King Mackerel Bag Limit Analysis

The Gulf of Mexico Fishery Management Council requested analysis of increasing the king mackerel bag limit from 2 to 3 fish per angler at their March 2015 meeting. This analysis also includes an increase to 4 fish per angler, to provide a range of alternatives should this action be added to an amendment. This action may be added to Amendment 26 to the Fishery Management Plan for Coastal Migratory Pelagic Resources in the Gulf of Mexico and South Atlantic Region or developed as a framework amendment.

First, Gulf of Mexico recreational datasets from Marine Recreational Fisheries Statistical Survey (MRFSS), Headboat, and Texas Parks and Wildlife Department (TPWD) were explored to determine the numbers of king mackerel harvested per angler. Data from the most recent years of complete data (2011-2013) were used. Figure 1 provides the distribution of the number of king mackerel harvested per angler.

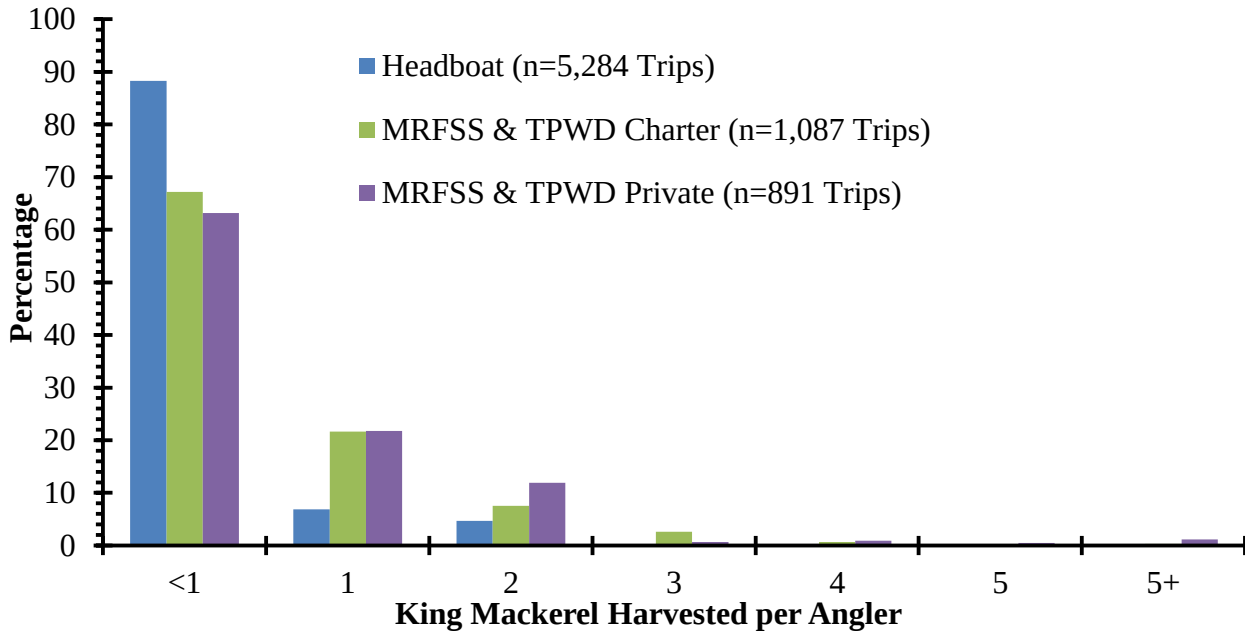

Figure 1. Distribution of Gulf of Mexico king mackerel harvested per angler by mode from the three recreational datasets (MRFSS, Headboat, and TPWD). The data used are from 2011 through 2013.

Since the current bag limit is two king mackerel per angler, the possibility exists that king mackerel may be discarded after the bag limit is met on a trip. This was explored by first isolating the trips that met or exceeded the bag limit. Only 7% (n=513 trips) of the total trips from 2011-2013 met or exceeded the 2-fish bag limit. The number of discards per angler on trips that met or exceeded the bag limit were plotted in Figure 2. However, discards are not recorded in the TPWD survey so it is unknown how many king mackerel were discarded in Texas waters. TPWD accounted for 22% (n=114 trips) of the 513 trips that met or exceeded the trip limit.

