros y aves marinas en comparación con los calados parcialmente diurnos profundos y poco profundos, sin afectar las tasas de captura de atún blanco (*Thunnus alalunga*). La GdTCS11 recibió de buen grado los resultados de la investigación y tomó nota de que hay lugar para más investigación con el fin de evaluar los efectos de pasar del calado profundo diurno a nocturno en diferentes pesquerías, y para desarrollar una definición de calado profundo.

Se debatió el documento **SBWG11 Doc 11** en el punto 5 de la agenda.

En **SBWG11 Doc 15** se informó sobre el desarrollo del anzuelo lastrado Procella de 50 g para su uso en la pesca con palangre pelágico (véase también SBWG10 Inf 09). Se informó de que colocar pesos en el anzuelo ofrecía la ventaja de evitar cualquier retraso en el perfil de hundimiento de las brazoladas, en comparación con los pesos posicionados más lejos del anzuelo. La GdTCS11 debatió si el peso del anzuelo podría utilizarse como contribución al lastrado de brazoladas, aunque no se llegó a una conclusión sobre este tema. La GdTCS11 acordó trasladar la orientación sobre la masa y el diseño de los anzuelos a la categoría "Otras recomendaciones" para dar lugar a más investigación e innovación, y recomendó no usar plomo al agregar peso al anzuelo y usar en cambio materiales no tóxicos.

En **SBWG11 Doc 21** se informó sobre la investigación sobre mitigación durante el virado para embarcaciones pequeñas, lo cual se debatió en relación con el punto 6 de la agenda. Los líderes del GdTCS en materia de mitigación de la captura secundaria buscarán armonizar las recomendaciones de mejores prácticas sobre mitigación durante el virado para embarcaciones pequeñas en pesquerías pelágicas y demersales.

En **SBWG11 Doc 23** se informó sobre enfoques de modelado para evaluar variables que pueden afectar la captura secundaria de aves marinas en la pesca con palangre pelágico en Nueva Zelandia. El modelo indicaba que las tasas de captura de aves marinas: a) disminuían con el aumento de las horas nocturnas, cuando la línea espantapájaros estaba sobre el punto de entrada del cebo, con el aumento de la altura de fijación de la línea espantapájaros (un indicador indirecto de la extensión aérea), y con el aumento de la distancia desde la costa, y b) aumentaban con el mayor número de giros del buque durante el virado, y la pesca con temperaturas de la superficie del mar más altas.

En **SBWG11 Inf 04** se informó sobre la investigación relativa a la eficacia de los diseños alternativos de líneas espantapájaros y pescantes para uso en la pesca con palangre a pequeña escala de Japón (embarcaciones <24 m). La industria pesquera no favorece los diseños de líneas espantapájaros exigidos por la WCPFC, y en la investigación se compararon las líneas espantapájaros sin cintas con las líneas espantapájaros ligeras. La extensión aérea se alcanzó más fácilmente utilizando líneas espantapájaros sin cintas. La GdTCS11 observó con preocupación que uno de los ensayos ocasionó 99 muertes de albatros, lo que sugiere una alta tasa de captura secundaria, incluso con el uso de las líneas espantapájaros probadas. Las líneas espantapájaros sin cintas serían difíciles de discernir para las aves durante el día, y es poco probable que estas se detecten por la noche. La GdTCS11 tomó nota de que, si bien los ensamblajes de aves marinas en el océano Pacífico norte difieren de los de otros lugares, las aves marinas eran abundantes en esta región y que se necesitan líneas espantapájaros bien diseñadas para minimizar efectivamente la captura secundaria.

En **SBWG11 Inf 06** se proporcionaron recomendaciones para la cadena de suministro de palangreros atuneros sobre el desempeño de las medidas de mitigación de la captura secundaria de aves marinas. La GdTCS11 tomó nota de que la información sobre la eficacia de las diversas opciones de mitigación también sería pertinente para la estrategia de comunicación del ACAP y otras actividades de divulgación.

En **SBWG11 Inf 11** se informó sobre una investigación que indicaba que el uso del calado nocturno, de líneas espantapájaros y de lastrado de brazoladas reducía significativamente la captura secundaria de aves marinas en una pesquería de palangre pelágico del océano Atlántico sudoriental dirigida al atún blanco (*Thunnus alalunga*). La GdTCS11 tomó nota de que la investigación demostró que las recomendaciones sobre mejores prácticas del ACAP

que sugieren el uso combinado del calado nocturno, el lastrado de brazoladas y las líneas espantapájaros constituyen la manera más eficaz de reducir la captura secundaria de aves marinas, que de otro modo sería muy alta.

7.2 Actualización de las fichas informativas de mitigación

Este tema se debatió en el punto 16.2 de la agenda.

7.3 Prioridades de investigación sobre mitigación

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

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.

Mejora del lastrado de brazoladas en las pesquerías en alta mar: desarrollar una brazolada experimental con tasas de hundimiento de anzuelos que concuerden con las recomendaciones sobre mejores prácticas del ACAP en cuanto al lastrado de brazoladas (por ejemplo, 60 g situados a ≤ 1 m de los anzuelos) en los niveles superiores de la columna de agua (0-2 m de profundidad). 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 promedio de ≥ 0,4 m/s a 2 m de profundidad para aportar a la elaboración del nuevo régimen 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 mediante el uso de tecnologías térmicas o de visión nocturna.

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

Combinaciones de medidas de mitigación: evaluar la efectividad 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 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.

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.

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.

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 GdTCS11, pero no generan ningún cambio sustantivo en las recomendaciones sobre mejores prácticas.

2. Fomentar la implementación de las prioridades de investigación identificadas en la Sección 7.3 a fin de mejorar la mitigación de la captura secundaria en las pesquerías de palangre pelágico.

