



# The implementation of ACAP Best Practice Advice to mitigate seabird bycatch in fisheries: Issues and options

G. Barry Baker<sup>a,b,\*</sup>, Valeriya Komyakova<sup>a,c,2</sup>, Alexia Wellbelove<sup>d,e</sup>, Nicola Beynon<sup>d</sup>, Marcus Haward<sup>a,c,3</sup>

<sup>a</sup> Institute for Marine and Antarctic Studies, University of Tasmania, Hobart 7001, Australia

<sup>b</sup> Latitude 42 Environmental Consultants Pty Ltd, 114 Watsons Road, Kettering 7155, Australia

<sup>c</sup> Centre for Marine Socioecology, University of Tasmania, Hobart 7001, Australia

<sup>d</sup> Humane Society International Australia, P.O. Box 439, Avalon 2107, Australia

<sup>e</sup> Australian Marine Conservation Society, P.O. Box 5815, West End, QLD 4101, Australia

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## ABSTRACT

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a multilateral agreement which strives to conserve albatrosses and petrels by coordinating international activities to mitigate threats to their populations. One of the major threats that seabirds face is fisheries-induced mortality, or bycatch. In recognition of the serious nature of this problem, ACAP established a Seabird Bycatch Working Group (SBWG) to advise on actions that will assist in the mitigation and reduction of seabird interactions with fisheries. The SBWG regularly examines the range of measures available that can minimise bycatch and has developed “best practice advice” (BPA), a suite of tools and methods for trawl and longline fisheries. This BPA has been widely promoted by ACAP Parties and others within jurisdictions and at Regional Fisheries Management Organisations (RFMOs) and CCAMLR other over the last 10 years. To assess the levels of implementation of ACAP’s BPA for industrial fisheries we employed both a qualitative and semi-quantitative multiple method research design that comprised content analysis of documents and meeting reports from ACAP meetings, a review of current seabird conservation measures of all tRFMOs that had members which were also ACAP parties, and by conducting a survey that asked 13 questions in relation to the uptake and adoption of ACAP BPA. We confined our analysis to pelagic longline and trawl fisheries within the jurisdictions of both ACAP parties and non-parties. Our research identified a number of key gaps in the uptake of the BPA guidelines in these fisheries. Complete uptake of BPA was poor by ACAP Parties both within their jurisdictions, and in high seas fisheries managed through RFMOs. For Parties, the level of uptake was difficult to assess accurately because reporting to the Agreement has thus far been inadequate for this purpose. Uptake of BPA in high seas fisheries by non-parties and RFMOs was also poor and unlikely to improve while ACAP Parties are unable to demonstrate commitment to their use in all national fisheries. The study findings provided advice and recommendations on addressing impediments to uptake that could lead to improved management of seabird bycatch in commercial fisheries.

## 1. Introduction

Seabirds are killed in a range of fisheries throughout the world, and fisheries-related mortality is responsible for population decreases in many species, particularly the albatrosses and petrels (Families Diomedidae and Procellariidae) [8,13,22]. This threat to seabirds has been

particularly well documented for longline fisheries [15], but mortality of seabirds is also associated with trawl, gillnet and purse-seine fisheries [22]. A recent global assessment of threats to seabirds found that large scale fisheries are causing declines in more than 80 species, with trawl and longline gear having the greatest impact in terms of the scope and severity of threat [13].

\* Corresponding author at: Latitude 42 Environmental Consultants Pty Ltd, 114 Watsons Road, Kettering 7155, Australia.

E-mail address: [barry.baker@latitude42.au](mailto:barry.baker@latitude42.au) (G.B. Baker).

<sup>1</sup> <https://orcid.org/0000-0003-4766-8182>

<sup>2</sup> <https://orcid.org/0000-0003-3755-1546>

<sup>3</sup> <https://orcid.org/0000-0003-4775-0864>

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The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a multilateral agreement which entered into force in 2004. Through its 13 Parties, the Agreement strives to conserve albatrosses and petrels by coordinating international activities to mitigate threats to their populations [11]. ACAP's Action Plan describes conservation measures to be implemented by Parties. These call for, among other things, a reduction in fishery-induced mortality.

In recognition of the serious problem posed to seabirds by fisheries interactions, ACAP established a Seabird Bycatch Working Group (SBWG) to advise the Agreement on actions that will assist in assessment, mitigation and reduction of negative interactions between fishing operations and albatrosses and petrels. The working group comprises representatives from ACAP's 13 Parties, together with invited experts with relevant technical or other expertise. It regularly examines the range of measures available that can minimise bycatch and has developed "best practice advice" (BPA), a suite of tools and methods for trawl and longline fisheries [22] which are reviewed whenever the Working Group meets (Supplementary material Appendix 1). This BPA has been widely promoted by ACAP Parties, the Agreement's secretariat and some non-government organisations both within jurisdictions and at the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), tuna Regional Fisheries Management Organisations (tRFMOs), and other RFMOs over the last 10 years.

While some Parties and RFMOs have adopted management measures based on ACAP's BPA, in many cases this advice has only been partially implemented [2]. The reasons for this are not well understood. The low level of observer coverage in many domestic and high seas fisheries, as well as deficiencies in data collection and reporting systems, have made it difficult to assess the level of implementation being achieved and the effectiveness of conservation measures in force.

This paper seeks to identify and understand key gaps in the implementation of ACAP Best Practice Advice in the commercial longline and trawl fisheries of ACAP Parties; explore potential limitations or impediments to adoption of Best Practice and provide recommendations on how these could be overcome; and identify ways to improve adoption and/or implementation of ACAP Best Practice Advice in commercial fisheries.

