

Research Summaries

Understanding bycatch in coastal net fisheries

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Gilman, E., J. Gearhart, B. Price, S. Eckert, H. Milliken, J. Wang, Y. Swimmer, D. Shiode, O. Abe, 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.

And

Moore, J.E., T.M. Cox, R.L. Lewison, A.J. Read, R. Bjorkland, S.L. McDonald, L.B. Crowder, E. Aruna, I. Ayissi, P. Espeut, C. Joynson-Hicks, N. Pilcher, C.N.S. Poonian, B. Solarin & J. Kiszka. 2010. An interview-based approach to assess marine mammal and sea turtle captures in artisanal fisheries. *Biological Conservation* 143: 795-805.

Fisheries related bycatch has been, and will likely continue to be, regarded as one of the main impacts on marine turtle populations. As such, it remains a critical issue worthy of attention (see Hamann *et al.*, 2010). In particular there is growing concern that, collectively, small-scale coastal fisheries are one of the most significant threats to some marine turtle species or populations. Similar to other fisheries, understanding and mitigating bycatch from coastal net fisheries is problematic because in addition to the variable ecological components there are significant social and economic issues that need to be considered. This is especially the case in developing nations where fishers are often in the lower social-economic grouping.

Two recent papers recognise the impacts of coastal net fisheries on marine turtles and offer insight into steps that can be undertaken to minimize these impacts. Moore *et al.* (2010) seek to better understand the magnitude of the impact and Gilman *et al.* (2010) review potential mitigation measures to gill net fisheries, which are a common artisanal fishing method.

Moore *et al.* (2010) developed survey methods that

would allow a cost and time efficient assessment of bycatch of marine turtles and mammals in artisanal fisheries. The study cost less than 50,000 USD and involved surveying over 6000 fishers in seven countries to investigate types of fishing methods (and the characteristics of each method) and species-specific bycatch rates (individuals per year). The survey essentially found that artisanal fisheries are likely to have a substantial impact on marine wildlife, particularly those using gill nets. However, the real strength of the study is in both the survey technique the authors have used and their retrospective comments about how to improve it. While the authors acknowledge the challenges of using surveys to collect reliable bycatch data, the survey is cost and time efficient. It can therefore provide a monitoring tool that can be undertaken over spatial scales large enough to collect comparative, reliable data on bycatch at fishery, species and population levels. It can also be used together with other initiatives to substantially improve regional management the fishery impacts on marine wildlife species.

Gilman *et al.* (2010) conduct a comprehensive review of turtle interactions in the coastal net fisheries and experiment-based assessments of mitigation

measures. Their review highlights the challenges of understanding and managing bycatch in small scale fisheries and describes several methods that can be used by both gill net and pound net fisheries to mitigate bycatch without impacting catch rates of target species. Importantly, however, the authors also highlight the need to undertake cost-benefit risk assessments to understand population specific impacts from bycatch mortality and in doing so provide details of the information needed to permit

realistic risk based assessments.

Taken together, the two bycatch studies above highlight the significance of the collective impact of coastal artisanal and net based fisheries on marine turtles are. Further, they highlight the need for an inter-disciplinary approach, including engaging the fishing industry, to design and apply cost effective mechanisms to understand and manage bycatch of marine wildlife species.

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Better estimating how many clutches females lay in a season

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Tucker, A.D. 2010. Nest site fidelity and clutch frequency of loggerhead turtles are better elucidated by satellite telemetry than by nocturnal tagging efforts: Implications for stock estimation. *Journal of Experimental Marine Biology and Ecology* 383: 48-55.

How many clutches does an individual sea turtle lay in a nesting season? It is a simple question to ask, but not simple to accurately answer. Of course, we know that individual turtles lay several clutches during a single nesting season, but discovering the exact clutch frequency (number of nests laid in a season) is logistically challenging. Traditionally, the tried-and-true method for determining clutch frequency has been to conduct “saturation” tagging projects, where patrollers monitor a nesting beach all night, every night, during the nesting season, in order to find and record all individual turtles nesting on the beach.

However, datasets from nighttime beach monitoring usually have at least a few gaps in information, because a) some turtles nested before or after the monitoring project was active; b) some turtles nested on a non-monitored beach near (or even far) from the monitored beach; c) some turtles emerged, nested and returned before the patrollers saw her; etc. Thus, a tagging project may be able to calculate the “Observed Clutch Frequency” (OCF) for the turtles in the study area, but most sea turtle researchers see OCF as an underestimate (e.g. Reina *et al.*, 2002). Many workers have applied a correction factor to the OCF.