

Division of Science, Research and Technology

Research Project Summary

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Survey of New Jersey's Blue Crab, *Callinectes sapidus*, Recreational Fishery, Year 1 - Delaware Bay

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Abstract

A summary of the New Jersey blue crab fishery in 1998 determined that estimates of harvest, effort, and the economic value from recreational crabbing did not exist for the state (Stehlik et al. 1998). Blue crabs are one of the most important commercial and recreational species in New Jersey and the need for more comprehensive data from the fisheries is vital to help management begin to assess the status of NJ's blue crab resource. Reliable, sound decisions can then be made to ensure the long-term stability of the resource.

The overall goal of the New Jersey Blue Crab Recreational Fishery Survey, a multi-year project, is to initiate the first-ever statewide program to sample the recreational blue crab fishery in NJ's portion of Delaware Bay and NJ's Atlantic coastal bays. This was accomplished for Delaware Bay in Year 1 through a randomized sampling methodology collected by telephone and intercept surveys focusing on the recreational blue crab fishery.

Introduction

Blue crabs are one of the most important commercial and recreational species in New Jersey. Despite the fact that Delaware Bay and New Jersey's coastal bays are near the northern range of the blue crab distribution (Williams 1984, Kahn 2003), New Jersey's commercial harvests have averaged 5.3 million pounds over the last several years with an annual dockside value of approximately \$5.7 million. The recent and substantial decline of the blue crab stock abundance, and consequently, harvest in Chesapeake Bay (Rugolo 1998, CBSAC 2004) has put an increased pressure on all of New Jersey's blue crab resources, particularly the Delaware Bay stock (Kahn 2003). Recent declines in the Delaware Bay blue crab landings and catch-per-unit-effort (Kahn 2003, Coakley 2004), and the overall lack of information on the status of blue crab populations from New Jersey's coastal bay populations (Barnegat Bay Estuary Program 2001) has prompted both interest and possible concerns about the status of New Jersey's blue crab resource. The need for more comprehensive data from the commercial and recreational fisheries, as well as from fishery independent surveys, is needed to help management begin to assess the status of New Jersey's blue crab resource. Reliable, sound decisions can then be made to ensure the long-term stability of the resource.

One essential component needed to help evaluate New Jersey's blue crab resource is to characterize the recreational fishery throughout the State. There is some information that the recreational harvest may be equal to or exceed that of the commercial fishery in New Jersey (Stehlik 1998). A poll of New Jersey residents in 1976 estimated that nearly one million people recreationally



fishery for blue crabs (Eagleton Institute of Politics 1977). That estimate does not include nonresidents that may significantly contribute to the recre-

ational harvest, particularly during the summer months along the coastal bays. In an attempt to begin measuring recreational effort, the New Jersey Division of Fish & Wildlife (DFW) required a recreational crabbing license, which allowed the licensee to set two commercial-style crab pots. The number of licensee's has steadily increased since its inception in 1985. However, despite the regulation, crab pots are often used without a license and DFW does not require a license for other popular crabbing devices such as collapsible traps, baited lines and dip nets.

A summary of the New Jersey blue crab fishery in 1998 determined that estimates of harvest, effort, and the economic value from recreational crabbing did not exist for the state (Stehlik et al. 1998). The research recommendations from the last two Delaware Bay Stock Assessment Reports have indicated the need for reliable estimates of harvest and effort in the recreational fishery, particularly in New Jersey, to provide a more comprehensive and robust stock assessment (Kahn 2003, Coakley 2004).



The overall goal of this multi-year project is to initiate the first-ever statewide program to sample the recreational blue crab fishery in New Jersey's portions of Delaware Bay and Atlantic coastal bays. The specific objectives for 2005 were to characterize the recreational fishery by the following:

1. Estimating the monthly fishing effort and harvest by gear within Delaware Bay, during the 2005 fishing season.
2. Characterizing the stock size structure by measurements taken at intercept surveys of harvested crabs.
3. Use the 2005 results to improve/modify future sampling program surveys throughout the state.

Methods and Data Analysis

The New Jersey Blue Crab Recreational Fishery Survey design combines a household telephone survey with an on-site intercept survey. The telephone survey gathers information from a large number of respondents in the general population. All callers were asked about their previous month of activity. The population covered was crabbing and non-crabbing households with telephones. Population not covered by the telephone survey was any households with no phones in the tri-county area and non-resident crabbers. The surveys were conducted on both weekdays and weekends, day and evening.

The intercept survey supplies detailed information from a smaller number of respondents from a targeted population (recreational crabbers). On-site intercept assignments were drawn from a list of predetermined sites and were weighted by day of the week and location activity, so weekends and a location with greater activity were drawn more often in order to draw assignments proportional to actual crabbing activity. Interviewers had a set of screening questions to determine eligibility, and if eligible, crabbers were asked a series of questions about their current crabbing trip and their crab catch was sampled.

Data obtained from the telephone survey were used to estimate the total number of marine recreational crabbing trips taken by residents of the tri-coastal area of Cape May, Cumberland and Salem Counties. The intercept survey

data was used to estimate the average recreational blue crab catch and harvest per trip, data that could not be reliably and efficiently collected by telephone. These data included blue crab identification, count, sex and carapace width. The intercept methodology consisted of dockside surveys of crabbers in Cape May, Cumberland and Salem Counties.

Together the surveys produce comprehensive estimates in both measurement content and population coverage for the tri-county area of Cumberland, Salem and Cape May. The geographic target for residents for both the telephone and intercept survey was the tri-county area of Cumberland, Salem and Cape May. A respondent was considered a non-resident if they were from any other New Jersey county or resided in another state.