## 2. Materials and methods

### 2.1. General

We employed both a qualitative and semi-quantitative multiple method research design. This comprised content analysis of documents and meeting reports from ACAP meetings (e.g., [3,4,23]), and discussions with key officials from ACAP parties and non-parties related to the uptake and impact of BPA. Initial background research was undertaken to develop robust research questions prior to data collection through the interviews and discussions [12,20].

### 2.2. ACAP best practice advice

ACAP's best practice advice is a suite of tools and methods for industrial trawl and longline fisheries which are reviewed regularly by its Seabird Bycatch Working Group (SBWG) and endorsed by the ACAP Advisory Committee whenever it meets. Currently BPA is most fully developed for pelagic longline, demersal longline and trawl gears<sup>4</sup> ([5,6,7]; summarised in Supplementary material Appendix 1), reflecting the gear most frequently involved in the deaths of ACAP listed albatrosses and petrels, and our review of uptake by Parties has been confined to these methods. The ACAP review process recognises that factors such as

safety, practicality and the characteristics of the fishery should also be taken into account when considering the efficacy of seabird bycatch mitigation measures and consequently in the development of advice and guidelines on best practice.

### 2.3. Desktop survey

All ACAP parties are required under the articles of the Convention to provide information through the Secretariat on the implementation of the Agreement, with particular reference to conservation measures undertaken. The key objectives for reporting are to provide information regarding the assessment of progress towards the objectives of the Agreement; gather information on lessons learned in order to conduct conservation efficiently and effectively; and identify further research and actions to conserve albatrosses and petrels. This information is provided for each session of the Meeting of the Parties (MOP), which is usually held every three years. We examined all Party Implementation Reports submitted to the most recent Session of the Meeting of the Parties [2] to assess stated levels of implementation of ACAP's BPA for industrial longline and trawl fisheries. Where necessary, we determined if longline and trawl gear types were used by a Party by referring to ACAP's prioritisation framework for at-sea threats [10]. We also reviewed the current approved conservation measures pertaining to mitigation of seabird bycatch of all Regional Fisheries Management Organisations (RFMOs) that had members which were also ACAP parties — this included five tRFMOs, two non-tuna RFMOs and CCAMLR — to ascertain if uptake and implementation of BPA was widespread amongst industrial high seas fishing fleets.

### 2.4. Online survey

We prepared a survey (Supplementary material Appendix 2) that asked 13 questions in relation to the uptake and adoption of ACAP BPA seabird bycatch mitigation measures in both pelagic longline and trawl fisheries within the jurisdictions of both ACAP parties and non-parties. We invited a total of 54 people to complete the online survey, approaching scientists, gear technologists, staff of government conservation and fishery management agencies, and fishery managers employed in the private sector, and who were known to have experience with ACAP and the development and implementation of BPA. Staff of RFMOs did not participate in the survey. The survey consisted of nine multiple closed-worded questions requiring respondents to check their preferences or indicate relevance to multiple categorical variables, and a further four questions that were open-ended, providing respondents with the opportunity to comment in more detail on various aspects of ACAP's BPA. Nine questions examined the level of awareness of BPA, opinions on the effectiveness of BPA, and the level of uptake of this advice within the survey respondents (hereinafter 'respondent') jurisdiction. Although ACAP BPA covers a range of gear types used in commercial fisheries, the survey was restricted to pelagic longline and trawl gear types. One question required the respondent to provide an assessment of the level of expertise of ACAP's SBWG members based on 5-point Likert scale (highly relevant, relevant, neutral, limited, no relevant expertise); another questioned why BPA is endorsed at ACAP meetings if there are impediments to jurisdictional endorsement of that advice; and two questions sought respondents' views on key points to improve mitigation of seabird bycatch and the uptake of BPA. Respondents were also provided with the freedom to provide an open answer to most questions. While we are interested in the views and opinion of experts, respondents were assured of anonymity in reporting results of the survey.

In evaluating responses to the questions, we defined 'effectiveness' and 'fully effective' as meaning the efficacy of mitigation measures to significantly reduce bycatch, either singularly or when used in combination as a suite of measures.

<sup>4</sup> Efforts to address seabird bycatch in gillnet and purse-seine fisheries are far less advanced, with very little concerted action to-date. Consequently, there is limited current best-practice and an urgent need for further research [22].

### 3. Results

#### 3.1. Desktop survey

While all 13 ACAP Parties submitted national information to the Agreement's Implementation Report for the 6th Session of the Meeting of the Parties [2], the level of reporting generally contained inadequate information to gain a comprehensive understanding on the uptake of BPA mitigation in fisheries operating in each Parties jurisdiction and on the high seas. Each party was required to provide information in a consistent format by using a proforma that sought information on priority land-based and at-sea conservation actions. The proforma did not contain a specific question relating to uptake of BPA but sought more general information on actions against a list of priorities identified for at-sea conservation in 2015 [1]. However, the proforma did identify 27 high priority domestic or high-seas fisheries and, for those fisheries, sought information on actions undertaken relevant to mitigation of bycatch.

No Party's Implementation Report provided a clear statement that BPA was implemented in any of their pelagic longline, demersal longline or trawl fisheries. When mitigation was not mentioned we assumed that full compliance with BPA was not being met, as implementation reports by Parties to multilateral environmental agreements (MEAs) usually highlight areas where compliance with conservation measures and implementation of resolutions has been achieved [19]. Providing support for this approach, two ACAP Parties highlighted the adoption of measures that 'closely reflected BPA'. On this basis, no ACAP Party appeared to be complying fully with BPA for any of the three gear types (Table 1).

