

Great Bay Blue Claw Crab Study,  
Diamondback Terrapin Interaction With Commercial Crab Pots.

TITLE: Test Of A Turtle Exclusion Device  
In Commercial Crab Pots

PREPARED FOR: N.J. Div. of Fish, Game and Wildlife  
Bureau of Marine Fisheries  
Nacote Creek Research Station  
P.O. Box 418 Port Republic, NJ 08241

BY: Anthony D Mazzaella  
Nacote Creek Research Station  
Technician 1

Test Of A Turtle Exclusion Device In Commercial Crab Pots

ABSTRACT

Tests were conducted to determine if a simple five by ten centimeter rectangular wire exclusion device, wired into the funnels of commercial crab pots, would adversely affect the catch of blue claw crabs (Callinectes sapidus), while prohibiting the entrance of diamondback terrapin (Malaclemys terrapin). Twenty Maryland style vinyl coated commercial crab pots were fished in New Jersey's Great Bay estuarine system for 116 days, from July 6, 1993 to August 31, 1993 and May 1, 1994 to June 30, 1994. Ten pots were modified with exclusion devices on each of the four funnels and ten pots were fished with no funnel modification. Pots were set in an alternating pattern and fished in conjunction with other commercial gear to mimic the commercial fishery as closely as possible. Pots were tended daily. All catch was measured and recorded.

A total of 22,981 crabs was sampled for the entire study period. In 1993, 6139 crabs were caught in modified pots with a mean size of 13.2 cm. No turtles were caught in modified pots. Un-modified pots caught 5288 crabs with a mean size of 13.3 cm. Three terrapins were caught. In 1994, 5703 crabs were caught in modified pots with a mean size of 12.3 cm. Three terrapins were caught. Un-modified pots caught 5851 crabs with a mean size of 12.2 cm. Thirty-seven terrapins were caught. The number of crabs caught in excluder modified pots and un-modified pots were comparable. Statistical analysis of length frequency distribution from modified and un-modified pots yielded no significant difference in size of crabs captured ( $\alpha = .05$ ) Terrapin exclusion

devices also reduced terrapin by-catch mortality.

#### INTRODUCTION

The diamondback terrapin (Malaclemys terrapin) is a species of turtle which occupies coastal brackish water habitats, with a geographic distribution on the eastern seaboard from southern New England to Mexico. Terrapin populations are impacted by predation, reduction of habitat, vehicular mortality, and drowning in commercial crab pots. Diamondback terrapin mortality resulting from commercial blue claw crab (Callinectes sapidus) by-catch has prompted research to determine if a simple 5cm by 10cm wire rectangular excluder device, designed by Dr. Roger Wood of the Wetlands Institute, would adversely affect crab catch while prohibiting or reducing by-catch of diamondback terrapins.

#### METHODS

On July 6, 1993 twenty commercial Maryland style vinyl coated crab pots were set in the Great Bay estuarine system, for a period of fifty five days. Ten commercial pots were equipped with 5cm by 10cm wire excluder devices wired into the inside of each of the four pot entrance funnels. Ten pots were not modified with excluders and fished as controls. Pots were outfitted with a float line and identification float. Pots were bottom weighted with a two foot square piece of three eighths inch diameter reinforcing rod bar to prevent movement and turn over (Fig. 1).

In 1993 pots were fished in two locations. During July pots were fished in Great Bay, at the mouth of Motts Creek, Oyster Creek, and Landing Creek (Region 1). During August the pots were fished at the mouth of Nacote Creek, in the Mullica River (Region 2) (Fig.2). The pots were set in an alternating pattern to mini-

mize catch variability due to location and were fished amid other pots set by commercial crab fishermen. Every effort possible was made to mimic the commercial fishery.

On April 30, 1994 ten excluder and ten control pots were reset for a sixty one day period. Pots were fished in a manner similar to 1993 sampling. In May pots were fished in Great Bay between the mouth of Motts Creek and Oyster Creek (Region 3). In June pots were moved to the mouth of Motts Creek, Oyster Creek and Landing Creek along the bay shore approximately twenty five yards from the marsh banks (Region 4) (Fig.2).

