

Data Report

Estimation of Bycatch with Seabirds, Sea Turtles, Bony Fish, Sharks, and Rays in the 2020 Permitted American Samoa Longline Fishery

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The attached Excel Workbook (pir.asll.2020.xlsx) includes annual longline bycatch estimates for the year 2020. Excluding marine mammals, the species list includes those observed caught in the American Samoa longline fishery in recent years. The bycatch of marine mammals will be reported in a separate report. The workbook includes a worksheet labeled “key” that provides definitions of the column headings and the items being estimated.

In 2020, COVID-19 affected the deployment of observers. When the World Health Organization declared a global COVID-19 pandemic on March 11, 2020, the American Samoa Government moved to declare a state of emergency in the territory and since March 22, 2020, has restricted air travel in or out of the territory to protect its population. On March 24, 2020, NOAA Fisheries issued a national emergency rule to waive observer coverage. This emergency rule was implemented to protect public health and to ensure the safety of fishermen, observers, and others. Because of these actions, only one observed trip occurred in 2020. Additionally, there are no records in the American Samoa Longline Logbook (2021) for approximately 23% of the 48 trips that landed in 2020. These vessel logbooks have not been received by PIFSC for data entry and it is unclear when they will be received. To determine the number of trips landing in 2020, the American Samoa Longline Logbook (2021) and American Samoa Longline Trip Log (2021a) were used.

The lack of observer coverage means that using a sample-based estimator to estimate bycatch is inappropriate, and our ability to create an appropriate model-based estimator is limited by available data. The only explanatory variables that are known for all trips that landed in 2020 are the variables related to the vessel (name, permit number, etc.) and the date and port of the trip’s departure and return. The lack of data also limits our ability to compare the fishing behavior from previous years to 2020. Based on the American Samoa Longline Trip Log (2021a) and the American Samoa Longline Logbook (2021) database, fewer trips occurred than in previous years: 48 trips in 2020 compared to 61, 58, 68, 61, 81, 99, 112, and 126 trips in 2019–2012. In 2020; 12 permit numbers fished compared to 15, 12, 14, 16, 18, 21, 22 and 22 in 2019–2012, respectively. For more information on the fishery and the data collected see McCracken (20,19).

Under the data-poor circumstances, a straightforward estimator of bycatch that could be used across species was chosen. Observations from the Longline Observer Data System (2021b) over years 2012–2020 were used to derive the 2020 estimates. First, for each calendar day of the year, the average bycatch over all observed active trips was computed for the species of interest. For this computation, a trip was considered active between its departure and return date and a set’s bycatch was assigned to the calendar day of the begin haul date. Each day’s average was then multiplied by the number of unobserved active fishing trips on that day in 2020. The sum of these products over all days is the estimated bycatch for unobserved trips. The bycatch from the observed trip added to this estimate is the estimated bycatch for the fleet in 2020

Let us now consider some specifics. Selecting the years to include was based on balancing the advantage of a larger sample size and the disadvantage of including years where bycatch rates are not similar to the 2020 rates. On 23 September 2011, the Western Pacific Pelagic Fisheries; American Samoa Longline Gear Modifications To Reduce Turtle Interactions Final Ruling (Federal Register 76 *FR* 52888) went into effect, and since this ruling may have affected the bycatch rate of multiple species, data from years prior to 2012 were not used. Trips that did not land and depart from the port of Pago Pago were also excluded, as it is known that all trips in 2020 departed and returned to this port. The range of 2012–2020 provided an average of 14 and a minimum of 5 observed active trips per day.

An estimator of the standard error was not derived because the data points are correlated and this correlation is likely very complex. Hence, an appropriate estimator of standard error would likely be very complex, if not intractable. Furthermore, the standard error would not capture the uncertainty in the fleet's behavior and how it might have affected the 2020 bycatch rates.

Given more time, estimates of bycatch might be improved upon, especially if handled on a per species basis. However, our ability to generate good estimates of bycatch is limited by the lack of data. If the 2020 bycatch estimate for a species will significantly influence the management of the American Samoa longline fishery, it is recommended that further time be spent on estimating its bycatch.

References

- McCracken ML. (2019). American Samoa Longline Fishery Estimated Anticipated Take Levels for Endangered Species Act Listed Species. Pacific Islands Fisheries Science Center, PIFSC Data Report, DR-19-028, 23 p. <https://doi.org/10.25923/b8gs-j441>.
- Pacific Islands Fisheries Science Center (2021): American Samoa Longline Logbook, <https://inport.nmfs.noaa.gov/inport/item/1775>.
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- Pacific Islands Regional Office (2021b), Longline Observer Data System, <https://inport.nmfs.noaa.gov/inport/item/9027>.