

Appendix F. Analyses to Support Actions and Alternatives

1. Gag Recreational Bag Limit Increase Analysis

Action 2 would revise the composition of the aggregate grouper bag limit and establish a recreational bag limit for gag. The current aggregate grouper bag limit is 3 fish, only one of which can be gag or black grouper. **Alternatives 2** and **3** propose removing gag from the aggregate and establishing a bag limit of 2 gag/person/day or 3 gag/person/day, respectively. The ABC for gag in 2014 was 805,000 pounds gutted weight (lbs gw) with a total ACL of 694,000 lbs gw, equal to the yield at 75% F_{MSY} . The recreational sector was allocated 49% of the total ACL for a recreational ACL of 340,060 lbs gw.

The bag limit increase analyses were compiled using trip level recreational data. Headboat Survey (HBS) catch-effort data were examined on a monthly basis (**Table F-1**), while Marine Recreational Information Program (MRIP) catch-effort data, which was analyzed by mode, were examined on a per wave basis (**Table F-2**). Waves were then split proportionally into months for projected landings analyses. The catch-effort data used 2012 and 2013 data, as 2010 and 2011 were statistically greater within the HBS data. Due to low sample sizes (<30 fish per month) in the MRIP catch-effort data for charter and private modes, samples were aggregated across all months in 2012 and 2013 to calculate aggregated annual bag limit increases. The increased bag limits was calculated as follows: If less than 1 gag per angler was landed, there was no reduction in the landings. If greater than or equal to 1 gag per angler was landed, the total number of fish was increased to 2 or 3, respectively, for each bag limit analysis. Note that these bag limits represent the upper bounds or maximum increases that could be expected if anglers that successfully reached their limit historically also reach their limit under the new bag limits. Landings data for 2013 were used, and compiled by mode and wave, with waves proportionally split into months for MRIP data, while HBS data was compiled by month.

Table F-1. Number of trips and landings under the status quo by month for HBS data

Month	2012		2013	
	Trips	Landings	Trips	Landings
1	122	3	105	10
2	145	0	101	2
3	251	3	93	4
4	301	0	87	1
5	298	435	167	208
6	347	803	193	288
7	202	263	157	254
8	159	189	153	245
9	135	160	94	121
10	108	109	88	115
11	100	44	39	60
12	149	80	72	72

Table F-2. Number of trips and landings under the status quo by wave for MRIP data.

Wave	Private				Charter			
	2012		2013		2012		2013	
	Trips	Landings	Trips	Landings	Trips	Landings	Trips	Landings
1	9	0	12	0	21	0	20	0
2	13	0	5	0	19	0	2	0
3	23	13	16	12	12	9	6	11
4	21	9	11	6	6	8	3	1
5	28	11	8	2	12	7.2	2	0
6	15	6	5	0	10	1	6	0

The final model assumed zero landings from January through April, due to the shallow water grouper spawning closure during that time. Due to low sample sizes, data were combined across all waves and years for the MRIP dataset in order to calculate the estimated percentage increase from the new bag limits. The final model projects the landings, percentage of recreational ACL, projected closure date, and days open for each of the proposed recreational ACLs in **Action 1** for the status quo (equivalent to a bag limit of 1), 2 gag bag limit, and 3 gag bag limit.

Table F-3. Projected landings under new bag limits.

ACL	Bag Limit	Projected			
		Closure date	Days Open	Landings	% ACL
ACL = ABC: 326,340 lbs gw	Status Quo	12/31	245*	98,582	30%
	Gag Bag limit = 2			133,587	41%
	Gag Bag limit = 3			168,592	52%
ACL = 95%ABC: 310,023 lbs gw	Status Quo	12/31	245*	98,582	32%
	Gag Bag limit = 2			133,587	43%
	Gag Bag limit = 3			168,592	54%
ACL = 90%ABC 293,706 lbs gw	Status Quo	12/31	245*	98,582	34%
	Gag Bag limit = 2			133,587	45%
	Gag Bag limit = 3			168,592	57%
ACL = 80%ABC 261,072 lbs gw	Status Quo	12/31	245*	98,582	38%
	Gag Bag limit = 2			133,587	51%
	Gag Bag limit = 3			168,592	65%

*245 days open are due to the Jan-April spawning closure for shallow-water grouper.

