

# Informational Leaflet 26

## COMPLETION REPORT - GROWTH OF MATURE FEMALE KING CRAB Paralithodes camtschatica (Tilesius)

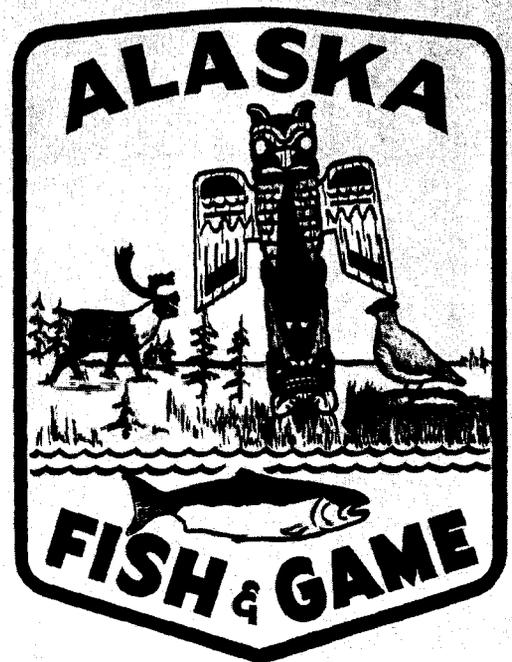
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Kodiak, Alaska

April 9, 1963

STATE OF ALASKA  
WILLIAM A. EGAN - GOVERNOR

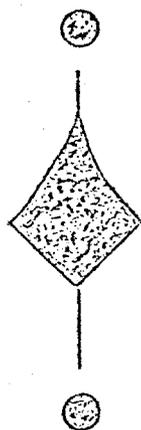
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# Informational Leaflet #26

ALASKA DEPARTMENT OF FISH AND GAME  
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## Completion Report



# GROWTH OF MATURE FEMALE KING CRAB

Paralithodes camtschatica (Tilesius)

by GEORGE W. GRAY Jr.  
Division of Biological Research

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## GROWTH OF MATURE FEMALE KING CRABS

### *Paralithodes camtschatica* (Tilesius)

Female king crabs are not harvested commercially and hence have received only limited biological attention. This study was undertaken to determine female growth without a large scale, expensive tagging program as used in obtaining male growth.

Preliminary studies using penned males showed retarded growth and hence proved unsatisfactory. The extended period of holding required to allow males to molt was probably the major contributing factor in retarding male growth. Female king crabs may be harvested from shallow waters just prior to molting which avoids the long period of captivity leading to excessive retarded growth (Powell, 1960).

In this experiment, only sexually mature female king crabs were used. At sexual maturity, females range in size from 95-113 mm in length. The size of the crabs used in this study was from 105 mm to 170 mm in length.

For holding the crabs, a tank 60' x 10' x 10' was divided into six sections, each 10' x 10' x 10'. This tank received a continuous supply of fresh sea water from two pipes located six inches from the bottom and running the full length of the tank.

The crabs were measured and tagged with an isthmus loop tag as they emerged from the capture vessel live tank. The measurement used was the carapace length measurement. This measurement was taken from the posterior exoskeletal margin of the right eye orbit to the posterior mid-lateral margin of the carapace. These areas are heavily calcified and are not easily depressed by the caliper jaws. In contrast, width measurements tend to fluctuate with the pressure applied to the caliper jaws and aren't reliable.

In this study, female growth ranged from a high of 9 mm in a crab that was 108 mm before molting to a low of 0 mm in a crab 148 mm before molting, (Figure 1). Growth by 10 mm size groups showed a progressive decline from 6.2 mm in the 100-109 mm size group to 1.9 mm in the 150-159 mm size group (Table 1). Average growth for all groups was 3.9 mm.

The results of this experiment compare favorably with studies done by other workers. Sakuda (1958) observed nine mature females molting in captivity. Growth of these crabs ranged from 2 mm to 6 mm with an average growth of 4 mm.

In 1960, Powell analyzed data from several small female tagging programs. His data showed a similar progressive decline in growth. However, his material indicated that growth of the 150-159 mm size group was 2.7 mm or almost a whole millimeter more than the same size group in the present study.

Only Bright, Durham, and Knudsen's work (1960) indicate radically different results. Average growth of females they observed was 5 mm or a full millimeter larger than the results obtained by other workers. However, Bright et al. dis-