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 **SBWG11 Doc 18** se describió el desarrollo del sistema Doble NISURI. Se trata de un sistema de pesca que consiste en calar los cebos a una velocidad de tres anzuelos por segundo desde un tubo doble de PVC para que las aves no vean la salida del anzuelo cebado. El sistema también ayuda a los pescadores a reducir el tiempo en el mar. Como los autores no estaban disponibles para responder preguntas sobre cómo funcionaba el arte, no estaba claro hasta qué punto la captura secundaria de aves marinas era un problema en la pesquería donde se probó el dispositivo. La GdTCS11 tomó nota de que los pesos externos de líneas utilizados en esta pesquería de palangre demersal estaban muy por debajo de lo recomendado en las recomendaciones de mejores prácticas para este tipo de pesca. En el documento no se disponía de pruebas suficientes para demostrar la eficacia de la técnica como mejor práctica en medidas de mitigación de la captura secundaria de aves marinas. Sin embargo, se acogió con beneplácito la labor por ser un instrumento asequible y práctico, y se alentó a que se presentaran informes sobre nuevas pruebas. Específicamente, la GdTCS11 alentó a los autores a comunicar claramente la configuración de los artes de la pesquería de una manera que permitiera evaluar la aplicabilidad más amplia de la técnica.

En **SBWG11 Doc 19** se describió un novedoso dispositivo de mitigación de captura secundaria de aves marinas para la poco estudiada pesquería de línea de mano de Ecuador. Consiste en un tubo de camuflaje de PVC de 8 pulgadas (20 cm) de diámetro y de un metro de largo, por donde pasan los anzuelos al principio y cuando se recoge la línea. El sistema evita que las aves vean los anzuelos cebados que están dentro del tubo cuando se lanza la línea. Dado que los autores no estaban disponibles para responder preguntas sobre el diseño y el funcionamiento del dispositivo, no estaba claro si había algún efecto en la pérdida de cebo, a qué tamaño de captura de peces objetivo podría aplicarse y si este método podría clasificarse mejor como una línea vertical. En el documento no había pruebas suficientes sobre la eficacia para demostrar que este dispositivo pudiese recomendarse como mejor práctica. Sin embargo, la GdTCS11 recibió de buen grado el desarrollo de este innovador dispositivo y alentó a que se realizaran más pruebas y se presentara un informe al respecto.

La GdTCS11 tomó nota de que los brazos de extensión de líneas espantapájaros descritos en **SBWG11 Inf 18** representan un desarrollo innovador para favorecer una implementación segura de líneas espantapájaros en las pesquerías de pequeña escala. Tales dispositivos también pueden ser aplicables a embarcaciones de arrastre industriales más grandes, y la GdTCS11 alentó a que se informe sobre los resultados de un mayor desarrollo y pruebas.

La GdTCS11 acordó actualizar la caja de herramientas de mitigación de la captura secundaria de aves marinas para pesquerías artesanales y en pequeña escala para reflejar adecuadamente las opciones de mitigación descritas en los documentos anteriores.

La GdTCS11 tomó nota del estudio de observación descripto en **SBWG11 Inf 21** respecto de cómo el desecho de despojos causa congregaciones de albatros en aguas de alta mar del sur de Perú. Si bien el estudio fue pequeño y generó datos cuantitativos limitados, la GdTCS11 tomó nota de que, si la atracción de aves marinas hacia las embarcaciones pesqueras era impulsada por el vertido de hígado de tiburón, entonces podrían desarrollarse técnicas prácticas de gestión de despojos. Se alentó a que se siguieran reuniendo datos.

La GdTCS11 recibió de buen grado el documento **SBWG11 Inf 22**, en el que se analizó la información autoinformada voluntariamente por los capitanes en un puerto importante del sudeste de Brasil para evaluar la captura secundaria de aves marinas en la pesca a pequeña escala del sudeste brasileño. La GdTCS11 tomó nota de que estas pesquerías eran una prioridad para la acción de conservación en el mar y de que se desarrollan en un área donde se han documentado altos niveles de aves marinas varadas a la playa. La GdTCS11 tomó nota de los desafíos sustanciales involucrados en la recolección de datos en una flota artesanal tan grande y compleja. La pesquería emplea una serie de métodos operativos, incluido un palangre de superficie dirigido al dorado (*Coryphaena hippurus*), donde el palangre se une directamente a los flotadores de superficie, lo que conduce a la captura de aves marinas vivas. La pesquería se superpone con especies incluidas en la lista del ACAP que se reproducen en otras jurisdicciones. Se informó a la GdTCS11 que el Plan de Acción Nacional de Brasil reconoce los riesgos de captura secundaria planteados por esta pesquería, y la GdTCS11 alentó firmemente a Brasil a continuar trabajando para reducir la captura secundaria de aves marinas en estas pesquerías.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Tomar nota de las importantes conclusiones sobre la captura secundaria en las pesquerías brasileñas de pequeña escala descritas en **SBWG11 Inf 22** y pedir que Brasil continúe esta importante iniciativa de monitoreo y que trabaje urgentemente para reducir la captura secundaria en estas pesquerías.

2. Fomentar un mayor trabajo intersesional para nutrir la caja de herramientas de mitigación de captura secundaria de aves marinas para la pesca artesanal y de pequeña escala para reflejar las actualizaciones proporcionadas a la GdTCS11, así como en futuras reuniones.

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 **SBWG11 Inf 16** se presentaron acciones actualizadas en Chile sobre la reducción de la captura secundaria de aves marinas en la pesca de cerco y la implementación de medidas de mitigación. Se alentó a los autores a que utilizaran la caja de herramientas de recomendaciones sobre las mejores prácticas de mitigación en la pesca de cerco (disponible actualmente como ANEXO 3 del documento CA12 Doc 13 Rev 1).

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

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

Juan Pablo Seco Pon, Vicecocoordinador del GdTCS, presentó la más reciente clasificación estadística internacional uniforme de los artes de pesca de la FAO, que puede utilizarse como guía para la clasificación de categorías de artes en otras pesquerías. Se presentó una versión anterior de esta clasificación en SBWG6 Doc 07. La GdTCS11 reconoció que tal categorización es adecuada, pero también tomó nota de que hay variaciones dentro de los artes de pesca entre flotas y regiones que merecen atención.

