 <p>Agreement on the Conservation of Albatrosses and Petrels</p>	<p>Seventh Meeting of the Seabird Bycatch Working Group</p> <p><i>La Serena, Chile, 2 - 4 May 2016</i></p> <p>‘Toolbox’ template for mitigation advice in artisanal and small-scale fisheries</p> <p><i>Jeffrey C. Mangel, Joanna Alfaro-Shigueto, Jorge Azocar & Igor Debski</i></p>
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SUMMARY

It was agreed at SBWG6 to work towards a model of advice that involves the development of a ‘toolbox’ of effective mitigation methods for artisanal and small-scale fisheries, rather than a more prescriptive list. We provide the first step of this process to develop a ‘toolbox’ template, and to include some examples to ‘populate’ the toolbox to illustrate how it could work in practice. For industrial trawl and longline fisheries, ACAP distils clearly defined best practice advice. A major challenge with the ‘toolbox’ approach is how advice on the adequacy of each mitigation method included can be clearly and simply communicated. An initial categorisation of advice is proposed.

RECOMMENDATIONS

1. The Working Group review the proposed mitigation ‘toolbox’ template, and agree a template for future use.
2. The Working Group agree a categorisation of advice that can be applied to each mitigation method included in the ‘toolbox’.
3. The Working Group identify possible mitigation methods to populate the ‘toolbox’.
4. The Working Group identify any other elements of the approach that require further development.

Plantilla de herramientas para brindar recomendaciones sobre medidas de mitigación en pesquerías artesanales y de pequeña escala

RESUMEN

En la GdTCS6 se acordó trabajar en pos de un modelo para la formulación de recomendaciones que suponía crear herramientas en forma de medidas efectivas de mitigación para las pesquerías artesanales y de pequeña escala, en lugar de elaborar una lista más prescriptiva. Facilitamos el primer paso de este proceso para crear una plantilla de herramientas e incluir algunos ejemplos para expandir estas herramientas a fin de demostrar su posible funcionamiento en la práctica. El ACAP sintetiza las recomendaciones de mejores prácticas claramente definidas para las pesquerías industriales de arrastre y palangre. Uno de los mayores desafíos respecto de la creación de estas herramientas es lograr que las notificaciones sobre la pertinencia de los métodos de mitigación incluidos se realicen de manera clara y simple. A tal fin, se propone la categorización inicial de las recomendaciones.

RECOMENDACIONES

1. Que el Grupo de Trabajo examine la plantilla de herramientas de mitigación y establezca una plantilla para uso futuro.
2. Que el Grupo de Trabajo acuerde una categorización de recomendaciones que puedan aplicarse a cada método de mitigación incluido en las herramientas.
3. Que el Grupo de Trabajo identifique posibles métodos de mitigación para expandir las herramientas.
4. Que el Grupo de Trabajo identifique cualquier aspecto de esta iniciativa que deba perfeccionarse.

Modèle de « boîte à outils » offrant des conseils en matière d'atténuation dans les pêches artisanales et de petite taille

RÉSUMÉ

Le GTCA6 avait convenu de travailler à la préparation d'un modèle de conseils impliquant l'élaboration d'une « boîte à outils » composée des méthodes d'atténuation efficaces dans les pêches artisanales et de petite taille, plutôt qu'une liste davantage normative. Nous assurons la première étape de ce processus consistant à élaborer un modèle de « boîte à outils » et à fournir quelques exemples destinés à « remplir » la boîte afin d'illustrer la manière dont elle pourrait fonctionner en pratique. L'ACAP distille des conseils précis en matière de bonnes pratiques pour la pêche industrielle au chalut et à la palangre. L'un des défis majeurs de l'approche de la « boîte à outils » consiste à déterminer la façon dont il convient de communiquer, de manière claire et simple, les conseils relatifs à la pertinence de chaque méthode d'atténuation. Une première classification des conseils est proposée.

