U.S. Longline Catches of Bigeye Tuna in the Pacific Ocean East of 150º W Longitude in 2005[1]

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June 7, 2006

Background

In June 2004, the Inter-American Tropical Tuna Commission (IATTC) passed a resolution requiring that in 2004, 2005, and 2006 its member countries limit catches of bigeye tuna by their large-scale tuna longline vessels (LSTLVs) in the IATTC's area of jurisdiction, namely, waters of the Pacific Ocean east of 150º W Longitude and between 40º N Latitude and 40º S Latitude (the "Convention Area"). The catch limit for each member country was defined as its reported catch of bigeye tuna from the Convention Area in 2001. The action extended a similar resolution issued by the IATTC in October 2003 that applied the same limit to bigeye tuna catches in 2004 alone. Under both resolutions, each party was also required to provide monthly catch reports to the IATTC's Director.

Two U.S. longline fleets, one based in Hawaii and another in California, operate within the Convention Area and are affected by the IATTC resolution. Historically, most of the U.S. longline catch of bigeye tuna has been taken by the Hawaii-based fleet.

The National Marine Fisheries Service (NMFS) estimated the total 2001 U.S. longline catch of bigeye tuna in the Convention Area as the product of the number of bigeye tuna caught by U.S. longline vessels east of 150º W Longitude in 2001 and the estimated mean body weight of bigeye caught by the Hawaii-based fleet in 2001 in those waters. The resulting estimate of 147 mt (Table 1, Fig. 1) was rounded by NMFS to determine an annual bigeye tuna catch quota of 150 mt applicable to U.S. longline vessels in 2004-2006.

In monitoring the Hawaii-based longline fleet's activities in the Convention Area during 2005, the NMFS Pacific Islands Fisheries Science Center (PIFSC) tabulated the bigeye catch as logbooks were delivered by vessel captains returning to port in Honolulu. On July 27, 2005, PIFSC's Fisheries Monitoring and Analysis Program issued an in-season, internal bulletin reporting the cumulative bigeye tuna catch in the Convention Area through mid-July. This report revealed that the cumulative bigeye tuna catch during 2005 had nearly doubled from 121 mt in mid-June to 241 mt in mid-July, exceeding the quota. Accordingly, the NMFS Pacific Islands Regional Office promulgated an Emergency Action, effective August 30, 2005, that prohibited U.S. longline vessels from retaining

[1] PIFSC Data Report DR-06-003
Issued 7 June 2006

bigeye tuna caught in the Convention Area for the remainder of 2005 (Federal Register, Vol. 70, No. 170, dated Friday, September 2, 2005).

This report presents estimates of the monthly bigeye tuna catches in the Convention Area by U.S. longline fleets during January-September 2005 and describes the data sources and methodology used to calculate them and monitor the cumulative catch.

Data sources

Monitoring the bigeye tuna catch in weight required a determination of the number of fish caught and their body weights. Two longline logbook data sets, the NMFS Western Pacific (WP) Longline logbooks for the Hawaii-based fleet and the NMFS High Seas (HS) Pelagic Longline logbooks for the California-based fleet, were used to monitor the numbers of bigeye tuna caught by date and location. The State of Hawaii's Commercial Marine Dealer Data (referred to hereafter as State Dealer data) provided records of individual weights of bigeye tuna caught by the Hawaii-based longline fleet and sold in Honolulu. These data were subsequently used to compute the mean body weight.

Methodology

The total numbers of bigeye tuna caught each month east of 150^{o} W Longitude were tabulated from the WP and HS logbooks (Table 1). These tabulations included the fish caught on all longline sets in the Convention Area.

Logbook records were extracted for fishing trips by Hawaii-based longline vessels that exerted all their fishing effort east of 150^{o} W Longitude, as indicated by their NMFS WP logbooks. These logbook records were then matched with records in the State Dealer data set, and the corresponding weight data for bigeye tuna were used to calculate the mean body weight (kg) of bigeye tuna caught and landed exclusively from the Convention Area. Because most of the bigeye tuna caught by Hawaii-based longline vessels were processed at sea, the weights recorded in the State Dealer data were multiplied by raising factors to estimate whole (body) weights. The raising factors used were 1.16 for gilled and gutted fish and 1.25 for headed and gutted fish. The calculated annual mean body weight for bigeye tuna during 2005 was multiplied by the total monthly number of bigeye tuna caught and kept east of 150^{o} W Longitude by both Hawaii-based and California-based vessels to estimate the total monthly catch in weight.

Results

The estimated total 2005 bigeye tuna catch from the Convention Area by the Hawaii- and California-based longline fleets was 539 mt, up more than three-fold from the previous year (Table 1, Fig. 1). The Hawaii-based fleet accounted for over 95% of the catch.