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 **SBWG11 Doc 05** se informó sobre un taller realizado el 14 de mayo de 2023, inmediatamente antes de la GdTCS11. 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.

En el taller se señaló una serie de desafíos a los que se enfrentaban las Partes para presentar datos que sirvieran de base a los indicadores de presión actuales respecto de la captura secundaria de aves marinas. Se determinaron varias posibles medidas que el ACAP podría adoptar para hacer frente a algunos de ellos, entre otras:

(i) Elaborar directrices sobre protocolos apropiados para la preparación y el análisis de datos.

(ii) Establecer un grupo de correspondencia intersesional para convenir entre 4 y 5 preguntas pertinentes que podrían utilizarse para obtener respuestas coherentes de las Partes sobre sus principales desafíos y soluciones relacionados con los datos. Estas respuestas podrían utilizarse para obtener una visión general de las principales cuestiones que deben abordarse.

(iii) Cada Parte debería celebrar un taller entre sus especialistas y gestores en materia de datos de pesquerías, y proveedores de datos del ACAP. Esos talleres darían mayor relieve al ACAP a nivel nacional y podrían proporcionarle información útil sobre los enfoques de las Partes respecto de los datos. Entre las cuestiones que se examinarían en los talleres podrían figurar las siguientes:

1. Elaboración de directrices sobre métodos, posiblemente una caja de herramientas de recopilación y análisis de datos.
2. Cómo abordar los obstáculos a la falta de capacidad y orientación.
3. Un enfoque en la estimación de los intervalos de confianza, así como el total y las tasas de la captura secundaria.
4. Elaboración de una serie de estudios de casos para fundamentar el debate sobre las limitaciones de capacidad y contribuir a la elaboración de posibles soluciones a las prioridades específicas de las Partes.

En el taller también se examinaron el alcance y la orientación de los actuales indicadores de Estado-Presión-Respuesta para la captura secundaria de aves marinas y se determinaron algunas esferas de mejora que podrían permitir una presentación de informes más inmediata mientras se adoptan medidas para mejorar la presentación de informes sobre los principales indicadores de Presión.

Se tomó nota de que era necesario definir mejor muchos términos (por ejemplo, “disponibilidad”) utilizados en los indicadores para garantizar la recopilación de datos coherentes y comparables.

En **SBWG11 Doc 16** se analizó la información disponible relacionada con la captura secundaria de aves marinas contenida en los informes anuales de las Partes Contratantes y las No Contratantes que Colaboran presentados a la Comisión Interamericana del Atún Tropical (CIAT). Este análisis requirió considerables recursos y no pudo automatizarse fácilmente. Sin embargo, análisis como este permiten comprender mejor la cantidad y calidad de la información comunicada por las Partes Contratantes y las No Contratantes que Colaboran, identificar las áreas débiles en la presentación de informes y determinar cómo podría ayudar el ACAP a mejorar los datos reunidos por los observadores.

En **SBWG11 Doc 20** se describió un enfoque analítico para los datos de captura secundaria en la pesca de arrastre chilena que demostró una disminución en la captura secundaria entre 2015 y 2021. El análisis utilizó una estimación de relación simple, como se sugiere en SBWG7 Doc 05. Se tomó nota de que la variación geográfica y el cambio en la ubicación de la pesca con arrastreros congeladores era probablemente un importante factor impulsor del cambio en la tasa de captura secundaria junto con la aplicación de otras medidas técnicas de mitigación.

Se debatió el documento **SBWG11 Doc 25** en el punto 15 de la Agenda.

Los autores no estuvieron disponibles para presentar el documento **SBWG11 Doc 27**, pero la GdTCS11 acogió con beneplácito el trabajo como una forma interesante de obtener información sobre captura secundaria de pescadores en una pequeña flota de embarcaciones en el Mediterráneo occidental. Los tamaños de las muestras indicaban que los autores habían entrevistado a muchos pescadores y que las bitácoras de autoinforme parecían haber logrado reunir datos y crear conciencia sobre la captura secundaria. El enfoque puede ser útil en otros lugares, pero se observó que, si la información obtenida por medio de este método comenzaba a utilizarse en la reglamentación o la aplicación, se corría el riesgo de reducir la calidad de los datos.

En **SBWG11 Inf 02** se indicó que había muy pocas capturas secundarias de arrastreros de vieira argentinos que no descartaban muchos desechos pesqueros comestibles.

Se consideró el documento **SBWG11 Inf 22** en relación con el punto 11 de la agenda.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Apoyar el establecimiento de un grupo intersesional de correspondencia para examinar los principales problemas en la recolección de datos y la presentación de informes.
2. Alentar a las Partes a que celebren un taller entre sus especialistas en datos sobre pesquerías, los administradores y los encargados de informar al ACAP para mejorar el flujo de datos al ACAP.
3. Refrendar el apoyo del ACAP a estos talleres, por ejemplo, proporcionando asesoramiento especializado, cuando sea factible, y alentar a las Partes a compartir sus experiencias con otras Partes para maximizar el aprendizaje.
4. Realizar una revisión intersesional para perfeccionar los indicadores de Estado-Presión-Respuesta a fin de que las Partes del Acuerdo puedan aplicarlos mejor y dar mayor visibilidad a la utilización de las recomendaciones sobre mejores prácticas.

