Estimated Reduction in Gulf of Mexico Recreational Red Snapper Harvest Associated with Various Bag Limits

NOAA Fisheries Service
Southeast Regional Office
St. Petersburg, FL
December 19, 2012

Abstract

Catch rates and the average weight of recreationally caught red snapper are currently increasing at a faster rate than red snapper quota increases. This is resulting in annual overages of the quota and reductions in the recreational fishing season length. Since 2007, the recreational red snapper season length has declined from 194 days to 46 days. Next year, the season is projected to be 27 days (range 24-30; SERO-2012-10). In order to extend the length of the fishing season, this analysis evaluated reducing the bag lmit from 2 fish per angler to 1.5, 1.0, or 0.5 red snapper per angler. Results indicate these bag limits would reduce landings by 17%, 38%, and 63%, respectively. Reduced landings would result in the fishing season be extended by as much as 1.2X under a 1.5 fish bag limit, 1.61X under a 1.0 fish bag limit, and 2.68X under a 0.5 fish bag limit. Assuming a 27-day season for 2013, reducing the bag limit from 2 to 1 fish would lengthen the season to a maximum of 44 days. Sensitivity analyses were also performed to evaluate the potential effect of anglers harvesting larger, heavier fish to compensate for a lower bag limit.

Introduction

Gulf of Mexico recreational red snapper are currently managed with a quota, 2-fish bag limit, and 16-inch total length minimum size limit. NOAA Fisheries estimates when the quota will be met each year prior to the season opening on June 1 (SERO 2012-01). With the exception of 2010, the recreational red snapper quota has been exceeded every year since 2007. Higher catch rates and increasing average fish weights have resulted in the quota being harvested more quickly. Since 2007, the recreational red snapper fishing season has been shortened from 194 days to 46 days. Last year, the recreational red snapper federal fishing season was projected to be 40 days. However, due to severe weather in the northeastern Gulf of Mexico, NOAA Fisheries Service extended the season (in late June) by an additional 6 days (SERO 2012-03). Preliminary landings for the 2012 fishing season now indicate the 3.96 million pound whole weight (mp ww) quota was exceeded by as much as 1.86 mp ww (SERO 2012-10). Despite an increase in the quota to approximately 4.14 mp ww in 2013, the federal recreational fishing season will again have to be reduced in 2013 to constrain harvest under status quo management restrictions (16 inch TL size limit, 2-fish bag limit). Preliminary analyses indicate the season length will be 30 days or less in 2013 under status quo management conditions (2-fish bag limit, 4.14 mp quota). The following analysis estimates reductions in harvest and corresponding increases in season length associated with reducing the 2-fish red snapper bag limit .

Data Sources

Recreational landings data for Gulf of Mexico red snapper were obtained from the Marine Recreational Fisheries Statistics Survey (MRFSS), the Texas Parks and Wildlife Department (TPWD) Creel Survey, and the Southeast Headboat Survey (HBS). MRFSS and TPWD conduct

dockside intercepts to collect information on the size and number of red snapper caught by mode (charter, private/rental, shore). The HBS collects the size and number of red snapper caught through dockside sampling and logbooks completed by headboat operators. Catch and effort data for 2011 from each of these surveys was used to estimate reductions associated with a one red snapper bag limit. Data for 2012 were not yet available for use.

Methods

The number of red snapper caught per angler on a given trip was collected by MRFSS, TPWD, and HBS. The MRFSS system classifies recreational catch into three categories:

- Type A - Fish that were caught, landed whole, and available for identification and enumeration by the interviewers.
- Type B - Fish that were caught but were either not kept or kept but not available for identification.
    - Type B1 - Fish that were caught and filleted, released dead, given away, or disposed of in some way other than Types A or B2.
    - Type B2 - Fish that were caught and released alive.

Type A and B1 catches were used for bag limit analyses. Type A catch represents the total catch of all anglers on a fishing trip. However, some or all of the anglers contributing to the A catch are also interviewed to report type B1 catch, and those may be recorded on an individual basis. If the number of people contributing to the A catch was greater than the number of people interviewed to report B1 catch, the following formula (see Brooks 2004), was used to account for possible under reporting of the B1 catch:

$$B1 = B1interviewed \times \frac{\#\ people\ in\ fishing\ party}{\#\ people\ interviewed\ to\ report\ B1\ catch}$$

The total catch per angler was then determined by summing the total Type A and Type B1 catch (AB1) for each trip and then dividing it by the number of anglers in the fishing party. Percent reductions in harvest were estimated for bag limits of 0.5, 1, 1.5, and 2.0 red snapper per person. If AB1 catch per angler was greater than the bag limit being analyzed but less than the current bag limit (2 fish), the value was re-set to the new bag limit ($AB1_{bag\ limit}$), otherwise no changes to the catch were made.

