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Richards 1977

SEDAR28-RD19

24 January 2012

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Cobia (*Rachycentron canadum*) Tagging within Chesapeake Bay and Updating of Growth Equations[1]

ABSTRACT: Early summer concentrations discovered by sportfishermen in Chesapeake Bay allowed tagging and release of twenty fish. Six returns were received from sport catches up to five years after release (1,855 days). Sport fishing mortality was 0.30 ± 0.21 with P = 95%.

Introduction

Cobia (*Rachycentron canadum*) normally enter Chesapeake Bay in late May or early June and leave by mid-October. Virginia sportfishermen in 1965 discovered concentrations of cobia in shallow water within Chesapeake Bay off the mouth of Onancock Creek. They were found on the bayside of the Eastern Shore from late May to mid-June. They were later found to extend southward on shoals off Pungoteague Creek. Water depths were 1.5 to 4.9 meters and highest sport catches were made during early June. Tagging was subsequently done with reasonable expectations of obtaining mortality and migration information because (1) significant numbers of cobia were available to tag, (2) fish were released in good condition, and (3) releases were made during early and perhaps initial seasonal appearance in the Bay. This note reports the tagging results and computer-calculated growth equations that are given to update those of Richards (1967).

Methods

Cobia were donated for tagging by sportfishermen during a spring tournament sponsored for four years by the Eastern Shore of Virginia Anglers Club. The club maintained catch statistics for each annual tournament and members graciously assisted in collection and tagging operations.

Cobia were brought alongside boats as soon as possible after being hooked and a tag (H-type, stainless-steel dart) was inserted below the origin of the soft dorsal fin by means of a wooden tagging rod. Cobia were not removed from the water for tagging except for small fish (under 6.8 kg - 15 lbs.) which were too active to tag in the water.

Results

Total catches during the tournament were estimated as: 1966 = 226; 1967 = 125; 1968 = 300; 1969 = 30 fish. Twenty cobia were tagged and released (Table 1). There were no indications of tagging injuries and recaptured tags were remarkedly clean and legible, even after five years.

All recaptures were reported by sportfishermen during summer months. Cobia are also commonly caught in commercial pound nets (Richards 1967), but no recaptures were reported from this gear. Tag returns suggest that distinct, repetitive, summer habitation occurs and that Chesapeake Bay cobia may be a distinct group or subpopulation.

Existence of a distinct subpopulation or group with a high total mortality is indicative that sport-catch limitations may be desirable. The sport fishing mortality is 0.30 ± 0.21 with a probability of 95% calculated from tag returns. Confidence limits are $p \pm t\sqrt{pq/n}$, where p = proportion returned, q is proportion not returned and the variance of p is pq/n = (0.3) (0.7)/20 = 0.0105. There has been a decline in commercial landings (U.S.D.I., B.C.F. 1960-1967; U.S.D.C., NMFS 1968-1974). Commercial catch in thousands of pounds landed were: 1960-1964, mean 21.3, range 12.5-32.9; 1965-1969, mean 4.2, range 2.6-9.8; 1970-1974, mean 3.2, range 1.9-4.4. The numbers of cobia entered in the Virginia Saltwater Sportfishing Association annual tournaments have also decreased. Tournament entries of cobia exceeding 45 pounds entry weight were: 1960-1964, mean 220 entries, range 115-298; 1965-1969, mean 125, range 49-185; 1970-1974, mean 57 entries, range 39-67; to recover slightly during 1975 to 89 entries. Changes in effort were generally toward an increase in sport fishing efforts and decrease in commercial activity during the period. The total mortality rate for cobia including commercial and sport catches plus natural mortality thus could be excessive.

The cobia recaptured after five years most probably was male. It was not available for biological examination, but weighed only 35 pounds at recapture, whereas females usually exceed 35 pounds in their fifth year. Minimal age of this fish was two years at tagging and seven at recapture. Therefore, if it were a female it should have weighed a minimum of 58.6 pounds. By comparison, a seven-year-old male usually weighs 29.3 pounds (Table 2).

[1] Contribution No. 754 from the Virginia Institute of Marine Science, Gloucester Point, Virginia 23062.

TABLE 1. Release and recapture data, fish weight, and distance moved for cobia tagged in Chesapeake Bay.

Releases			Returns		Recapture Weight (Pounds)	Distance From Release Site (in Nautical Miles)
Date	No. Tagged	Recaptured	Date	Days out		
16 June 1967	1	1	10 July 67	24	63	36
21 June 1967	2	1	31 Aug. 67	71	51	12
24 June 1967	1					
5 June 1968	8	1	20 July 69	370	30	27
		1	30 July 71	1121	22	32
		1	4 July 73	1855	35	32
6 June 1968	3	1	16 Aug. 68	40	23	24
8 June 1968	1					
13 June 1969	4	0	None			
Total	20	6				

TABLE 2. Length and weight solutions for cobia growth equations.

t in years	Females				Males			
	Fork Length		Weight		Fork Length		Weight	
	in.	cm	lbs.	kg	in.	cm	lbs.	kg
1	14.0	36	0.85	0.4	12.2	31	0.6	0.3
2	24.2	61	5.2	2.4	20.8	53	3.4	1.5
3	32.3	82	13.3	6.0	27.3	69	8.2	3.7
4	38.8	99	24.0	10.9	32.3	82	13.9	6.3
5	44.0	112	35.7	16.2	36.0	91	19.6	8.9
6	48.1	122	47.5	21.5	38.8	99	24.8	11.2
7	51.4	131	58.6	26.6	40.9	104	29.3	13.3
8	54.0	137	68.7	31.2	42.5	108	33.1	15.0

Growth equations generated by analog computer (Richards 1970) using data from Richards (1967) are:

Males:

$FL = 121\ (1\text{-}e^{-0.28(t+0.06)})$

$W = 21.3\ (1\text{-}e^{-0.28t})^{3.088}$

Females:

$FL = 164\ (1\text{-}e^{-0.226(t+0.08)})$

$W = 54.5\ (1\text{-}e^{-0.225t})^{3.088}$

where fork lengths to posterior tip of median caudal ray are in centimeters and weights are in kilograms. Solutions for "t" are shown in Table 2.

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