Pots were checked daily and baited with a single Atlantic menhaden (Brevoortia tyrannus). All blue claw crabs and terrapin were measured and sexed. Crab lengths were point to point carapace measurements. Terrapin were measured from the bottom of the plastron to the top of the carapace for carapace height, carapace width was taken at the widest point across the carapace. All other by-catch was recorded. All drowned terrapins were dissected for fecundity. Differences between length frequency distributions of excluder and control pot crab catches was tested using Kolmogorov-Smirnov two tailed test for large samples. Length frequency distributions of harvestable crabs (12cm+) were also tested. A length frequency graph was plotted to show frequency between the crabs caught in excluder and control pots (Fig.3).

#### RESULTS

A total of 22,981 crabs was sampled during the study period. Excluder pots caught 11,842 crabs with a mean size of 12.7 cm (SD= 1.4) Control pots caught 11,139 crabs with a mean of 12.7 cm (SD=1.4)(Fig.4). A by-catch of three terrapin with a mean

carapace width of 8.4 cm and carapace height of 4.5 cm were caught in excluder pots. Control pots caught 40 terrapin with a mean carapace width of 10.4 cm and carapace height of 5.5 cm. All terrapin caught in excluder pots were males. Sixteen female, terrapin and twenty four male terrapin were caught in control pots. Eighty percent of the female terrapin dissected were gravid.

Numbers of blue claw crabs caught in excluder pots and control pots were comparable. Kolmogorov-Smirnov tests revealed no significant difference between the populations. Excluder modified pots caught more crabs in three of the four regions tested.

#### DISCUSSION

The five by ten centimeter excluder device tested did not affect crab catch. Numbers of crabs and sizes of crabs captured showed the excluder device will not affect blue claw crab harvest. Although the excluder device did not prohibit the capture of diamondback terrapins, the diamondback terrapin is greatly reduced as by-catch in the excluder crab pots. The device tested appears to be a simple solution to the problem of terrapin mortality in crab pots. Although the numbers of terrapin drowning in commercial crab pots in New Jersey is unknown, terrapin by-catch is a concern due to the growing number of commercial pots fished. Commercial crab pots are not only fished in New Jersey waters by commercial crabbers, but recreational crabbers are permitted to crab with two commercial style pots with a recreational crabbing license. Regulations will be reviewed before the next crabbing season to determine the feasibility and effectiveness of requir-

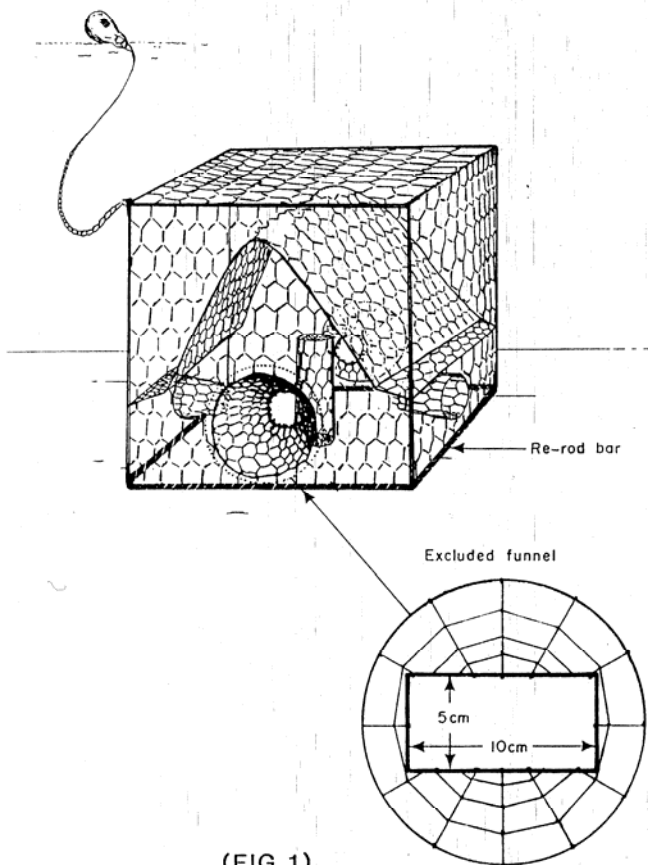
ing turtle excluders in commercial crab pots.

