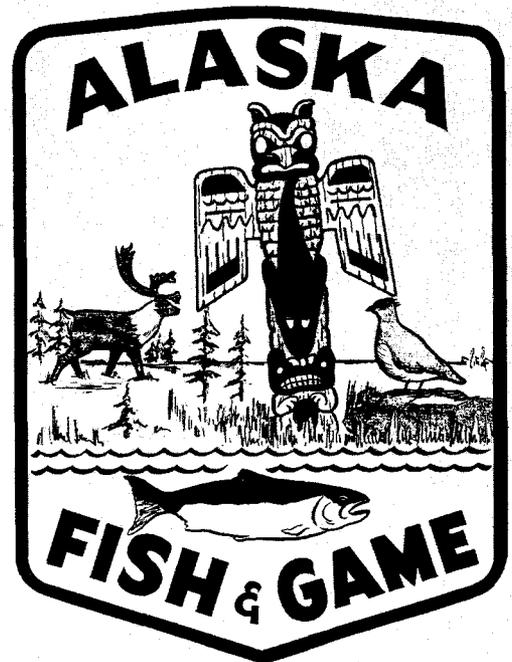


Informational Leaflet 22

FINAL REPORT - LOSS OF ISTHMUS TAGS FROM KING CRAB Paralithodes camtschatica (Tilesius)

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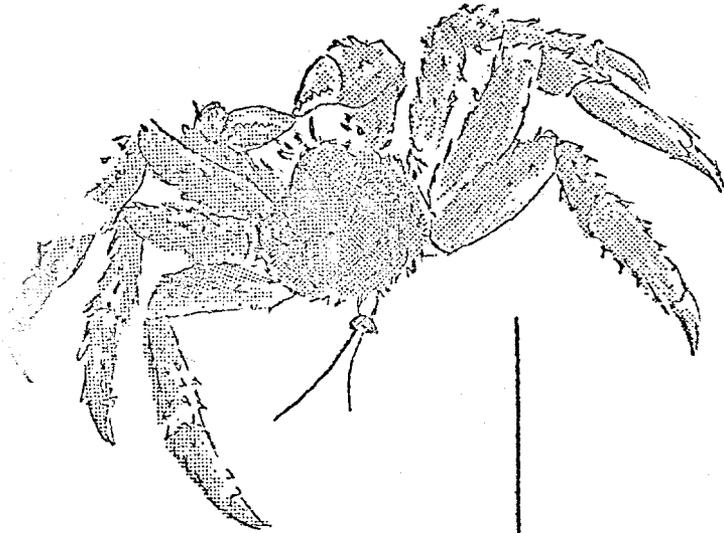
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22

FINAL REPORT



LOSS OF
ISTHMUS TAGS
FROM

**KING
CRABS**

Paralithodes camtschatica (Tilesius)

DU

GEORGE W. GRAY, JR.

In the past ten years, the king crab industry of Alaska has experienced phenomenal growth. Production from one area alone, Alitak Bay - Kodiak Island, exceeded one million pounds during July of 1962. A year round fishery of this magnitude is a major facet of the economy of the areas involved.

Successful management of this rapidly expanding king crab fishery on a sustainable yield basis requires accurate knowledge of the animals' growth, migration patterns, mortality, distribution, and the rate of commercial harvest. Since 1954, large numbers of king crabs have been tagged in an effort to obtain this information. However, the value of the data collected by tagging crabs has been seriously impaired by the lack of accurate estimates of the number of tags lost.

The standard method of marking king crabs utilizes a plastic, spaghetti loop tag (Huizer 1954). A curved needle is used to thread the tag through the isthmus, which is a band of fleshy tissue connecting the median ventral surface of the carapace and abdomen (Figure 1). The thin chitinous membrane surrounding the isthmus, in contrast to the other hard parts of king crabs, sloughs off and allows the crab to molt successfully and still retain the tag. Other tags, such as carapace darts, are shed with the exoskeleton and may cause mortality by imprisoning the molting crab in the old exoskeleton.

