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Trap Contributions to Losses in the American Lobster Fishery

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by
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INTRODUCTION

Studies to evaluate the impact of unbuoyed traps on lobster (Homarus americanus) survival were conducted in Maine waters from July 1971 to June 1973.

MATERIALS

On July 22, 1971, 98 tagged lobsters of various legal and illegal sizes and both sexes were placed in 35 unbaited conventional square traps, with 30 mm lath spacing, without buoy lines, on the sea bottom near Jonesport, Maine, in depths ranging from about 10 to 20 meters. On July 29, 1971, four tagged lobsters were added to one trap from which the previous occupants had escaped by July 24.

The 84 m^2 study area site, considered by fishermen not to be a good lobster habitat, having a muddy bottom and no rocks which could be utilized as cover, was purposely selected because its use would not interfere with commercial fishing and traps would be protected from storm damage.

METHODS

Traps were checked on ~~ten~~ nine occasions before October 15, 1971, by scuba diving. When traps were checked by diving, it was possible to count the lobsters and observe evidence of cannibalism, but tagged lobsters could not readily be distinguished from others that entered the traps. In order to differentiate tagged from untagged lobsters, all traps were brought to the surface for more thorough examination. This practice was commenced on October 15, 1971, and continued throughout the remaining period of the study.

Traps were retrieved 16 times between October 15, 1971, and June 26, 1973, making a total of 26 checks during the investigation. The length of time between observations of the two-year period ranged from 1 to 161 days, with a median interval of 13 days and a mean of 28 days. Observations were curtailed during the low temperature months because of the inactivity of lobsters in relatively shallow water.

RESULTS

During the first summer-fall season, 43 percent of the tagged lobsters cannot be accounted for; 25 percent remained captive; 20 percent escaped and were recaptured; and 12 percent were cannibalized. During the second summer-fall season, 126 percent recruitment occurred; 22 percent cannot be accounted for; 18 percent of both tagged and recruited lobsters were cannibalized; 55 percent remained in the traps; and 5 percent of tagged lobsters escaped and were recaptured. (Table 1).

A minimum 67 "wild" lobsters were recruited by the traps, of which 24 still remained captive when the study was terminated. Two tagged lobsters that departed their original traps entered other experimental traps which they in turn left before entering two of the commercial traps surrounding the study site. A tagged male lobster missing from trap #6 was caught in a commercial trap 0.4 km from the study area on April 28, 1973, after having remained in trap #6 for 22 months and having moulted once in October 1971 from sublegal to legal size. Four traps failed to recruit any lobsters, 9 recruited one each, 13 two each, 6 three each, 2 four each, and one recruited six. Only five traps recruited more lobsters than were initially placed in them; while six recruited a like number.

DISCUSSION

In the three most recent years, gross fishing effort in the Maine lobster fishery has, perhaps temporarily, stabilized at approximately one and one-quarter million traps, a 67 percent increase over the three-quarter million level of the preceding twelve-year period.

Annual loss of traps has varied markedly since the mid-1940's. In major late summer-fall storm years, fishermen have reported losses of up to 100 percent in many fishing areas; at other times in other areas less than 10 percent. An average annual loss of 20 to 25 percent has been estimated from interviews with fishermen and counts made by departmental scientific and enforcement personnel of traps stranded intertidally by storms. This estimate would indicate that about 200,000 traps have been lost annually during the past decade from storms, accidents, or vandalism, with each trap containing an average of 3.1 lobsters (Dow 1961). Storm-lost traps are the most consistently damaged and when they are washed ashore usually contain dead lobsters.

Cannibalism occurs principally from July to early November, coincident with the greatest concentration of traps, fishermen, and catch. Within this period, 70 to 75 percent of the annual catch is made, which for the last thirty years has averaged 9,000 metric tons, consisting of approximately 18 million lobsters. Previous studies (Dow 1961, 1966) also demonstrated a 2 1/2-fold increase in the total number of lobsters entering traps of the summer-fall fishery in comparison with the winter and spring fisheries.

During the two-year period of this investigation, in which only 12 percent of the traps used were sufficiently damaged by lobster chelipeds to permit escape, the annual Maine lobster catch was 7,670 metric tons,

consisting of 14.2 million lobsters caught in 1 1/4 million traps. Between July and November when the peak of cannibalism occurs, 77 percent of the annual catch was made and consisted of 10.9 million lobsters.