The temporal pattern of bigeye tuna catches east of 150^{o} W Longitude in 2005 exhibited two phases. The monthly catch of bigeye tuna remained low from January through May,

and then increased sharply in June-August (Figs. 3-4), corresponding to an increase in vessel participation (Fig. 2). The highest monthly catch, 252 mt, was recorded in July. The cumulative catch of bigeye tuna catch through June was estimated to be 133 mt, indicating that the 150 mt catch quota for the Convention Area was probably exceeded in early July. The cumulative catch increased more than three-fold during June, nearly tripled again in July, and then increased by another 37% in August (Table 2, Fig. 4). The increase in monthly bigeye tuna catches during summer of 2005 was similar to the pattern in 2004, but the increase began earlier in 2005 and was substantially larger.

Hawaii-based longline vessels recorded 48 trips exclusively within the Convention Area in 2005. Body weight data for 6,591 bigeye tuna caught on these trips, representing 52% of the bigeye tuna caught by U.S. longline vessels within this area, were used to calculate the annual mean weight of 42.5 kg. This value is 50% greater than the mean body weight of bigeye tuna caught in 2004.

Discussion

The 1-4 week duration of a fishing trip for U.S. longline vessels is an important constraint in timely monitoring of longline catches using logbook and landings data. The long time at sea and the time required for NMFS to receive and compile both logbook and State Dealer data after the vessel lands its catch give rise to a lag of at least several weeks between the time a bigeye catch occurs and the time it is officially registered. Hence, the cumulative catch will reach the quota level well before that event is evident in the fishery statistics. The delay between catch events and reporting of resulting catch levels, and the lag between catch reporting and fishery closure were among the factors that caused the bigeye tuna catch in 2005 to exceed the 150 mt quota.

A new system of monitoring bigeye tuna catches east of 150^{o} W Longitude has been implemented in 2006. This system still uses logbook data as the principal means for monitoring bigeye tuna catches but also relies on daily Vessel Monitoring System data to provide real-time information on vessel activity. Observers deployed on the vessels by NMFS also monitor daily catches at sea and collect data on the size of the retained bigeye tuna. During 2006, these data will be used to forecast the approximate date when the bigeye tuna catch in the Convention Area will reach the 150 mt quota.

Table 1. Annual catches of bigeye tuna by U.S. longline vessels in the Pacific Ocean east of 150º W Longitude, 1999-2005.

Year	Catch (mt)
1999	228
2000	162
2001	147
2002	132
2003	232
2004	158
2005	539

Table 2. Catch of bigeye tuna by U.S. longline vessels in the Pacific Ocean east of 150º W Longitude in 2005. Monthly data for January-April are aggregated to protect the confidentiality of fishery statistics.

	January - April	May	June	July	August	September
# Active vessels	9	6	25	49	53	6
# Fish kept	792	107	2244	5936	3347	203
Catch (mt)	33	5	95	252	145	9
Cumulative catch (mt)	33	38	133	385	530	539

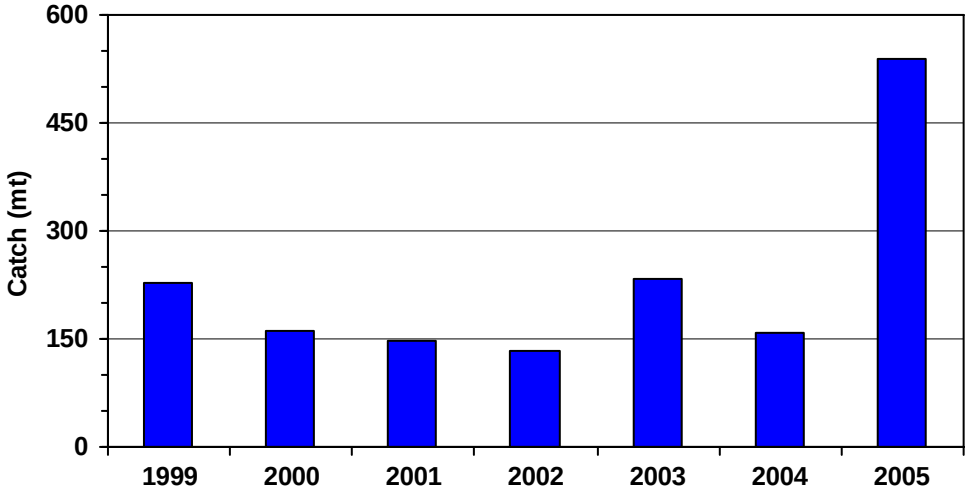

Figure 1. Annual U.S. longline catch of bigeye tuna in the Pacific Ocean east of 150º W Longitude, 1999-2005.

