

 <p>Agreement on the Conservation of Albatrosses and Petrels</p>	<p><b>Seventh Meeting of the Seabird Bycatch Working Group</b></p> <p><i>La Serena, Chile, 2 - 4 May 2016</i></p> <p><b>'Smart Tuna Hook' as best practice seabird bycatch mitigation in pelagic longline fisheries</b></p> <p><i>Jonathon HS Barrington</i></p>
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### **SUMMARY**

The 'Smart Tuna Hook' is proposed for review against criteria for assessing and recommending as best practice seabird bycatch mitigation in pelagic longline fisheries. The Advisory Committee has adopted the six best practice seabird bycatch mitigation criteria developed by the Seabird Bycatch Working Group for assessing and recommending best practice advice on seabird bycatch mitigation measures. An assessment of the Smart Tuna Hook is provided against these criteria.

### **RECOMMENDATIONS**

1. That SBWG reviews the assessment of the 'Smart Tuna Hook' against criteria for assessing and recommending as best practice seabird bycatch mitigation.
2. That SBWG considers recommending the 'Smart Tuna Hook' as best practice seabird bycatch mitigation in pelagic longline fisheries.

## **Uso del Smart Tuna Hook (anzuelo inteligente de atún) como parte de las mejores prácticas en mitigación de captura secundaria de aves marinas en pesquerías de palangre pelágico**

### **RESUMEN**

Se propone el producto Smart Tuna Hook (anzuelo inteligente de atún) para su evaluación, sujeta a criterios de revisión y su recomendación como parte de las mejores prácticas en materia de mitigación de captura secundaria de aves marinas en las pesquerías de palangre pelágico. El Comité Asesor ha adoptado los seis criterios con relación a las mejores prácticas en mitigación de la captura secundaria de aves marinas elaborados por el Grupo de Trabajo sobre Captura Secundaria de Aves Marinas, a fin de evaluar y formular recomendaciones sobre las mejores prácticas para mitigar la captura secundaria de aves marinas. La evaluación del Smart Tuna Hook está sujeta a dichos criterios.

### **RECOMENDACIONES**

1. Que el GdTCS analice la evaluación del Smart Tuna Hook en función de los criterios para su evaluación y recomendación como parte de las mejores prácticas en mitigación de captura secundaria de aves marinas.
2. Que el GdTCS considere la recomendación del Smart Tuna Hook como parte de las mejores prácticas en mitigación de captura secundaria de aves marinas en las pesquerías de palangre pelágico.

## **Le « Smart Tuna Hook » en tant que bonne pratique pour atténuer la capture accessoire dans la pêche pélagique à la palangre**

### **RÉSUMÉ**

Le « Smart Tuna Hook » est proposé à l'examen par rapport aux critères d'évaluation et de recommandation en tant que bonne pratique en matière d'atténuation de la capture accessoire d'oiseaux marins dans la pêche pélagique à la palangre. Le Comité consultatif a adopté les six critères de bonnes pratiques en matière d'atténuation de la capture accessoire d'oiseaux marins élaborés par le Groupe de travail sur les captures accessoires d'oiseaux marins pour l'évaluation et la recommandation d'avis en matière de bonnes pratiques concernant les mesures d'atténuation des captures accessoires d'oiseaux marins. Une évaluation du « Smart Tuna Hook » est fournie par rapport à ces critères.

### **RECOMMANDATIONS**

1. Que le GTCA réexamine l'évaluation du « Smart Tuna Hook » par rapport aux critères d'évaluation et de recommandation de bonnes pratiques en matière d'atténuation de la capture accessoire des oiseaux de mer.
2. Que le GTCA examine la recommandation du « Smart Tuna Hook » en tant que bonne pratique en matière d'atténuation de la capture accessoire des oiseaux de mer dans la pêche pélagique à la palangre.

## 1. INTRODUCTION

The 'Smart Tuna Hook' is an innovative seabird bycatch mitigation technology. The Smart Tuna Hook is a 38 g device that attaches to a modified longline hook shielding the point and barb of baited hooks. The device provides a barrier to ingestion by seabird species during setting of branch lines. The sink rate of the branch line to 4 m depth exceeds that of conventionally weighted branch lines (38 g Smart Tuna Hook  $0.60 \text{ m}\cdot\text{sec}^{-1}$ , compared to 60 g at 3.5 m  $0.39 \text{ m}\cdot\text{sec}^{-1}$ ). An alloy link to the shield corrodes on contact with seawater causing the shield to release after about 15 min immersion, exposing the baited hook. On release, the baited Smart Tuna Hook has ordinarily submerged below the diving and feeding depths of seabirds (an exception exists in circumstances where the longline is set at a shallow depth). The shield sinks to the seabed and corrodes within 12 months. Byproducts of corrosion are iron oxide and carbon. The Smart Tuna Hook is unweighted during hauling.

The Smart Tuna Hook technology is innovative in three key ways: (i) baited hooks are shielded to prevent seabird ingestion or hooking during setting, (ii) branch line weighting at the hook maximises the sink rate of the baited hook, and (iii) release of the shield after immersion reduces the risk of a flyback event during hauling. Use of the Smart Tuna Hook also reduces the need to use lead weights and swivels as branch line weighting, and consequently reduces the risk of loss of lead in the marine environment when gear is lost or fails.

Experimental research has been conducted on the efficacy of the Smart Tuna Hook in reducing bycatch of seabirds in the South African Pelagic Longline Fishery (Baker et al, in review; Jusseit, 2010). The Advisory Committee have agreed to six best practice seabird bycatch mitigation criteria developed by the Seabird Bycatch Working Group (SBWG) for assessing and recommending best practice advice on seabird bycatch mitigation measures (**AC8 Final Report**, para 12.1.3). An assessment of the research findings concerning the Smart Tuna Hook is provided against these criteria.

