

THE IMPACT OF RECREATIONAL CRABBING ON NORTH CAROLINA'S CRAB POPULATION

Hans Vogel song, PhD
Department of Recreation and Leisure Studies,
East Carolina University, Greenville, NC 27858

Jimmy Nobles
Commercial Fisherman, Greenville, NC

Abstract: In order to properly manage and regulate fisheries, resource managers must have accurate information concerning harvest rates for individual species. While commercial crabbers are required to report crab landings, little is known about the harvest rates and catch effort of North Carolina's recreational crabbers. The purpose of this project was to determine the impact of North Carolina's Recreational Commercial Gear License (RCGL) holders on the harvest of blue crabs (*Callinectes sapidus*). Specific objectives were to estimate the total number of crabs harvested by RCGL holders, as well as the amount of effort they put into crabbing and the types of crabbing equipment they used.

In order to accomplish these objectives, a random sample of 574 license holders was drawn from the approximately 7,100 RCGL holders who were eligible to use commercial gear to harvest crabs between July 2001, and July 2002. Telephone surveys were conducted on 388 members (68%) of this sample between September 2001 and March 2002. This survey included items on individual use of the RCGL licenses, type of equipment used, location of crab harvesting, number of days spent crabbing, and daily and season harvest estimates.

Results indicated that a relatively high portion (22.2%) of RCGL holders did not use their licenses to attempt to harvest any type of fish or seafood. RCGL holders who used their licenses harvested an estimated total of 354,150 crabs (118,050 lbs.) during the 2001 crabbing season, with an estimated market value of \$98,808. In addition, only 23.5% of RCGL holders reported any type of crab harvesting activities. Of those who reported harvesting crabs, 86.8% reported using gear that was specifically targeted to crabs. Overall, this data

demonstrates that RCGL license holders are having a minimum impact on crab populations within North Carolina, especially when compared with commercial harvest rates.

Introduction

In order to properly manage and regulate fisheries, resource managers must have accurate information concerning harvest rates for individual species. While commercial crabbers are required to report crab landings, little is known about the harvest rates and catch effort of North Carolina's recreational crabbers. The purpose of this project was to determine the impact of North Carolina's Recreational Commercial Gear License (RCGL) holders on the harvest of blue crabs (*Callinectes sapidus*). Specific objectives were to estimate the total number of crabs harvested by RCGL holders, as well as the amount of effort they put into crabbing and the types of crabbing equipment they used.

Methods

In order to accomplish these objectives, a telephone survey was developed, pilot tested, and administered to a sample of the approximately 7,100 RCGL holders who were eligible to use commercial gear to harvest crabs between July 2001, and July 2002. A sample of 574 was randomly drawn using the Statistical Package for Social Sciences (SPSS) computer software. The data collection interviewer made at least three attempts to contact each individual in the sample between September 2001, and March 2002. A total of 388 interviews were completed, resulting in a response rate of 68%. The telephone survey included items on individual use of the RCGL licenses, type of equipment used, location of crab harvesting, number of days spent crabbing, and daily and season harvest estimates.

Results

Since RCGL licenses can be used for a number of fishing related activities, the first question that was asked of respondents was whether or not they used their license to harvest crabs. The responses to this question are provided in Table 1.

The fact that only 23.5% of RCGL license holders used the licenses to harvest crabs during the 2001 season indicates that the majority of license holders are not utilizing their licenses to harvest

Table 1. — Crabbing Activity by RCGL holders

Harvest Crabs	Number	Percentage
Yes	91	23.5
No	297	76.5
Total	388	100

crabs. This percentage was extrapolated to all RCGL license holders to estimate that a total of 1,669 license holders attempted to harvest crabs during the 2001 season. This figure will be used throughout this report to estimate numbers related to the study objectives.

A follow-up question to respondents who reported that they had not attempted to harvest crabs during the 2001 season, concerned what they had used their RCGL for. This data is summarized in Table 2.