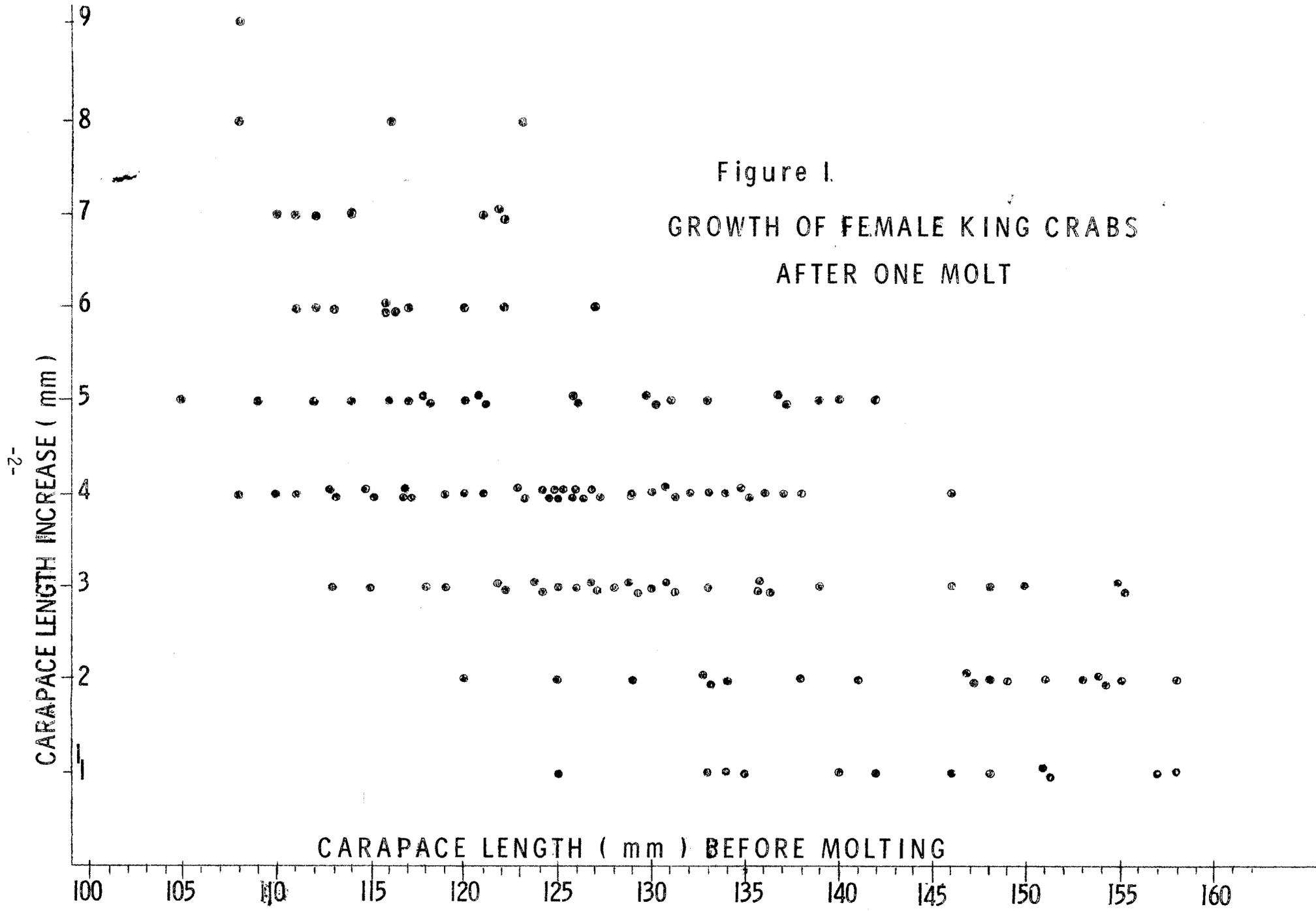


Table 1. Female king crab growth increments by 10 mm size groups.

Size Group	Number of Crabs	Average Size Before Molting (mm)	Growth (mm)	Average Size After Molting (mm)	% of Increase
100-109	5	107.6	6.2	113.8	5.8%
110-119	32	114.7	5.0	119.7	4.4%
120-129	42	124.4	4.1	128.5	3.3%
130-139	33	134.0	3.5	137.5	2.6%
140-149	15	145.2	2.5	147.7	1.7%
150-159	13	154.0	1.9	155.9	1.2%
ALL GROUPS	140	127.5	3.9	131.4	3.1%

carded 25 growth measurements under 3 mm as measurement error and state "there is some doubt that all of the above measurements omitted as bias are actually due to measurement error". By discarding all measurements under 3 mm, Bright, Durham, and Knudsen probably distorted the growth curve making it appear higher than it actually is. They also felt that "the annual increment decreases with increasing size until the crab reaches approximately 130 mm, and thereafter the increase per year is slight, but relatively constant". Work done by other observers and the present study indicate that growth is still progressively decreasing to the 150-159 mm size group and may continue to decrease beyond this point.

Two factors may have caused the differences in results between the present study and Bright, Durham, and Knudsen's and Powell's work. All these observers mentioned that measurement error was present due to the use of crude calipers. Female growth is slight, particularly in the larger size groups, and an error in measuring of 1 or 2 mm could grossly influence the results. Another factor was the artificial conditions of the present study. Some decrease in growth may have occurred in the pens thus making Powell's growth per size group closer to correct.

The results of this experiment indicate that female king crab growth decreases very rapidly after sexual maturity is reached. Analysis of the data by 10 mm size groups shows this decrease to be progressive in nature.

## LITERATURE CITED

- Bright, Donald B., Floyd E. Durham, and Jens W. Knudsen. 1960. King crab investigations of Cook Inlet, Alaska. Department of Biology, Allan Hancock Foundation, University of Southern California at Los Angeles, 180 pp.
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- Sakuda, Henry M. 1958. Observations of molting female king crabs (*Paralithodes camtschatica*). U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries No. 274, 5 pp.

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