## 2. ASSESSMENT OF SMART TUNA HOOK

### 2.1. Experimental research

Criterion 1: Individual fishing technologies and techniques should be selected from those shown by experimental research to significantly<sup>1</sup> reduce the rate of seabird incidental mortality<sup>2</sup> to the lowest achievable levels.

Experimental research has been conducted using the Smart Tuna Hook in the South African Pelagic Longline Fishery (Baker et al, in review). The South African Pelagic Longline Fishery has been identified as a 'very high impact fishery' for seabirds (Baker et al, 2007). The research indicated that use of the 38g Smart Tuna Hook attached at the hook leads to a significant reduction in seabird bycatch (81.8-91.4% reduction), when compared to the status quo in the fishery, a control of 80 g attached 3.2 m from the hook. The research indicated that there was a reduction in the seabird bycatch rate in the fishery to 0.059-0.247 birds per 1000 hooks, compared to the status quo of 0.647-1.411 birds per 1000 hooks.

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<sup>1</sup> Any use of the word 'significant' in this document is meant in the statistical context.

<sup>2</sup> This may be determined by either a direct reduction in seabird mortality or by reduction in seabird attack rates, as a proxy.

## **2.2. Specifications and minimum performance standards**

Criterion 2: Fishing technologies and techniques, or a combination thereof, shall have clear and proven specifications and minimum performance standards for their deployment and use.

Operational trials indicate that the Smart Tuna Hook performs well in commercial pelagic tuna longline fishing operations. Operational trials of the Smart Tuna Hook have been conducted in the Australian Eastern Tuna and Billfish Fishery and South African Pelagic Longline Fishery to determine the operational performance of this device in commercial fishing operations (Baker et al, in review; Jusseit, 2010). The operational trials indicated that fishing crew adapt readily to attaching the shield to the Smart Tuna Hooks, either with the hook and barb facing them or pointing away from them. The fishing crew commented that the baited Smart Tuna Hook was easier to deploy than a baited, weighted branch line, as there was no need for the double handling required with the lead swivel.

Fishing operators, presently, will need to change to modified Tuna Hooks (Circle or Japanese Style Longline) that accommodate the shields. The shields need to be kept in dry storage until required, to avoid corrosion of the alloy link before use.

## **2.3. Practicality, cost-effectiveness and availability**

Criterion 3: Fishing technologies and techniques shall be demonstrated to be practical, cost effective and widely available.

The Smart Tuna Hook is commercially available. Oceansmart advises that delivery can be affected based on the volume ordered, shipping can be direct to the vessel's port ex factory in cartons loaded onto pallets, and the product is easily stored. The Smart Tuna Hook has been designed to use minimal storage space. The Smart Tuna Hook also provides a number of safety aspects for operators. These include a reduced risk of exposure to lead; a reduced accidental hooking of crew once the shield is applied during the setting process; and a reduced risk of injury due to flybacks, when compared to using lead swivels.

## **2.4. Effect on catch rates of target species**

Criterion 4: Fishing technologies and techniques should, to the extent practicable, maintain catch rates of target species.

Research indicates that there is no detectable difference in the catch rates of commercially valuable species when using the Smart Tuna Hook, compared to the status quo, indicating no detectable detrimental effect on fish catch for any species (Baker et al, in review).

## **2.5. Effect on bycatch of other taxa**

Criterion 5: Fishing technologies and techniques should, to the extent practicable not increase the bycatch of other taxa.

Research undertaken does not indicate that use of the Smart Tuna Hook would lead to an increase in the bycatch of any non-target species (Baker et al, in review). Captive turtle studies indicate that the Smart Tuna Hook mitigates the risk of bycatch by hooking of marine turtles until the shield is released (Jusseit, 2010). Although larger marine turtles would potentially be capable of ingesting the shielded hook and bait, none of the marine turtles tested attempted to swallow the device (Jusseit, 2010).

## 2.6. Performance standards and methods of ensuring compliance

Criterion 6: Minimum performance standards and methods of ensuring compliance should be provided for fishing technologies and techniques, and should be clearly specified in fishery regulations.

Monitoring, surveillance and compliance of use of the Smart Tuna Hook may be undertaken by onboard observers, using electronic monitoring systems to monitor setting operations, and during in port inspections. Where there is a concern, paper trails may be followed to monitor purchases of Smart Tuna Hook shields, to compare these over time with the numbers of hooks set by the fishing vessel. There is a residual risk of non-use in unmonitored fisheries, as with the use of any other seabird bycatch mitigation.

## 3. SMART TUNA HOOK AS BEST PRACTICE SEABIRD BYCATCH MITIGATION

The SBWG is invited to review the above evaluation and decide whether to recommend the 'Smart Tuna Hook' as best practice seabird bycatch mitigation in pelagic longline fisheries.

## REFERENCES

Baker GB, Double MC, Gales R, Tuck GN, Abbott CL, Ryan PG, Petersen SL, Robertson CJR and Alderman R (2007). A global assessment of the impact of fisheries related mortality on shy and white-capped albatrosses: conservation implications. *Biological Conservation* 137, 319–333.

Baker GB, Candy S and Rollinson D (In review). Efficacy of the 'Smart Tuna Hook' in reducing bycatch of seabirds in the South African Pelagic Longline Fishery. Submitted to Fisheries Research.

Jusseit H (2010). *Testing seabird and turtle mitigation efficacy of the Smart Hook system in tuna longline fisheries - Phase 1*. AFMA Fisheries research 2008/805.

Viewed: 1 March 2016.

Available on the internet:

<http://www.inhalesuite2.com/uploads/62/documents/Smart%20Hook%20Project%20Final%20Report.pdf>.