Submission of 2005-2007 U.S. Fishery Statistics for the Western and Central Pacific Ocean to the Western and Central Pacific Fisheries Commission[1]

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Fisheries Science Center
Honolulu, Hawaii[2]

This is the fourth submission of annual fishery statistics by the Pacific Islands Fisheries Science Center (PIFSC), of NOAA's National Marine Fisheries Service (NMFS), to the Western and Central Pacific Fisheries Commission (WCPFC). The submission consists of provisional 2006 data for U.S. fisheries targeting tuna and tuna-like species in 2006, and updated data for 2005, unless otherwise indicated.

To more effectively and efficiently compile annual statistics by the overlapping areas of authority (or interest) of the WCPFC, the Inter-American Tropical Tuna Commission, and the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, the PIFSC revised its data processing procedures for the provision of aggregated fisheries statistics to these RFO's. This process is not complete, especially with regard to standardizing methods, and updating and broadening the scope of historical data.

The U.S. Magnuson-Stevens Reauthorization Act (MSRA) has now placed fisheries observer data into the category of "fisheries confidential data" which must be aggregated before being released. Aggregation standards to prevent disclosure of "fisheries confidential business practices" are under national review. Also, there are several national initiatives under consideration that would authorize disclosure of un-aggregated, operational-level data to the WCPFC. It is hoped that these developments will soon permit observer data and un-aggregated log sheet data to be submitted to the WCPFC. These are not provided here.

New features of this year's data submission include provision of aggregated catch and effort data from identified deep- and shallow-set sectors of the longline fisheries, along with more complete fish dealer weight data and port sampling measurements from the Hawaii- and American Samoa-based fisheries.

Some of the fishery names have been changed from those used in past reports. Troll fishing is one of the fishery categories identified for reporting to the commission. In past reports, one kind of troll fishing was sometimes combined with handline fishing where both gears targeted a broad variety of tropical tunas, istiophorid billfishes, and associated species such as dolphin fish, using tropical island-based small vessels. Some past reports combined

---

[1] PIFSC Data Report DR-08-006. Issued 6 June 2008.
[2] Prepared in collaboration with the NOAA Fisheries Service Southwest Fisheries Science Center

tropical troll fishing with handline and pole-and-line under the name "small-scale" fisheries (referring to the fact that these fisheries comprise a very small fraction of U.S. production). For this data submission, tropical troll fishery catch and vessel count data are listed separately (however, data on landed fish weights from the State of Hawaii Dealer reports still do not identify troll versus handline landings, so the same average weights were assumed for both fisheries). The tropical troll fishery is distinguished from the troll fishery for albacore that operates mostly in temperate waters with very little catch of any species besides albacore. The U.S. does not consider the tropical troll fishery to be a fishery "for" albacore, as it catches almost no albacore. The troll fishery for albacore has previously been termed the "distant-water" troll fishery, but a large component of this fishery operates close to home ports on the U.S. west coast. So the "distant-water" term seems somewhat inappropriate and also not descriptive of the difference between tropical troll and albacore troll fishing.

Three categories of fishery data are provided: 1) Category I -- annual catch estimates and numbers of active vessels in each fishing fleet (purse seine, longline, albacore troll, tropical troll, handline, and pole-and-line, etc. 2) Category II -- catch and effort (logbook) data in aggregated form for longline and distant-water troll fisheries, and 3) Category III – size (length or weight) data for key species and fisheries. The methods used in compiling the three categories of fishery statistics and other specifics are described below. For some fisheries, statistics were compiled by the year (calendar year 2005-2007) the catch was landed and for others they are compiled by the year the fishing gear was set or hauled. For the troll fishery targeting albacore in the South Pacific, data are also provided by fishing season (July of year x through June of year x+1). The procedure for determining the dates upon which to base summaries have not been standardized among all the fisheries, and may not match the standard used in last year's submission. In particular, in this year's submission the longline fisheries statistics for the Western and Central Pacific have been compiled by date of the fishing operation (date of set, for both Category I and Category II), not date of landing. For the other fisheries, Category I data are usually summarized by year of landing and Category II data are summarized by date of operation. When we complete the development and documentation of standardized data summarization procedures we will apply the procedures to the historical data and submit revised statistics.

