

The pink salmon, as shown in Figure 21, were recovered west of the point of tagging in every case. The percentage recovery (0.6%, Table 13) was extremely low, and difficult to explain since there is no question that all were mature. It should be emphasized that 1957 was a poor year for pinks in American areas and apparently a good year in Asian areas. In years when American streams are productive, the tagging may well show a different picture. During 1956, for instance, pinks were scarce in the high seas areas found productive in 1957. Apparently no appreciable numbers of either Asian or American pinks were present that year.

Six kings from the 1955 tagging were recovered in 1957. Thus, of the 270 kings tagged in the Swiftsure area in May and June of 1955, the following recoveries were subsequently made.

Year	Number of Fish	Percentage
1955	28	10.4
1956	13	5.4
1957	6	2.6

These data speak well of the probability that tags will remain on salmon at sea. The recovery percentages for 1956 and 1957 are corrected only for the numbers previously recovered, and therefore are minimums, since an unknown number also would be expected to leave the fishery each year for spawning.

KING CRAB INVESTIGATIONS

During 1957 the king crab investigators have emphasized the field phases of the study, the major part aboard the *Mitkof*, which operated in the Bering Sea from mid-May to mid-September. The observers have followed the operational plan which was presented in April, 1957.

Trend of Fishery

The king crab fishery in the Bering Sea encountered an abundance of crabs in the past year. Preliminary reports indicate that the fishermen found crabs in greater numbers than were encountered in the preceding few years for which we have records. Following the relatively poor fishing of 1956, the increased success of fishing in 1957 is particularly noteworthy. We are certain that the improvement in fishing is real, but it is not known whether more crabs are present or whether they are simply more available to the fishery.

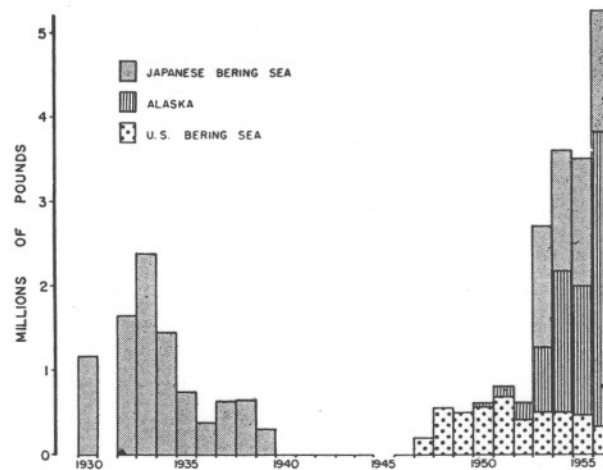


Fig. 22. King crab production in Alaska and the eastern Bering Sea.

The catch of king crabs from the Bering Sea has remained practically constant for the past several years; however, this is to be expected since the bulk of the catch is taken by the Japanese mothership fishery which has operated under a fixed catch quota of approximately 59,850 cases of canned crab. The mothership operates only long enough to make this catch. The 1957 season was particularly short since fishing was excellent. Figure 22 shows the Bering Sea and total Alaska king crab production, in pounds of finished product. The statistics reflect the recent and continuing growth of the crab fishery as a whole.

Growth

The extent of the fishery which the Bering Sea king crabs can support is determined to a large degree by their rate of growth. Observations of tagged crabs provide evidence for determining the rate, although the nature of the crab's growth by moulting makes accurate results difficult at this early stage of observation. Therefore Figure 23 shows two growth rates: the maximum which would result if the crabs moulted annually, and the average, which is the result of combining the growth from tagged crabs with the observed percentages moulting for each size. This figure was constructed by adding to the smallest size for which growth had been observed (110 mm.), the calculated growth for each successive moult at the rate of once annually. In the case of average individual growth, the annual amount was decreased by the observed percentage of non-moulting crabs of that size. The "maximum growth rate" assumes an annual moult.