12. TÉCNICAS DE MONITOREO DE LA CAPTURA SECUNDARIA DE AVES MARINAS Y DEL USO DE LAS MEDIDAS DE MITIGACIÓN

12.1 Revisión del desarrollo de métodos o técnicas de monitoreo en relación con la captura secundaria de aves marinas y el uso de medidas de mitigación

En **SBWG11 Doc 12** se informó que se desarrolló y evaluó una serie de marcadores genéticos, basados en muestras de plumas para ayudar en la identificación de especies de albatros y petreles capturadas en la pesca. A partir de los análisis, se determinó que la combinación de dos marcadores genéticos podía identificar el 97 % (n=35) de las 36 especies de aves marinas objetivo como especies (n=32) o especies hermanas (n=3), mientras que para una especie de petrel no había secuencias de referencia. Los métodos genéticos proporcionan un marco simplificado para la identificación molecular de la captura secundaria de aves marinas a fin de corroborar o corregir los registros en las bitácoras de pesca, los informes de observadores y las auditorías de las imágenes captadas mediante monitoreo electrónico (ME). La GdTCS11 tomó nota de la importancia del análisis genético para la identificación específica de especies de aves marinas capturadas en la pesca para mejorar el monitoreo y la gestión de la captura secundaria, y reconoció el valor de los resultados presentados en **SBWG11 Doc 12**. Los autores señalaron que las pruebas fueron diseñadas específicamente para ser simples y rentables, y aconsejaron que el género de las aves capturadas incidentalmente también podría determinarse a partir de muestras de plumas, lo

que es importante para comprender los efectos a nivel poblacional de la mortalidad de las aves marinas en la pesca.

En **SBWG11 Doc 24** se presentó un dispositivo de monitoreo del cumplimiento de líneas espantapájaros desarrollado con fondos de una pequeña subvención del ACAP. El dispositivo funciona midiendo continuamente la tensión ejercida por una línea espantapájaros cuando su extremo terminal se arrastra a través del agua. Esos dispositivos pueden mejorar la vigilancia independiente de la implementación y el uso de líneas espantapájaros, así como reducir la carga de trabajo y los posibles riesgos para la salud y la seguridad en el trabajo que enfrentan los observadores de pesquerías en el mar. Cabe considerar un mayor nivel de investigación y desarrollo de dispositivos de monitoreo del cumplimiento de las líneas espantapájaros. La GdTCS11 acordó que esta herramienta confiable y asequible podría incluirse en el arsenal de dispositivos que pueden ser integrados en el ME para permitir el monitoreo del uso de medidas de mitigación de captura secundaria de aves marinas. La GdTCS11 alentó a continuar la investigación y el desarrollo de tales dispositivos.

En **SBWG11 Doc 26** se describieron los resultados de un programa de ME desarrollado en el marco de la certificación de la pesquería argentina de la merluza de cola (*Macruronus magellanicus*) de acuerdo con la norma del Marine Stewardship Council (MSC) y el desarrollo de un plan de acción conjunto entre el cliente de la pesquería y Aves Argentinas. Se instalaron cámaras y se solicitaron bitácoras de pesca en cuatro arrastreros congeladores para registrar el uso y la configuración de líneas espantapájaros para cables de arrastre en 21 viajes de pesca. Los datos recopilados indicaron que se desplegaron líneas espantapájaros durante el 80,5 % del tiempo de virado en los viajes monitoreados. Se identificaron limitaciones técnicas que pueden afectar la calidad de los datos recopilados. La GdTCS11 reconoció la importancia del documento **SBWG11 Doc. 26**, que muestra cómo se pueden utilizar las cámaras para evaluar la eficacia de las líneas espantapájaros y monitorear su uso y, asimismo, tomó nota del posible valor de los sistemas de certificación para promover mejoras en el cumplimiento de las medidas de mitigación de la captura secundaria de aves marinas.

La GdTCS11 reconoció el valor de utilizar bitácoras de autoinforme para evaluar la captura secundaria de aves marinas, particularmente en la pesca de pequeña escala, como se describe en **SBWG11 Doc 27** y **SBWG11 Inf 22**. Este método permite obtener un gran volumen de datos con resolución diaria (o basada en operaciones de pesca individuales). La GdTCS11 tomó nota de que el uso de bitácoras de pesca también podría ser útil para establecer relaciones con los pescadores, sin embargo, en las pesquerías donde las medidas de ordenación son obligatorias o los pescadores perciben que la notificación de captura secundaria es algo negativo, se espera que la fiabilidad de los datos de bitácoras de autoinforme sea baja.

En **SBWG11 Inf 24** se analizó el tiempo de calados individuales con palangre pelágico en las OROP de atún y las flotas de pabellón utilizando datos del sistema de identificación automática (SIA) de Global Fishing Watch (GFW), y se mostró que, en general, el calado nocturno es extremadamente inusual, mucho menor que el registrado por los sistemas de observadores a bordo y en la información notificada por las Partes Contratantes y las No Contratantes que Colaboran a las OROP. La GdTCS11 reconoció la importancia de los resultados reflejados en **SBWG11 Inf 24** como una posible herramienta para evaluar el cumplimiento de las Medidas de Conservación y Ordenación en alta mar. La GdTCS11 debatió el valor de la metodología y los algoritmos utilizados en este trabajo para permitir la verificación remota del calado nocturno, y tomó nota de que este tipo de análisis también se puede realizar utilizando datos del Sistema de Control de Buques (VMS).

Los siguientes documentos de información también fueron pertinentes para el punto 12 de la agenda: **SBWG11 Inf 09, SBWG11 Inf 14** y **SBWG11 Inf 23**.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Alentar una mayor colaboración entre las Partes en la utilización de técnicas genéticas para la identificación de especímenes de aves marinas capturados de forma secundaria.
2. Elevar el foco del ACAP en la implementación y el monitoreo al mismo nivel de prioridad que el desarrollo de recomendaciones de mejores prácticas.
3. Alentar a las Partes a que sigan trabajando para adoptar o desarrollar, y aplicar tecnologías y técnicas que permitan evaluar el cumplimiento de las pesquerías de las medidas de mitigación de la captura secundaria de aves marinas.