The information available about the rate of loss of plastic loop tags is confusing and contradictory. During March, April, and May of 1954, Huizer observed 2 males and 25 females tagged with isthmus loop tags. Seven females lost their tags. Huizer stated that "no tag loss was attributed to the molting process", and blamed the loss on "over-crowding and wire construction of the live boxes, rough water during storms and frequent extended trips to the crabbing grounds which left the live boxes unattended".

In 1958 and 1959, Bright, Durham, and Knudsen¹ recovered 22 crabs tagged in 1957 which had lost their tags. They "believed that the number is higher because close examination is required to detect the scar indicating tagging".

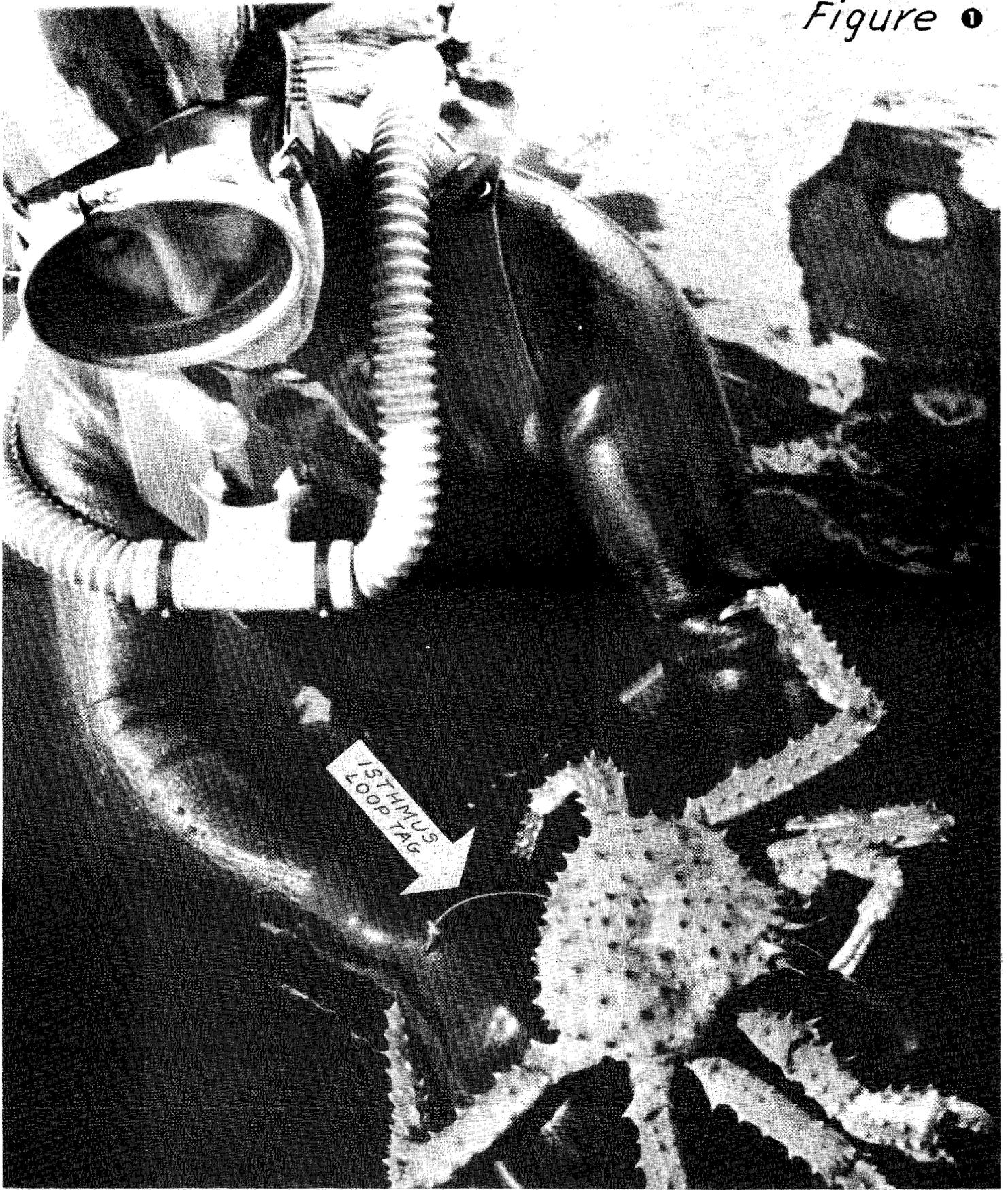
Powell (1960) observed 50 tagged male king crabs in sunken pens. In a 170 day trial, 49 of the 50 crabs molted with an isthmus loop tag loss of 38%. Powell concluded that "the high percent of "open" scars may suggest a high tag loss during times of molting".²

