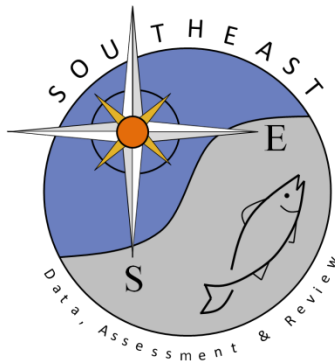


Release Condition and Observed Discard Mortality of Cobia in the For-Hire Recreational Fisheries in Florida

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SEDAR58-DW06

Submitted: 2 January 2019



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Please cite this document as:

Duffin, B. 2019. Release Condition and Observed Discard Mortality of Cobia in the For-Hire Recreational Fisheries in Florida. SEDAR58-DW06. SEDAR, North Charleston, SC. 8 pp.

ATLANTIC

Charter								X	X	X			
Headboat	X	X	X	X	X	X	X	X	X	X	X	X	X

KEYS

Charter					X	X	X		X	X	X	X	X
Headboat	X	X	X		X	X	X	X	X	X	X	X	X

Cooperative vessels were randomly selected year-round for observer coverage. The state of Florida was stratified along both coasts into regions: Northwest Panhandle (Escambia to Franklin County), Central Peninsula (Citrus to Sarasota County), Southwest Florida (Charlotte to Collier County), Florida Keys (Monroe County), Southeast Florida (Dade to Indian River County), and Northeast Florida (Nassau to Brevard County). Operators from selected vessels were contacted by state biologists and were scheduled for a single sampling trip in a selected week. Dependent upon the number of customers on board, one or two biologists accompanied passengers during the scheduled trip. The captain and mates cooperated by making sure fish caught by their anglers were observed by one of the biologists before they were stored in the fish hold or released overboard. Biologists would assist with dehooking fish, but were not permitted to influence the decision to keep or release a fish.

Trip Level Data Elements

Trip level information for each trip included the area fished, duration of fishing (to the nearest half hour), number of anglers, and depths (meters) of the fishing sites. Site specific fishing depths have been recorded beginning in 2009.

Area fished for southeast and northeast Florida and trips originating in the Florida Keys in the Atlantic was coded as:

- 1: 3 miles or less from shore; or
- 2: more than 3 miles from shore

Area fished for trips fishing waters of the Gulf of Mexico are coded as:

- 3: 10 miles or less from shore; or
- 4: more than 10 miles from shore

Characterization of Trips duration:

- Half-day (<6 hours)
- Three-quarter day (6 to 8.5 hours)
- Full day (9 or more hours)
- Multiday (24 or more hours)

Station Level Data Elements

- Depth fished

- Degrees/minutes

Fish Level Data Elements

Disposition codes are recorded for all fish and represent the final fate (e.g. kept or discarded) of each observed fish.

Disposition was coded as:

- 1: thrown back alive, legal;
- 2: thrown back alive, not legal;
- 3: plan to eat;
- 4: used for bait or plan to use for bait;
- 5: sold or plan to sell;
- 6: thrown back dead or plan to throw away.

Release condition has been recorded since 2009 and is observed at the surface immediately following release. Fish coded as “Good” swam down from the surface of the water immediately and fish coded as “Fair” swam down in a disoriented fashion. Other release conditions have been considered immediate mortality.

Release Condition was coded as:

- 1: Good (submerged immediately)
- 2: Fair (initially disoriented before submerging)
- 3: Bad
- 4: Dead
- 5: Eaten
- 9: Unobserved

Hook location and type of hook have been recorded since 2009 on the Gulf coast of Florida, 2010 in the Keys, and 2011 on the east coast of Florida.

Hook location is recorded as:

- E: Eye
- F: Foul hooked (external)
- G: Gill
- I: Inside mouth
- L: Lip
- T: Throat
- U: Gut

Hook type is recorded as:

- C: Circle
- J: J-hook
- T: Treble
- K: Kahle

Hook offset is recorded as Yes/No.

Supplemental Intercept Survey Methods

The supplemental intercept survey on the Atlantic coast of Florida samples a subset of MRIP sites where federally managed fish landed from private recreational and charter trips may be intercepted for biological sampling. Sample selections are stratified by region (Northeast, Southeast, and the Keys) and fishing mode (private or charter). Each week up to two charter and three private boat assignments per region are completed. Each offshore fishing party intercepted that has landed catch is asked to report the minimum and maximum depths and distances from shore fished, as well as the depth and distance where they spent the majority of time fishing.

Boat level data on catch is recorded for each interview. For each managed species, anglers are asked to report the follow for discarded fish:

- Total number that were alive when released and
- Total number that were under the legal size limit (regardless of whether the season is open)
- Total number that were unable to re-submerge (floated off)
- Total number that were dead before they were returned to the water
- Total number that were used for bait

Results

Number of observed headboat and charter recreational fishing trips positive for cobia in the Gulf and Atlantic are summarized by year, region and vessel type (Table 2). Proportion of observed fish discarded in the Atlantic and Gulf are presented in Table 3 and 4, respectively.