The following formulas were used to estimate reductions in harvest resulting from bag limits:

If AB1 catch <= proposed bag limit, then harvest = A + B1

If AB1 catch > proposed bag limit and < two fish bag limit, then harvest = $AB1_{bag\ limit}$

Reductions for HBS bag limits were calculated in a similar manner as described above, except no B1 catch data were available. If the catch per angler was greater than the bag limit being analyzed but less than the current bag limit (2 fish), the value was re-set to the bag limit, as

described above. If the catch per angler was less than the bag limit being analyzed, then no change to the catch was made.

Bag limit reductions for TPWD were calculated in a different manner due to the four-fish bag limit in Texas' state waters. No reduction in harvest was estimated for trips reporting landings from state waters or for trips reporting landings from federal waters when the federal season was not open. Additionally, no reduction in harvest was estimated for federal water trips exceeding the two fish bag limit. Landings per angler on trips harvesting greater than the proposed bag limit but less than two red snapper per angler from federal waters during the June 1-July 18, 2011 federal season were reduced to the proposed bag limit.

Percent reductions (in numbers of fish) associated with bag limits were estimated relative to the status quo two red snapper bag limit, by mode of fishing and data source (MRFSS, HBS, TPWD). Reductions were then weighted by the amount of landings reported by each mode in 2011 (Table 1) to determine a Gulfwide reduction in red snapper harvest.

Table 1. Gulf of Mexico red snapper recreational landings by mode and datasource, 2011.

Data Source	Mode	Landings	Weighting Factor
Headboat	Headboat	630,563	13.7%
MRFSS	Charter	854,335	18.6%
	Private	2,922,535	63.5%
TPWD	Charter	38,788	0.8%
	Private	156,333	3.4%
All	All	4,602,553	100%

Bag limit reductions were calculated based on changes in numbers of fish. Reduction estimates inherently assume that percent reductions in numbers are equivalent to percent reductions in pounds of fish. However, given high catch rates and availability of red snapper, it is likely that anglers will harvest on average larger fish if the bag limit is reduced to less than 2 fish per angler. Analyses were initially attempted to evaluate changes in average weight of fish caught by eliminating smaller fish caught on trips exceeding the proposed bag limits. However, due to how catch-effort data are collected, significant time would be needed to link catch-effort data files with biological samples and then determine methods to eliminate landed fish reported in the catch that would now be discarded due to bag limits. A simplistic approach was used instead to demonstrate how changes in average weight resulting from various lower bag limits would affect the estimated season length. To evaluate how the season length may be affected if fishermen retain on average larger fish when harvesting smaller bag limits, the estimated projected average weight of fish in 2013 was increased by 0.25 pound increments up to one pound greater than the projected amount. Changes in season length were then computed using the following equation:

$$\Delta\, Season\ Length\ (\%) = \frac{1}{(100\% - \%\ bag\ limit\ reduction)} \times \frac{avg.wgt}{(avg.wgt + x)}$$

Where the projected average weight equals 7.70 pounds whole weight (SERO 2012-10) and *x* equals the incremental increase in average weight associated with lowering the bag limit.

Results and Discussion

Figure 1 provides a frequency distribution of the catch per angler by mode and data source. Seventy-eight percent of intercepted MRFSS charter angler trips caught an average of 1.01-2.0 red snapper in 2011, compared with 68% of headboat angler trips and 53% of MRFSS private angler trips. For TPWD, 44% of charter angler trips and 45% of private angler trips intercepted caught greater than two red snapper per angler.

Table 2 summarizes percent reduction in landings by mode and data source associated with reducing the red snapper bag limit from two to 1.5, 1, or 0.5 fish per angler. The largest reductions were associated with the MRFSS charter mode, followed by the Headboat mode, and MRFSS private mode. Reductions were considerably lower for TPWD (<10%) owing to the four fish bag limit in state waters.