RECOMMANDATIONS

1. Que le Groupe de travail examine le modèle proposé de « boîte à outils » pour l'atténuation, et convienne d'un modèle qui sera utilisé à l'avenir.
2. Que le Groupe de travail convienne d'une classification des conseils pouvant être appliqués à chacune des méthodes d'atténuation présentées dans la « boîte à outils ».
3. Que le Groupe de travail identifie les méthodes d'atténuation pouvant figurer dans la « boîte à outils ».
4. Que le Groupe de travail identifie tout autre élément de cette approche nécessitant d'être approfondi.

1. INTRODUCTION

ACAP has started focussing greater attention on the consideration of seabird bycatch in artisanal and other small-scale fisheries. There are a number of challenges associated with developing advice for the mitigation of seabird bycatch in small-scale fisheries. These include the diverse nature of the gear and methods used by these fisheries, the smaller size of vessels, reduced size and capacity of crew, and lack of mechanisation. All of these, and other, factors necessitate a more flexible and less prescriptive approach to providing advice on seabird bycatch mitigation for small-scale fisheries than has been adopted for industrial fisheries. Consequently, it was agreed at SBWG6 to work towards a model of advice that involves the development of a 'toolbox' of effective mitigation methods, rather than a more prescriptive list. It was recommended at SBWG6 that a useful first step of this process would be to develop a 'toolbox' template, and to include some examples to 'populate' the toolbox and test how it could work in practice.

2. ARTISANAL & SMALL-SCALE FISHERIES

Previous works presented at the SBWG have begun to better clarify and define artisanal and small-scale fisheries (SSF) (e.g. Debski et al. 2014, Favero et al. 2014, Goya et al. 2011). Along with a clearer understanding of the characteristic of these fisheries, it has also become evident that SSF may in some cases have negative impacts on seabird species, including ACAP listed species (e.g. Mangel et al. 2012). While there is no agreed upon definition of SSF, some commonly recognized characteristics include their:

- Lack of mechanization
- Small vessel and crew size
- Highly geographically dispersed fleets
- Vessels change and adapt gear frequently
- Limited enforcement of existing regulations
- Common in impoverished communities, i.e. few resources for monitoring, mitigation

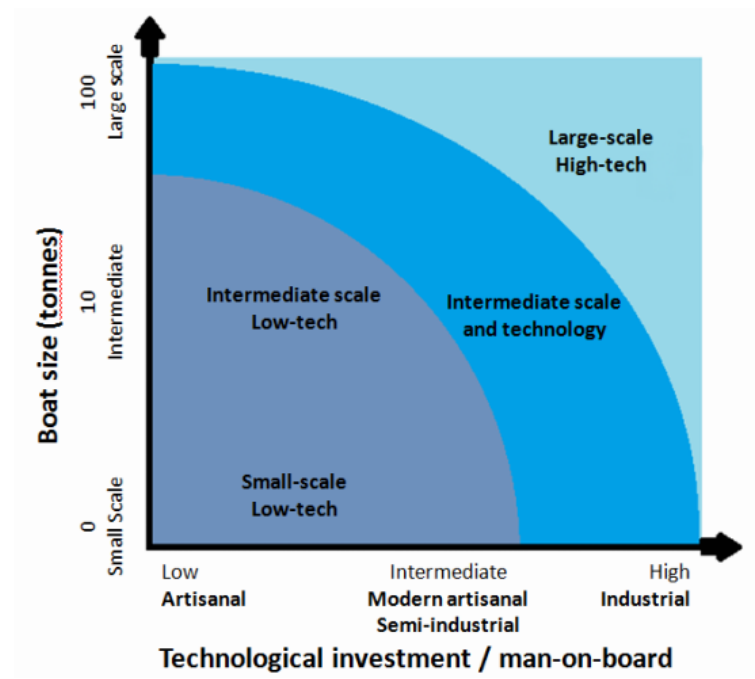


Figure 1. Graphic definition of small-scale, artisanal and industrial fisheries as a function of vessel size and relative technological investment. Adapted from FAO Small-scale and artisanal fisheries at <http://www.fao.org/fishery/topic/14753/en>.

