Agreement on the Conservation of Albatrosses and Petrels

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Incidence of live bird haul capture in pelagic longline fisheries.

Examination and Comparison of live bird haul captures in Fisheries other than the Hawaii shallow set fishery

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SUMMARY

For this study, incidence of live bird capture during line hauling was derived from 80 million observed hooks on which a total of 4379 seabirds were caught. Of these, 19% were alive, or 10% if excluding the Hawaii shallow set fishery. Outside the Hawaii Shallow Set fishery there is widespread evidence of live bird haul capture, although at a lower rate. The reason for higher incidence in certain fisheries, yet lower incidence in others, is not entirely clear. Annually, in pelagic longline fisheries alone there could be at least 3,500-7,350 birds caught alive and released with uncertain survival prospects.

The greatest cause for concern with regard to live bird haul capture in pelagic longline fisheries is the potential for this to substantially increase as a consequence of the ACAP best practice mitigation guidelines advocating night setting. A night setting routine causes the majority of hauling to shift into daylight hours, thereby increasing the risk of bird capture during the haul. However, the benefit to seabirds from more night setting is likely to greatly exceed the potential negative consequences of increased capture during the haul. Possible combined mitigation alternatives to night setting, which also maintain a low risk of live bird haul capture do exist.

A focus on the appropriate safe release of haul-caught birds would help to offset increased haul catch because of night setting. There is a critical need to rectify the deficiencies in data collection, and to ensure accurate reporting of observer data detailing haul catch. It is also essential to reach a better understanding of post-release survival rates and to further investigate the prevalence of live haul capture in specific fisheries and the potential for this problem to increase in fisheries more widely.

RECOMMENDATIONS

1. Recognise the implications of the ACAP Best Practice Guidelines, which have the potential to cause an increase in line hauling capture incidence as a consequence of advocating night setting which in turn causes more of the hauling to occur in daylight.
2. Define ‘bird bycatch’ more clearly in relation to those birds landed alive and released. Because post-release survival prospects are uncertain the live caught are also counted as dead. This has important implications to night setting advocacy and attitude to mitigating haul captures (especially if it increases).
3. Request that New Zealand provide more detail about the prevalence of live bird capture in its pelagic longline fisheries. It was not possible to extract such information in a timely manner for this study.
4. Enable through tRFMO’s, a method for Members to accurately document and report live bird haul captures, providing suggestions as to what may be necessary to add to existing observer data collection protocols, data analysis, data reporting, with appropriate data compilation and accessibility. See Annex 1.
5. In light of live bird haul capture incidence, review existing outreach material on live bird handling practices and the need to be more proactive in education on this specific issue. Suggestions have been outlined in Annex 2.
6. Request that USA undertake further analysis of fishery observer data to improve understanding of haul bird capture and mitigation options. See Annex 3
7. Review the ACAP Grants process, and the administration of WG assignments that could enhance the ability of WG members to complete assignments and improve outcomes.
8. Post-release bird survival studies are required, and these may include tracking of released haul caught birds.

Incidencia de la captura de aves vivas durante el virado en las pesquerías de palangre pelágico.

Evaluación y comparación de captura de aves vivas durante el virado en pesquerías distintas de la pesquería de calado superficial de Hawai

RESUMEN

Los datos de este estudio sobre la incidencia de la captura de aves vivas durante el virado se obtuvieron de 80 millones de anzuelos observados, donde un total de 4379 aves marinas fueron capturadas. De esa totalidad, un 19% estaban con vida, lo que equivale a un 10% si se excluyen las pesquerías de calado superficial de Hawai. Fuera de las pesquerías de calado superficial de Hawai, existe evidencia generalizada con relación a la captura de aves vivas durante el virado, aunque las tasas son menores. Se desconoce la razón por la cual algunas pesquerías tienen una incidencia mayor y otras, sin embargo, tienen una menor. Se estima que solo en las pesquerías de palangre pelágico, el número de aves marinas capturadas con vida y luego liberadas, con posibilidades de supervivencia inciertas, es de al menos 3.500 a 7.350 por año.

La principal causa de preocupación con relación a la captura de aves vivas durante el virado en las pesquerías de palangre pelágico obedece a la posibilidad de que este fenómeno aumente de manera sustancial como consecuencia de las guías de mejores prácticas del ACAP para la mitigación que abogan por el calado nocturno. La rutina de calado nocturno conlleva que la mayoría de las operaciones de virado se trasladen a las horas diurnas,y así aumenta el riesgo de capturar aves durante el virado. Sin embargo, es probable que los beneficios del calado nocturno para las aves marinas superen ampliamente las posibles consecuencias negativas de que aumenten los volúmenes de captura durante el virado. Las posibles medidas combinadas de mitigación como alternativas al calado nocturno, que también mantienen el riesgo de captura de aves vivas durante el virado en niveles bajos, de hecho son una realidad.

Subrayar la adecuada liberación segura de las aves marinas capturadas durante las operaciones de virado ayudaría a contrarrestar el aumento de capturas registradas durante esas operaciones. Hay una necesidad apremiante de rectificar las deficiencias a la hora de recopilar datos y de garantizar la notificación precisa de los datos de observación con detalles de captura secundaria de aves marinas durante el virado. También es fundamental comprender más cabalmente las tasas de supervivencia de aves tras su liberación y continuar investigando sobre la prevalencia de la captura de aves vivas durante el virado en determinadas pesquerías y las probabilidades de que este problema aumente de manera generalizada en las pesquerías.

RECOMENDACIONES

1. Reconocer las implicancias de las guías de mejores prácticas del ACAP, que pueden llegar a generar un aumento en la incidencia de la captura secundaria durante la recogida del palangre como consecuencia de abogar por el calado nocturno, que, a su vez, conlleva que una mayor parte del virado se realice durante las horas diurnas.
2. Definir la "captura secundaria de aves" con mayor claridad respecto de las aves que caen vivas y son liberadas. Las aves capturadas con vida son contabilizadas como muertas dado que sus posibilidades de sobrevivir tras ser liberadas son inciertas. Ese factor tiene implicancias importantes en lo referido a abogar por el calado nocturno y a la actitud frente a la mitigación de la captura de aves durante el virado (en especial si esta aumenta).
3. Solicitar que Nueva Zelanda proporcione más detalles sobre la prevalencia de captura de aves vivas en sus pesquerías de palangre pelágico. No fue posible obtener esa información de manera oportuna a los efectos del presente estudio.
4. Posibilitar, a través de las OROP, un método para que los Miembros documenten y notifiquen con precisión la captura secundaria de aves vivas durante el virado formulando sugerencias sobre aportes que pueden ser necesarios con relación a los protocolos existentes de recopilación de datos de observación, el análisis de datos y la notificación de datos a partir de la accesibilidad y recopilación de información. Remítase al Anexo 1.
5. Revisar el material existente acerca de la concientización sobre las prácticas para la manipulación de aves vivas y de la necesidad de implementar un enfoque más proactivo sobre este tema, a la luz de la incidencia de la captura de aves vivas durante el virado. En el Anexo 2 se han incluido algunas sugerencias.
6. Solicitar que EE. UU. examine en mayor profundidad los datos de observación de las pesquerías a fin de comprender más cabalmente la captura secundaria de aves vivas durante el virado y las opciones de mitigación. Remítase al Anexo 3.
7. Revisar el proceso de Subvenciones del ACAP y la gestión de designaciones relativas al GdT que podría mejorar la capacidad de los miembros de ese grupo a la hora de completar las designaciones y obtener mejores resultados.
8. Se requiere la realización de estudios sobre la tasa de supervivencia de aves marinas tras su liberación, los cuales pueden incluir el rastreo de las aves capturadas durante las operaciones de virado y luego liberadas.

