



Summary of Available Information on Sea Turtle Interactions in Foreign Pelagic Fisheries

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182nd Meeting of the Western Pacific Regional Fishery Management Council
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1 BACKGROUND

The Western Pacific Regional Fishery Management Council at its 181st Meeting in March 2020 adopted a recommendation from the Scientific and Statistical Committee (SSC) and directed staff to work with the National Marine Fisheries Service (NMFS) to obtain publicly available reports and other data on sea turtle interaction rates in foreign fisheries operating in the areas overlapping with the loggerhead and leatherback turtle distributions, and to provide a presentation to the SSC at its next meeting. The SSC's recommendation stemmed from the Hawaii deep-set longline fishery sea turtle take model discussion, during which the SSC inquired about the relative degree of take and mortality of loggerhead and leatherback turtles by non-US fisheries. Pacific Islands Fisheries Science Center (PIFSC) presenters indicated there is uncertainty due to data limitations but noted that mortality and impact of foreign fisheries would be much higher due to overall effort and lower application of best practices for bycatch mitigation.

This document provides a brief summary of available estimates of loggerhead and leatherback turtle interactions in the pelagic longline fisheries, as well as information available on coastal and artisanal fisheries in the Pacific.

2 BYCATCH ESTIMATES IN PACIFIC PELAGIC LONGLINE FISHERIES

Reliable sea turtle bycatch estimates remain limited for pelagic longline fisheries outside of the US. Earlier estimates based on public domain catch and effort data from approximately 40 countries and bycatch data from 13 international observer programs suggested that pelagic longline fisheries throughout the Pacific may have interacted with 30,000 loggerhead turtles and 20,000 leatherback turtles in the year 2000 (Lewison et al. 2004). Beverly and Chapman (2007) used global longline fishing effort from Lewison et al. (2004) and bycatch rates from Molony (2005) and applied a simple formula given by Witzell (1984) of multiplying observer data by total effort, which resulted in a worldwide annual estimate of total catch of 47,970 sea turtles.

The first preliminary bycatch estimates for the Western and Central Pacific Fisheries Commission (WCPFC) Convention Area were generated in 2018 for years 2003-2017 (Peatman et al. 2018). The estimates were generated using longline observer data held in SPC's master observer database, fitting statistical models to observer data to estimate catch rates and raise catch rates with aggregate effort data to estimate total catches for longline fisheries in the WCPFC Convention Area within a simulation modelling framework. The annual median

estimated interactions for loggerhead turtles were 91-5,208 (median CV = 65.2%), and 617-2,153 (median CV = 58.3%) for leatherback turtles. The report notes that region-wide estimates north of 10°N are unlikely to be robust given that there are large areas in the region with limited observer data (e.g., 2 fleets accounting for 80% of expanded effort in the region with an annual observer coverage <0.3%). The report also notes that the estimates of overall sea turtle catches are likely overestimated, based on comparison of proportion of olive ridley estimated bycatch to other turtle species between this study and the Common Oceans (2017) analysis (Peatman et al. 2018).

Table 2 and Table 3 compares the WCPFC Convention Area estimates for leatherback and loggerhead turtle interactions with the estimated and observed total interactions in the Hawaii and American Samoa longline fisheries. Due to the limitations in the WCPFC Convention Area estimates described in Peatman et al. (2018), this comparison is included to provide an approximate relative scale of impacts of the US longline fisheries in the Pacific. For loggerhead turtles, the Hawaii longline fisheries data are compared with the WCPFC estimates for north of 10N rather than the entire Convention Area to reflect overlap with the North Pacific population. Loggerhead turtles have not been observed in the American Samoa longline fishery. The interactions in the Hawaii and American Samoa longline fisheries on average represent 1 percent or less of the total Pacific-wide estimates.

Table 1. Summary of Pacific-wide sea turtle interaction estimates in pelagic longline fisheries.

Source	Scope	Year(s)	Estimates
Lewison et al. 2004	Pelagic longline fisheries throughout the Pacific	2000	<i>Interactions</i> 30,000 loggerheads 20,000 leatherbacks <i>Mortalities</i> 2,600-6,000 loggerheads 1,000-3,200 leatherbacks
Beverly & Chapman 2007	Pelagic longline fisheries worldwide	1990-2004	<i>Tuna deep-set</i> 19,440 sea turtles annually <i>Swordfish shallow-set</i> 28,480 sea turtles annually <i>Total annual estimated catch from all longline fisheries worldwide</i> 47,970 sea turtles annually
Peatman et al. 2018	WCPFC convention area using SPC observer database	2003-2017	<i>Median</i> 91-5,208 loggerheads annually (median CV = 64.2%) 617-2,153 leatherbacks annually (median CV = 58.3%)

Table 2. Comparison of the estimated median leatherback turtle interactions in the WCPFC Convention Area and the estimated total interactions in the Hawaii and American Samoa longline fisheries.