For the pelagic longline method, 11 Parties had relevant fisheries, and five used at least two of the three best practice measures (branchline weighting, bird scaring lines, night setting), but only one used all three measures in combination (Table 1); however, we assessed that this Party was not fully compliant because the stated branchline weighting regime did not meet ACAP BPA recommendations. Another Party stated that measures used 'reflect closely the ACAP Best Practice Advice' but provided insufficient detail in their report to provide assurance of full compliance. Of concern was that six Parties provided no information on high priority fisheries for which they had competency.

For demersal longline fisheries, 12 Parties had relevant fisheries that employed this gear type but only limited details were provided in two reports. One Party reported the use of line weighting but provided no details on the regime applied. Another Party reported that Permit regulations for their fisheries are 'in line with ACAP's recommendations' but provided no other information. Two Parties with high priority fisheries for which they had competency provided no information on mitigation for those fisheries. In summary, it is likely that none of the 12 Parties with demersal longline fisheries has fully adopted BPA, however for one this was uncertain (Table 1).

Reporting was also poor from the 11 Parties with demersal or pelagic trawl fisheries and only one indicating compliance with BPA although no further information was provided to give assurance that this was the case. Another Party indicated partial compliance with management of waste and protection of trawl warps. The remaining nine Parties provided no information on the use of mitigation for trawl fisheries, except for two Parties that only included information on the measures used in two high priority fisheries for which they had competency.

Review of the conservation measures used by the five tuna RFMOs (tRFMOs) and another two RFRMOs that use demersal longline and trawl gears showed that some of ACAP's BPA had been adopted for high seas fisheries but critical elements, such as the combined use of three measures (line weighting, bird scaring lines and night setting of longlines) for pelagic longlines had not been taken up (Table 2). While line weighting regimes were recommended for both pelagic and demersal longline fisheries, the weight prescriptions of the BPA were not met. One of the tRFMOs (CCSBT) did not have its own mitigation prescriptions but

recommended that its members comply with all current seabird measures, adopted by the IOTC, ICCAT and WCPFC, when fishing in the relevant Convention areas or areas of competence for these tuna RFMOs [17].

Measures adopted by SPRFMO and CCAMLR for trawl fisheries were generally stronger than those used by the tRFMOs due to the focus on management of waste disposal, a critical element for mitigating bycatch with this gear type (Table 2). Measures for demersal longline also approached BPA, particularly for SPRFMO which had adopted ACAP's line weighting prescriptions and the combined use of line weighting, bird scaring lines and night setting. Measures recommended by SEAFO for line weighting met BPA standards but appeared not to be mandatory ('should' rather than 'shall') if night setting is practiced. However, using demersal longline gear without some form of line weighting in industrial vessels is unlikely. An exemption from mandatory night setting is available for vessels able to achieve a line sink rate exceeding 0.3 m/s, or 0.2 m/s for autoliners using IWL gear, indicating that the combined use of three measures was not preferred by SEAFO members.

#### 3.2. Online survey

A total of 36 individuals responded to the survey, although not all respondents responded to all questions. Most respondents were from countries that were a party to ACAP (29/35, 83%), worked for conservation agencies (18/34, 53%), and/or were members of ACAP's Seabird Bycatch Working Group (19/35, 54%). Respondents were from five regions: Oceania (17/34, 50%), North America (6/34, 18%), South America (6/34, 18%), UK overseas territories (4/34, 12%) and South Africa (1/34, 2%). Note that not all respondents disclosed a jurisdiction to which their responses related.

While the questions relating to longline gear addressed pelagic gears only, it was clear that some respondents were referring to BPA for demersal gear in their answers. As all such responses addressed the principal issue of awareness, effectiveness and implementation of BPA, the analysis that follows at times considers both pelagic and demersal longline gear as one gear type.

For longline gear, all respondents were either fully aware (30/34, 88%) or partially aware of ACAP's BPA. Awareness of trawl BPA was also high with respondents being either fully aware 27/35 (77%) or partially aware 7/35 (27%), respectively. One respondent was unaware of the BPA for trawl (Table 3).

The BPA measures were considered effective by 21/33 (64%) and 17/33 (52%) of respondents for longline and trawl, respectively; 12/33 (36%) and 16/33 (48%) of respondents thought the measures were partially effective for the same gears (Table 3).

Full implementation of BPA was reported as low for both longline fisheries (3/34–9%) and trawl fisheries (3/34–9%; Table 3). Most respondents reported high levels of partial implementation (defined as implementation of some but not all recommended best practices) in both longline and trawl fisheries (longline 27/34, 79%; trawl 21/34, 62%). No full implementation of BPA was reported in 4/34 (12%) and 10/34 (29%) responses for longline and trawl, respectively (Table 3).

The major reasons cited for not taking up best practice measures (Table 4) were, in order of number of responses:

- mitigation not considered practical;
- fishers do not want to use BPA measures;
- mitigation not considered necessary because birds are rarely caught and conservation concern not demonstrated;
- the cost of installing mitigation;
- the impact on fishing efficiency; and
- safety concerns.

Respondents could, and did, record more than one response (Table 4). Lack of regulations and weak management, and the need for more research to demonstrate either mitigation efficacy or the need for

Table 1

Summary of implementation of ACAP's BPA for industrial longline and trawl gear by Parties to the Agreement, as reported to the 6th Session of the Meeting of the Parties, held in 2018. 'Priority' fishery refers to one of 27 high seas and domestic fisheries identified by ACAP as a high priority following assessment of all global fisheries likely to impact populations of albatrosses and petrels [1]. Unless stated specifically in a Party's implementation report, a fishery was not considered to be fully compliant with BPA.