#### ACKNOWLEDGMENTS

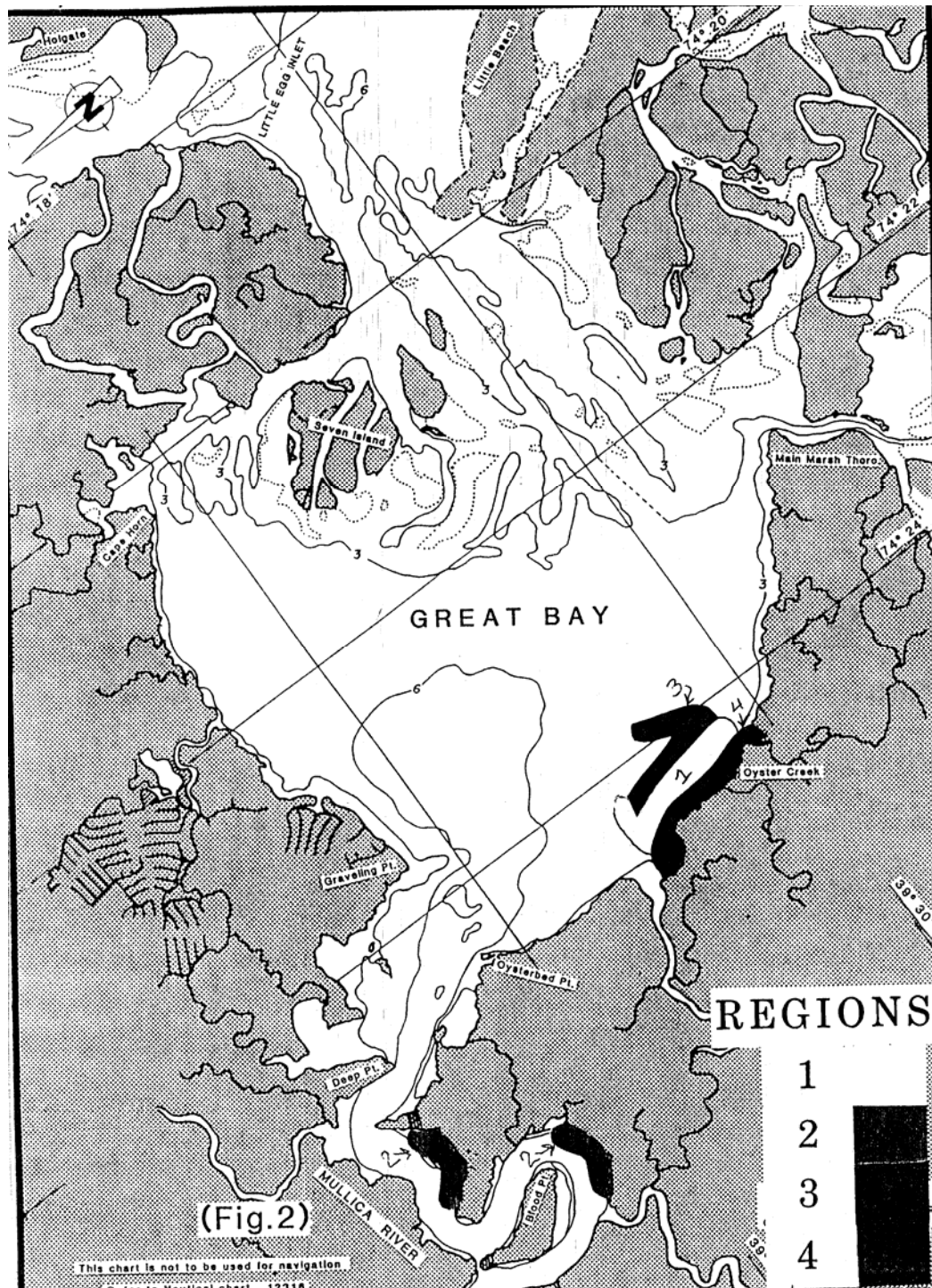
The author thanks the ~~U.S. Fish and Wildlife Service~~, for the initial mini-grant to the ~~New Jersey Div. of Fish, Game and Wildlife~~ to develop a device to reduce terrapin by-catch in commercial crab pots.

I am grateful to the Nacote Creek Research Station Staff, Dr. Roger Wood, and Rodney Goodson for the initial undertaking of this study. Special thanks to ~~Paul Scarlett and Peter Himchak~~ for reviewing this paper.