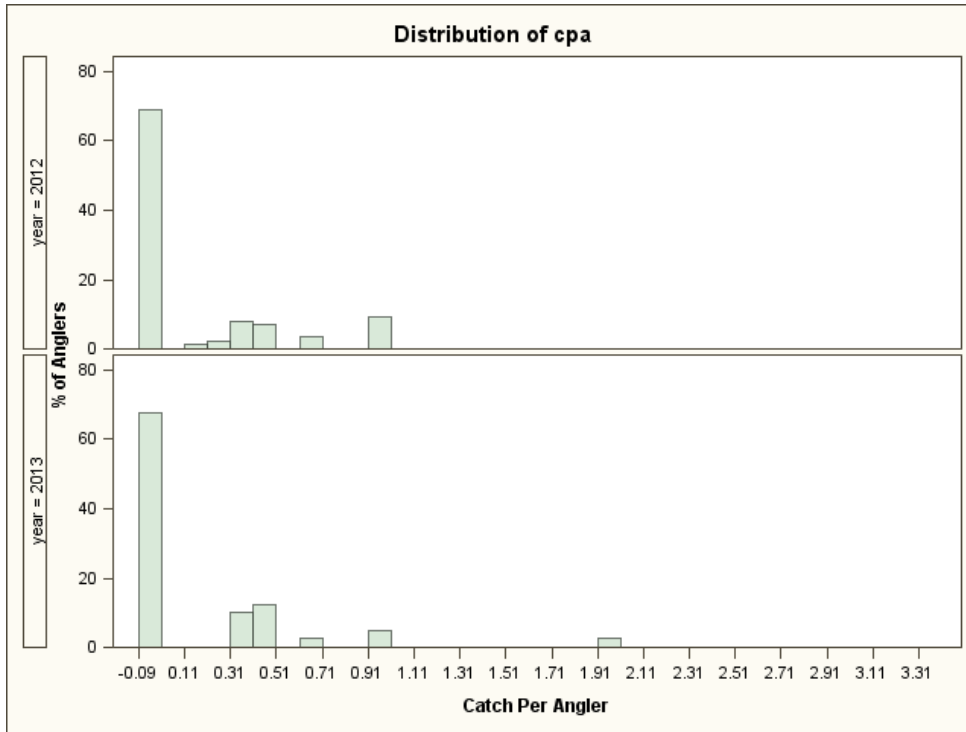


Figure 1. MRIP landings per angler (LPA) by year for private mode.

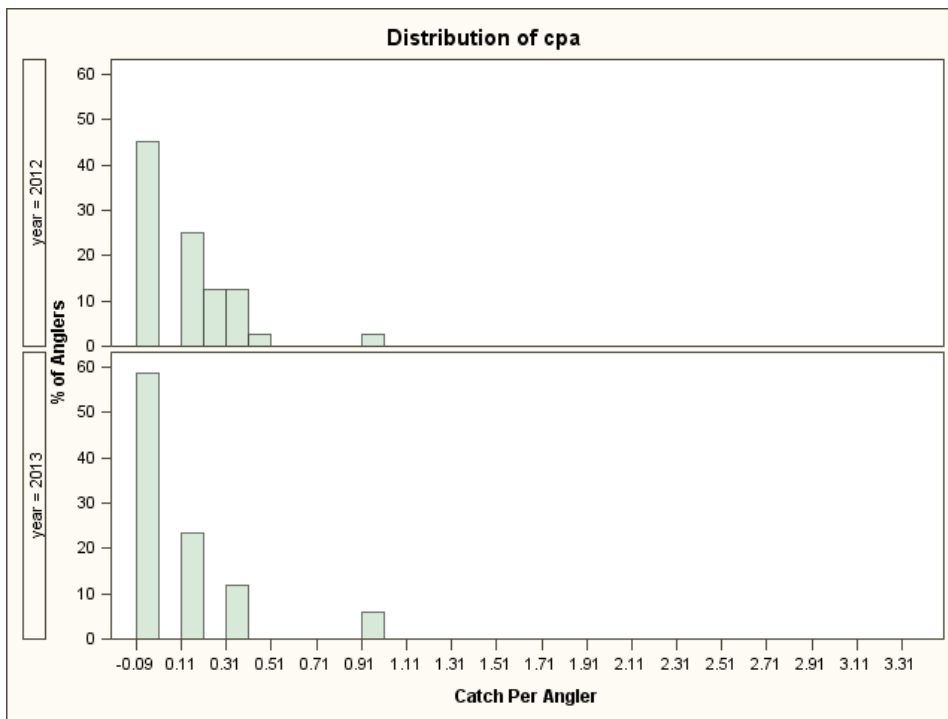


Figure 2. MRIP landings per angler (LPA) by year for charter mode.