13. PAI/PAN-AVES MARINAS DE LA FAO

13.1 Revisión del estado de implementación del PAN-Aves marinas

La GdTCS11 felicitó a Argentina y Uruguay por avanzar en el desarrollo de un Plan de Acción Regional 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 (**SBWG11 Inf 03**). El objetivo del plan es proporcionar un marco formal, conceptual y operativo que contribuya a mejorar el estado de conservación de las aves marinas presentes en la Zona Común de Pesca Argentino-Uruguaya, y mitigar los impactos negativos de la interacción de estas especies con la pesca bajo un enfoque ecosistémico. Aunque Argentina y Uruguay ya han adoptado sus propios Planes de Acción Nacionales-Aves marinas, el Plan Regional pretende ser más que la suma de ambos planes nacionales, favoreciendo la colaboración entre ambos países, y tratando de ampliar la colaboración a una escala regional más amplia.

Muchas especies del ACAP utilizan aguas donde las pesquerías que influyen en la captura secundaria de aves marinas son gestionadas por más de una Parte. Por lo tanto, la GdTCS11 reconoció el posible beneficio de otras Partes, que comparten responsabilidades por esas aguas, y también desarrollaron e implementaron Planes de Acción Regionales que complementarían, pero no reemplazarían, sus propios Planes de Acción Nacionales.

En **SBWG11 Inf 15** se informó que el PAN-Aves marinas de Chile se actualizó para incluir medidas de mitigación para la pesca de arrastre y con palangre a nivel nacional. Actualmente se está examinando el Plan de Acción Nacional, que debería finalizarse este año. La GdTCS11 recibió de buen grado el informe.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Alentar la colaboración entre las Partes para establecer y aplicar Planes de Acción Regionales para hacer frente a la captura secundaria de aves marinas, cuando proceda.

14. COORDINACIÓN DE ACTIVIDADES CON RELACIÓN A LAS OROP

14.1 Información actualizada sobre la aplicación de la estrategia de interacción con las OROP

Se aceptó el documento **SBWG11 Doc 09** para su consideración por la reunión a pesar de su publicación tardía. Tras el debate relativo al documento se acordó que era necesario contar con un resumen claro y actualizable de los acontecimientos y una estrategia clara de interacción con las OROP. A fin de crearlos, se acordó establecer un pequeño grupo intersesional. Se tomó nota de que la RdP7 había dado gran prioridad a lograr una interacción exitosa con las OROP.

La GdTCS11 tomó nota de la importancia de que el ACAP continúe interactuando con las OROP, en colaboración con las Partes Contratantes y las No Contratantes que Colaboran de los Estados del área de distribución y BirdLife International, para avanzar en las mejoras de las Medidas de Conservación y Ordenación relacionadas con las aves marinas, las medidas de monitoreo y el cumplimiento.

Se trató el documento **SBWG11 Doc 16** en relación con el punto 11 de la agenda. La GdTCS11 tomó nota de la importancia del enfoque descrito y destacó el valor de presentar una versión perfeccionada a la CIAT.

Se debatió el documento **SBWG11 Doc 25** en el punto 15 de la agenda.

En **SBWG11 Inf 05** se abordó una estrategia multianual sobre aves marinas adoptada por la Comisión para la Conservación del Atún Rojo del Sur (CCSBT) en 2019 y su plan de acción adoptado en 2022. La GdTCS11 reconoció la importancia de esta estrategia y el potencial para el desarrollo de estrategias similares en otras OROP.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Apoyar la implementación continua de la actual estrategia de interacción con las OROP, actualizada en **SBWG11 Doc 09**.
2. Apoyar el establecimiento de un grupo intersesional para:
   (i) revisar los objetivos de la actual estrategia de interacción con las OROP con vistas a actualizarlos según sea necesario;
   (ii) revisar el formato temático de la estrategia y decidir si puede ser preferible un formato diferente;

(iii) mejorar la implementación de las mejores prácticas en medidas de mitigación de captura secundaria de aves marinas;

(iv) informar a la GdTCS12 y la CA14.

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

En **SBWG11 Doc 25** se identificaron los principales vacíos en la implementación de las recomendaciones de mejores prácticas del ACAP en las pesquerías comerciales de palangre de las Partes del ACAP; se exploraron posibles limitaciones o impedimentos para la adopción de las recomendaciones de mejores prácticas; y se identificaron formas de mejorar la adopción o la implementación de dichas recomendaciones. La información fuente comprendía un examen de todos los informes de implementación de las Partes presentados ante la RdP6 (2018), un examen de las medidas de conservación aprobadas para la mitigación de la captura secundaria de aves marinas de las OROP y una encuesta en línea en la que se formularon 13 preguntas sobre la aceptación y adopción de las recomendaciones de mejores prácticas del ACAP. La encuesta se dirigió a científicos, tecnólogos de artes, organismos de conservación y administradores de pesquerías empleados tanto en el sector público como en el privado, y de los que se sabía que tenían experiencia en el ACAP y en la elaboración y aplicación de recomendaciones de mejores prácticas. Los autores observaron que, en la actualidad, pocas Partes del ACAP y OROP de atún aplican plenamente las recomendaciones de mejores prácticas del Acuerdo, a pesar de que hay pocas pruebas de que los expertos piensen que dichas recomendaciones serían ineficaces si se aplicaran plenamente. También informaron que la presentación de informes de implementación deficientes y ambiguos por las Partes dificultaba la evaluación precisa del nivel de utilización de las recomendaciones de mejores prácticas. También señalaron que era improbable que las OROP aplicaran plenamente las recomendaciones de mejores prácticas del ACAP, mientras que las Partes del ACAP no aplicaban plenamente esas medidas. Por último, los autores recomiendan que el ACAP aliente a las Partes a que incorporen las recomendaciones de mejores prácticas en los elementos de su legislación y reglamentación nacionales para la ordenación de la pesca.