As the data in Table 2 indicate, the majority (68%) of RCGL holders use their licenses to gill net. This is followed by crabbing (23.5% from Table 1). Other less significant uses include shrimping (5%), herring netting (5%), oystering (4%), clamming (2%), and catching bait (1%). Surprisingly, over one-fifth of the sample reported that they did not use their RCGL licenses to harvest any seafood.

In an effort to determine harvest rates and effort put forth by RCGL crabbers, respondents were asked how many days per year they spent attempting to harvest crabs, how many crabs they harvested on an average day of crabbing, and how many total crabs they harvested throughout the season. The responses to these questions are respectively provided in Tables 3 through 5.

Table 2. — Use of RCGL by Non-Crabbers

Non-Crabbing Activity	Number	Percentage
Gill Netting	201	67.7
Did not use license	66	22.2
Shrimping	15	5.01
Herring Netting	14	4.7
Oystering	12	4.0
Clamming	6	2.0
Catching/Netting Bait	4	1.3
Other	3	1.0

Table 3. — Number of Days Spent Attempting to Harvest Crabs

Days Crabbing	Number	Percentage
1-5	29	32
6-10	21	23
11-15	14	15
16-20	11	13
21-25	2	2
> 25	14	15
Avg days crabbing = 15.09		

Table 4. — Average Crabs Per Day Harvested

Crabs per day	Number	Percentage
0-5	20	22
6-10	18	20
11-15	18	20
16-20	13	14
21-25	9	10
26-50	12	13
> 50	1	1
Avg Crabs per day = 15.85		

Table 5. — Total Estimated Crabs Harvested Per Season

Total crabs per season	Number	Percentage
0-5027	30	
51-100	23	25
101-150	8	9
151-200	6	6.5
201-300	13	14
301-400	6	6.5
>400	8	9
Avg Crabs per season = 203.27		

The data shown in the previous tables indicates a great deal of variety in effort and harvest rates. Although a few individuals (15%) spent over 25 days attempting to harvest crabs, the majority (55%) spent 10 days or fewer on the activity. Overall, the average number of days respondents reported attempting to harvest crabs was 15.85. Reported harvest rates also varied considerably within the sample. While the majority (62%) of the sample reported harvesting less than 15 crabs per day, a sizable portion (14.3%) reported harvesting 25 or more crabs per day. The average number of crabs harvested per day (15.85)

multiplied by the average number of days spent crabbing (15.09) yields an estimate of 239.17 crabs per year harvested by RCGL holders. This figure is slightly higher than the average number of total crabs harvested (203.27) estimated by respondents. For both of these estimates, it appears that the majority of respondents are harvesting relatively few crabs (42% reported less than 10 per day and 55% reported less than 100 per year). However, these averages are greatly increased by the relatively small numbers of highly successful respondents who reported harvesting large numbers (greater than 25 per day and greater than 300 per year) of crabs throughout the season.

In addition to estimated harvest rates, the type of equipment used by RCGL holders to harvest crabs was also of interest. Respondents were asked to indicate whether or not they used crab pots, gill nets, shrimp trawls, or a dip net to harvest crabs. The responses to these questions are summarized in Table 6.

Table 6. — Methods Used to Harvest Crabs

Crabbing method	Number	Percentage
Crab Pots	69	76
Bait/Dip Net	14	15
Shrimp Trawl	9	10
Gill Nets	7	8

Of the individuals who reported attempting to harvest crabs, the majority (76%) reported using crab pots. This was followed by baiting and dip netting (15%), shrimp trawling (10%), and gill netting (8%). Since those individuals using crab pots and dip nets were targeting crabs as a primary harvest species, as compared to gill netters and shrimp trawlers who harvest crabs as a by-catch, the reported total annual harvest was broken down and compared by crabbing method. Table 7 displays the results of this comparison.

Table 7. — Total Annual Harvest by Crabbing Method

Crabbing method	Number	Avg Crabs per year
Crab Pots	69	241.99
Bait/Dip Net	14	162.43
Shrimp Trawl	9	88
Gill Nets	7	76.43

As predicted, respondents who reported harvesting crabs by crab pots and dip nets reported harvesting significantly more crabs than those who reported using gill nets and shrimp trawls. With this in mind, these averages and appropriate percentages can be used to estimate the total number of crabs harvested statewide by RCGL holders. Table 8 provides a breakdown of this analysis.