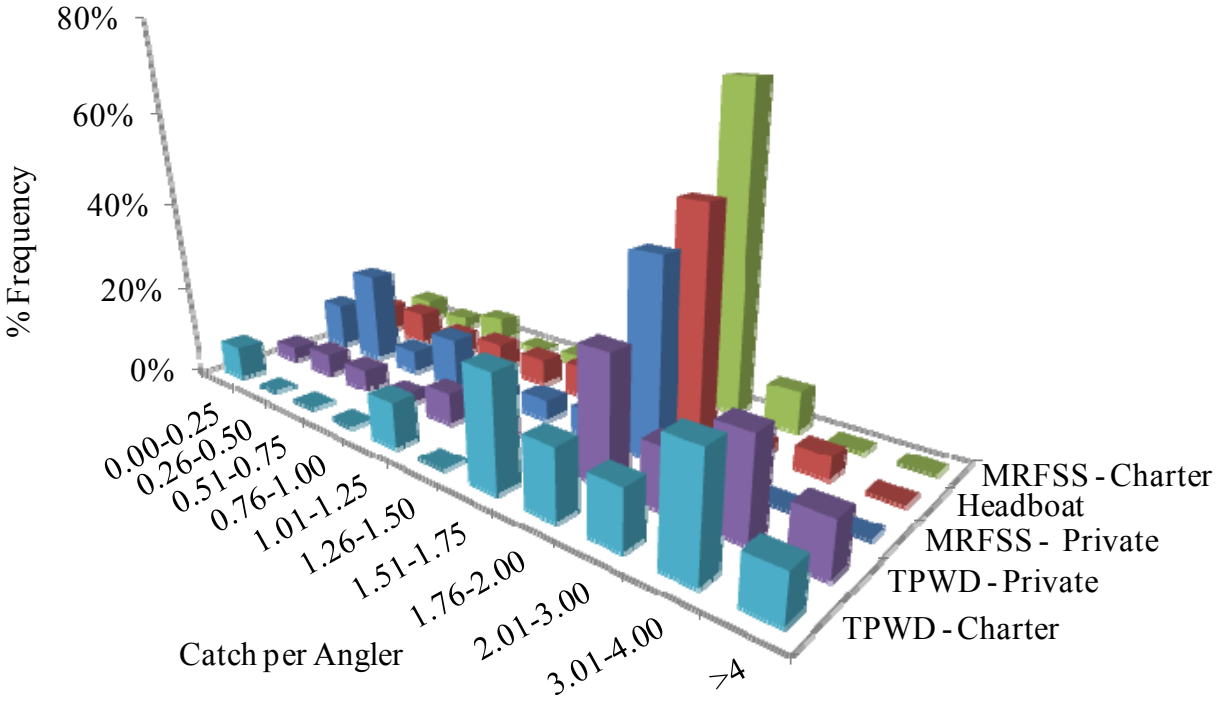

Figure 1. Gulf of Mexico recreational red snapper catch per angler by mode and data source, 2011.

Table 2. Percent reduction in 2011 landings by mode and data source associated with reducing the red snapper bag limit from two to 1.5, 1, or 0.5 fish per angler.

Data Source	Mode	% Reduction		
		1.5 fish	**1 fish**	**0.5 fish**
Headboat	Headboat	16.5%	38.0%	63.1%
MRFSS	Charter	21.9%	46.0%	71.0%
	Private	16.6%	37.1%	63.5%
TPWD	Charter	1.9%	6.9%	13.1%
	Private	4.0%	9.2%	15.6%
Weighted Reduction	All modes	17.0%	37.7%	62.8%

The overall Gulfwide weighted reduction in red snapper landings associated with a one fish bag limit was 37.7%. Reducing the red snapper bag limit from 2 to 1.5 fish per angler is estimated to reduce landings by 17.0% and reducing the bag limit from 2 to 0.5 fish per angler is estimated to reduce landings by 62.8%. The above scenarios assume average weights of red snapper will not increase due to lower recreational bag limits.

Table 3 summarizes the estimated reductions in harvest and changes in season length associated with various bag limits and average weights. Reducing the bag limit from two to 1.5, 1.0, or 0.5 fish per angler is estimated to increase the red snapper season length by approximately 1.20X, 1.61X, and 2.68X respectively. However, if fishermen compensate for the lower bag limit by keeping larger fish then the reduction in harvest and season extension would be less. For example, under a one fish bag limit, if fishermen land fish one pound heavier than the projected average weight then the season would only be 1.27X longer. Additionally, if states do not adopt a compatible bag limits than estimated reductions summarized herein would be overestimated.

Table 3. Estimated reductions in landings and changes in season length associated with various bag limits and red snapper average weights.

2013 Avg. Weight	Bag Limit = 1.5		Bag Limit = 1.0		Bag Limit = 0.5	
	% Landings Reduction	Δ Season Length	% Landings Reduction	Δ Season Length	% Landings Reduction	Δ Season Length
7.7 (proj)	17.0%	1.20X	37.7%	1.61X	62.8%	2.68X
7.95	16.0%	1.13X	35.4%	1.51X	59.0%	2.52X
8.20	15.0%	1.06X	33.4%	1.42X	55.6%	2.38X
8.45	14.2%	1.01X	31.6%	1.34X	52.6%	2.25X
8.70	13.5%	0.96X	29.9%	1.27X	49.9%	2.13X

References

Brooks, E. 2004. An evaluation of adding vermilion snapper to the aggregate bag limit and a vermilion snapper bag limit of 10 for recreational fishery management. SFD-2004-002. Southeast Fisheries Science Center, Miami, Florida. 24 pages.

SERO. 2012-01. 2012 Recreational Red Snapper Quota Closure Analysis. NOAA Fisheries Service. Southeast Regional Office. St. Petersburg, Florida. 12 pages.

SERO. 2012-03. Extension of the Gulf of Mexico Recreational Red Snapper Fishing Season. NOAA Fisheries Service. Southeast Regional Office. St. Petersburg, Florida. 13 pages.

SERO. 2012-10. 2013 Recreational Red Snapper Quota Closure Analysis. NOAA Fisheries Service. Southeast Regional Office. St. Petersburg, Florida. 8 pages + appendix.