Fréquence des captures d'oiseaux marins vivants lors du relevage des lignes dans les pêcheries palangrières pélagiques.

Examen et comparaison des captures d'oiseaux marins vivants lors du relevage des lignes dans les pêcheries autres que la pêcherie de surface d'Hawaï

RÉSUMÉ

Dans le cadre de la présente étude, l'observation de 80 millions d'hameçons, auxquels ont mordu quelque 4 379 oiseaux marins, a permis d'évaluer la fréquence des captures d'oiseaux marins vivants lors du relevage des lignes. 19 % des oiseaux étaient vivants ; 10 % si l'on exclut la pêcherie de surface d'Hawaï. En dehors de la pêcherie de surface d'Hawaï, de nombreux éléments attestent, bien que dans une moindre mesure, de la capture d'oiseaux marins vivants lors du relevage des lignes. On ne sait pas avec exactitude pourquoi la fréquence est plus importante dans certaines pêcheries et plus faible dans d'autres. Chaque année, pour les seules pêcheries palangrières pélagiques, au moins 3 500 à 7 350 oiseaux seraient capturés vivants et relâchés alors que leurs chances de survie sont incertaines.

Pour ce qui concerne les captures d'oiseaux marins vivants lors du relevage des lignes dans les pêcheries palangrières pélagiques, l'élément qui suscite le plus d'inquiétudes est la pose de nuit prônée par l'ACAP. En effet, cette bonne pratique destinée à atténuer les captures d'oiseaux marins serait susceptible de produire l'effet contraire. La pose de nuit implique que la majorité des lignes sont relevées en plein jour, ce qui augmente le risque de captures d'oiseaux marins au cours de l'opération. Néanmoins, les avantages que les oiseaux marins retireraient d'un renforcement de la pose de nuit sont susceptibles de dépasser largement les conséquences potentiellement négatives de l'augmentation des captures lors du relevage des lignes. En dehors de la pose de nuit, d'autres solutions d'atténuation mixtes existent qui permettent de contenir le risque de captures d'oiseaux vivants lors du relevage des lignes.

Mettre l'accent sur les techniques appropriées qui facilitent la remise en liberté en toute sécurité des oiseaux capturés lors du relevage des lignes permettrait de compenser l'augmentation du nombre de captures lors du relevage des lignes liée à la pose de nuit. Il est indispensable de combler les lacunes en matière de collecte de données et d'assurer la communication précise des données d'observation qui décrivent en détail les captures d'oiseaux marins lors du relevage des lignes. Il est, par ailleurs, essentiel de mieux comprendre les taux de survie des oiseaux marins après leur remise en liberté et d'examiner de manière approfondie la proportion d'oiseaux marins vivants lors du relevage des lignes dans des pêcheries spécifiques, ainsi que la probabilité que ce problème augmente dans les pêcheries de manière générale.

RECOMMANDATIONS

1. Reconnaître les conséquences des conseils en matière de bonnes pratiques de l'ACAP, susceptibles d'augmenter la fréquence des captures d'oiseaux marins vivants lors du relevage des lignes, puisqu'ils prônent la pose de nuit dont le corollaire est le halage d'une grande partie des lignes à la lumière du jour.
2. Définir plus clairement le terme « captures accessoires d'oiseaux » pour ce qui concerne les oiseaux capturés vivants et relâchés. En raison de l'incertitude qui entoure les perspectives de survie des oiseaux après leur libération, les oiseaux capturés vivants sont considérés comme étant morts. Cela a des conséquences importantes en ce qui concerne la promotion de la pose de nuit et les comportements vis-à-vis de l'atténuation des captures d'oiseaux lors du relevage des lignes (en particulier si le nombre de captures augmente).
3. Demander à la Nouvelle-Zélande de fournir de plus amples informations concernant la proportion d'oiseaux marins capturés vivants dans ses pêcheries palangrières pélagiques. Il n'a pas été possible d'obtenir ces informations en temps voulu dans le cadre de la présente étude.
4. Permettre aux Membres, par l'intermédiaire des ORGP thonières, de faire état avec exactitude des captures d'oiseaux vivants lors du relevage des lignes en soumettant des suggestions quant aux améliorations pouvant être apportées aux actuels protocoles de collecte de données d'observation, à l'analyse des données et à leur communication, et ce en garantissant la compilation adéquate des données et leur accessibilité. Voir annexe 1.
5. Compte tenu de la fréquence des captures d'oiseaux vivants lors du relevage des lignes, passer en revue les guides de bonne pratique en matière de manipulation des oiseaux vivants et favoriser une démarche d'information volontariste concernant ce point spécifique. Des suggestions sont exposées à l'annexe 2.
6. Demander aux États-Unis d'analyser plus en détail les données d'observation des pêcheries afin de mieux connaître le phénomène des captures d'oiseaux et les mesures possibles en matière d'atténuation. Voir annexe 3.
7. Passer en revue le processus d'allocation de subventions de l'ACAP ainsi que l'administration des tâches des groupes de travail afin de permettre à leurs acteurs de mieux s'acquitter de leur mission et d'améliorer les résultats.
8. Analyser le taux de survie des oiseaux après qu'ils ont été relâchés et éventuellement suivre l'évolution des oiseaux qui ont été libérés après avoir été capturés au cours du relevage des lignes.