ACAP Party	Pelagic longline gear						
	Relevant fisheries?	Use following three best practice measures simultaneously				Alternative	Fully compliant with BPA ?
		i. branchline weighting	ii. night-setting	iii. Bird Scaring Lines.	3 measures used simultaneously		
Argentina	No	No relevant fishery					
Australia	Yes	Yes	No	Yes	No	No	No
Brazil	Yes	Yes	Yes	Yes	Yes	being trialed	No
Chile	Yes	No information provided on Priority Fishery.					No
Ecuador	Yes	No information provided on Priority Fishery, observer program mentioned.					No
France	Yes	Yes	Yes	Yes	unsure	No	No
New Zealand	Yes	Limited information provided on domestic & priority Fisheries				No	No
Norway	No	No relevant fishery					
Peru	Yes	No information provided on priority fisheries					No
South Africa	Yes	Yes	No	Yes	No	No	No
		Measures used 'reflect closely the ACAP Best Practice advice'					
Spain	Yes	No	Yes	Yes	No	No	No
United Kingdom	Yes	No information provided on Priority Fishery.					No
Uruguay	Yes	No information provided on Priority Fishery.					No

  

ACAP Party	Trawl gear						
	Relevant fisheries	offal	warp & cable strikes		net entanglements		Fully compliant with BPA ?
		manage discharge	trawl warps	net monitoring cables	net cleaning	net binding	
Argentina	Yes	No	yes, in part	No	No	No	No
Australia	Yes	yes, in part	yes, in part	N/A	No	No	No
Brazil	No	No relevant fishery					
Chile	Yes	No information provided on priority fishery					No
Ecuador	Yes	No information provided					No
France	Yes	No information provided					No
New Zealand	Yes	No information provided on domestic, CCAMLR & priority RFMO fisheries					No
Norway	Yes	No information provided on domestic & CCAMLR fisheries					No
Peru	Yes	No information provided on domestic fisheries					No
South Africa	Yes	No details provided; Permit regulations are 'in line with ACAP's recommendations'					Cannot be determined
Spain		No	No	No	No	No	No
United Kingdom	Yes	No information provided on domestic & CCAMLR fisheries					No
Uruguay	No	No relevant fishery					

  

ACAP Party	Relevant fisheries	Demersal longline gear				Fully compliant with BPA
		line weighting	night-setting	bird scaring lines.	three measures used in combination	
Argentina	Yes	No information provided				No
Australia	Yes	yes	no	no	No	No
Brazil	Yes	No information provided on priority fishery				No
Chile	Yes	No information provided				No
Ecuador	No	No relevant fishery				
France	Yes	No information provided				No
New Zealand	Yes	No information provided on domestic & CCAMLR fisheries				No
Norway	Yes	No information provided on domestic & CCAMLR fisheries				No
Peru	Yes	No information provided on priority fishery				No
South Africa	Yes	No details provided; Permit regulations are 'in line with ACAP's recommendations'				Cannot be determined
Spain	Yes	No information provided on CCAMLR fisheries				No
United Kingdom	Yes	No information provided on domestic & CCAMLR fisheries				No
Uruguay	Yes	No information provided on CCAMLR fishery				No

**Table 2**

ACAP's BPA for pelagic longline, demersal longline and trawl fisheries, and the elements adopted by eight RFMOs that use these gears in waters where albatrosses and petrels occur. Note that one tuna RFMO, the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) has not prescribed conservation measures for its fisheries but requires its members to comply with all current binding and recommendatory measures which have been adopted by the IOTC, ICCAT and WCPFC, when fishing in the relevant areas of competence for these tuna RFMOs. Shaded cells indicate the measure(s) adopted comply strictly with BPA.