Category I: Statistics on Annual Catch and Active Vessels

The estimates of annual "catch" for 2005-2007 were compiled from a number of sources: 1) American Samoa Department of Marine and Wildlife Resources offshore creel survey catch data; NMFS Am. Samoa federal longline logbooks and size frequency data from the NMFS cannery sampling program; 2) Guam Division of Aquatic and Wildlife Resources offshore creel survey catch data and commercial landings data; 3) Hawaii Division of Aquatic Resources (HDAR) Commercial Fisherman reports (catch data) and Marine Dealer reports (landings data) and federal longline logbook landings data (fish kept) (for Hawaii-based boats); 4) Pacific Fisheries Information Network (PacFIN) data which may contain landings data from all three U.S. Pacific coast States; and 5) Northern Mariana Islands Division of Fish and Wildlife Commercial Purchase landings data. Therefore, the U.S. annual catch statistics are nominally a mixture of estimated catches and landings. However, with the exception of the Hawaii fishery logbooks, which do report discards (see below), the fishermen's' reports and the surveys generally include only kept catch (landings).

In using logbook data to compute Category I landings statistics for longline fisheries, catches in numbers of fish kept, by species, were summed for those longline sets located in the WCPO, and in the EPO North of the Equator for N. Pacific albacore, striped marlin, and swordfish. For the Hawaii longline fleet, the final estimate of landed weight for each species was derived as the product of number of fish kept (logbook data) and mean whole fish weight from HDAR dealer data. For the first time, in this report, average weights were estimated separately for the deep-set and shallow-set (<15 hooks per float) fisheries sectors, by month of landing, as long as weights were available from at least 20 fish per sector per month. Otherwise annual averages, averages across sectors, or other proxy weights were applied. The Category I statistics are summed for both sectors (but data segregated by deep- and shallow-set fishery sectors are included in the Category II data described below). Separate average weights were estimated for bigeye tuna in the EPO at an annual level for both sectors combined. Procedures for separately estimating EPO bigeye weight were developed to better track progress towards an EPO catch quota.

Data from the single longliner operating out of California in the EPO in 2005-2007 are combined with data from Hawaii-based vessels in the EPO. In tabulating catches by fishery, California and Hawaii are considered as one North Pacific-based fishery. Catches for a fishery based outside of the 50 United States (e.g., the American Samoa-based fishery) are tabulated separately. No tabulation is possible for the small longline fishery based in Guam, as the entire fishery represents less than three vessels. Note that because the California-based fishery catch total represents a single vessel, and is reported in combination with the Hawaii-based total, neither total can be reported separately without revealing fisheries-confidential data (by difference).

The HDAR has improved the coverage and quality of the dealer data and these data represent nearly complete coverage of longline landings. Landed fish are weighed to the nearest half pound. If fish were landed in processed form (e.g., gilled and gutted), conversion factors were used to estimate their whole weight. California longline data and other west coast fishery statistics were then added as needed to derive the total landings for N. Pacific albacore, swordfish, and striped marlin. Total landings were then expressed in units of metric tons. American Samoa longline landings in numbers of fish were also converted to metric tons using average size of landed fish. For this submission, the average size data were compiled and applied on a monthly basis, unless fewer than 20 fish were measured per month, in which case a sample from a longer time frame (i.e., annual) or other proxy average weight was used.

Category I statistics are weights estimated from reported numbers with no adjustment to account for discarded or unreported fish catch. Although longline logbooks include information on numbers of fish discarded, a procedure for estimating the average weight of discarded fish has not yet been developed. Statistics on the number of principal fish species discarded in the Hawaii longline fishery are available at http://www.pifsc.noaa.gov./fmsd/reports.php. With respect to under-reporting, observer data do not suggest substantial under-reporting of commercial (landed) fish species caught by Hawaii longliners.

There is some misidentification of species in the logbook data, which can result in simultaneous over- and under- reporting of similar species, and all longline logbook species data provided in this report rely solely on fishermen's identifications. As an example, nominal

Hawaii longline data indicate that the annual CPUE for blue marlin in 1995 was the highest reached in recent years. However, comparisons of this CPUE statistic with concurrent HDAR landings data and data collected by observers deployed on selected Hawaii longline vessels by the NMFS Pacific Islands Regional Office (PIRO) demonstrated that it was considerably inflated by misidentification of striped marlin as blue marlin (see http://www.soest.hawaii.edu/PFRP/reprints/walsh_sdarticle.pdf). Providing feedback and training to fishermen seems to have reduced misidentification in recent years.

Catches by the Hawaii troll and handline fisheries were shown to be under-reported in the past, but improvements in the HDAR dealer data system may have greatly reduced this problem. For American Samoa fishing effort reported in logbooks is compared with data from the creel survey (http://www.wpcouncil.org/pelagic.htm, choose "Pelagics Annual Report"). Results were used to evaluate the difference between reported and estimated catch, indicating that in 2005-2007 the underreporting of catch was no more than 0.5% for the entire American Samoa longline fishery.