La GdTCS11 recibió de buen grado esta importante contribución y reconoció que existen barreras para el cumplimiento de los informes al ACAP. Un obstáculo importante para varias Partes era que no todas las entidades pertinentes que disponen de los datos necesarios para la presentación de informes del ACAP estaban motivadas para compartir información. En algunos casos, los administradores pueden no estar de acuerdo en que las aves marinas necesiten protección en sus pesquerías. Se tomó nota de que la legislación que exigía la aplicación de las recomendaciones de mejores prácticas no necesariamente daba lugar a la aprobación y aplicación. También se tomó nota de que se recomienda la inclusión de representantes de la industria en las reuniones del GdTCS, ya que podría mejorar el proceso del ACAP y la aplicación de las recomendaciones de mejores prácticas.

La GdTCS11 también acordó que la revisión de los indicadores mejoraría la calidad y utilidad de la información proporcionada al ACAP, y acordó que los indicadores deberían revisarse durante el período entre sesiones para que estos sean más específicos y se centren en las declaraciones de acción.

En **SBWG11 Doc 13** se presentaron los resultados de una revisión de las mejores prácticas en el desarrollo de marcos de gestión para abordar la captura secundaria de aves marinas. Esto incluyó evaluar cómo se identifican los problemas relativos a la captura secundaria, cómo se establecen los objetivos relativos a la población y a la reducción de la captura secundaria, y cómo se utilizan los procesos de evaluación de riesgos para evaluar el impacto. El examen se basó en las prácticas vigentes en los marcos de ordenación nacionales e internacionales para gestionar los efectos de las pesquerías en las aves marinas, así como en los mamíferos marinos, las tortugas marinas y los elasmobranquios. Sobre la base de esta revisión, se formuló una serie de recomendaciones a dos niveles: para los administradores de la pesca y los responsables políticos que trabajan con pesquerías individuales; y para organizaciones internacionales o regionales más amplias que trabajan en la captura secundaria de aves marinas. La GdTCS11 recibió de buen grado este documento y acordó alentar a las Partes a considerar sus recomendaciones. Se tomó nota de que el ACAP se proponía actualizar la información sobre superposición de las pesquerías con las distribuciones de aves marinas y compartir ampliamente esa información. Esto se mejorará aún más con el desarrollo de la estrategia de comunicación del ACAP.

En **SBWG11 Doc 22** se describió una caja de herramientas de información con base empírica para la cadena de suministro del atunero al mercado desarrollado por Southern Seabirds Trust y el Departamento de Conservación de Nueva Zelandia. La caja de herramientas incluye estos objetivos:

- resumir las zonas de riesgo para las aves marinas en los océanos del mundo;
- describir las medidas técnicas y operativas de mitigación disponibles para reducir la mortalidad de las aves marinas; describir en qué medida es probable que las medidas reduzcan la mortalidad de las aves marinas cuando se utilizan individualmente y en combinación;
- esbozar las herramientas de auditoría disponibles para verificar que las medidas se utilicen y cumplan las especificaciones del ACAP;
- describir la idoneidad y fiabilidad de estas herramientas de auditoría en diferentes situaciones;
- proporcionar orientación sobre los resultados de auditoría en términos de probables reducciones de la mortalidad de las aves marinas.

La caja de herramientas proporcionará información al instante a las empresas responsables que buscan garantizar la sostenibilidad de sus productos.

La GdTCS11 acogió con beneplácito este enfoque para la implementación de las recomendaciones de mejores prácticas al involucrarse directamente con la cadena de suministro que va de las embarcaciones al mercado, especialmente porque las normas del Marine Stewardship Council se han revisado y fortalecido en relación con las aves marinas. Muchos recursos del ACAP están disponibles para ayudar en este esfuerzo, y la GdTCS11 recibió de buen grado todos los productos del ACAP disponibles para apoyarlo. La GdTCS11 expresó su deseo de colaborar con el proyecto y alentó futuras manifestaciones sobre cómo puede ayudar el ACAP.

El documento **SBWG 11 Inf 06** fue uno de los primeros productos de la caja de herramientas que examinó las pruebas disponibles sobre el desempeño de determinadas medidas de mitigación de la captura secundaria de aves marinas, incluidas cinco que el ACAP ha identificado como medidas de mejores prácticas para su uso en la pesca de palangre pelágico.

Este informe se centró en la presentación de pruebas y no pretende ser una fuente de recomendaciones de mejores prácticas de mitigación. La GdTCS11 recibió de buen grado este documento bien elaborado y acordó que es un resumen útil de las fortalezas y limitaciones de las recomendaciones de mejores prácticas del ACAP, así como la justificación para el uso simultáneo de las tres principales mejores prácticas en medidas de mitigación. El GdTCS expresó su interés en considerar otros productos derivados de la caja de herramientas.

En **SBWG11 Inf 08** se presentaron los resultados de la revisión de la norma de pesca del MSC relativa a los impactos sobre las especies en peligro de extinción, amenazadas, y protegidas (ETP). Los principales cambios relativos a la captura secundaria de aves marinas incluyen que la pesquería que solicita la certificación demuestre que no obstaculiza la recuperación de especies ETP a un "estado de conservación favorable", que aplica medidas de buenas prácticas para minimizar la mortalidad cuando exista y que demuestra que las medidas han sido eficaces para reducir la mortalidad de especies ETP o que el impacto es nulo o insignificante. La GdTCS11 recibió de buen grado este documento y expresó su apoyo a la revisión 3 de la norma del MSC, lo cual reconoce una mayor necesidad de protección de las aves marinas en el proceso de certificación. La GdTCS11 agradeció a los miembros que habían contribuido al proceso de revisión.