1. INTRODUCTION

The issue of line hauling live bird capture as distinct from conventional line setting capture in pelagic longline fisheries was first highlighted in a brief USA paper (SBWG5 Doc44) in 2013. Line-setting bird bycatch has always been the primary focus of the ACAP Best Practice Seabird Bycatch mitigation advice. Similar measures to mitigate seabird bycatch during setting operations, including night setting, were implemented in the Hawaii shallow set swordfish fishery, and they created a situation whereby haul captures exceeded set captures of birds. Although the live bird capture rate was not then a serious concern, consideration was given to trying to reduce it. Information was subsequently provided to the ACAP in SBWG6 Info08 resulting in 'development of methods that minimise seabird hooking during hook retrieval being listed in mitigation research priorities (AC8, Doc12 Rev1 Report of SBWG6 2014 point 4.4). Doc 16 Rev3, 3.24 outlines the development of Best Practice advice for haul mitigation in pelagic and demersal longline fisheries, and 3.25 calls for an investigation into 'the existence of haul seabird bycatch outside the Hawaii fishery'. This paper attempts to address that particular information deficit.

In demersal longline fisheries, live bird haul capture can be a frequent and persistent problem, whereas in pelagic longline fisheries it has been considered a minor problem as observer data generally confirms. The processes of live haul capture and mitigation measures for demersal fisheries are sufficiently different to those of pelagic fisheries to warrant separate examination. This paper focuses solely on pelagic fisheries.

Accurate information on the incidence of live bird haul capture from many pelagic longline fisheries is lacking, presumably due to the rarity of such events, the inadequacy of observer protocols for documenting them, and the tendency to not differentiate life status in seabird bycatch reporting even when such data has been available, (Minami and Inoue 2012, for example). It is unclear whether assumptions were made that all captured birds were dead or whether records of live captures have simply been excluded, as in the case of Anderson et al (2011) who collated seabird bycatch data from 68 fisheries to obtain an estimate of total global annual bycatch. Assuming Anderson et al (2011) DID include live captures in their total annual global pelagic longline fisheries estimate, excluding the "abnormally" higher Hawaiian Shallow Set fishery (HSS) live captures this means that between 3500 and 7350 birds are caught and hauled alive annually in the pelagic longline sector alone.

2. METHODS

Information was derived from approximately 80 million hooks observed in various industrial pelagic longline fisheries between 1988 and 2014, (table 1). Because the majority of readily accessible seabird bycatch observer data rarely includes reliable figures of live versus dead birds or differentiates between line set captures and line haul captures, this study focused on seeking out data from specific fisheries where such information did exist.

The following questions were put to a selection of pelagic longline observer data from New Zealand, Australia and Hawaii

1. Of all observed seabird bycatch, what was the proportion landed alive?
2. What was the proportion of birds landed alive in daylight versus darkness?
3. What was the percentage of hooks observed hauled in daylight versus night?
4. What was the proportion of all the live bird captures actually known to have been captured during the haul?

While Australia (AFMA) answered these questions specifically, USA (NOAA) provided an appropriate sub-set of observer data in order that the questions could be answered. Since New Zealand (MPI) could do neither within the time frame of the project, data examined from NZ was confined to the online ‘Dragonfly’ publication of summarised observer information on bycatch.

The USA (NOAA) data was of particular significance to ascertain whether the extent of day hauling alone was a key contributing factor to incidence of live bird haul capture. Provision of specific observer data from both the Hawaii SS (HSS) fishery and Hawaii Deep Set (HDS) fishery allowed for the investigation of haul capture in both fisheries and comparisons between them, which helped ascertain the relationship between night setting and the incidence of haul captures. Resource constraints on the project necessitated simplification of some parameters, such as generalisations of light/dark determinations for each set, geographically and seasonally. Consequently for this study, daylight was defined as the time between mean nautical dawn (0500 am) and mean nautical dusk (730pm) for that general region. Numbers of hooks in each haul were used to calculate percentages hauled in day and in night based on the haul start time plus the mean HSS haul duration of 9 hours (or for HDS 12 hours), relative to nautical dawn and dusk. The HDS data examined was confined to all observed sets north of 23 degrees north latitude. Excluded from the study were sets to the south where few susceptible bird species occur.

3. RESULTS

3.1. Comparisons of live bird haul capture incidence in the Hawaii shallow set fishery (HSS) and the Hawaii deep set (HDS) fishery

From 2005 – 2013 in the HSS fishery, 468 birds out of 600 caught were live haul captures. By comparison, 16 out of 385 over the same period of time (table 1) in the HDS fishery were live haul captures. In table 2, a breakdown provided of live haul-captures relative to daylight hours clearly indicates how the duration of daylight hauling in each fishery could alone dictate haul capture incidence.

To illustrate the consequence of a potential trend toward night setting (with the resulting higher proportion of hauling occurring in daylight), data from the HSS fishery (mostly day-hauled hooks) and the HDS fishery (mostly night-hauled hooks) were examined. In such a comparison, these fisheries are geographically separate and bird abundance is likely to correlate with incidence of capture (Gilman et al 2014). However, the fact that virtually all (99%) HSS hooks are day-hauled whereas only 22% of HDS (table 3) are day-hauled is a highly relevant operational difference that could alone be the most important determinant in the variation in rate of live bird haul capture of these as well as other fisheries.

If the duration of day hauling alone is indeed the most important determinant of live bird capture the corresponding CPUE ought to be similar in both fisheries. However, this is not the case. The CPUE of live birds caught on day hauled hooks in the HSS fishery of 0.036 per 1000 hooks is 18 times greater than that of the HDS fishery at 0.002 per thousand hooks. It is not known if a difference in bird abundance could be largely responsible for live bird haul CPUE being so different on day hauled hooks. Considering just the hauls on which birds were caught, the CPUE was 1.69 per thousand hooks in the HSS fishery compared to 0.52 per thousand hooks in the HDS fishery. If all vessels in each fishery caught birds at these same rates the total take (2005-2013) by the HSS would have been 21,000, and in the HDS, 19,000 birds.

Whether having a lower number of hooks in a haul had any bearing on live bird haul captures is not known. However a mean number of 991 hooks per haul that caught birds compared to 783 in hauls without birds, may indicate that this is a factor, and it is logical that less hooks per set means slower and therefore safer hauling for birds.

Although Gilman et al (2014) state that 70% of live bird captures are single events in a haul, the fact that 28 % of all live birds and 30% of all dead birds were captured in just 3% of trips that caught birds (table 5) needs investigation, particularly for the purpose of prescribing the right mitigation. With a significant proportion of all birds live-caught in the fishery being from a small proportion of fishing trips this could be related to the prevalence of birds as discussed by Gilman et al (2014). However, it is also possible that these 10 trips could for example have in common, the same captain, or the same vessel, or both. This is not known without access to further data. The practices of an individual captain or those of the crew, or alternatively the layout of the vessel and its individual peculiarities can all have a significant bearing on incidence of live bird haul capture. The extent of hauling competence (or incompetence) can be a critical factor, also whether crew rather than captain assumes full responsibility for the haul procedure, including who drives the boat during hauling.

