WWF POSITION ON CIRCLE HOOKS

POSITION STATEMENT

April 2007

For further information contact:

Robin Davies
Manager, Global Bycatch Initiative

WWF International
Avenue du Mont Blanc
1196 Gland
Switzerland
Tel: +41 22 364 9010
Fax: +41 22 364 0526
rdavies@wwfint.org

SUMMARY

This document outlines WWFs current position on the use of circle hooks in longline fisheries as a marine turtle bycatch mitigation measure. Although understanding about where circle hooks can and cannot be effective is increasing rapidly, there are still incorrect and/or over simplistic assessments of circle hook effectiveness being advocated. The main problem has been the assumption that to solve the problems associated with marine turtles being caught on longline hooks, all fishers have to do is to simply replace normal J-shaped hooks with circle hooks. In reality, the situation is far more complex and there are many other important factors to consider, especially in the context of a broader ecosystems based management approach to fisheries. In addition, circle hooks are used specifically to avoid marine turtle bycatch only, and are not used to reduce the bycatch of other commonly bycaught species, such as cetaceans. Please note this position statement is not intended to be an in-depth analysis of circle hook technicalities. For this, the paper written by Casale (2006) should be referred to. Rather, it is an overview and summary of the current understanding of the major circle hook issues and how this should be reflected in WWFs associated messaging.

INTRODUCTION

Mortality as a result of bycatch remains a serious threat to marine turtle populations and is one of the major causes of declines in their numbers. Of particular and urgent concern is the dramatic decline of the now critically endangered leatherback turtle, especially in the Pacific Ocean where the number of breeding females may be as low as 2,500 individuals. One of the major bycatch factors arises from marine turtles being caught either on longline hooks, or the branchlines (the line attaching the hook to the actual longline). With hundreds of millions of hooks being fished annually, there are enormous challenges to overcome in tackling this problem. Despite this, over the past few years trials involving the replacement of J-hooks with circle hooks have shown promising results in reducing marine turtle bycatch.

However, there are many factors that can influence the effectiveness and financial viability of circle hooks. For example, not only do they act differently with regard to different turtle species, but their usage may also increase or decrease target and non-target species catch rates, which can have serious implications for both marine conservation and the commercial viability of fishing operations. Consequently, a better understanding of these and other emerging factors must be taken into account before advocating their use. The following sections therefore provide summaries of our current understanding of the main factors surrounding circle hook usage and how these factors affect their efficacy as a bycatch mitigation measure. These summaries are then consolidated into final conclusions and recommendations.

KEY ISSUES / QUESTIONS

Circle Hooks: Can they reduce marine turtle bycatch?

There is growing evidence to suggest that circle hooks can reduce marine turtle bycatch, even by as much as 88%, in some cases (e.g. Watson *et al*., 2005). Essentially, this means that, under similar circumstances, circle hooks will catch less turtles than J-hooks. Additionally, due to their shape, circle hooks are less likely to be ingested by a turtle and are therefore easier to remove – improving post-hooking survival rates. However, there are a number of important issues that either govern their effectiveness or limit their use with respect to the type of fishery in question. The main factors are: 1) circle hook size and shape; 2) type of bait; 3) post hooking mortalities; 4) increasing target catch; 5) decreasing target catch, and 6) impact on elasmobranches (sharks, skates and rays). These are discussed and summarised in the following sections.

1) Circle hook size and shape

Our current understanding is that large circle hooks (e.g. size 16/0 and above) are the most effective at reducing the bycatch of both hard and soft shelled turtles. However, smaller sizes can be effective in certain fishing situations and research is currently being conducted that will determine where smaller circle hooks can also have a significant conservation impact. Additionally, circle hooks come in a wide range of sizes and modifications, such as the incorporation of a sideways bend (offset), or even a protruding wire that further reduces hooking and ingestion rates. However, whilst research continues into the various ways circle hooks can be modified and how this impacts turtle bycatch rates, we must be careful not to speculate until we have more scientifically rigorous results regarding their efficacy.

Summary:

Large circle hooks are effective in reducing marine turtle bycatch. Smaller or modified circle hooks may also be effective and research is being conducted to determine this.