Mitigation measure	ACAP BPA	Measures adopted by RFMOs							
		IATTC	ICCAT	IOTC	WCPFC	SPRFMO	SEAFO	SIOFA	CCAMLR
<b>Pelagic longline</b>									
Branch line weighting	yes	yes	yes	yes	yes	n/a	n/a	yes	n/a
Night setting (NS)	yes	yes	yes	yes	yes	n/a	n/a	yes	n/a
Bird Scaring Lines (BSL)	yes	yes	yes	yes	yes	n/a	n/a	yes	n/a
No. measures used simultaneously (branchline weighting, BSL & NS)	three	two	two	two	two			two	
Other measures									
• Side setting		yes				n/a	n/a		n/a
• Side setting with bird curtain					yes	n/a	n/a		n/a
• Blue dyed bait	no	yes			yes	n/a	n/a		n/a
• Deep-setting line setter	no	yes			yes	n/a	n/a		n/a
• Underwater setting chute		yes				n/a	n/a		n/a
Hook shielding devices	yes					n/a	n/a		n/a
Waste management									
• no discharge during shooting & hauling		yes			yes	n/a	n/a		n/a
• strategic discharge from opposite side of boat to setting/hauling area		yes			yes	n/a	n/a		n/a
Area of application	not defined by ACAP	N of 23°N, S of 30°S plus coastal area N to 2°N	S of 25°S	S of 25°S	N of 23°N, S of 30°S	n/a	n/a	S of 25°S	n/a
<b>Demersal longline</b>									
Area closures where appropriate	yes	n/a	n/a	n/a	n/a	no	no	yes	yes
Line weighting									
• autoline IWL	yes	n/a	n/a	n/a	n/a	yes	yes	yes	yes
• autoline external weights to non-IWL longlines	yes	n/a	n/a	n/a	n/a	yes	yes	yes	yes
• Spanish system mainline weighting	yes	n/a	n/a	n/a	n/a	yes	yes	yes	yes
• Trotline system weighting of distal end of droplines	yes	n/a	n/a	n/a	n/a	yes	yes	yes	yes
Night setting (NS) of longlines mandatory	yes	n/a	n/a	n/a	n/a	yes	yes	yes	no
Bird Scaring Lines (BSL)									
• single BSL	yes	n/a	n/a	n/a	n/a	yes	yes	yes	yes
• double BSL	yes	n/a	n/a	n/a	n/a		encourage d	no	encourage d
Combined use of line weighting, BSL & NS	yes	n/a	n/a	n/a	n/a	yes	no	yes	no
Bird Excluder Device around haul area	yes	n/a	n/a	n/a	n/a	optional		yes	some areas
Cachalotera nets used on trotlines (Chilean method)	yes	n/a	n/a	n/a	n/a	yes	encourage d	no	
Waste management									
• Retention during setting	yes	n/a	n/a	n/a	n/a	yes	yes	yes	yes
• Retention during hauling	yes	n/a	n/a	n/a	n/a	yes	encourage d	yes	encourage d
• Discharge on opposite side to hauling	yes	n/a	n/a	n/a	n/a		encourage d		yes
• removal of fish hooks from offal prior to discharge	yes	n/a	n/a	n/a	n/a		yes		yes
Area of application							S of 30°S		
<b>Trawl</b>									
Area closures where appropriate	yes								yes
Waste management									
• Retention during shooting and hauling	yes	n/a	n/a	n/a	n/a	yes	yes	n/a	yes
• Mealing & retention	yes	n/a	n/a	n/a	n/a	yes		n/a	
• Batching	yes	n/a	n/a	n/a	n/a	yes		n/a	yes
• Mincing	yes	n/a	n/a	n/a	n/a			n/a	
Bird Scaring Lines or bafflers to reduce cable strikes	n/a	n/a	n/a	n/a	n/a			n/a	
• —Trawl warps	yes	n/a	n/a	n/a	n/a	yes	yes	n/a	under trial
• Net monitoring cable	yes	n/a	n/a	n/a	n/a			n/a	under trial
• Bird baffler	yes	n/a	n/a	n/a	n/a	yes		n/a	
Net sonde monitoring cable ban	yes	n/a	n/a	n/a	n/a			n/a	yes
Net entanglement mitigation									
• net cleaning & removal of stickers	yes	n/a	n/a	n/a	n/a	encourage d	yes	n/a	yes
• minimise time net is on surface	yes	n/a	n/a	n/a	n/a	encourage d	yes	n/a	yes
• net binding to larger meshes	yes	n/a	n/a	n/a	n/a			n/a	
• incorporate weight into net belly before setting (pelagic trawl)	yes	n/a	n/a	n/a	n/a		encourage d	n/a	encourage d

mitigation, were also considered important reasons for poor implementation.

Reasons cited for not fully implementing BPA within jurisdictions bore similarities to those cited for not taking up best practice measures (Table 5). In order of number of responses major impediments were considered to be: lack of support from fishery agencies; the power and influence of fishing industry lobby; fishing industry capacity; the need for regulations to implement BPA; and failure to demonstrate conservation need (> 10% of total responses). The disconnect between conservation and fishery agencies within jurisdictions (whole of government support — 7% of responses), and the need for flexible rather than prescriptive BPA measures (7% of responses) were also cited as important constraints.

The survey responses for questions 10–13 provided interesting insights into the level of uptake of BPA and their perceived effectiveness, which are explored below in the Discussion.

## 4. Discussion

### 4.1. Uptake of BPA by ACAP parties and RFMOs

The data obtained in this study reinforces the results of other studies addressing fishery bycatch mitigation (see, particularly, [14]). Powerful and vested interests in the fishing sector and owners and skippers reluctant to change existing practices are factors that can constrain implementation of initiatives. As Eayrs and Pol [14] note, there is reluctance to adopt new approaches – even when these initiatives can increase catch efficiency and/or reduce costs [14]. This reluctance is buttressed by the relative political strength of the fishing industry (as mentioned by a number of respondents, Table 4) as opposed to conservation interests. The lack of adoption of guidelines is a logical outcome of a failure of industry to be convinced of the salience of this advice. On the other side one respondent noted that the inability of conservation agencies to press their case is often reinforced by a “*lack of political power/will to stand up to industry*”.

The development of BPA for fishing gears has been given a high priority by ACAP through the work of their Seabird Bycatch Working Group and Advisory Committee since the Agreement entered into force. The complete uptake of this advice would, however, appear to be poor by both ACAP Parties within their jurisdictions, and in high seas fisheries managed through RFMOs. For Parties, the level of uptake was difficult to assess accurately because reporting to the Agreement has thus far been inadequate for this purpose. ACAP has acknowledged that data received through the current reporting format was very limited and has identified the steps needed if any progress is to be achieved towards widespread adoption of BPA mitigation in fisheries [18]. Additional steps are planned to seek more extensive data provision, particularly through ACAP’s web-based reporting system (ACAP Secretariat, unpublished data), which was developed to capture and use fisheries and bycatch data submitted by Parties and collaborating Range States. However, this may not translate to incorporation in publicly available documents such as Party implementation reports, unless expressly sought by all Parties.

It is perhaps not surprising that information on BPA mitigation implementation by Parties does not feature strongly in national reports as, to date, the Status-Pressure-Response framework used by ACAP to measure performance has two main Pressure Indicators for bycatch: total number of ACAP species killed per year, and their bycatch rate, across each of the fisheries of member Parties [18]. The level of uptake on BPA mandated mitigation measures should also be a Pressure Indicator, with Parties required to report on this parameter for all of the fisheries operating within their jurisdictions and include not just a statement that BPA is used for each fishery, but details of the extent to which each measure is used on a fishery-by-fishery basis. Wider adoption of BPA within jurisdictions is unlikely to occur until ACAP can demonstrate that best practice measures are widely used by all ACAP

Parties. In order to achieve this, ACAP Parties should report on the uptake of BPA mandated mitigation measures in their national reports.