Year	WCPFC area estimated median catch	Hawaii Deep-set Longline		American Samoa Longline		Hawaii Shallow-set Longline	
		Estimated total	% of WCPFC estimate	Estimated total	% of WCPFC estimate	Total observed	% of WCPFC estimate
2003	1,399	4	0.29%	--	--	--	--
2004	1,847	15	0.81%	--	--	1	0.05%
2005	1,996	4	0.20%	--	--	8	0.40%
2006	1,496	9	0.60%	0	0.00%	2	0.13%
2007	1,583	4	0.25%	0	0.00%	5	0.32%
2008	1,000	11	1.10%	0	0.00%	2	0.20%
2009	1,424	4	0.28%	0	0.00%	9	0.63%
2010	1,856	6	0.32%	0	0.00%	8	0.43%
2011	1,992	14	0.70%	4	0.20%	16	0.80%
2012	2,153	6	0.28%	6	0.28%	7	0.33%
2013	1,808	15	0.83%	13	0.72%	10	0.55%
2014	1,840	38	2.07%	4	0.22%	16	0.87%
2015	1,865	18	0.97%	22	1.18%	5	0.27%
2016	1,132	15	1.33%	3	0.27%	5	0.44%
2017	617	0	0.00%	3	0.49%	4	0.65%
Average	1,601	11	0.67%	5	0.28%	7	0.43%

Source: Peatman et al. 2018; WPRFMC 2019.

Table 3. Comparison of the estimated median loggerhead turtle interactions north of 10N and the estimated total interactions in the Hawaii longline fisheries.

Year	North of 10N median catch	Hawaii Deep-set Longline		Hawaii Shallow-set Longline	
		Estimated total	% of WCPFC estimate	Total observed	% of WCPFC estimate
2003	34	0	0.00%	--	--
2004	141	0	0.00%	1	0.71%
2005	753	0	0.00%	10	1.33%
2006	2,158	0	0.00%	17	0.79%
2007	2,117	1	0.05%	15	0.71%
2008	753	0	0.00%	0	0.00%
2009	553	0	0.00%	3	0.54%
2010	616	1	0.16%	7	1.14%
2011	787	0	0.00%	12	1.52%
2012	666	0	0.00%	6	0.90%
2013	804	2	0.25%	6	0.75%
2014	1,785	0	0.00%	14	0.78%
2015	2,636	2	0.08%	13	0.49%
2016	1,905	2	0.10%	15	0.79%
2017	555	3	0.54%	21	3.78%
Average	1,084	1	0.08%	10	1.02%

Source: Peatman et al. 2018; WPRFMC 2019.

3 BYCATCH INFORMATION IN OTHER FISHERIES

Two recent NMFS documents (NMFS 2019, 2020) include a comprehensive summary of threats to loggerhead and leatherback turtle species, including fisheries interactions. These reviews indicate that sea turtle interaction data in fisheries outside of pelagic longline fisheries remain limited.

The Hawaii shallow-set longline fishery Biological Opinion (BiOp; NMFS 2019) and the Loggerhead Turtle 5-year Status Review (NMFS 2020) include summaries of threats to the North Pacific loggerhead turtle population from coastal and artisanal fisheries outside of the US, and associated conservation efforts. Where quantitative data on interactions or strandings are included, they are non-continuous data and do not represent reliable estimates of total bycatch in a given fishery. Nevertheless, these documents state that:

- Interactions and mortality with coastal and artisanal fisheries in Mexico and the Asian region likely represent the most serious threats to North Pacific loggerhead sea turtles (NMFS 2019);
- The greatest threat to the North Pacific loggerhead is likely bycatch of adult turtles in western Pacific fisheries operating in the Sea of Japan, and South and East China Seas (NMFS 2020); and
- IUU fishing in East China Sea likely a high source of mortality for the North Pacific Ocean distinct population segment (NMFS 2020).

For the Western Pacific leatherback turtle population, the shallow-set longline BiOp includes limited mention of coastal or artisanal fishery bycatch outside of the US in the threats and conservation section, and places a greater focus on nesting beach threats and directed take (NMFS 2019).

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