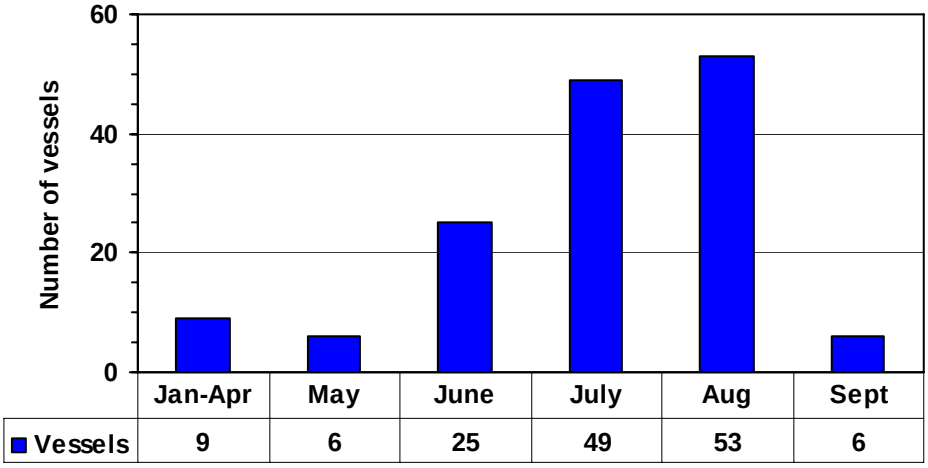

Figure 2. Number of U.S. longline vessels catching bigeye tuna in the Pacific Ocean east of 150º W Longitude during 2005.

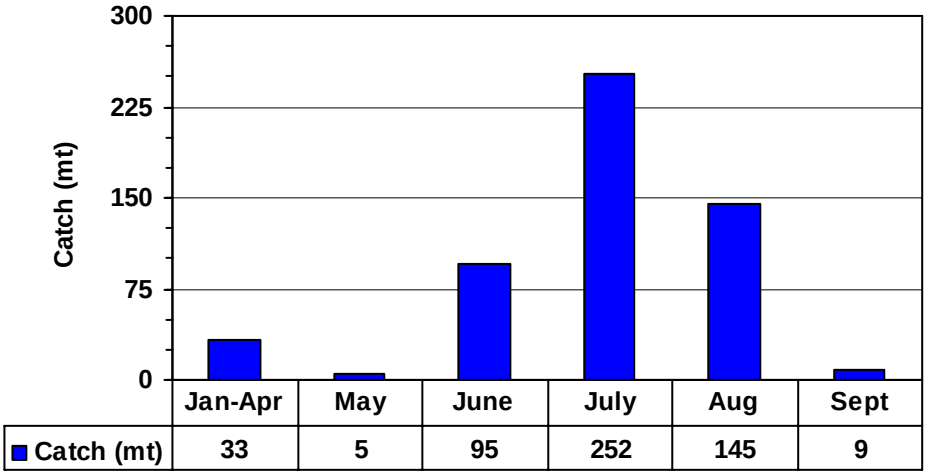

Figure 3. Catch of bigeye tuna by U.S. longline vessels in the Pacific Ocean east of 150º W Longitude during 2005.

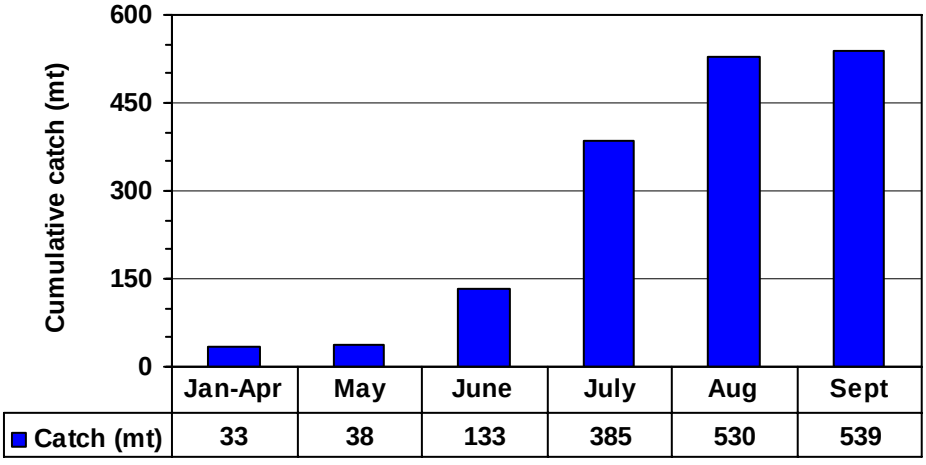

Figure 4. Cumulative catch of bigeye tuna by U.S. longline vessels in the Pacific Ocean east of 150º W Longitude during 2005.