The HDS fishery haul rate typical of pelagic longline fisheries of around 3.2 hooks per minute is actually faster than the HSS haul rate of 1.76 hooks per minute. The haul rate is determined by several factors including vessel speed, mainline drum diameter and its rpm, and the distance between branchline attachment and the mainline. Birds caught during the haul are caught during the final recovery stage after the branchline is unclipped. Deep set hooks tend to stay deep for longer until arriving alongside vertically, compared to HSS hooks, which come in more horizontally and remain accessible to birds for longer.

Table 4 indicates that the HDS fishery maintains a daily fishing routine, typical of pelagic longline fisheries generally, which starts the haul within 3 hours prior to nautical dusk (7.30pm). This ensures that most hooks are hauled in darkness. By contrast, the HSS fishery with its haul usually starting within 3 hours after nautical dawn (5.00am) results in virtually all hooks being hauled in daylight.

3.2. New Zealand surface longline fisheries

In the NZ longline fisheries between 2003 and 2013, 27% of all seabirds captured were landed alive (table 1). Throughout this period, the ratio of live to dead birds was reasonably consistent from year to year although in 2013 as few as 15% of birds were alive. It would be interesting to investigate if this lower rate in 2013 is related to more effective mitigation or greater extent of uptake (NZ CCSBT ERSWG 9 Country Report - night sets or day sets with weighted lines).

There is a considerably higher proportion of live bird captures in the NZ Southern Bluefin tuna (SBT) fishery than those reported by all other fleets fishing for SBT. It is important to understand what is responsible for this. Efforts to do so throughout the course of the current study have been unsuccessful. The information in table 7 for 2013/2014 (CCSBT, CC10 2014) shows that the live bird catch in the NZ charter fleet and the NZ domestic fleet combined was 29% over the two years, although the charter fleet live bird catch was 48% compared to the domestic fleet’s catch of 18%. The higher live catch rate of the charter fleet in the absence of more comprehensive data, is cause for concern, since this essentially represents DW Asian operations within a likely ranked 'Higher Risk' bird region.

Large albatross species are generally recovered alive more frequently than the smaller albatross species, due to being more buoyant and more powerful, therefore having the ability to survive longer on a hook. Large albatrosses are much less likely to be caught during the haul than the smaller species of albatrosses, who have the aerial agility, speed and manoeuvrability required for flying close alongside the hull of a vessel. Surprisingly, 43% of Southern Buller's albatrosses were captured alive whereas the next closest live capture rate of a similar (in terms of capture risk (Brothers 2008)) albatross species was 14% for the NZ Whitecap. The combined live capture incidence of four very similar albatross species (New Zealand Whitecap, Campbell Black-browed, Salvin's and Black-browed) was just 12%. Without scrutinising observer records it is impossible to reconcile this apparent anomaly. Table 6 has been included to illustrate how certain species are more often live-landed (for example Southern Buller's) than other species. However, for many species the overall numbers are too small to draw any conclusions.

Because the larger albatross species do not have a similar risk of haul capture to their smaller cousins, the comparative rate of live-capture could be indicative of whether they were caught during line setting or line hauling. Similar numbers (around 30%) of larger (5 species) and smaller (6 species) albatrosses were alive. An equivalent live caught proportion of 'large' and 'small' albatrosses may be due to the fact that, although the large albatrosses are unlikely to be haul caught, they have higher survival prospects if set-caught and are therefore more often hauled alive than set-caught small albatrosses.

Small petrels (9 species) are even more adept at interacting alongside a vessel and are therefore more likely than albatrosses to be live-caught during hauling. If they are set-caught, their survival prospects will be even lower than the smaller albatross species, indicated by the live capture incidence of 12%. It would generally be expected that smaller petrel mortality would be reasonably consistent across the fishery data, however all 12 Flesh-footed shearwaters caught were recorded as alive as well as about half the Sooty shearwaters, yet virtually all other similar sized species captured were dead. Such an anomaly in the data is inexplicable and indicates a scenario that is unlikely.

3.3. Australian pelagic longline fishery

Information provided upon request about live bird capture incidence in the Australian pelagic longline fishery consisted of percentages only, which have been derived from very small yearly capture numbers.

In Australia's domestic pelagic longline fishery between 2001-2014 inclusive, (AFMA Observer data) the incidence of live bird capture has remained very low despite the probable increase in percentage of daytime hauling in recent years as a consequence of increased night setting to avoid birds. Findings from the data do not indicate a change in live haul capture rates as a result of more hooks being set at night. It is possible, though unlikely, that the increased use of mechanical branchline recovery devices (snood pullers) in this fishery could contribute to the low live bird haul capture incidence. The use of such devices is sporadic in the Australian fishery and seldom, if at all, used in the Hawaii fisheries despite the use of very similar fishing gear. Low levels of use in the fisheries of both countries suggest that mechanised retrieval of the gear in question has some operational drawbacks, and this fact alone would make mechanised retrieval a questionable measure in certain fisheries for mitigating haul captures.

If the fishery statistics summarised by Brothers (2007) remain similar today then particular characteristics such as much shorter setting times (average 3.3 hours) with considerably less hooks (average 957 hooks) may be factors contributing to the potential of more set caught birds being hauled alive in the Australian domestic fishery. However, although shorter set times and less hooks should increase the survival prospects of set-caught or soak-caught birds, a longer soak time typically used (time from end of set to start of haul) of 7-10 hours may counteract this.

The limited data from the fishery makes it difficult to derive satisfactory or definitive answers about bird interactions. The percentage of observer coverage (around 7%) is simply inadequate to give enough information about such relatively rare events. For example, in 2008 there were just 12 seabird interactions recorded, 8 of which were mortalities, while in 2009 there were 6 interactions recorded, 4 of which were mortalities (Wilson et al 2009).

Despite 60.7% of observed hauled hooks being in daylight, a percentage that should increase the likelihood of live bird haul captures, data does not indicate this. In this fishery only 6.5% of live captures are believed to have been haul-caught, although 11.7% of all live captures are haul caught in other equivalent fisheries. Expressed differently, around 94% of the live bird captures in this fishery are NOT haul caught. The reason for this discrepancy is unclear, as is the quite high incidence (28%) of live birds hauled at night (which are presumably set or soak captures).

From a study of seabird bycatch over an 8 year period (1988-1995) in Australian waters, Gales et al (1998) found that with 80% of hooks set in daylight, and a corresponding predominance of night-time line hauling, only 3% of around 600 birds caught were alive, these being considered to be haul captures. Observed in this study were 7.9 million hooks from a total fishing effort of around 173 million hooks in a Distant Water (DW) Japanese fishery equivalent to all DW fishing.

3.4. Tuna RFMO's pelagic longline fisheries

There did not appear to be any relevant data to add to this study from the tRFMO sources of IOTC, IATTC, WCPFC and ICCAT. Together with a need for improved reporting on seabird bycatch (ISSF 2015) there is a need for the reported information to be appropriately compiled and made readily accessible (Angel et al 2015) by the tRFMO's. In contrast, the CCSBT information sources, at least in recent times, provided some useful information.