Complete uptake of BPA in high seas fisheries, particularly in those targeting tuna and swordfish, was generally poor and unlikely to improve while ACAP Parties are unable to demonstrate commitment to their use in all national fisheries, a point that was also identified by respondents to the survey (see below). All ACAP Parties are members of at least one of the eight RFMOs that have competency for high seas fisheries that overlap with the geographic range of ACAP listed species (Table 6), and each of these RFMOs has between three and 11 ACAP Parties in its members. ACAP Party membership of an RFMO provides an opportunity to work within a fishery to bring about change to accepted fishing practices, including application of best practice conservation measures, leading and promoting the development of binding Conservation and Management Measures (CMMs) that contain elements of BPA, and collection of data to contribute to management of ecologically related species such as seabirds (see below for further expansion on this point).

### 4.2. Online survey and reasons for low level of BPA uptake

Assessing effectiveness and influences in relation to development of and implementation of conservation measures is challenging. Both effectiveness and influence are contested, multilayered concepts with no agreed single definition. Effectiveness, at its most simple formulation, is the situation when a measure has addressed the problem for which it was developed. Establishing a measure meets the criterion of addressing a problem but does not necessarily lead to solving that problem.

As one respondent noted there is a need to better understand “*what are the impediments to uptake*”. The survey highlights a number of factors that are considered by respondents to have limited broad-based uptake of the BPA guidelines. Considerable work has been done to develop the BPA guidelines within ACAP. It is clear that constraints and limitations in the implementation of the guidelines have contributed to a view emerging from the survey that while the BPA guidelines are important, they may not be seen by some as containing practical measures, which is one of the factors that could be hampering their implementation.

The survey responses for questions 10–13 provide interesting insights into this lack of uptake, and these points are explored further below. Reasons put forward included:

- BPA has been developed by conservation-based scientists with limited involvement and consequently support from the fishing industry who are clearly the end users of the recommendations;
- Limited engagement of fisheries agencies in the development of BPA guidelines, hence a disconnect in domestic fisheries management and legislation;
- Failures in compliance monitoring (sticks);
- Limited incentives and support for changed behaviour (carrots); and
- Lack of fishing industry champions of the BPA guidelines.

Other responses suggested that the nature of the advice and guidelines may be a factor. Responses provide useful insights to challenges from the use of advice and guidelines. Hortatory, non-binding, initiatives do not have the bite of binding “hard” regulation but at the same time can be important in motivating and encouraging changes in behaviour. Promoting mitigation devices and practices that are efficient and easy to deploy may facilitate this. A respondent notes that such devices/practices need to be “*easy to implement and leave in place (to not require persistent monitoring or enforcement)*”. Development of regulations by a Party to implement BPA will vary, as will the level of ‘enforcement’ of these regulations, being dependent on domestic legal arrangements and processes. Research and assessment of the implementation of regulations is challenging – requiring detailed work in member countries and was beyond the scope of this project. However, this is an area that would be relevant for future research.

**Table 3**  
Awareness and effectiveness of BPA for longline and trawl gear.

Question	Yes	Partially	No
Aware of BPA for longline	30	4	0
Effectiveness of BPA for longline	21	12	0
Full implementation of BPA for longline	3	27	4
Aware of BPA for trawl gear	27	7	1
Effectiveness of BPA for trawl gear	17	16	0
Full implementation of BPA for trawl	3	21	10

**Table 4**  
Suggested reasons why ACAP BPA not currently implemented, as indicated by responses to both listed options and an open text box in Questions 4 and 8.

Suggested reasons	No of respondents		
	Longline	Trawl	Total
Not considered practical	12	18	30
Fishers do not want to use BPA measures	17	8	25
Not considered necessary, birds are rarely caught, conservation concern not demonstrated	11	12	23
Cost of installing mitigation	10	10	20
Fishing efficiency impacted	11	8	19
Safety concerns	13	4	17
Not regulated, weak management	8	4	12
Additional research required to demonstrate efficacy or need	4	6	10
Not considered effective	0	5	5
Flexibility needed to cater for individual vessels, 'Tool Box' approach preferred to prescriptive approach	2	1	3
Fishers need to be engaged in BPA process	1	2	3
Not tested in commercial situation across range of vessels and fisheries	0	2	2
Fishers don't care about seabirds	1	0	1

While there may be some criticism of lack of enforceable action for non-compliance with advice, one respondent noted that “it is right to have guidelines and a concept of best practice, [and as a result] ACAP does good work”. This was reflected in a comment that the BPA guidelines are “thought to be something to aspire to”, while a contrary view was that “ACAP needs to significantly raise the bar in terms of the level of expectation on Parties to fully adopt BPA”.

A lack of engagement with the fishing industry is seen by a few respondents as a major factor contributing to a lack of effective uptake. This is linked to interactions within ACAP in the broadest sense – a respondent noted that “fisheries managers within the fisheries agency are not strongly engaged in ACAP”. This disconnect is linked to further constraint where, in the words of a respondent, the “fishing agency does not fully cooperate with the conservation and enforcement agencies”. This is

**Table 5**  
Identified ‘constraints’ of fully implementing all measures in ACAP’s BPA (Question 9).

Constraints	No. of respondents
Support of fishery agency required	22
Power and influence of fishing industry lobby; support of fishing industry	22
Fishing industry capacity	12
Regulations required but not supported by government	10
Need for mitigation not understood, conservation need not demonstrated	10
‘Whole of government’ support currently lacking between conservation and fisheries agencies.	8
BPA impractical; flexible approach to mitigation required	8
Incentives for fishers; empowerment of fishers	3
Enforcement of regulations; capacity issues in fisheries/enforcement agencies	2
Improved data collection	1

an area that must be addressed by ACAP and member countries going forward to ensure buy-in to the BPA guidelines.