# TEST OF A TURTLE EXCLUSION DEVICE



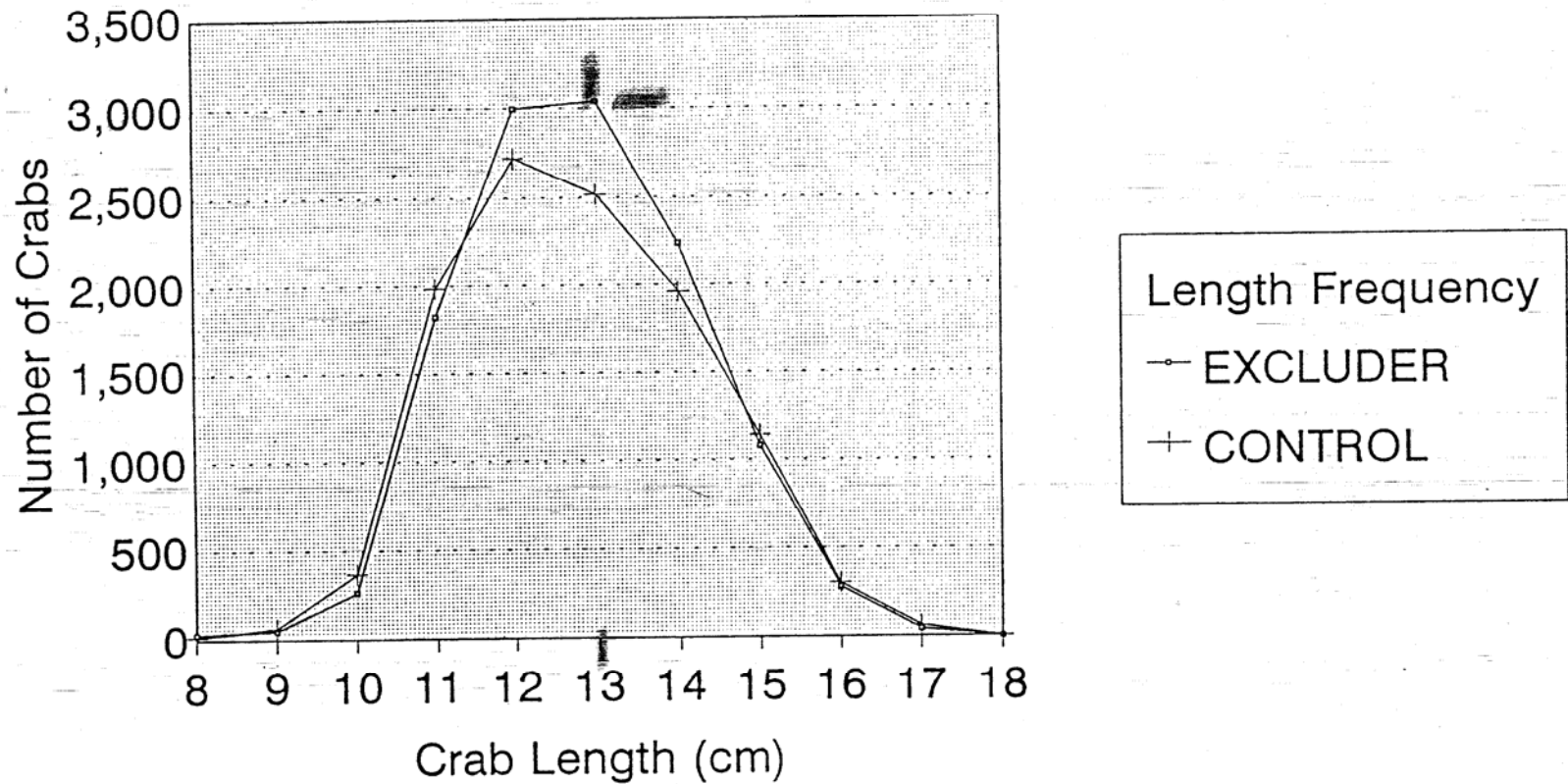
(FIG. 1)



(Fig. 2)

# TOTAL CRAB FREQUENCY

Excluder Pots vs Control Pots



(Fig.3)

# TOTAL CRAB CATCH

## Excluder Pots vs Control Pots

CRAB LENGTH (cm)	EXCLUDER	CONTROL
8 3.1"	32	15
9 3.5"	48	65
10 3.9"	263	368
11 4.3"	1824	1985
12 4.7"	2997	2719
13 5.1"	3039	2515
14 5.5"	2237	1962
15 5.9"	1080	1142
16 6.3"	281	304
17 6.7"	41	62
18 7.1"	0	2
TOTAL CRABS	11842	11139
MEAN SIZE	12.7(cm)	12.7(cm)
SD	1.4	1.4

(Fig.4)