3. TOOLBOX CONSIDERATIONS

Given these SSF characteristics, opportunities for bycatch mitigation are, in many cases, challenging to identify or implement. Efforts to test or implement bycatch mitigation have been tried, however, in some SSF settings, primarily with sea turtles and small cetaceans (e.g. Gilman et al. 2010, Mangel et al. 2013, Peckham et al. 2015, Ortiz et al 2016). Tests of bycatch mitigation in SSF to reduce seabird bycatch are relatively more limited but include the NISURI Fastset (Brothers et al. 2014) and tests of sub-surface nets and net illumination (Mangel et al. 2014). Other useful resources we considered in developing this report were the summary report from the 2015 Workshop on Reduction of Bycatch of Seabirds, Sea Turtles, and Sea Mammals hosted by American Bird Conservancy and Birdlife International (Wiedenfeld et al. 2015), as well as the Bycatch.org database of bycatch mitigation studies.

Apart from technical solutions to bycatch, when working with SSF we believe that it is imperative that alternative methods to reduce bycatch be considered. This need for alternative methods takes into account the challenges in testing and implementing mitigation measures in these fisheries, including the fishery characteristics detailed above. Any toolbox of mitigation solutions in SSF should therefore include the implementation of educational/outreach campaigns, the development of human resources (capacity building), long-term working plans in SSF communities, training in safe handling and release, and co-management of resources or fishing grounds, among others. Tools like these can be considered to be potentially applicable across fishery types. These non-technological solutions may often be the first or perhaps most effective options available in these fisheries. The dynamic nature of SSF also reinforces the need for fishery monitoring, as this can help identify emergent bycatch issues or potential opportunities to guide fishery development to reduce negative impacts before practices become entrenched.

Tables 1 and 2 provide two sample formats for summarizing examples of technological mitigation trials in small-scale fisheries. The example in Table 2 includes a proposed categorisation of the efficacy of the mitigation techniques, based on demonstration of reduced bycatch of seabirds and in particular ACAP-listed species. Such a table could serve as a main summary component of the mitigation advice toolbox.

In choosing a mitigation solution, apart from the summary information contained in the table, we have developed a series of guidance questions that can help researchers and managers determine if a particular mitigation technology is feasible for their SSF:


- What oversight or enforcement is required to demonstrate implementation
 - Mitigation fixed into fishing gear can more easily be monitored (e.g. port inspection).
- The estimated financial cost of the mitigation solution and how does it compares to the operating costs in the fishery.
- Whether the equipment require maintenance or replacement spare parts.
 - Who would provide maintenance and replacements?
 - Are components available in local markets or do they need to be imported?
 - What are the ongoing costs?
- Whether training in the mitigation technique is required.
 - Who would provide the training?
 - Is there sufficient training capacity?
- Whether the mitigation technique is appropriated for a small vessel craft.
 - Consider storage space, effective deployment, others.
- Whether the mitigation technique impact the target catch or lead to changes in bycatch (including other bycatch species).

Table 1. Mitigation toolbox sample #1.


Fishery	Target species	Mitigation	Effect	Field tested?	Main finding	Source
Demersal setnet	guitarfish	Net illumination	Increase net visibility	Yes	Reduced guanay cormorant bycatch 90%	Mangel et al 2014.
Driftnet		High visibility panels	Increase net visibility	Yes	<i>tbd</i>	Birdlife International.
Demersal longline	hake	NISURI Fastset	Increase branchline sink-rate	Yes	Increased set speed ~10x	Brothers et al 2014.

Table 2. Mitigation toolbox sample #2. Alternative mitigation toolbox structure, by fishing method. Here we have also included a color-coding to highlight method effectiveness with seabirds and ACAP-listed species.





Method: demersal setnet

Mitigation	Function	Recommendation to SBWG	Testing	Findings	Limitations	Source	Status
Net illumination	Increase net visibility		In fishery, guitarfish, Country/Region	Reduced guanay cormorant bycatch 90%		Mangel et al. 2014	
			<i>Additional trials added here...</i>				
Orange net colour	Increase net visibility		On birds in captivity	Reduced little penguin entanglements by XX%		Baker et al	

Method: demersal longline

Mitigation	Function	Recommendation to SBWG	Testing	Findings	Limitations	Source	Status
NISURI	Reduce bait availability for birds			Increased set speed ~10x		Brothers et al. 2014	