RECOMENDACIONES AL COMITÉ ASESOR

El GdTCS recomienda al Comité Asesor lo siguiente:

1. Refrendar y apoyar el desarrollo de una caja de herramientas de información con base empírica por parte de Southern Seabirds Trust para la cadena de suministro que va del atunero al mercado.
2. Reconocer que actualmente son pocas las Partes del ACAP y las OROP de atún que aplican íntegramente las recomendaciones de mejores prácticas del ACAP, y que la presentación inadecuada de informes de implementación de las Partes a la RdP dificulta la evaluación precisa del nivel de aceptación de las recomendaciones de mejores prácticas.
3. Examinar el alcance de la presentación de informes de las Partes y la forma en que esto podría mejorarse para proporcionar informes más transparentes y sólidos sobre la implementación de las recomendaciones de mejores prácticas y la presentación de informes sobre captura secundaria.
4. Reconocer que la participación del ACAP en el proceso de examen de la norma de pesca del MSC contribuyó a introducir mejoras sustanciales en una nueva versión de dicha norma. La nueva norma incluye requisitos sobre información, gestión y resultados relativos a la captura secundaria de aves marinas.
5. Fomentar la participación continua del ACAP en los procesos de certificación pesquera.

16. HERRAMIENTAS Y DIRECTRICES

16.1 Actualizaciones y nuevas directrices

En **SBWG11 Doc 14** se señaló que, durante los eventos de captura secundaria en pesquerías de cerco, hubo una falta de protocolos para el rescate y manejo eficaz de especies no objetivo como las aves marinas. En la mayoría de estos casos, los procedimientos de extracción y manipulación de aves se realizan de manera inadecuada, con el potencial de daño físico a las aves que posteriormente se liberan. En el documento se proporcionaba información actualizada y recomendaciones sobre las técnicas seguras de manipulación de aves marinas en la pesca de cerco y el uso de instrumentos apropiados con ese fin. La GdTCS11 agradeció a los autores por el artículo y sugirió presentar estas recomendaciones como ficha informativa específica para pesquerías de cerco o integrarse en una ficha informativa específica sobre el manejo seguro de aves marinas enredadas de redes.

16.2 Fichas informativas sobre mitigación

En **SBWG11 Doc 08** se informó sobre los avances logrados en la actualización de las fichas informativas sobre mitigación de la captura secundaria para reflejar el nuevo diseño simplificado. Tras la GdTCS10, se han finalizado y traducido a ocho idiomas la ficha descriptiva introductoria y una sobre la mejora de la seguridad de la tripulación durante el virado de brazoladas. Las cuatro fichas relativas a líneas espantapájaros están pendientes de finalización, como prioridad. Otras fichas de mejores prácticas del ACAP que aún no se han adaptado al nuevo formato simplificado son el lastrado de brazoladas para palangre demersal (actualmente, existen fichas separadas para pesos externos, pesos integrados y sistema chileno); colisiones con los cables y enredos con la red. La GdTCS11 consideró que la hoja informativa sobre las colisiones con los cables debería ser prioritaria, señalando que también debería cubrir los cables de monitoreo. Marcelo García (Chile) aceptó liderar el desarrollo de esta ficha informativa.

Sebastián Jiménez seguirá liderando las cuatro fichas informativas sobre líneas espantapájaros, y Verónica Iriarte liderará la redacción de una ficha informativa sobre el manejo seguro de aves marinas enredadas en redes, que incluye las redes de cerco.

Barry Baker (Australia) acordó desarrollar la ficha informativa sobre lastrado de brazoladas para palangre demersal si no se encontraba otro postulante.

La Secretaría tomó nota de que las fichas informativas se produjeron en varios idiomas y que se agradecerían la traducción y, especialmente, el apoyo para la corrección de parte de los miembros del GdTCS y otros expertos pertinentes. Varios miembros del GdTCS ofrecieron sus servicios para esta tarea. La Secretaría agradeció a los Estados Unidos por patrocinar las traducciones más recientes.

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 GdTCS11.

2. Recibir de buen grado la elaboración de directrices sobre la manipulación segura de aves marinas en las pesquerías de cerco (según lo informado en **SBWG11 Doc14**) y alentar la elaboración de directrices para otros artes de pesca.

17. PROGRAMAS FINANCIADOS POR EL ACAP

17.1 Pequeñas subvenciones y pasantías

En **AC13 Inf 02** se proporcionó un resumen de las pasantías apoyadas por la ronda de financiación de 2022. También se ofreció un resumen de los avances y los resultados de las pequeñas subvenciones apoyadas en las rondas de financiación de 2020 y 2019, así como las pasantías de 2019, que se vieron retrasadas debido a las restricciones de viajes internacionales y que aún no habían comenzado en el momento de presentar el informe para la CA12 en agosto de 2021. La GdTCS11 tomó nota de que ambos programas posibilitaron un trabajo valioso e interesante para avanzar en los objetivos de ACAP y de que le gustaría que esto continuara.

17.2 Prioridades de financiación para el período 2023-2025

El GdTCS alentó futuras propuestas de pequeñas subvenciones y pasantías que aborden temas identificados en el Programa de Trabajo u otras prioridades de investigación identificadas en este informe.

18. PROGRAMA DE TRABAJO DEL GDTCS

18.1 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 (**CA13 Doc 13**) fueron analizadas tras las deliberaciones llevadas adelante durante la GdTCS11. Se ha preparado una versión actualizada del Programa de Trabajo para su consideración por parte del Comité Asesor.

19. OTROS ASUNTOS

No se plantearon temas en este punto de la agenda.

20. 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 los intérpretes por sus valiosos esfuerzos durante la reunión y a los anfitriones del Reino Unido por proporcionar una sede e instalaciones para la reunión excelentes.