The CCSBT fishery comprises vessels with the same or similar gear, that fish across all tRFMO juridictions. As such, the CCSBT data is considered indicative of the live bird haul capture incidence generally, except that there is a far higher risk of bird interaction across the CCSBT fishery. Therefore the live bird haul capture figures from CCSBT alone could be higher than those from across all tRFMO's jurisdictions simply because of this fact.

3.5. The CCSBT Fishery

Perhaps the most accurate live bird haul capture indicator for DW Asian longline vessels comes from Gales et al (1998) previously mentioned, in which live bird haul capture incidence was 3% of ALL bird captures. Although this figure is likely to be valid today, more recent similar data combining figures from three Asian CCSBT Member nations (table 1) indicates that live bird capture (136) constitutes 7.4% of all observed captures (1710 birds). However this data does not differentiate between live birds caught during set, soak or haul.

It is of interest to note (see table 1) the difference in the percentages of live versus dead bird catch, with Japan's varying from 2.2% to 11.1% between years, figures most consistent with the low rates reported in Gales et al (1998) and Brothers (2008). In the Brothers (2008) study that covered 305 longline sets of nearly 800,000 hooks across five fisheries (mostly CCSBT) and monitoring of over 500,000 hauled hooks, no birds were still alive (there were 85 dead birds) when the lines were hauled. Also, there were no instances of birds actually being caught during hauling, and of particular relevance to the current study, is that only around 14% of hooks were hauled in daylight (84% of setting occurred in daylight, and varied from 43% to 100%).

The above rates also correlate with Korea's low rate, although their overall reported bird captures are inexplicably low. Of concern is that Taiwan's rate, tending to be steady at around 14%, had a live capture rate which reached 23.6% during one period - this approaches the relatively high rate of New Zealand. Although questioned about this during the course of the CCSBT meetings Taiwan was unable to clarify if its' vessels are equipped (as Japan's generally are), with mechanised branchline recovery devices. These devices are believed to help reduce live bird haul capture.

Irrespective of whether DW Asian vessels in the future trend towards night setting to reduce day setting seabird captures, the resultant increase in day hauling captures could be minimised, provided mechanised branchline recovery is widely practiced. The live bird haul capture rate from the day hauled portion of Hawaii DS fishing alone, suggests that if for any reason more night setting was to occur, increased day hauling may not necessarily result in a large number of live haul bird captures.

4. DISCUSSION

When viewed on the basis of daily fishing operations, live bird haul capture rate can be as high as 10 birds per 1000 hooks (one record, table 5) which is actually higher than the worst of line setting catch rates. This suggests that in other circumstances with similar fishing methods, live bird haul captures could reach the higher rate that has been observed. Of course if the relative prevalence of live bird haul capture in the HSS fishery is found to be associated with practices seen only in this fishery such as port side hauling or branchline hauling positions too far aft, then there would be less cause for concern about haul captures more widely. Haul captures may on the other hand simply be associated with an unfortunate mix of conditions of bird abundance and wind direction during day hauling of hooks. This is all the more reason to ensure that live bird haul capture in this HSS fishery is thoroughly understood, a task beyond the scope of this paper.

Even with the highest live bird haul capture scenario, (HSS) CPUE can be as low as 0.007 birds per 1000 hooks or up to around 0.06 (Gilman et al 2014) and there is a risk of these (apparently) low rates being seen as inconsequential, irrespective of there being measures that could further reduce them. Across all fisheries CPUE was around 0.01 birds per 1000 hooks, 0.04 for dead birds and 0.05 overall. The highest rate in the fisheries of this study was 0.04 in the HSS fishery followed by New Zealand with 0.03 Even the HSS rate (0.04) is still lower than target overall maximum rates such as Australia's 0.05 birds per 1000 hooks (DEPAC 2011).

With 78% of birds caught being alive in the HSS fishery, this represents the highest live bird haul capture figures from all the fisheries examined. The next highest of 27% in the NZ fishery, may include some live birds that were NOT haul-caught. In this fishery it has been estimated that 'up to a quarter of seabirds are caught in the haul, rather than during setting', (NZ Country Report CCSBT ERSWG10 2013). If this statement is accurate, this means that around 2% (or 19 birds out of 223) of live captures may not be haul caught. From all other fisheries that had reasonable data of this type, the live bird percentage was lower at around 10% or less, although the proportion across all fisheries was 19.5%. Relatively higher live bird catches in both NZ and HSS fisheries may simply be due to the associated higher bird abundance. The higher specific species abundance could also account for disproportionately higher catches of certain species (Laysan in Hawaii, Southern Buller's in NZ). Higher species abundance alone, irrespective of the risk capture difference between species (Brothers 2008) could determine catch rates overall and of certain species.

Live capture incidence in the HSS is likely to be due to a combination of specific unique and avoidable fishing practices (far-aft branchline recovery stations, vessel haul side alternation) (Gilman pers. comms.) in combination with the day hauling routine. In view of this, it does not automatically follow that rates of live bird capture will rise if there is a trend in the future, to more day hauling of hooks (ie night setting) in other fisheries. This view in part is reinforced by the very low incidence of live bird capture observed in (only) small portions of day hauled hooks by most fisheries that are currently mainly night hauling after setting during the day.

Seabird catch rate dropped dramatically after management prescriptions were imposed upon the HSS fishery in 2001 (Gilman et al 2014). If bird catch reduction has been achieved by more night setting of hooks (and prescribed branchline weight), then comparing current live bird capture rate would help to assess the likely impact of a trend to more night setting. Gilman et al (2014) expressed the opinion that the comparatively high live bird haul captures in that particular fishery are 'very unlikely to pose a risk to population viability or hinder plans for population rebuilding'. However, if longline fisheries more widely, attained a similar haul capture rate through a night setting trend for example, then this statement may no longer apply (except that a lower set capture would offset overall capture rate). At its' 2017 meeting the ERSWG to CCSBT is due to give further consideration to clarifying the term 'High Risk'. It will be important to include in any high-risk management, the consequences to live bird haul capture. Possibly the current evidence from the NZ charter fleet already indicates such issues. Higher rates of day haul capture when fishing in areas of greater bird abundance could be a predictable outcome if night setting (additional to other mitigation measures) is necessary in high-risk areas to contain line set bird mortalities.