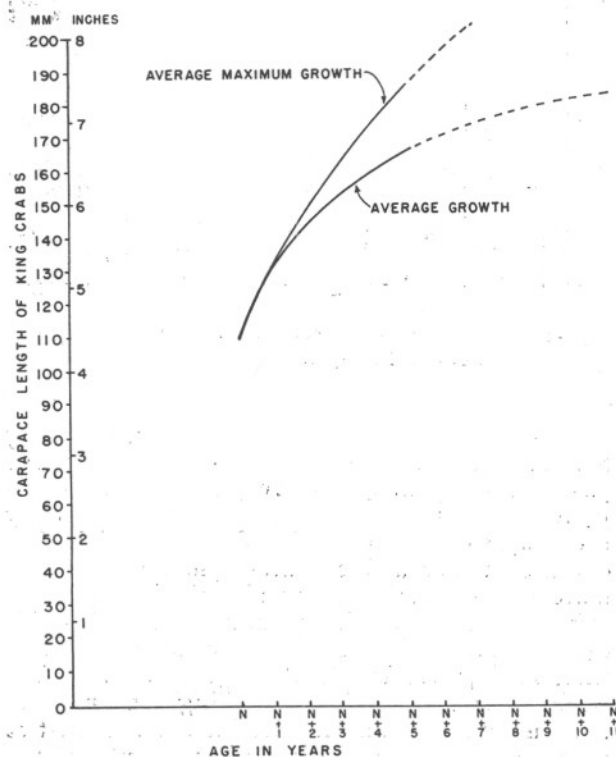


Fig. 23. Growth of Bering Sea king crabs from tags.

Figure 23 should not be regarded as a completely accurate depiction of growth rate; it is presented at this time as a demonstration of a method being used and our progress with it. We have as yet too few recoveries showing growth to allow us to establish firmly the amount of increase at shedding, especially for the smaller and larger sizes. We also suspect that the frequency of moulting and therefore growth may not be the same every year. Data are needed also for sizes smaller than 100 millimeters if the total age is to be established. We have begun to accumulate information for the small crabs.

Abundance

During July the *Mitkof* occupied a series of 77 fishing stations (Figure 24) to attempt to estimate the number of king crabs of commercial size in the eastern Bering Sea. The pattern covered the ground inhabited by these crabs quite well with the possible exception of the area off Unimak Pass which is too rough to trawl. At each station the observers recorded the number, sex, and size of crabs caught. From calculations to determine the density of crabs per unit area, it was estimated that the number of crabs more than 135 mm. in carapace length (6½ inches in width) was 19,186,824. Of this number, about 17.7 million were more than 6½ inches wide, and 12.25 million were more than 7. Although other factors will be considered in a final count, it is not likely, however, that the general magnitude of the estimate will be changed, as the estimate is probably of a minimal nature, since it is based upon the assumption that the trawl caught all of the crabs in its path. Further, by the time the survey was made, a 1957 catch in excess of 1,000,000 large crabs had already been taken.

These estimates agree generally with the rate of tag recovery from the fishery. Approximately 5% of the tags released in 1956 have been recovered by the 1957 fishery.

Tagging

Table 15 gives the numbers of tags released and recovered in 1957. The release of tags for the current year has been completed.

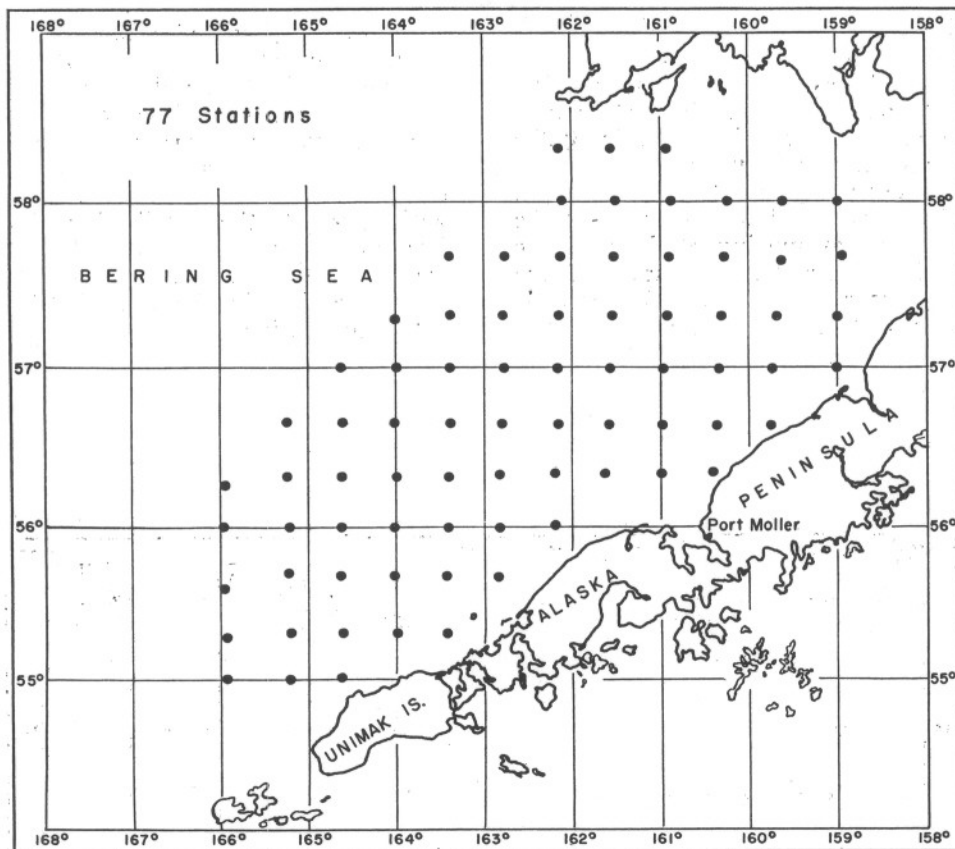


Fig. 24. King crab station pattern, July 1957.

