

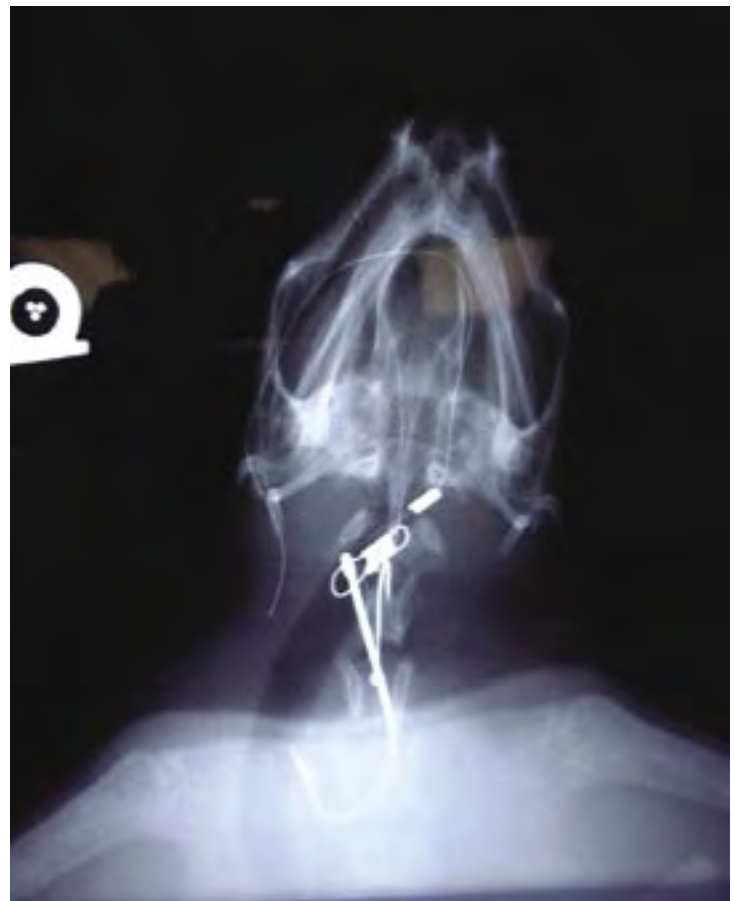
Fishing Technology Gears Up for Turtle Conservation

Story after story tells that bycatch in pelagic and coastal fisheries may be one of the greatest threats to sea turtles in the open ocean, where they spend a great portion of their lives. A variety of current research is testing new approaches to fishing to reduce that threat.

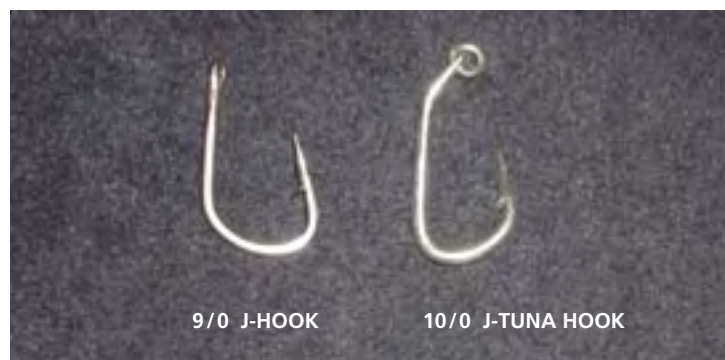
Perhaps the most promising results thus far relate to changes in longline fishing gear, such as altering the type of fishhook. Certain hook types appear to greatly reduce the capture and entanglement of sea turtles. To date, experiments have shown that using large circular hooks effectively reduces sea turtle bycatch rates, compared to using the more commonly used small J-shaped hooks. Use of circle hooks also reduces the proportion of turtles that swallow the hook, which typically results in internal damage and possibly death to the turtle. Experiments have shown that in addition to the positive implications for turtles derived from the use of large circle hooks, there is little or no reduction in the capture of the target fish species. Recent studies in Brazil even show that the number of target species may increase with use of these hooks. As such, the replacement of small J-hooks with large circle hooks presents a win-win scenario for the fishing industry and sea turtles and a viable alternative in some fleets.

Other strategies that may also prove effective in reducing turtle mortality from commercial fisheries include setting gear below depths where turtles are abundant, using fish instead of squid for bait, single-hooking fish bait, reducing gear soak time, retrieving gear during the daytime, and closing certain fisheries to avoid bycatch hotspots.

Scientists are also examining the sensory cues that attract sea turtles and fish to pelagic longline fishing gear, with the ultimate goal of developing modified gear to attract fish but not turtles. Current findings indicate that both fish and turtles are primarily attracted to fishing gear by visual cues and that there are differences in the color



This X ray of a juvenile green turtle reveals J-hooks caught in its throat. © 2002 CHRIS JOHNSON / WWW.FLORIDALEATHERBACKS.COM



Using circular hooks rather than J-hooks on fishing lines has proven to reduce sea turtle fatality without significantly affecting capture of target fish species. ©NATIONAL MARINE FISHERIES SERVICE

sensitivities between fish and sea turtles. On the basis of these findings, researchers are now experimenting with flashing light sticks, as well as other similar modifications, that are attached to longline gear and attract fish but not turtles.

All fisheries are different, based on a wide array of factors including the target species, the depth of the gear, and day-vs.-night setting; hence it is unlikely that one mitigation method would be effective at reducing turtle bycatch across the board. As such, field tests must be undertaken throughout the world and under as many different conditions as possible to determine the best combination of solutions for each scenario to ultimately result in minimizing the incidental capture of unwanted and often highly endangered species such as sea turtles.

Yonat Swimmer is a fisheries research biologist working with NOAA's National Marine Fisheries Service's Fisheries Pacific Islands Fisheries Science Center. Her research focuses on means to reduce sea turtle interaction in fisheries, with respect to both understanding measures that attract turtles and fish to fishing gear, and conducting field trials to identify a mitigation method that reduces rates of turtle bycatch.

Eric Gilman is the Fisheries Bycatch Program Director of the Blue Ocean Institute. His research focuses on identifying effective and commercially viable strategies to minimize fisheries bycatch.