Legend (proposed categorisation of status in terms of mitigation efficacy):

-  Reduced seabird bycatch, tested/applicable to ACAP species
-  Reduce seabird bycatch, not tested/applicable ACAP species
-  No Reduction of bycatch
-  Testing in progress

4. REFERENCES

- Brothers, N., H. Freifeld, G. Suarez & G. Wallace. 2014. NISURI Fastset – a simple, cheap, effective artisanal demersal longline setting system to reduce seabird bycatch. SBWG6-Doc 14, Sixth meeting of the ACAP Seabird Bycatch Working Group, Punta del Este, Uruguay, 10 to 12 September. 15 pp.
- Debski, I., A. Wolfaardt & M. Favero. 2014. Definitions and descriptions of net fisheries. SBWG6-Doc 7, Sixth meeting of the ACAP Seabird Bycatch Working Group, Punta del Este, Uruguay, 10 to 12 September. 6 pp.
- Favero, M., I. Debski, T. Neves & A. Wolfaardt. 2014. Artisanal, small-scale and subsistence fisheries. SBWG6-Doc 8, Sixth meeting of the ACAP Seabird Bycatch Working Group, Punta del Este, Uruguay, 10 to 12 September. 9 pp.
- Gilman, E., J. Gearhart, B. Price, S. Eckert, H. Milliken, J. Wang, Y. Swimmer, D. Shiode, O. Abe, S. H. Peckham, M. Chaloupka, M. Hall, J. Mangel, J. Alfaro-Shigueto, P. Dalzell & A. Ishizaki. 2010. Mitigating sea turtle by-catch in coastal passive net fisheries. *Fish and Fisheries* 11: 57-88.
- Goya, E., B. Baker, W. Papworth & M. Favero. 2011. Caracterización de las Pesquerías Artesanales en Sudamérica y su Impacto sobre Albatros y Petreles. SBWG4-Doc 22, Fourth meeting of the ACAP Seabird Bycatch Working Group, Guayaquil, Ecuador, 22 to 24 August. 41 pp.
- Mangel, J., J. Alfaro-Shigueto, A. Baquero, J. Darquea, B.J. Godley & J. Hardesty Norris. 2011. Seabird bycatch by small-scale fisheries in Ecuador and Peru. SBWG4-Doc 24, Fourth meeting of the ACAP Seabird Bycatch Working Group, Guayaquil, Ecuador, 22 to 24 August. 30 pp.
- Mangel, J., J. Alfaro-Shigueto, J. Wang, Y. Swimmer & G. Wallace. 2014. Tests of visual cues and sub-surface nets as bycatch mitigation measures in small-scale gillnet fisheries in Peru. SBWG6-Doc 16, Sixth meeting of the ACAP Seabird Bycatch Working Group, Punta del Este, Uruguay, 10 to 12 September. 13 pp.
- Mangel, J. C., J. Alfaro-Shigueto, M. J. Witt, D. J. Hodgson & B. J. Godley. 2013. Using pingers to reduce bycatch of small cetaceans in Peru's small-scale driftnet fishery. *Oryx* 47(4): 595-606.
- Ortiz, N., J. C. Mangel, J. Wang, J. Alfaro-Shigueto, S. Pingo, A. Jimenez, T. Suarez, Y. Swimmer, F. Carvalho & B. J. Godley. 2016. Reducing green turtle bycatch in small-scale fisheries using illuminated gillnets: the cost of saving a sea turtle. *Marine Ecology Progress Series* 545: 251-259.
- Peckham, S. H., J. Lucero-Romero, D. Maldonado-Diaz, A. Rodriguez, J. Senko, M. Wojakowski & A. Gaos. 2015. Buoyless nets reduce sea turtle bycatch in coastal net fisheries. *Conservation Letters*: DOI: 10.1111/conl.12176.
- Wiedenfeld, D. A., R. Crawford & C. M. Pott (2015). Results of a Workshop on Reduction of Bycatch of Seabirds, Sea Turtles, and Sea Mammals in Gillnets, 21-23 January 2015, American Bird Conservancy and Birdlife International: 36.