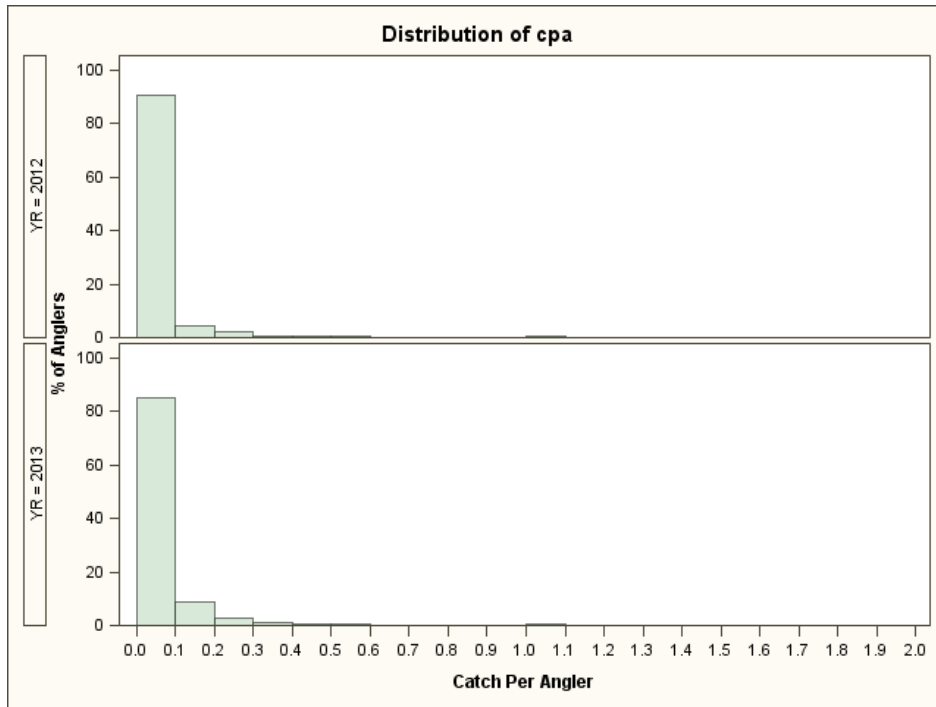


Figure 3. HBS landings per angler (LPA) by year.

2. Analysis of Aggregate Bag Limit

Action 2 proposes to revise the composition of the aggregate grouper bag limit by removing gag from the bag limit. The current aggregate grouper bag limit includes the following species: gag, black grouper, golden tilefish, snowy grouper, misty grouper, red grouper, scamp, yellowedge grouper, yellowfin grouper, yellowmouth grouper, blueline tilefish, sand tilefish, coney, grasby, red hind, and rock hind. The current aggregate grouper bag limit is 3 fish per angler per day. Within this limit, only one fish can be a gag or black grouper per person per day, only 1 golden tilefish may be landed per person per day, and only one snowy grouper can be landed per vessel per day. An analysis was requested to identify the impacts of removing gag from the aggregate, with a proposed alternative of reducing the aggregate grouper bag limit to 2 per person per day. Initial analysis looked at the number of trips that caught fish and the number of trips that landed fish (positive trip) by data source (Marine Recreational Information Program (MRIP) and Headboat Survey (HBS)). In addition, landings per angler per trip (LPA) was calculated for all trips and positive trips. The four groupings analyzed were 1) the entire aggregate, 2) gag only, 3) black grouper only, and 4) gag and/or black grouper (**Tables F-3 and F-4**). The black grouper analysis was added due to concerns that additional black grouper might be retained with the removal of or change to the 1 gag or black grouper per person per day.

Between 31%-53% of the trips that caught an aggregate species landed an aggregate species. The LPA for all aggregate trips was less than one for both data sources. When adjusting for positive trips, LPA increases, but is still less than 1. Five percent of all trips caught the maximum limit per angler. The low LPA indicates that fishermen are either not encountering the fish in the aggregate or are discarding the fish due to regulations other than the bag limit (e.g. spawning season closures, size limits).

The percentage of trips catching aggregate species that landed gag was between 7-19% for MRIP trips and 15-24% for HBS trips. Average LPA for gag was less than 0.1, and the LPA for positive gag trips averaged 0.47 for MRIP trips and 0.13 for HBS trips. Trips landing black grouper were less than trips landing gag and had lower LPAs than gag. The percentage of aggregate trips that landed gag and/or black grouper was low (MRIP trips: 11-23%, HBS trips: 18-29%). The percentage of trips where the LPA for gag and black grouper were greater than 1 were also low (MRIP: < 3%, HBS: <1%). Only 2 MRIP trips reported catching both black grouper and gag, while 13-28 HBS trips (<1%) caught both species. The low LPA for gag and/or black grouper trips indicates that it is unlikely that the removal of gag will have a considerable effect on black grouper landings.