2) Circle hooks and bait type

The type of bait used on a circle hook can affect its performance in both reducing marine turtle bycatch and maintaining commercial catch levels. We currently know, for example, that circle hooks baited with fish usually hook less turtles than those baited with squid. This is primarily because squid are more sought after by turtles, therefore increasing both hooking and hook ingestion rates. Other factors, such as colour, may also have an effect. Statistically significant results are needed to ascertain the relative effectiveness of these and other combinations, such as live vs. frozen vs. artificial baits, in relation to both circle and J-hooks.

Summary:

Bait type is an important consideration regarding the effectiveness of circle hooks in reducing marine turtle bycatch

3) Circle hooks and post hooking mortality of marine turtles

When fishermen haul in their gear, hooked marine turtles are often alive because drifting or pelagic longlines set at a shallow depth (i.e. no deeper than 40m) may still enable the turtle to reach the surface to breathe. At this stage, fishermen are faced with two options: 1) release the turtle before it's brought aboard by cutting the branchline, or 2) bring the turtle onboard to unhook it.

The first option is the worst one. Here, the turtle is released with an embedded hook and trailing length of line. Observations have shown that this line can be swallowed and the action of internal organs then causes the line to pull progressively tighter and tighter against the embedded hook, leading to the turtle's eventual death (nothing conclusive is yet known about the survival of turtles released with just hooks left in their mouths). Only when the size and weight of the turtle makes it impossible to lift it aboard should the line be cut. Under these circumstances, the line should be cut as close to the hook as possible.

The second option is therefore preferred, provided correct turtle handling guidelines are followed. As is often the case, however, untrained or busy fishermen regularly mishandle the de-hooking procedure and the subsequent injuries can lead to infection and mortalities. The mouth is the most frequent hooking location when using circle hooks (as opposed to J-hooks which are more frequently ingested), but although this is easily accessible, the removal of the hook still requires considerable care and attention. Indeed, some experts speculate that circle hooks are actually more difficult to remove (barbless hooks would ease this process, though the effect on target catch is unknown). Even the first step of pulling the turtle onboard is not necessarily safe: if the turtle is pulled by the branchline, it is possible that its body weight on the hook may cause further internal damage. Ultimately, post-release marine turtle mortality relative to 'J' and circle hooks

caught in different body areas is unknown and it may well be that mortalities increase for either hook type when the hooking occurs deeper than the mouth.

If a turtle has swallowed a circle hook, removing the hook is almost impossible without causing serious injury. Consequently, the only option is to release the turtle with the swallowed hook as there is a chance the body will either expel it naturally or that tissue will grow around the hook and partially protect the turtle from any ill effect. There is, of course, a chance that an ingested hook can kill the turtle, but currently this is poorly understood. It is therefore essential that industry education programmes are introduced so fishermen know when de-hooking is appropriate and how to de-hook in a manner that maximizes the turtle's post-release survival. Observers, fishery officers, or trained fishermen themselves are the most effective teachers of this, but where such expertise is lacking, waterproof (i.e. boat-friendly) information leaflets can help.

Summary:

Removing a circle hook, if deemed necessary to increase the chances of the turtles survival, should be undertaken whilst taking every recognized precaution to avoid damaging the animal.

4) Circle hooks increasing target catch

Research suggests that, in some cases, circle hooks can increase the catch rates of commercial species and therefore close attention needs to be given to the potential impact this may have on the fish stocks being targeted. If a circle hook measure is enacted that decreases turtle bycatch, yet which increases commercial catch rates, fishing effort should be carefully managed so the conservation measure does not increase target species catch rates beyond a level which is sustainable.

Summary:

Where large circle hooks decrease marine turtle bycatch, but increase target catch, fishing effort should be managed to keep target species catch rates within sustainable levels.

5) Circle hooks decreasing target catch

Circle hooks may decrease the catch rates of some commercial species, especially if the hooks are too large, and in this situation voluntary industry uptake can be almost impossible. Whilst the widespread use of large circle hooks would probably reduce most marine turtle bycatch, such a blanket measure could be so detrimental to commercial catch rates that industry uptake would be extremely difficult. It could even undo much of the industry trust that many have worked so hard to achieve and which has been so crucial in achieving successes to date. Consequently, where the use of circle hooks conflicts with the economic interests of fishermen, there needs to be careful consideration given to the urgency of the conservation problem.