Recreational catches are not included in the total annual catch estimates for Hawaii or the Northern Mariana Islands but are included for American Samoa and Guam, where such data are collected through surveys.

Albacore troll catches in the South Pacific summarized for this and previous reports did not clearly specify the geographic location of catches. The albacore troll fishery operated in the area of overlap between the WCPFC and IATTC Statistical Areas, and sometimes farther east as well. Separate totals for the area of overlap and the entire South Pacific will be provided as soon as possible. No catches of striped marlin, swordfish, or bluefin tuna are made by any U.S. fisheries south of the Equator and east of 150^{o} W.

Category II: Catch and Effort (Logbook) Statistics

Three longline data sets were integrated to calculate logbook statistics for 2005-2007, with information provided on numbers of fish caught by species, effort in sets and hooks, and location of catch. United Nations Food and Agriculture Organization 3-alpha species codes were used as species labels. The largest data set used derives from the mandatory submission of the NMFS Western Pacific Longline Fishing Log by Hawaii-based fishers. A rigorous quality control process is followed, including a quick review conducted with the provider when the logs are picked up from the vessels, later a visual inspection of the logs, and finally a computer-based error checking algorithm. The second largest data set used derives from a similar program for American Samoa-based vessel. These data are collected by NMFS field agents stationed in American Samoa and also by the American Samoa Department of Marine and Wildlife Resources in cooperation with NMFS. The third source of data includes logbooks and landings receipts from the longline fishery based in California.

All longline data sets were merged into a single logbook data set. These combined logbook data, therefore, represent all operations of the American Samoa-, Hawaii-, and California-based fleets, not just operations taking place in the WCPO. Estimated weights are included in these files for the first time. The data were aggregated by fishery (Hawaii = HI, California combined with Hawaii = CH, American Samoa = AS), set depth (deep-set = D,

shallow-set = S) year, month, and 5º longitude x 5º latitude blocks. Confidential statistics (i.e., those from 5x5x month blocks with fewer than 3 vessels reporting) were aggregated by annual intervals into large areas of the ocean (termed "quads" in the longline data files). These areas coincide with RFMO jurisdictions and are labeled WCPFC-N (W of 150° W and N of the equator), WCPFC-S (west of 150° W and S of the equator) and IATTC-N (E of 150° W and N of the equator). There are no U.S. longline fisheries operating east of 150° W and S of the equator. Data from the single longliner operating out of California in the EPO in 2005-2007 are included in annual quad summaries, combined with data from Hawaii-based vessels in the same quad (fishery = CH). The number of 5º longitude x 5 º latitude blocks that were combined into large annual quads to preserve confidentiality, as well as the small numbers of blocks suppressed (because they comprised all of the data for a fishery and set depth in the entire annual quad and still represented less than 3 vessels) are listed at the end of each annual data file. These do not include the suppressed data from the Guam-based longline fishery. Also listed is the estimated under-reporting (in logbooks) by artisanal-scale vessels from the American-Samoa based fishery in a single 5º longitude x 5 º latitude block enclosing the Island of Tutuila (based on comparison with creel-survey estimates). The Category II data have not been raised here (nor were Category I catch totals raised). The estimated under-reporting of catch was no more than 0.5% of the total for the American Samoa-based fishery in any of the 3 years.

Since 1995, U.S. distant-water troll vessels fishing on the high seas have been required to submit federal High Seas Compliance Act logbooks, and since 2005, all troll vessels on the U.S. West Coast have been required to submit logbooks. The catch and effort data for distant-water troll fishing were summarized for 2006 and 2007 by 1º longitude x 1º latitude x month strata in the N. Pacific and by 5º longitude x 5º latitude x month strata in the S. Pacific. To meet domestic fisheries data confidentiality requirements, a 3-boat filter was applied to each 1x1x month or 5x5x month block of summarized data, i.e., data in blocks with fewer than 3 boats fishing were excluded. A simple summary of the impacts of this filtering is included at the bottom of each worksheet of Category II troll data.