The fact that line setting at night, as a mitigation measure, can alone reduce seabird catch rate by 85% in pelagic longline fisheries (eg. Brothers et al 1999) is adequate justification for this measure being retained as one of three best practice mitigation recommendations of the ACAP, despite its potential implications for increasing total live bird haul captures. Believed to be largely a consequence of having adopted the option to mitigate set captures by night setting in 2001, bird mortality declined by 91% in the HSS fishery. Although this change probably increased overall total live bird haul captures, the actual rate of catch per daytime-hauled hooks may not have altered. A key question remaining is whether vessels could continue to day set (night haul) with minimal haul captures and minimal set captures while using other mitigation strategies (branchline weighting, bird scaring lines, side setting, hook pods etc.). A CPUE of around 0.011 birds per 1000 hooks or better would be achieved. The problem with this is greater uncertainty of compliance with the mitigation options.

It is wrong to assume in pelagic longline fisheries that any bird caught and alive when landed was haul caught. In this study there was at least one fishery, Australia's, and possibly another, New Zealand's, in which live-landed birds included those caught during the set or the soak of the line. Observers are often unable to make distinctions about WHEN a live bird was actually hooked, except that when a bird is caught during hauling this should usually be apparent – actually witnessed or else based on a bird's physical condition. It is essential that observers clearly differentiate a bird being witnessed as haul caught, from those others that are uncertain. The general condition of a bird and state of its plumage (water-soaked, exhausted) can help to indicate it being set-caught or haul-caught.

A major uncertainty is whether seabirds simply exploit whichever phase of the fishing cycle presents the greatest food opportunity, be it either hauling or setting, and this is of course further influenced by their preference for daytime feeding. Observation supports that there is a greater abundance of birds throughout day hauling compared to during day setting, which simply indicates that hauling presents the greater feeding opportunity (fish processing, spent bait disposal) for birds (Brothers 2008).

Impact of the ACAP best practice recommended line weighting, on the likelihood of set captured birds still being alive when landed, remains unclear. However, with added weight it is likely that more birds caught during the set or soak will now drown. The Australian fishery has essentially progressed from entirely unweighted gear to entirely weighted gear, although comparative data upon which to draw any conclusions in regard is lacking. Added weight will likely reduce the survival of birds captured during the set or soak but it will not reduce survival prospects of those captured during the haul.

Apart from the current predominance in most pelagic longline fisheries of night hauling (itself a major limiting factor on incidence of live bird haul capture) there are believed to be other factors preventing birds being captured during the haul. In most instances the fisheries discussed are considered 'Deep Set' and in these fisheries the haul rate is essentially slow. Slow hauling tends to keep hook recovery (specifically those retaining bait) at a more vertical angle to the ship, so that when these hooks surface they are close to the protection of the ship's side, forward of the stern. By contrast, in the HSS fishery hooks are likely to be exposed near the sea surface for longer, enabling access by birds.

The prevalent usage of at least one (often two) branchline coiling devices, particularly on the DW Asian vessels is likely to be substantially reducing risk of haul capture. An additional important factor pertaining to the larger vessels (greater length DW) is that the distance from the mainline hauler roller position to the vessel's stern is greater (compared to branchline length) ensuring that incoming hooks do not trail astern where birds have access. In addition, the larger vessels tend to have sufficient crew (around 15 on deck) to avoid delays in individual branchline recovery. By contrast, the smaller vessels often have similar daily fishing effort, yet use only 3-5 crew on deck, resulting in occasional interruptions to branchline recovery. Gilman et al (2014) however, does indicate that captures more often occurred (at least in that fishery) on branchlines that were being tended (as opposed to say having been left to trail astern or alongside when crew fall behind under excessively fast haul rates).

The smaller seabird species particularly susceptible to capture such as the White chinned petrel, Grey petrel and species of shearwaters will often still pursue incoming hooks close alongside (even during night hauling) although are generally unsuccessful. They are often deterred at the last minute by continuous water discharge from various hull outlets close to sea level. Hooks can also become obscured by turbulence when close to the hull. It is not known to what extent these features of DW vessels are preventing haul capture of birds, a situation worth investigating. The larger bird species are either incapable or reluctant to attempt similar close manoeuvring alongside in pursuit of baited hooks.

It is unknown whether a relationship exists between the specific side where line hauling takes place and live bird haul capture incidence. Potentially significant is the predominance of port-side hauling in the HSS fleet, whereas in the HDS fishery and elsewhere starboard-side hauling is predominant. It is Vietnamese American owned vessels, which are mostly operating port side hauling. According to Brothers, unpublished 2007 data, 47 out of 49 vessels of the HSS fleet were port-side hauling, whereas another 82 vessels were starboard-side hauling in the HDS fishery.

Certain branchline handling practices that increase bird access to hooks as they are hauled could be more prevalent on port side haul vessels. The majority of crew, being right-handed would be more consistently efficient and competent in a starboard haul configuration. If so, hauling on the port side could contribute to the apparent live bird haul capture CPUE difference between HDS and HSS fisheries, although this is unlikely given the pattern of bird catch distribution across sets and trips evident in table 5. Predominant port side hauling in the HSS fishery could also be providing birds with more reliable access to incoming hooks alongside the vessel because of more suitable flying conditions in relation to hauling direction.

The available information about the actual circumstances of live bird haul capture in the HSS fishery is inadequate for making recommendations of targeted mitigation measures. However, unlike the majority of fisheries in which 10% or less observer coverage is attained, 100% of this fishery is observed. This is likely to ensure high levels of compliance with any mitigation measure imposed. The mitigation options proposed by Gilman et al (2014) include several that may be of some benefit, and others which are of no benefit or which are operationally unacceptable. Data indicating that more branchline weight closer to the hook helps to reduce haul interactions (more weight closer to hook keeps hauled hooks deeper), could merely be concealing that weighted swivels act as decoys. If this is the case it suggests that the introduction of a simple lure device on branchlines in the appropriate position may serve to distract birds from incoming hooks.

If data were available to correlate live bird haul captures with branchline length, specifically its length relative to the distance between mainline haul roller and stern, it is likely the findings would indicate that minor adjustments to branchline length alone could be effective and be operationally acceptable. Shortening branchline lengths so that they measure less than the distance between branchline coiling position and the stern of the vessel is likely to be effective and still be within the range of branchline lengths currently in use. For this to be successful, the practice of placing hook boxes aft for branchline recovery on some vessels would have to cease and, in some cases this alone may alleviate the need to shorten branchlines. The alternative is to increase the distance of protection for the incoming hook beyond the stern a little, using simple devices such as the Bird Curtain associated with side-setting (Gilman et al 2011). This style of bird deterrent is likely to be routinely employed and taken up by other fisheries also (without high levels of observer presence) since it does not necessitate daily attendance, as do conventional BSL's. However, any such addition to daily life aboard which is designed specifically for reducing what is already an infrequent event is likely to meet with resistance.