Overall, from 2009-2013, the top five aggregate species landed for MRIP trips were: blueline tilefish, red grouper, gag, scamp, and snowy grouper. In 2012 and 2013, black grouper replaced snowy grouper as the fifth most commonly caught species. The top five species landed for HBS trips from 2009-2013 were blueline tilefish, scamp, gag, red grouper and sand tilefish. In 2009 and 2011, rock hind replaced sand tilefish as the fifth most commonly caught species. The species listed above are the species most likely to show an increase in landings if gag is removed and the aggregate grouper bag limit remains at 3 fish, although the low gag LPA would indicate that any increase in landings is highly unlikely, as the current bag limit is frequently not met.

Table F-3. Number of trips that caught a species in aggregate grouper bag limit and the average landings per angler per trip (LPA) by year from the MRIP data.

		2009	2010	2011	2012	2013
Aggregate	Trips that caught an aggregate fish	145	448	278	446	359
	Positive aggregate trips (landed an aggregate fish)	72	139	96	167	118
	Trips that with aggregate LPA \geq 3	3	8	5	16	12
	Average aggregate LPA, all aggregate trips (max = 3)	0.45	0.29	0.29	0.34	0.33
	Average aggregate LPA, positive trips (max = 3)	0.90	0.92	0.84	0.90	1.0
Gag	Trips that landed gag	27	38	28	52	24
	Trips that discarded gag	38	121	93	154	78
	% aggregate trips that landed gag	19%	8%	10%	12%	7%
	Average gag LPA, all aggregate trips (max = 1)	0.07	0.05	0.05	0.05	0.03
	Average gag LPA, positive trips (max = 1)	0.40	0.53	0.50	0.43	0.47
Black grouper	Trips landed black grouper	6	11	7	18	16
	% all aggregate trips that landed black grouper	4%	2%	3%	4%	4%
	Average black grouper LPA, all aggregate trips (max = 1)	0.03	0.01	0.02	0.02	0.02
	Average black grouper LPA, positive trips (max = 1)	0.65	0.33	0.78	0.46	0.43
Gag and black grouper	Trips landed gag and/or black grouper	33	48	35	69	40
	% all aggregate trips that landed gag and/or black grouper	23%	11%	13%	15%	11%
	Trips where gag/ black grouper LPA \geq 1	3	10	8	13	6
	Trips landing both gag and black grouper	0	1	0	1	0
	Average gag/black grouper LPA, all aggregate trips	0.10	0.05	0.07	0.07	0.05
	Average gag/black grouper LPA, positive trips	0.44	0.50	0.56	0.45	0.45

Table F-4. Number of trips that caught a species in aggregate grouper bag limit and the average landings per angler per trip (LPA) by year from the HBS data.

		2009	2010	2011	2012	2013
Aggregate	Trips that caught an aggregate fish	4967	4916	3772	4572	4423
	Positive aggregate trips (landed an aggregate fish)	2583	2344	1988	1926	2007
	Trips with aggregate LPA \geq 3	23	12	32	47	20
	Average aggregate LPA, all aggregate trips (max = 3)	0.13	0.13	0.16	0.13	0.12
	Average aggregate LPA, positive trips (max = 3)	0.24	0.28	0.31	0.30	0.27
Gag	Trips that landed gag	1177	1122	922	674	663
	Trips that discarded gag	2048	1760	1428	1855	913
	% aggregate trips that landed gag	24%	23%	24%	15%	15%
	Average gag LPA, all aggregate trips (max = 1)	0.03	0.03	0.03	0.02	0.02
	Average gag LPA, positive trips (max = 1)	0.12	0.14	0.14	0.13	0.10
Black grouper	Trips landed black grouper	138	138	176	163	240
	% all aggregate trips that landed black grouper	3%	3%	5%	4%	5%
	Average black grouper LPA, all aggregate trips (max = 1)	0.003	0.003	0.006	0.004	0.007
	Average black grouper LPA, positive trips (max = 1)	0.10	0.12	0.13	0.12	0.13
Gag and black grouper	Trips landed gag and/or black grouper	1293	1240	1085	823	865
	% all aggregate trips that landed gag and/or black grouper	26%	25%	29%	18%	20%
	Trips where gag/black grouper LPA \geq 1	18	19	15	20	6
	Trips landing both gag and black grouper	22	20	13	14	38
	Average gag/black grouper LPA	0.03	0.04	0.04	0.02	0.02
	Average gag/black grouper LPA, positive trips	0.12	0.14	0.14	0.13	0.11