Category III: Size Composition Statistics

Size data for a major subset of Hawaii longline landings (whole weight to the nearest half pound converted to kilograms) were compiled from the HDAR Commercial Marine Dealer data from vessel-trips with landing years 2005-2007 and are provided by month and set depth for albacore, yellowfin and bigeye tuna, blue and striped marlin, and swordfish. The source database (HDAR) does not identify the fishery (e.g., longline, troll). This must be determined by matching landing dates and license numbers (fisheries confidential, suppressed) with logbook data. Because 100% matching is not possible, the Category III weight data often total less than the estimated weight of the catch provided in Category I. Monthly means of these average weights by set depth were used to estimate the weights of catches (numbers of fish by set depth) based on landing date for the Category I and II data (above). When fish were landed in processed form (e.g., gilled and gutted), conversion factors were used to estimate the whole weight. Likewise, weights for the Hawaii tropical troll and handline landings were compiled for yellowfin tuna, skipjack tuna, striped marlin, and blue marlin. These data are the remainder after the longline data have been segregated, and are not separated between tropical troll or handine. Troll and handline operations cannot be distinguished by license numbers which may

represent both types of fishing. Some records in these files represent more than one fish (as indicated by pieces > 1) and in the past these records were removed in creating the frequency distributions that were submitted instead of the data.

Length frequency statistics from port sampling of the American Samoa longline landings were compiled monthly and provided for albacore, yellowfin, and bigeye tuna.

The requirement to submit size data by area have not been met by this data submission. The available HDAR dealer data do not identify area of catch. A special and painstaking (not fully automated) procedure developed to link dealer weight data to longline trips that fished in the EPO for quota monitoring initiated the development of a procedure we are working on to assign some mean or central trip position to landings. This will only be possible at the trip level, and each trip has sets from a wide geographic range that cannot be individually linked to landed weights. We hope to use such a procedure to categorize the geographic location of the dealer data in the next data submission. Last year, size data for all fish identified to the species level and measured by the PIRO-deployed Hawaii longline observers were provided by 5x5x month blocks for the years 2005 and 2006 for blocks deemed non-confidential in the Category II data summaries. This procedure was omitted this year, as rules for release of aggregated observer data are being reviewed by NMFS. It is hoped that these data can be provided in the near future.

Size data for the distant-water troll fishery are taken by port samplers (trained scientific technicians) as troll vessels unload in California, Washington, and Oregon ports and in Pago Pago, American Samoa. The data submitted last year have not been updated, and data for 2007 are not yet available. The Category I estimates of 2007 catches were based on 2006 average weights.

Names of Data Files Provided

Category I:	Annual Catches (estimated metric tons) and Numbers of Active Vessels	
		CAT_I_WCPFC 2005-2007 ver 2.6.xls
Category II:	Logbook Data (numbers of fish and effort) aggregated by non-confidential strata, each representing at least 3 licenses (i.e. vessels):	
	Longline (annual files show deep- and shallow-set (<15 hooks per float) data from North Pacific-based and American Samoa-based fleets, including estimated weight	CAT-II_LL WCPFC 2005 ver 2.0.csv CAT-II_LL WCPFC 2006 ver 2.0.csv CAT-II_LL WCPFC 2007 ver 2.0.csv
	Albacore (e.g. "Distant-water" Troll	CAT_II_Albacore_Troll WCPFC 2006-2007 ver 2.0.xls
Category III:	Size Composition:	
	Am. Samoa Longline Landings Port Samples (lengths)	AM_SAM_LL_ALB_2005-2007.XLS AM_SAM_LL_BET_2005-2007.XLS AM_SAM_LL_YFT_2005-2007.XLS
	Hawaii State Division of Aquatic Resources Dealer Data (weights) inferred to be from deep-set, or shallow-set longline landings	HI_LL_ALB_2005-2007.xls HI_LL_BET_2005Q1.xls HI_LL_BET_2005Q2.xls HI_LL_BET_2005Q3.xls HI_LL_BET_2005Q4.xls HI_LL_BET_2006Q1.xls HI_LL_BET_2006Q2.xls HI_LL_BET_2006Q3.xls HI_LL_BET_2006Q4.xls HI_LL_BET_2007Q1.xls HI_LL_BET_2007Q2.xls HI_LL_BET_2007Q3.xls HI_LL_BET_2007Q4.xls HI_LL_BUM_2005-2007.xls HI_LL_MLS_2005-2007.xls

		HI_LL_SWO_2005-2007.xls HI_LL_YFT_2005.xls HI_LL_YFT_2006.xls HI_LL_YFT_2007.xls
	Hawaii State Division of Aquatic Resources Dealer Data (weights) inferred to be from non-longline (i.e., from troll or handline)	HI_T&HL_BUM_2005-2007.XLS HI_T&HL_MLS_2005-2007.XLS HI_T&HL_SJT_2005-2007.XLS HI_T&HL_YFT_2005.XLS HI_T&HL_YFT_2006.XLS HI_T&HL_YFT_2007.XLS
Metadata Document:	This Data Report	DR-08-006.doc