Given the generally low incidence of live bird haul capture in pelagic longline fisheries, and the fact that a high proportion of these live birds, if handled and released appropriately may survive, a focus on improving bird handling information and availability (appendix 2) is likely to be an effective strategy of ultimate conservation benefit to birds. Although no useful data was encountered about live bird haul capture incidence in artisanal fisheries, the slow haul rate and generally heavier branchlines are making live bird haul capture less likely in these fisheries (except on occasions where catching birds is the intention). However, specific mitigation strategies are warranted for the few fisheries or even those particular vessels in which haul capture rates are relatively high. Deliberate bird capture or accidental capture that results in discarding or retaining (see for example Pro Delphinus 2008) can be impossible to document reliably. This is an important reason why live bird haul capture is best prevented in the first place, rather than being addressed only by improving post-release survival.

Currently numbers of live birds caught and released are likely to be combined with data of all birds caught, but if live catch does increase, the perceived impact on species' populations may arise as a topic of debate. Post-release survival is the primary issue here and this could be improved by appropriate handling practices, and the careful avoidance of handling that causes life-threatening damage to the bird. The inclination of crew when handling live birds is to first grab the nearest part of the bird - often a wing tip. Doing this carries a high risk of lethal injury for the bird because wrist damage is almost inevitable (larger seabird species in particular have sufficient wing muscle power against such restraint to cause the damage). Safe handling literature should emphasise this (see Appendix 2) and should also stress the fact that full body restraint is rarely needed, as the majority of live capture instances will be birds 'lightly hooked'. This necessitates only brief restraint by grasping the bill itself while the hook is removed. Only under more severe hooking or cases of waterlogging or exhaustion is bodily restraint appropriate. Even then, holding the bill is first required before gathering in both wings without grasping the outermost wing section (instead take the elbow and fold it inward against the bird's body). However, from a practical perspective the odds of an HSS vessel encountering a live bird is only one in 26 days of fishing, which potentially equates to around one every 80 days for an individual crew member. On a DW vessel, which will encounter a live bird every 33 days, a crew member might wait 450 days before actually handling a live bird! Such infrequency makes it difficult to improve bird-handling practices via educational literature, but also poses challenges for uptake of mitigation strategies to reduce the incidence of live bird haul capture.

The post-release survival prospects of seabirds that have been caught during longline hauling are poorly understood. If it was discovered that most do not survive long after release, then haul capture is a more serious issue. Using simple plumage marking as well as tracking technology on released birds would be helpful to investigate this further.

Within the tRFMO's, the level of observer data detail required to answer the simplest questions about the life status and capture circumstances of seabirds hauled aboard longline vessels may well exist, as in recent times in CCSBT data. However, it was found to be not a straightforward process to locate it, and there were still many data gaps encountered. Efforts to rectify such data deficiencies should be ongoing, and shortcomings rectified as a matter of priority.

ANNEX 1

Recommended additions to observer protocols for more accurately documenting the details of live bird interactions.

1. For every separate bird bycatch event observers must differentiate whether the bird was caught during hauling, setting or uncertain.

2. For every separate bird bycatch event the observers should record if the bird is alive or dead.
3. For every separate bird bycatch event the observer needs to document the length of that particular branchline and the weighting characteristics (amount and distance from the hook)
4. Add to observing data collection fields covering vessel characteristics
    a. Distance between mainline haul roller and stern of vessel.
    b. Distance between mechanised branchline retrieval device(s) and the stern of vessel.
    c. Number of mechanised branchline retrieval devices.
5. Hauling and setting captures along with life status should be reliably reported in relevant international meetings. (note: this needs to be reported in a way that bird captures (set or haul) can be related to the mitigation measures in use, including the practice of night setting).

ANNEX 2

Improvements to live bird de-hooking information

1. There is a very high risk of damage to the wrist joint of albatrosses in particular during recovery of live hauled birds. This should be indicated in revised literature. A simple first statement – The first move is always to grab the bill. Never grab the wing.

2. Most instances of haul capture, only require a brief period of bird restraint by firmly grabbing the bill in order to disengage the hook.

3. Once the hook has been disengaged, the bird should simply be allowed to drop to the water immediately below.

4. Whilst slowing a ship to deal with a live bird haul capture might be desirable, and is current advice, to do so is largely impractical, so the inclusion of such advice is questionable.

5. Live capture incidence is sufficiently infrequent to allow individual crew to become proficient. Advice therefore should be kept simple and safe for both handler and bird.

6. Multi-lingual literature about live bird haul captures and retrieval methods could be needed for fisheries such as the Hawaii fishery where there is a significant proportion of non English-speaking crew (Vietnamese American ownership and a mixture of Micronesian, Indonesian and Philippine crew).

7. Observers should be allowed to participate in release of birds and also require specific training in this.

ANNEX 3

Improving understanding and mitigation of live bird haul captures

It would be helpful for the ACAP to seek USA cooperation to more accurately define the aspects of its HSS fishery that are contributing most to live bird captures. Doing so would be particularly useful for ascertaining the best mitigation for live bird haul capture. This could be achieved by examining fisheries data to:

1. Compare pre and post 2001 operational features of relevance that may have altered.
2. Assess whether starboard haul vessels and port haul vessels in the fishery have similar incidents of haul capture.
3. Determine whether incidence of haul capture correlate to a relationship between branchline length and branchline recovery position relative to a vessel's stern.
4. Ascertain any correlation of individual vessel and/or captain to live bird haul captures within year and across years. Further examine the high live bird capture incidence, which has occurred within specific fishing trips to ascertain if this is or isn't related to bird abundance.

ANNEX 4. TABLES

Table 1. The proportion of captured seabirds which were alive when landed in various pelagic longline fisheries.

Fishery	Live	Dead	% alive	Approx. hooks observed (X million)
NZ 2002-2013	223	595	27	8
NZ 2014	10	25	40	0.6
USA Shallow set 2005-2013	468	132	78	12
USA Deep set 2005-2013	16	369	4.3	36
Aust. 2001-2014	8	12	40	0.3
CCSBT Korea 2010-2014	1	75	1.3	0.3
CCSBT Japan 2011	9	407	2.2	1.9
CCSBT Japan 2012	11	88	11.1	1.2
CCSBT Japan 2013	16	337	4.5	1.1
CCSBT Japan 2014	51	580	8.1	1.9
CCSBT Taiwan 2009-2010	25	81	23.6	3.9
CCSBT Taiwan 2012-2013	17	103	14.2	4
CCSBT Taiwan 2014	6	37	13.9	2.5
CCSBT Japan (Gales et al 1998)	18+-	600+-	3	7.9
Various (Brothers 2008)	0	85	0	0.5
TOTALS	**856**	**3523**		**81.8**

Table 2. Life status of birds caught and landed relative to day and night in the Hawaii Shallow Set and Deep Set Pelagic longline fisheries (2005-2013)

Fishery	Birds landed alive		Birds landed dead		% landed alive
	day	night	day	night	
Shallow set	467	1	130	2	78%
Deep set	16	0	21	348	4.2%

Table 3. Observed fishing effort summary including day haul versus night haul proportions of the Hawaii Shallow set and Hawaii Deep set pelagic longline fisheries (2005-2013)

Fishery	Total no. of observed hauls	Total no. hooks observed hauled	Mean no. hooks per haul	Hooks hauled in darkness	% hooks hauled in darkness
Shallow set	13099	12435843	949	41240	0.33
Deep set	15761	36292647	2303	28412682	78.29

Table 4. Based on haul start times, mean nautical dawn at 0500am and mean nautical dusk at 7.30pm, the number and proportion of 9 hour mean duration Shallow Set hauls and 12 hour mean duration Deep Set hauls that occurred in darkness (Hawaii Fisheries 2005-2013).