Hayes, during a 1961 experiment, held 2,886 crabs in live boxes for 1 to 3 days after tagging and found no initial tag loss. However, his work was not done during crab ecdysis.

¹ Bright, Donald B., Floyd E. Durham, and Jens W. Knudsen. 1960. King crab investigations of Cook Inlet, Alaska. Dept. of Biol., Univ. Southern Calif., Los Angeles, 180 pp. (Mimeo).

² Powell, Guy C. 1960. King crab research activities, Typewritten report, Alaska Department of Fish and Game, Juneau, Alaska.

Figure 1



SCUBA DIVER EXAMINES TAG AND CRAB CONDITION

The present experiment was designed to clarify earlier study results, and to evaluate tag retention resulting from the use of new and more flexible plastics.

Experimental Procedures

In this experiment, a tank 60 x 10 x 10 feet was used to hold tagged crabs. The tank was partitioned with shiplap into 6 sections, each 10 x 10 x 10 feet. Each section received a continuous supply of fresh sea water from 2 pipes located 6" from the bottom and running the full length of the tank.

On April 13, 1962, 60 mature female king crabs were placed in each section after being tagged with isthmus loop tags. Two days later 15 additional female king crabs were tagged with carapace dart tags and placed in each section. At this time, 3 sublegal (under 6-1/2" in width) new shelled males were also placed in each section giving a total density of 78 crabs/section.

Carapace length of female king crabs used in this study ranged from 105 to 170 millimeters. Crabs were randomly placed in sections to avoid biasing tag loss in any section by crab size. Handling was kept to a minimum by tagging crabs immediately after they emerged from the capture vessel live tank. The maximum time crabs were out of water was approximately 10 minutes.

To determine tag loss, each section was checked by SCUBA divers approximately once every 4 days. All shed exoskeletons, and dead crabs were removed. New shelled crabs were brought to the surface and the tag number recorded.

The crabs were fed throughout the experiment with each section receiving approximately 15 pounds of frozen fish per week. Divers were able to observe when most of the food was consumed and hence control the frequency of feeding.

Results

Of 360 mature female crabs tagged with isthmus loops and held 57 days, 261 molted. Only one crab lost its tag. The scar in the isthmus was of the "open" type, indicating the tag had been torn out. This tag may have been ripped out during a complete check of the sections by divers, when crabs were confined in small wire live boxes.

Several factors may have caused the difference in results between earlier experiments and the present study. Huizer and Powell both used wire live boxes. Tags will hang up in wire and by struggling the crab is likely to tear the tag loose. The "open" wound mentioned by Powell would be attributed to this type of loss. Another factor is the flexibility of the "spaghetti". Stiff plastic tubing pulls out more easily than soft, flexible tubing. Huizer used very stiff plastic. Bright, Durham, and Knudsen did their work during the formative years of king crab tagging and probably used a stiffer plastic than is employed today.

The results of this experiment indicate that with proper methods and materials the loss of isthmus tags immediately prior to, during, and following ecdysis is negligible.

Literature Cited

- Hayes, Murray L. 1961. King crab tagging methods in Alaska. North Atlantic Fish Marking Symposium, contribution. No. 42.
- Huizer, E. 1954. King crab (*Paralithodes camtschatica*) investigation report. Alaska Department of Fish and Game, Annual Report 1954. Pp. 34-43.

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