The process of development of the advice and guidelines was recognised by a respondent as one factor that may contribute to lack of uptake. They noted that there appears to be “limited engagement with industry prior to BPA consideration at ACAP meetings, so practicality and safety constraints are perhaps not as well considered as they should be”. It was suggested by another respondent that “greater involvement in ACAP SBWG of fisheries managers and specialist scientific observers” would be of great benefit.

Most Parties have viewed ACAP solely as a MEA and have directed policy implementation of the Agreement in country toward their environment portfolios. This has led to Membership of ACAPs working groups, Advisory Committee and Meeting of the Parties being drawn largely from conservation-based scientists and policy makers. Development of BPA by scientists and others with a largely conservation background in the past has been more through necessity than intent, but ensuring greater involvement of fishers in future reviews of mitigation measures may lead to BPA that is both more effective and attractive to fishers.

Suggestions to include fishery managers and industry representatives in BPA development also reflects a view that the prescriptive nature of the BPA guidelines may be a constraint. A way forward was suggested by another respondent: “Draft best practice as enabling guidelines instead of prescription that recognise use of best materials, deployment, training and note how vessel characteristics and operations make significant differences to utility of devices”. Moving away from a perception of the BPA guidelines as a single solution but retaining the core of the guidelines was suggested: “The categories are good, [but] focus on a suite of mitigation measures for each category that a fisher/manager can be advised by”.

It was clear that respondents recognised that issues and perceptions of safety and the impacts of BPA initiatives on operational issues are factors hindering uptake. One respondent suggested that “there are a range of issues, such as safety concerns around line weighting in pelagic longline, to wider issues of practicality in small-vessel fisheries, where the toolbox type of advice ACAP is developing for small-scale and artisanal fisheries may be more appropriate”. If a toolbox approach is to be used it will be important to empirically demonstrate that the tools being used are achieving the same optimal outcome, with Parties reporting explicitly on this.

Ensuring that practices underpinning the BPA Guidelines are workable is important. It was suggested by a respondent that greater effort be put into on-water testing in real time and they suggested a period of “operation [of the guidelines] with observations but without technicians on board so the practicality of day in, day out operation is tested fully”. As a respondent noted, a key is to “demonstrate empirically that what ACAP prescribes is more effective than current practices”.

While considerable focus was placed on the lack of compliance monitoring (see below) it was recognised that “regulation does not lead to effective ownership of seabird capture by fishers” and in the words of another respondent “the driver for real change is providing those in the field fishing with a sense of ownership to use this equipment”. A comment was made that “more focus on implementation of vessel specific measures through risk management plans on vessels” would enhance the application of mitigation measures. Working with industry has long term benefits as noted by one respondent: “ownership of their mitigation approaches and solutions will result in more driven passionate fishers who can enact long term behavioural change”. Such champions of mitigation are important - a respondent encouraged ACAP to “recognise efforts of those who are working to improve their use of mitigation measures, use these vessels/fleets as champions for the cause to show what can be done”.

#### 4.3. Reasons for Non-implementation

There are clearly a number of factors that contribute to non-implementation of the BPA guidelines in full, some of which have

**Table 6**

RFMOs relevant to ACAP. Identified with solid circles (●) are ACAP Parties that are also Members of Regional Fisheries Management Organisations (RFMOs) — including the Inter American Tropical Tuna Commission (IATTC), International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC), the Western and Central Pacific Fisheries Commission (WCPFC), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the South Pacific Regional Fisheries Management Organisation (SPRFMO), the South East Atlantic Fisheries Organisation (SEAFO) and the Southern Indian Ocean Fisheries Agreement (SIOFA). European Union member countries that are by default also contracting Parties to the RFMOs included here are identified by “EU”, noting that the EU is not a Party to ACAP. ACAP Parties that are signatory states to an RFMO but have yet to ratify it are identified with (S).

ACAP Party	RFMO								
	IATTC	ICCAT	IOTC	WCPFC	CCSBT	CCAMLR	SPRFMO	SEAFO	SIOFA
Argentina						●			
Australia			●	●	●		●		●
Brazil		●				●			
Chile						●	●		
Ecuador	●						●		
France	●	●	●	●	EU	●		EU	●
New Zealand				●	●	●	●		S
Norway		●				●		●	
Peru	●						●		
South Africa		●	●		●	●		●	
Spain		EU	EU	EU	EU	●		EU	EU
United Kingdom		●	●			●			
Uruguay		●				●			
European Union		●	●	●	●	●	●	●	●

been noted above. The lack of formal commitment and legal requirement in domestic legislation is clearly a challenge. Respondents noted that as the guidelines are not enforceable and /or not mandated the problem of compliance is heightened.<sup>5</sup> Another respondent provided a useful and insightful assessment in noting that “*impediments to implementation are less concerned with the BPA and more concerned with the relevance of BPA in the context of our fisheries*”. This links to views that the guidelines may be overly complex and include requirements that are operationally difficult to implement, or at least are perceived to be overly complex, which may contribute to non-implementation. This point was reflected in a respondent’s comment that “*the reluctance to take up ACAP BPAs as the only standard is due to them not fitting well enough to local operating and economic conditions*”. While respondents did not provide examples of this, Fisheries New Zealand [16] recently proposed changes to implement best practice line weighting in demersal longline fisheries in New Zealand with a caveat that “*it is unknown whether all vessels are capable of meeting the proposed line weighting requirements under varying conditions*”.