An overall discard mortality rate of 0.012 was observed for cobia in the Gulf and Atlantic on charter and headboats. Immediate discard mortality and proportion of impaired fish inclusive of dead and floating fish for the Gulf and Atlantic headboats and charter boats are reported in Table 5. Proportions of impaired (due to hook injury or release conditions “Dead”, “Bad”, or “Fair”) fish according to binned fishing depth (10 m bins) are presented in Figure 1. The majority of discards observed were caught in depths less than 50 meters, and a relatively low proportion ($p < 0.10$) of these fish exhibited impairments. A higher proportion ($p = 0.20$) of fish caught in the 61-70m depth bin exhibited impairments; however, only a small number of the total discards observed were caught at this depth.

Interviews as part of the Atlantic Coast Biological Survey reported 2.6% of fish discarded from charter trips and 8.5% from private recreational trips (1 of 39 total discards; 4 of 47 total discards, respectively) as discarded dead.

Out of 520 harvested and discarded fish checked for hook injury in the Gulf and Atlantic, 4% were hooked in potentially lethal areas (eyes, throat, gut, gills, or foul hooked). The majority of observed cobia in Atlantic were caught on J-hooks. A larger percent of fish hooked on J-hooks were subject to potentially lethal hook injury. Though only a small number of fish were caught on them, no cobia caught on treble or kahle hooks exhibited potentially lethal hook injury. A comparison of hook injury across hook types and region is shown in Table 6.

Table 2. Number of observed trips where cobia were caught on the Atlantic and Gulf coasts of Florida, by year and vessel type.

Year	ATLANTIC		GULF OF MEXICO	
	<i>Headboat</i>	<i>Charter</i>	<i>Headboat</i>	<i>Charter</i>
2005	16	-	5	-
2006	16	-	6	-
2007	19	-	6	-
2008	11	-	-	-
2009	14	-	4	2
2010	19	-	1	2
2011	9	-	4	6
2012	16	-	4	6
2013	12	25	1	2
2014	21	24	4	1
2015	13	15	4	6
2016	14	1	8	4
2017	17	4	8	7
2018	11	2	12	6
Total	208	71	67	42

Table 3. Cobia discard proportions from the Atlantic coast of Florida observed in the charter and headboat fisheries.

Year	Atlantic					
	Headboat			Charter		
	<i>Harvest</i>	<i>Disc</i>	<i>Disc Prop</i>	<i>Harvest</i>	<i>Disc</i>	<i>Disc Prop</i>
2005	5	18	0.7826	-	-	-
2006	22	7	0.2414	-	-	-
2007	22	9	0.2903	-	-	-
2008	7	8	0.5333	-	-	-
2009	16	20	0.5556	-	-	-
2010	15	21	0.5833	-	-	-
2011	12	3	0.2000	-	-	-
2012	12	16	0.5714	-	-	-
2013	10	7	0.4118	40	23	0.3651
2014	21	31	0.5962	32	15	0.3191
2015	10	7	0.4118	11	8	0.4211

2016	7	15	0.6818	1	0	0.0000
2017	13	14	0.5185	1	7	0.8750
2018	6	12	0.6667	1	5	0.8333

Table 4. Cobia discard proportions from the Gulf coast of Florida observed in the charter and headboat fisheries.

Year	Gulf of Mexico					
	Headboat			Charter		
	<i>Harvest</i>	<i>Disc</i>	<i>Disc Prop</i>	<i>Harvest</i>	<i>Disc</i>	<i>Disc Prop</i>
2005	18	6	0.2500	-	-	-
2006	88	4	0.0435	-	-	-
2007	5	5	0.5000	-	-	-
2008	-	-	-	-	-	-
2009	1	4	0.8000	2	1	0.3333
2010	1	0	0.0000	1	1	0.5000
2011	1	3	0.7500	2	7	0.7778
2012	2	2	0.5000	3	5	0.6250
2013	0	1	1.0000	2	0	0.0000
2014	2	3	0.6000	0	1	1.0000
2015	35	8	0.1860	10	1	0.0909
2016	6	7	0.5385	1	4	0.8000
2017	6	13	0.6842	4	7	0.6364
2018	5	5	0.5000	11	10	0.4762

Table 5. Discard mortality and release condition of cobia observed on the Atlantic and Gulf coasts of Florida, by vessel type. Proportion of impaired fish includes those coded as “Bad”, “Dead”, and “Fair”.

	Vessel Type	Release Condition				Prop. Impaired	Immediate Mortality
		<i>Good</i>	<i>Fair</i>	<i>Bad</i>	<i>Dead</i>		
Atlantic	Charter	52	5	1	1	0.1186	0.0339
	Headboat	178	7	-	1	0.0430	0.0054
Gulf	Charter	30	-	-	-	-	-
	Headboat	57	4	1	-	0.0806	0.0161

Table 6. Percent of potentially lethal hook injury observed on the Atlantic and Gulf coasts of Florida for charter and headboats combined. C = circle hook, J = J-hook, K = kahle hook, T = treble hook.

Hook Type	Atlantic			Gulf of Mexico		
	<i>N</i>	<i>Potential Mort.</i>	<i>Percent</i>	<i>N</i>	<i>Potential Mort.</i>	<i>Percent</i>
C	140	5	3.57	164	1	0.61
J	186	13	6.99	14	2	14.29
K	1	-	-	-	-	-
T	13	-	-	2	-	-
Total	340			180		

Figure 1. Total numbers (frequency) of cobia discards observed in the headboat and charter fisheries at each 10 meter depth interval, and the proportion that were impaired.