TABLE 15. Summary of Tag Recoveries, 1957

Tagging Year	Numbers Released	Year Recovered				Total
		Numbers Recovered (Percent Recovered)				
		1954	1955	1956	1957	
1954	1,107	44 (4.0%)	60 (5.4%)	1 (0.1%)	2 (0.2%)	107
1955	1,351		32 (2.4%)	53 (3.9%)	35 (2.7%)	120
1956	4,063			53 (1.3%)	197 (4.8%)	250
1957	13,747				42 (0.3%)	42
TOTAL:		44	92	107	276	518

Current Studies

The almost total absence of information relating to the circulation of water in the eastern Bering Sea has been a handicap in determining the origin(s) of the stocks of king crabs, because at early planktonic stages, they drift with the water. During June, 1957, the field observers noted the direction the water was moving at four of the stations shown in Figure 24, and measured the flow by using a current meter at hourly intervals throughout a complete tidal cycle. After the

effect of flooding and ebbing tides has been removed, the net transport of water is as shown in Figure 25. Some differences exist between the movement of surface and bottom water, but the net movement seems to be of a counter-clockwise nature in the Bristol Bay area. The movement of water is particularly important with regard to the distribution of newly hatched free swimming crab larvae. Due to the low velocity of this water, the distribution of crab larvae hatched in the Port Moller area should not be extensive.

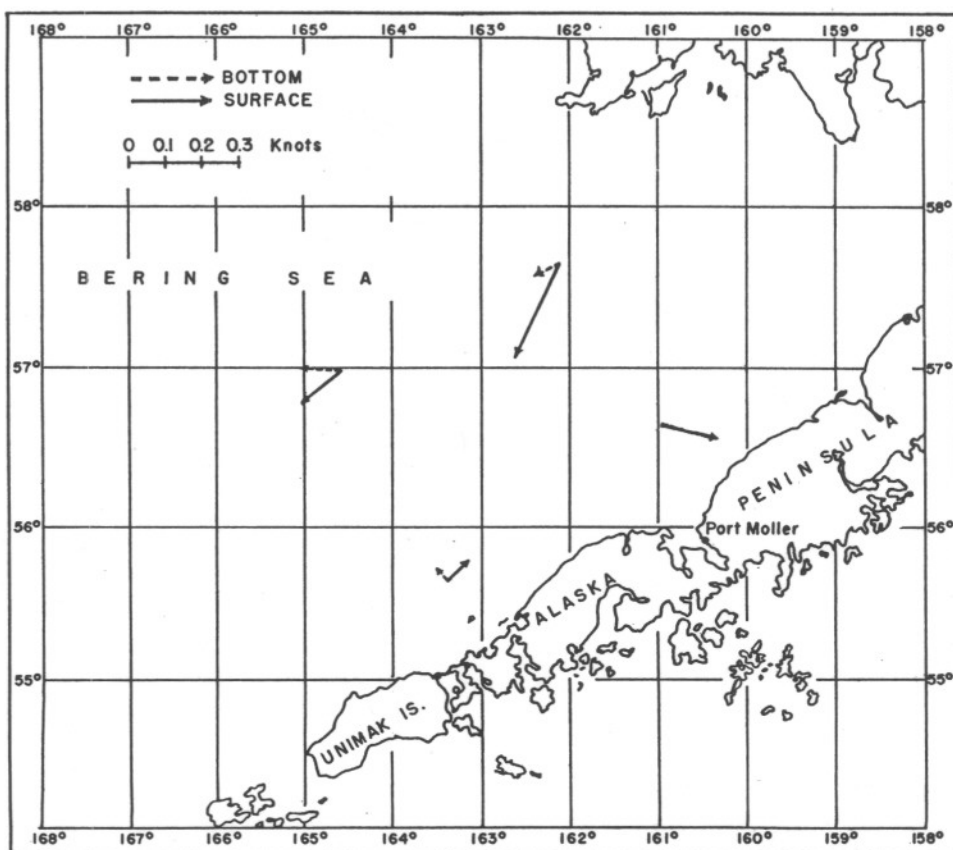


Fig. 25. Net current direction and velocity at surface and bottom.