A further comment recognised that “*better cooperation is needed between industry and regulators to test/enhance new or existing mitigation measures. [This] would require governments being more willing to invest in R&D, or at least commit to directing a proportion of fishing taxes into seabird-fisheries interactions issues. Could help lead to more ‘out-of-the-box’ solutions*”. We recognise that while government-sourced financing may be useful, it should be developed with industry engagement and support.

#### 4.4. The Way ahead

This research provides a number of insights on strategies to support uptake of mitigation and reduction of seabird bycatch. Increased attention to the implementation of the BPA guidelines as best practice by all ACAP Parties is a major step, acknowledging that full uptake of the current guidelines is unlikely to be achieved while industry may not see them fitting well to local operating and economic conditions [14]. The failure of all ACAP parties to fully implement the BPA guidelines constrains the broader development of mitigation measures and application, and their transfer to other fisheries management bodies. Improved reporting on the uptake of the BPA guidelines from ACAP Parties is

<sup>5</sup> Some respondents appeared to have misunderstood that the guidelines are prepared to influence domestic regulations, legislation and conservation measures, rather than be enforceable measures.

recommended and this could be achieved by adding requirements to the pro forma for party reporting. This information from Parties would inform discussions at the Seabird Bycatch Working Group and assist with recommendations for BPA refinement. It would also improve the accountability of ACAP Parties to implementing the Agreement’s objectives.

It is further recommended that ACAP and its Parties work to reinforce the urgency of the conservation crisis for albatross and petrel species, and how this is relevant within their jurisdictions and on the high seas where their fleets may operate.

There is also a need for ACAP and its Parties to demonstrate the effectiveness of BPA in mitigating seabird bycatch with projects on the water involving industry and working through operational issues.

We further recommend ACAP and its Parties continue to update its strategies for engagement with RFMOs to encourage uptake of BPA.

As tuna RFMOs (tRFMOs) continue to pose the greatest risk on the high seas for ACAP species (Annex 8 in [4]), ACAP should continue to promote information and knowledge of the BPA guidelines to these bodies, building on the early work of the ACAP Secretariat and BirdLife International [21]. None of the tRFMOs has an outstanding record in addressing seabird bycatch within their areas of competence, based on the reluctance to review levels of seabird bycatch, the strength of mitigation measures adopted, and their bycatch data collection and reporting requirements [23]. Some tRFMOs have, however, made more progress than others. As CCSBT has resolved to align their ecologically related species conservation measures with those of other spatially-based RFMOs when fishing within the relevant area of competence [9], priority in seeking broader adoption of BPA guidelines on the high seas could be better directed toward the IOTC, WCPFC and ICCAT. While the remaining tRFMO, IATTC, has competency for much of the eastern Pacific Ocean, it is the tRFMO with the weakest seabird conservation measures in place, which is perhaps indicative of a reluctance to change at present.

## 5. Conclusion

The incidental catch of seabirds during fishing operations has increased in salience as an issue of concern. Significant work has been undertaken in the development of practices to mitigate the incidental catch of seabirds under the auspices of ACAP, including the development of BPA guidelines. Challenges remain in the implementation of these guidelines. This paper identifies a number of factors that impact the uptake of such guidelines within ACAP member states and provides a



number of recommendations to improve the reporting and encouragement of BPA uptake. Continuing to support innovation and development of mitigation practices and tools is important but encouraging the uptake and implementation of existing measures should be the priority. Achieving this would be greatly assisted if Parties incorporated BPA into elements of their domestic legislation and regulations pertaining to management of fisheries. Future work by ACAP should emphasise more extensive at-sea trials over longer time frames to 'bottom-out' practical implementation, rather than focussing on shorter term experimental approaches. The work of ACAP's Seabird Bycatch Working Group (SBWG) remains important in addressing this concern, directing research and providing advice to ACAP's Advisory Committee and the Meeting of the Parties and then to other bodies, including the tRFMOs.

### CRedit author contributions statement

**G. Barry Baker:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing. **Valeriya Komyakova:** Conceptualization, Formal analysis, Investigation, Methodology, Software, Writing – original draft, Writing – review & editing. **Alexia Wellbelove:** Conceptualization, Funding acquisition, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Nicola Beynon:** Conceptualization, Funding acquisition, Project administration, Writing – review & editing. **Marcus Haward:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing.

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### Data Availability

The data that has been used is confidential.

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### Appendix A. Supporting information

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### Glossary

**ACAP:** Agreement on the Conservation of Albatrosses and Petrels  
**BPA:** best practice advice  
**CCAMLR:** Commission for the Conservation of Antarctic Marine Living Resources  
**CCSBT:** Commission for the Conservation of Southern Bluefin Tuna  
**IATTC:** Inter American Tropical Tuna Commission  
**ICCAT:** International Commission for the Conservation of Atlantic Tunas  
**IOTC:** Indian Ocean Tuna Commission  
**MEA:** multilateral environmental agreements  
**RFMO:** Regional Fisheries Management Organization  
**SBWG:** Seabird Bycatch Working Group, a working group of ACAP  
**SEAFO:** South East Atlantic Fisheries Organization  
**SPRFMO:** South Pacific Regional Fisheries Management Organization  
**SIAFA:** Southern Indian Ocean Fisheries Agreement  
**tRFMO:** tuna Regional Fisheries Management Organization  
**WCPFC:** Western and Central Pacific Fisheries Commission