As Table 8 points out, NC RCGL holders harvested an estimated total of 354,150 crabs during the 2001 crabbing season. If converting to pounds, using approximately three crabs to one pound, we estimate that approximately 118,050 pounds of crabs were harvested by RCGL holders with a total market value of \$98, 808, using \$.83.7 per pound (current market price). This figure may also vary with the size and grade of caught crabs. While the figures contained in Table 8 are useful, by further segmenting harvest by region or body of water, managers can better understand the impact that RCGL crabbers are having on specific watersheds throughout the state. Respondents to the survey were asked to indicate on which body of water they participated in crab harvesting. Responses to this questions were examined and reduced into one of the following six categories: The Albemarle Sound watershed; The Tar/Pamlico River Watershed; The Neuse Watershed; The Cape Fear Watershed; The Lower Inter-Coastal Waterway (southern half of State); and the Pamlico Sound. Table 9 provides a summary of this data, along with estimates of harvest for specific watershed regions.

The majority (54.9%) of recreational crabbing activity within the sample took place on waters associated with the Inter-Coastal Waterway between the Pamlico Sound and the Cape Fear River. This was followed by activity on the Tar/Pamlico and Neuse River Watersheds, and the Cape Fear Watershed. The least amount of recreational crabbing activity within the state took place on the Pamlico Sound and Albemarle Sound Watersheds. It is important to note that these results are indicative only of crabbing activity by RCGL holders, and do not reflect the total amount of all crabbing activity that takes place within North Carolina.

Table 8. — Estimate of 2001 RCGL Crab Harvest Totals

Crabbing method	Percentage*	Estimated Statewide Users**	Average Annual Harvest	Total Crabs Harvested
Crab Pots	75.8	1,265	241.99	305,875.36
Gill Nets	5.5	92	76.43	7,031.56
Shrimp Trawl	7.7	129	88	11,356
Bait/Dip Net	11.0	184	162.43	29,887.12
Total Crabs Harvested =				354,150.04

*Percentage was derived from Table 6. In cases where an individual used more than 1 method to harvest crabs, the method yielding the highest number of crabs was chosen as primary method

**Derived from multiplying percentage by the estimated 1,669 statewide RCGL crab harvesters.

Table 9. — Crabbing Activity & Harvest by Body of Water

Body of Water	Number	Percent	Crabs Harvested	Pounds of crabs harvested
Albermarle	5	5.5	19,478	6,493
Tar/Pamlico River	12	13.2	46,748	15,583
Neuse River	12	13.2	46,748	15,583
Cape Fear River	7	7.7	27,270	9,090
Southern ICW	50	54.9	194,428	64,809
Pamlico Sound	5	5.5	19,478	6,493
Total	91	100.0	354,150	118,051

Summary

North Carolina RCGL holders harvested an estimated total of 354,150 crabs during the 2001 crabbing season. Approximately 118,050 pounds of crabs were harvested by RCGL holders with an estimated total market value of \$98,808. When compared to the 29,938, 956 pounds of crabs with an estimated market value of \$25,078,700 harvested by commercial crabbers in NC during the same time period, it appears that the crab harvest impact of RCGL holders is minimal. This project demonstrated that RCGL holders bring in less than one-half of 1 percent (0.4%) of all harvested crabs. Other important information includes:

- Only 23.5% of RCGL holders reported any type of crab harvesting activities. Of those who reported harvesting crabs, 86.8% reported using gear that was specifically targeted to crabs (crab-pots, bait/dip nets).

- Respondents who reported harvesting crabs by crab pots and dip nets reported significantly more crabs caught than those who reported using gill nets and shrimp trawls.
- Over half of the crabs harvested by RCGL holders were taken from waters associated with the ICW between the Cape Fear River and the Pamlico Sound. The proximity of this region to relatively large population centers (compared to the rest of the study region), may account for more recreational license holders utilizing this resource.
- A high percentage (22.2%) of RCGL holders reported that they did not use their licenses to attempt to harvest any type of fish or seafood.

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