Haul start time ½ hr intervals	Deep set			Shallow set		
	Number of hauls	Hours in darkness	% of haul in darkness	Number of hauls	Hours in darkness	% of haul in darkness
1:00am	9	4	33	0	0	0
1:30am	3	3.5	29	0	0	0
2:00am	7	3	25	0	0	0
2.30am	6	2.5	21	1	2.5	28
3:00am	2	2	17	9	2	22
3:30am	0	0	0	22	1.5	17
4:00am	1	1	8	68	1	11
4:30am	3	0.5	4	203	0.5	6
5:00am	2	0	0	680	0	0
5:30am	2	0	0	1180	0	0
6:00am	5	0	0	2053	0	0
6:30am	2	0	0	2945	0	0
7:00am	1	0	0	3246	0	0
7.30am	5	0	0	1672	0	0
8:00am	4	0.5	4	665	0	0
8:30am	14	1	8	197	0	0
9:00am	8	1.5	13	70	0	0
9:30am	2	2	17	26	0	0
10:00am	7	2.5	21	18	0	0
10:30am	7	3	25	11	0	0
11:00am	5	3.5	29	6	0.5	6
11:30am	2	4	33	2	1	11
12.00noon	16	4.5	38	0	0	0
12:30pm	11	5	42	1	2	22
1:00pm	16	5.5	46	1	2.5	28

1:30pm	68	6	50	0	0	0
2:00pm	103	6.5	54	1	3.5	39
2.30pm	284	7	58	1	4	44
3:00pm	530	7.5	63	0	0	0
3:30pm	599	8	67	0	0	0
4:00pm	556	8.5	71	1	5.5	61
4:30pm	1117	9	75	0	0	0
5:00pm	2182	9.5	79	2	6.5	72
5:30pm	3053	10	83	1	7	78
6:00pm	2858	10.5	88	2	7.5	83
6:30pm	1843	9.5	79	1	8	89
7:00pm	1054	10	83	1	0.5	6
7.30pm	543	9.5	79	0	0	0
8:00pm	336	9	75	4	9	100
8:30pm	181	8.5	71	0	0	0
9:00pm	96	8	67	2	8	89
9:30pm	70	7.5	63	0	0	0
10:00pm	44	7	58	3	7	78
10:30pm	37	6.5	54	0	0	0
11:00pm	24	6	50	0	0	0
11:30pm	29	5.5	46	1	5.5	61
12.00midnight	4	5	42	2	5	56
12.30am	10	4.5	38	1	4.5	50

Table 5. Breakdown of the number of birds caught and landed alive or dead per set and per fishing trip in which one or more birds were caught in the Hawaii Shallow Set Pelagic Longline Fishery (2005-2013)

BIRDS CAUGHT PER HAUL OR TRIP	HAULS			TRIPS		
	Number of hauls	Total birds caught	Birds caught alive	Number of trips	Total birds caught	Birds caught alive
1	330	330	271	192	107	85
2	60	120	90	36	72	55
3	16	48	38	19	57	41
4	4	16	16	10	40	35
5	7	35	17	8	41	31
6	2	12	8	4	24	10
7	3	21	12	5	35	22
8	1	8	8	2	16	16
9	0	0	0	3	27	25
10	1	10	8	1	10	4
11	0	0	0	1	11	9
12	0	0	0	1	12	12
13	0	0	0	0	0	0
14	0	0	0	3	43	37
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	1	17	12
18	0	0	0	0	0	0
19	0	0	0	1	19	19
20	0	0	0	1	20	13
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	2	50	24

Table 6. Species composition and life status of seabirds caught in New Zealand's pelagic longline fishery 2002/2003 to 2012/2013.

Species	Dead	Live	Proportion alive
Southern Royal albatross (L)	5	1	17%
Northern Royal albatross (L)	1	0	0
Gibson's albatross (L)	32	4	11%
Wandering albatross (L)	6	6	50%
Antipodean albatross (L)	22	18	45%
Southern Buller's albatross (S)	201	152	43%
Campbell Black-browed albatross (S)	41	4	9%
Black-browed albatross (S)	5	1	17%
NZ White-capped albatross (S)	95	15	14%
Salvin's albatross (S)	9	0	0
Light-mantled sooty albatross (S)	1	0	0
White-chinned petrel (p)	41	0	0
Grey petrel (p)	48	0	0
Grey-faced petrel (p)	20	0	0
Westland petrel (p)	9	0	0
White-headed petrel (p)	2	0	0
Black petrel (p)	11	2	15%
Southern giant petrel	2	0	0
Sooty shearwater (p)	9	4	31%
Flesh-footed shearwater (p)	0	12	100%
albatross sp.	34	1	3%
Large seabird	0	1	100%
Gadfly petrel	1	0	0
TOTALS	**595**	223	27%
(L) All large albatrosses L =5 species	66	29	30%
(S) All small albatrosses S=6 species	353	172	33%
(p) Small petrels p=9 species	140	20	12%

Table 7. Breakdown of bird catch, live versus dead by New Zealand charter and domestic pelagic longline vessels in 2013 and 2014

Pelagic longline fishery type	**Birds alive**		**Birds dead**		**% alive**
	2013	2014	2013	2014	
Charter fleet	2	8	3	8	48%
Domestic fleet	5	2	14	17	18%

ANNEX 5

Hydraulic Branchline Retrieval Device

Fig 1. The bird bycatch mitigation benefit of these hydraulic branchline retrieval devices on DW pelagic longline vessels is obvious, although unsubstantiated. They allow uninterrupted fast rate of hauling, which denies birds' access to hauled hooks.

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Providing observer data on request can be an immense task for those requested to do so which in turn significantly contributes to seabird bycatch management for the ACAP. It is important that ACAP Parties acknowledge this contribution.

In the interests of improving the ACAP's performance, if the ACAP funding process had been capable of supplying this project with the funds specifically set aside for it, the data could have been analysed more thoroughly.

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