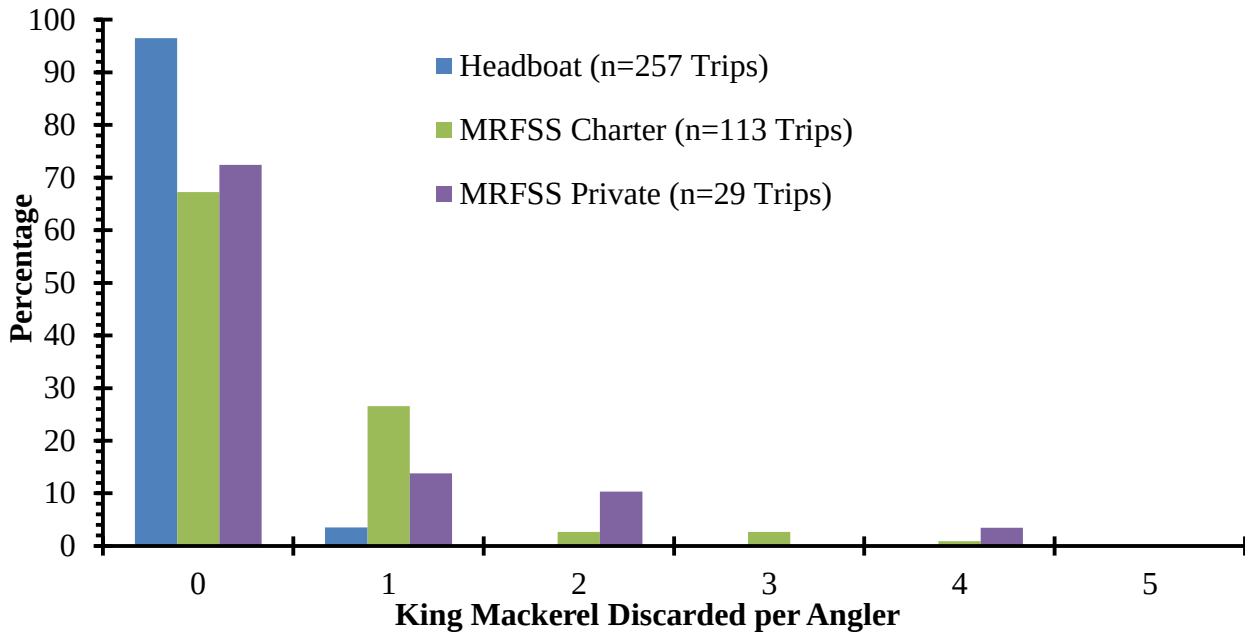

Figure 2. Distribution of Gulf of Mexico king mackerel discarded per angler by mode from MRFSS and Headboat data. TPWD data are not included because no discard information is collect in the TPWD survey. The data used are from 2011 through 2013.

Increases from 2 to 3 fish and from 2 to 4 fish were analyzed with two different methods that modified the trips that met the 2 fish per angler bag limit. Trips that harvested less than 2 fish per angler or more than 2 fish per angler were not modified. The first of the two methods assumed that all trips that met the 2 fish per angler bag limit would also meet the 3 and 4 fish per angler bag limit. The second method isolated the trips that met the 2 fish bag limit and assumed they met the 3 and 4 fish bag limit if those trips also had discards of 1 or 2 king mackerel, respectively. For example, a trip that met the 2 fish bag limit and had at least two discarded king mackerel was analyzed by assuming 4 king mackerel (2 harvested fish plus the 2 discarded fish) were harvested for that trip. It must be noted that the second method assumes discarded king mackerel were only discarded because the trip limit was met. However, these discards could have been because these fish were below the minimum size limit of 24 inches fork length. The length of the discarded fish is not available so it is not possible to distinguish if the discards were because the fish was below the minimum size. The calculated percent increase in landings by mode are shown in Table 1.

Table 1. Calculated percent increase in Gulf of Mexico king mackerel recreational landings from increasing the bag limit. Percent increase in landings was calculated by mode for two different methods. Method 1 assumes all the trips that met the 2 fish bag limit would also meet the 3 or 4 fish per angler bag limit. Method 2 isolated the trips that met the 2 fish bag limit and allowed them to meet the 3 and 4 fish bag limit if these trips also had discarded king mackerel. Analysis for TPWD was not possible because discards are not recorded in the TPWD survey.

Bag Limit	MRFSS		TPWD		Headboat
	Charter	Private	Charter	Private	
Method 1					
2 to 3 Fish	7%	11%	6%	14%	13%
2 to 4 Fish	17%	22%	11%	28%	27%
Method 2					
2 to 3 Fish	1%	1%	NA	NA	<1%
2 to 4 Fish	2%	4%	NA	NA	<1%

An overall percent increase in recreational landings was calculated by weighting the percent increase for each mode by the percentage of landings that mode contributed to the overall recreational landings. The pounds and percentage of king mackerel recreational landings for each mode from 2011 to 2013 are shown in Table 2. The overall percent increase is shown in Table 3.

Table 2. Gulf of Mexico king mackerel landings by mode from 2011 to 2013. The landings are in pounds whole weight (lbs ww) and percent of the total landings.

Mode	Landings (lbs ww)	Percent
MRFSS charter	2,543,217	27%
MRFSS private	6,157,548	64%
TPWD charter	25,797	0%
TPWD private	292,286	3%
Headboat	567,549	6%
Total	9,586,397	100%

Table 3. Percent increase in Gulf of Mexico king mackerel recreational landings generated from data for the years 2011 to 2013. The percent increase estimates were calculated by weighting the increase in the bag limit for each mode (Table 1). The weighting was based on the percentage of landings each mode contributed to the overall landings from 2011 to 2013 (Table 2).

Bag Limit	Method 1	Method 2
2 to 3 Fish	10.1%	0.9%
2 to 4 Fish	21.1%	3.1%

This analysis attempted to predict realistic changes to king mackerel recreational landings by applying increases to the current 2-fish bag limit. Uncertainty exists in these projections, as economic conditions, weather events, changes in catch-per-unit effort, fisher response to management regulations, and a variety of other factors may cause departures from this assumption. The bounds of this uncertainty are not captured by the analysis as currently configured; as such, it should be used with caution as a 'best guess' for future dynamics. In addition to the aforementioned sources of uncertainty, the predicted increase in landings associated with bag limit options assume past performance in the fishery is a good predictor of future dynamics. The analysis constrained the range of data considered to recent years to reduce the unreliability of this assumption.