In critical situations it is incumbent to push for the introduction of the most appropriate conservation measure, be that circle hooks or circle hooks in conjunction with some other solution/combination of solutions. In applying these conservation measures, there must be actions that endeavour to minimise any resultant economic hardship to fishermen. In less critical situations, industry engagement should be sought, together with calls for rigorous trialling and management plans that find the most effective and mutually agreeable solutions.

Summary:

When the marine turtle conservation problem is critical, the most appropriate management measures must be introduced in a manner that seeks to minimise economic hardship to fishers.

6) Circle hooks and elasmobranchs

Whilst it is currently known that circle hooks can both increase and decrease the bycatch of sharks, skates, and rays, current understanding is still limited due to an overall lack of data. Additionally, elasmobranch populations are threatened by unregulated and regulated directed catches within multi-species fisheries, and therefore there is an urgent need for elasmobranch fisheries to be under their own set of specific management and regulatory measures. For this to happen, it is essential that information on shark stocks, migration routes and all other relevant factors continues to be collected so accurate assessment can support sustainable management.

The most important consideration is where circle hooks could increase the catch of elasmobranchs. In these situations, there is the potential for the measure to simply displace the problem from one species to another. It

is vital that during all circle hook trials information on the impacts of these hooks on shark catch rates is collected. However, where a marine turtle population is in a critical state, it may be necessary to call for the use of an appropriate conservation measure, such as circle hooks, to solve that immediate problem, provided close examination is paid to the impacts that such a measure could have on shark stocks, especially those which themselves are endangered.

Summary:

When the marine turtle conservation problem is critical, and where circle hooks can reduce turtle bycatch, their use should be introduced. Any conservation measure must be carefully monitored to ensure the problem is not displaced to endangered elasmobranch populations. If this is the case, an alternative solution should be considered.

CONCLUSIONS

Bycatch of marine turtles in longline fisheries is having a major impact on the populations of marine turtles. However, research is showing that replacement of J-hooks with circle hooks can substantially reduce this bycatch. Consequently, WWF's current position is that circle hooks are promising as a turtle bycatch mitigation tool in these fisheries, although there are many factors that can influence their effectiveness. Additionally, on-going research continues to yield innovative ideas about how to both apply and modify the hooks to make them more applicable in more situations. Ultimately, it is likely that a certain type of circle hook with a certain type of bait will be effective in a certain fishery that targets a certain species or group of species. Accurately assessing the correct balance of these combinations underpins the importance of scientifically rigorous experiments. These experiments will also serve to provide information on the impact of circle hooks on target and non-target catch. Consequently, where circle hooks have the potential to alleviate the immediate threat posed to marine turtles from longline bycatch, circle hook trials must be implemented as a matter of urgency to ensure that these technologies can be applied in the most appropriate manner and as quickly as possible.

Successful bycatch mitigation initiatives using circle hooks in longline fisheries will be strongly dependant on raising awareness among the fishermen, through education/training and also by learning from them, as their knowledge and understanding of the environment they spend their lives in can provide valuable information for turtle conservation. It should further be noted that circle hooks alone cannot be considered as the only solution for reaching a sustainable longline fishery as their application may be just one of a suite of technical and policy measures.

Please note that new data and information is being gathered every month, and therefore this paper must be considered a time-limited position based on current available knowledge and experience. However, when recommending the use of circle hooks in fisheries experiencing turtle bycatch, it is better to use the phrase 'large circle hooks' (as opposed to simply 'circle hooks'), with the caveat that smaller or modified circle hooks may also prove effective, dependant on the outcome of current research.

Until further updates, any messaging regarding the effectiveness of circle hooks in reducing turtle bycatch should pay close attention to this document.

References

Casale, P. 2006. *Circle Hooks as a Measure for Reducing the Impact of the Longline Fishery on Sea Turtles: Suggestion for WWF's Position.* Paolo Casale: Species Programme and TRAFFIC, WWF Italy. ***Under Review. Will be posted on Connect when completed.***

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