CONCLUSIONS

1. Unbaited, unbuoyed traps continue to catch lobsters for an indefinite time, with most of the catch being made between June and September.
2. Restrictive lath spacing prevents some lobsters from trap escapement.
2. Cannibalism occurs during the summer and fall coincident with moult.
3. Approximately one-third or more of all lobsters in or entering unbuoyed traps will be lost to the fishery from cannibalism or retention.

REFERENCES

Dow, R. L. 1961. "Some factors influencing Maine lobster landings." Commercial Fisheries Review, Vol. 23, No. 9.

Dow, R. L. 1966. "Limitations on measurement of effort-yield in the Maine lobster fishery." Fishing News International, August.

Table 1 — 1971

Trap #	7/22	7/23	7/24	7/27	7/29	8/1	8/2	8/9	8/25	9/21	10/15	2/15	7/25	8/25	9/12	9/18
1	2	2	2	2	2	2	2	2	1	1	0	0	1	1	0	0
2	2	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
3	2	2	2	2	2	2	2	2	2	2	1x	1x	1x	1x	2x	2x
4	4	4	4	4	4	4	4	2	2	2	2*	1x	1x	1x	1x	1x
5	4	4	3	2	2	3	2	1	1	2	0	0	0	0	0	0
6	4	4	3	3	3	2	2	2	1	1	1x	1x	2x	3x	3x	2x
7	2	2	2	2	2	2	2	2	2	2	2*	1x	2x	2x	2x	2x
8	2	2	2	2	2	2	2	2	1	1	1x	1	2	2	3	3
9	2	2	1	1	1	1	1	1	1	1	1x	1x	1x	2x	0	1c
10	4	4	4	3	2	0	0	0	0	1	1	0	1	1	0	0
11	4	4	4	3	2	2	2	2	1	1	1x	1x	1x	2xc	0	1c
12	4	4	4	3	3	3	3	3	3	1	1x	0	1	1	1	1
13	2	2	2	2	2	2	2	2	2	2	2*	1x	1x	0	0	0
14	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
15	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0
16	4	-	0	0	0	0	0	0	0	0	0	0	1	1	2	2
17	4	4	4	4	4	4	5	5	3	2	2*	1x	0	1	1	1
18	0	0	0	0	4#	4	4	3	2	1	0		1	3	2	3
19	2	2	2	2	2	2	2	2	1	1	1x	1x	2x	1x	2x	3c
20	2	2	2	2	2	1	1	1	1	0	0	0	0	1	1	1
21	2	2	2	2	2	2	2	1	1	1	1x	1x	2	2x	3x	1
22	4	4	4	2	2	2	2	2	2	1	1x	1x	0	1	0	0
23	4	4	4	4	1	1	1	1	1	2	1x	1x	0	1	1	1
24	4	4	4	4	3	4	3	3	3	0	0	0	0	1	0	0
25	2	2	2	1	1	1	1	1	1	1	1x	1x	1x	2	1	2
26	2	-	-	1	1	1	1	1	1	0	0	0	0	2	2	3
27	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0
28	4	-	-	3	3	3	3	2	2	2	1x	1x	1x	1x	1x	1x
29	4	4	4	4	4	4	4	4	2	2	2*	1x	1x	1x	1x	3c
30	2	2	2	2	2	2	2	2	2	2	1x	1x	1x	1x	1x	1x
31	2	-	-	4	4	4	4	3	2	1	1x	0	0	0	0	0
32	2	2	2	2	2	2	2	2	1	1	1x	1x	1x	1x	1x	1x
33	2	2	2	2	2	2	2	1	0	0	0	0	1	0	0	0
34	4	-	-	3	3	3	3	3	1	0	0	0	0	0	0	0
35	4	4	4	4	3	3	3	4	2	4	2x	1x	1x	1x	1x	1x
Total Lobsters	98			80	77	75	74	66	47	40	29	19	28	38	33	38
Total Tagged	98										26	18	14	13	11	8
Cannibalized				1971 Cumulative Total						12				1		4

- 4 lobsters added on 7/29/71

* - 2 tagged lobsters

x - 1 tagged lobster

c - 1 lobster cannibalized