Results and Conclusions

The telephone interview target of 2,250 was exceeded, with 2,273 interviews completed, with 103 crabbers interviewed. The fielding period for the telephone survey was June through November. Data collected included number of recreational crabbers, number of trips per month, harvest, gear type and crabbing locations. The data obtained from the telephone portion of the survey was used to estimate the total number of recreational crabbing trips by tri-county residents.



The intercept survey target of 850 intercepts, was reached, with 831 surveys completed. The fielding period for the surveys was May through October. Boaters made up 27% (230 interviews), with the rest crabbing on land (601). Over 3,200 individual length and sex measurements were recorded. Data collected included number of crabs caught and harvested, number of trips taken, gear type, crab consumption and residency. The population covered was all recreational crabbers visiting the predetermined sites. Data from the intercept survey was used to estimate average catch & harvest per crabbing trip. The ratio of resident crabbers to non-resident crabbers interviewed at intercept locations was used to scale up the effort estimates for residents (from the telephone survey) to calculate the total recreational blue crabbing effort.

Due to limited sample sizes, several response categories

were collapsed. The final categories:

Gear Type – crab pot, collapsible trap, all others.

Mode – Land (pier, jetty, bank, beach) and Boat (private, rental).

Season – Early (May-June) Peak (July-August) Late (Sept-Oct).

Out of the tri-county residents, nearly 11,000 households or 9.4% of the tri-county population participated in crabbing in 2005. Cape May County residents participated the most, with 10.7%. Ninety percent of the households crabbed together, with an average of 2.3 crabbers per household. Average monthly participation was 3.5%, peaking in August at 8.7%.

Tri-county residents accounted for almost 40% of all crabbing activity taking place, residential participation peaked in Sept – Oct, accounting for almost 47% of all participants.

New Jersey residents accounted for nearly 82% of all crabbers interviewed, Pennsylvania was at 16%, with crabbers as far away as Colorado, Florida, Georgia and Minnesota interviewed. Non-resident participation peaked in August. The average number of crabbers each month, resident and non-resident was 24,000.

The tri-county residential effort was estimated at 65,000 trips per season, with Cumberland County accounting for 55% of all trips. Two-thirds of the activity occurred in July and August. Residents accounted for 44% of the effort. The overall effort was estimated to be a total of 202,000 recreational crabbing trips.

The recreational catch estimates are as follows - 4.17 million crabs were caught, 66% of them in July and August, with an average of 19 crabs caught per trip. Boat mode was more productive than the shore, 23 crabs vs. 17 crabs respectively. Catch by gear type is as follows – 40% collapsible traps, 8% pots, all others 52%.

The recreational harvest estimates are as follows – 1.92 million crabs harvested, which is equivalent to over 20% of the New Jersey commercial harvest in Delaware Bay during the same time period. This ratio of recreational to commercial blue crab harvest in New Jersey is much higher than an estimate developed from a survey conducted in the mid 1990's by the Delaware Division of Fish and Wildlife for the Delaware blue crab fishery. This survey estimated recreational harvest was equivalent to only 1.5% of the commercial harvest. The average harvest per trip was 9 crabs, with boat mode accounting for 74% of the harvest.

The intercept surveys also collected consumption information. Less than 5% of respondents said they would not consume any of their catch. Almost 30% said they would eat between six and ten crabs at their next meal. Six percent eat crabs once a week, and 43% eat them less than once a month.

Interviewers recorded biological data for over 3,200 crabs. Nearly 75% of the harvest was comprised of males, with a harvest sex ratio of 2.93:1 males to females (commercial harvest has about the same ratio). Almost 80% of the female harvest was mature. The average size of female harvest was 139mm (5.5 inches),

mature male size 142mm (5.3 inches). These sizes are consistent with the average size of harvestable sized crabs in the fishery-independent New Jersey Delaware Bay trawl survey.

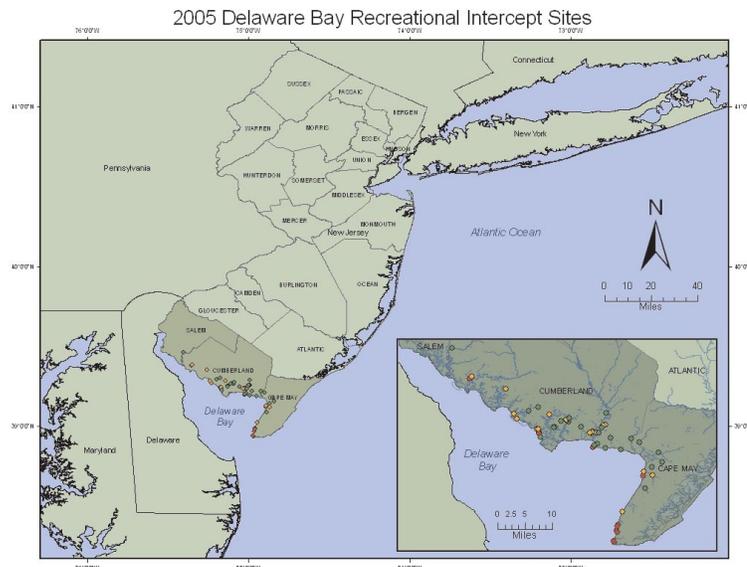
The estimates of recreational crabbing effort, catch and harvest by residents and non-residents in the New Jersey portion of the Delaware Bay have

an immediate application to the joint New Jersey and Delaware blue crab stock assessment for the Delaware Bay resource. The results from this survey determined that recreational harvest has been severely underestimated in past stock assessments, which has produced underestimates of stock size for the blue crab resource. With this new information, a much more robust and informative stock assessment can be developed. The survey also indicates that continued monitoring and sampling of the recreational fishery may be warranted to track the annual changes in recreational effort and harvest.

Year 2 of this study will be conducted in the southern Atlantic Coastal region of New Jersey.

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