ANEXO 1. LISTA DE PARTICIPANTES DE LA REUNIÓN GdTCS11

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
Juan Pablo Seco Pon	SBWG Co-viceconvenor, Instituto de Investigaciones Marinas y Costeras, CONICET-UNMDP, Argentina
Luis Adasme	Instituto de Fomento Pesquero, Chile
José Carlos Baez	Spanish Oceanographic Institute
Barry Baker	Institute for Marine and Antarctic Studies (IMAS), Australia
Jonathon Barrington	Department of Climate Change, Energy, the Environment and Water, Australian Antarctic Division, Australia
Andrés Domingo	Dirección Nacional de Recursos Acuáticos, Uruguay
Marco Favero	Instituto de Investigaciones Marinas y Costeras, CONICET, Argentina
Caroline Fox	Environment and Climate Change Canada
Eric Gilman	Fisheries Research Group,
Ed Melvin	University of Washington, USA
Gabriela Navarro	Subsecretaría de Pesca y Acuicultura, Argentina
Tatiana Neves	Projeto Albatroz, Brazil
Cristián Suazo	Albatross Task Force - Chile, BirdLife International
Mark Tasker	Joint Nature Conservation Committee, United Kingdom/ TWG Convenor
Megan Tierney	Joint Nature Conservation Committee, United Kingdom

Advisory Committee Members, Representatives and Advisors	
Orea Anderson	Advisor, United Kingdom
Elizabeth Biott	Alternate Representative, United Kingdom
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ANEXO 2. REVISIÓN DEL ACAP DE LAS MEDIDAS DE MITIGACIÓN DE LA CAPTURA INCIDENTAL DE AVES MARINAS PARA PESQUERÍAS DE ARRASTRE PELÁGICO Y DEMERSAL

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 Thirteenth Meeting of the Advisory Committee
Edinburgh, United Kingdom, 22-26 May 2023

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 fish waste discharged by vessels that catch and process fish on-board (catcher-processors). 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 not associated with cable strikes. However, seabird net mortalities can occur in catcher-processor 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

[1] The netsonde monitor 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)[4] Any use of the word 'significant' in this document is meant in the statistical context.

attracted to the net during hauling by fish in the net, creating risk of net entanglement. Net entanglements can be prevented by reducing the time the net is exposed on the surface of the water. The following measures have been shown to be effective at reducing seabird bycatch in trawl fisheries and are recommended as best practice measures:

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 protecting trawl cables with mitigation devices. The following measures are recommended:

Warp cables

1. Deploy Bird Scaring Lines 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 during hauling through proper maintenance of winches and good deck practices; 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.

Agreement on the Conservation of Albatrosses and Petrels

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

Reviewed at the Thirteenth Meeting of the Advisory Committee
Edinburgh, United Kingdom, 22 – 26 May 2023

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

[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.[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).

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 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 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;

[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*. 2006; 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 in New Zealand (Pierre *et al*. 2010; Pierre *et al*. 2012b), the Falkland Islands (Islas Malvinas)[7] (Kuepfer *et al*. 2022) and Uruguay (Jimenéz et al. 2022;).

[7] 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 Sándwich del Sur) and the surrounding maritime areas.

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 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). 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.* 2023). 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.

Need for combination

Should be used in combination with offal/discard management.

Implementation monitoring

On-board observers, electronic monitoring or at-sea surveillance.

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 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.

2.3 Warp scarers

ACAP advice

Insufficient evidence. Not recommended as a mitigation 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.

2.4 Bird bafflers

ACAP advice

Insufficient evidence. Not recommended as a mitigation 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.

2.5 Cones on warp cables

ACAP advice

Insufficient evidence. Not recommended as a mitigation 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.

2.6 Warp boom

ACAP advice

Insufficient evidence. Not recommended as a mitigation 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.

2.7 Warp deflector

ACAP advice

Insufficient evidence. Not recommended as a mitigation 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).

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 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 INCIDENTAL DE AVES MARINAS PARA PESQUERÍAS DE PALANGRE DEMERSAL [8]

Agreement on the Conservation of Albatrosses and Petrels

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

Reviewed at the Thirteenth Meeting of the Advisory Committee
Edinburgh, United Kingdom, 22-26 May 2023

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.

[8] Only the amended component of the review document is presented here as noted in 6.1, and not the full advice and review document.

Agreement on the Conservation of Albatrosses and Petrels

ACAP Review of Seabird Bycatch Mitigation Measures for Demersal Longline Fisheries

Reviewed at the Thirteenth Meeting of the Advisory Committee
Edinburgh, United Kingdom, 22-26 May 2023

MITIGATION MEASURES UNDER DEVELOPMENT OR WHICH REQUIRE FURTHER DEVELOPMENT OR INVESTIGATION

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).

17. 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.

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

Agreement on the Conservation of Albatrosses and Petrels

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

Reviewed at the Thirteenth Meeting of the Advisory Committee
Edinburgh, United Kingdom, 22-26 May 2023

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 optimize 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 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. 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 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 taken into account.

Current recommended minimum standards for branch line weighting configurations include the following:

(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.

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.

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 Twelfth Meeting of the Advisory Committee
Virtual meeting, 31 August – 2 September 2021

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[1] reduce the rate of seabird incidental mortality[2] 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.

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

[2] 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 (http://www.acap.aq/en/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).

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. 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). 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 line weighting, providing certain pre-conditions can be met, among other things: (a) that the weighting regime is adequately specified; (b) safety issues are adequately addressed; and (c) issues concerning application to artisanal fisheries are being taken into account.

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), current recommended minimum standards for branch line weighting are as follows:

(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.

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 <35 m total length: 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 ≥35 m total length: 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 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. Studies should also include evaluations of the effects of branch line weighting on the catch rate of pelagic fish and provide data that allow evaluation of the relative safety and practicality attributes of various weighting configurations.

Mitigation Fact Sheet

https://www.acap.aq/en/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 and 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 weighted branch lines 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 weighted branch lines. 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 weighted branch lines 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 weighted branch lines (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 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 meters outboard of the side of the vessel that baits are deployed.

Need for combination

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

Implementation monitoring

Requires fisheries observers, video surveillance or at-sea surveillance (e.g. patrol boats or aerial over-flights).

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 line weighting, has been found to be effective

for mixed and short BSLs (ATF 2011; Domingo *et al.* 2017, Gianuca *et al.* 2011, Meyer and 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 line weighting and night setting. BSLs used alone can rarely protect baited hooks beyond the aerial extent of the line.

Implementation monitoring

Requires fisheries observers, video surveillance, or at-sea surveillance (e.g. patrol boats or aerial over-flights).

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.

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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