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THE ALASKA DEPARTMENT OF FISH AND GAME'S WESTWARD REGION 1988 CRAB SURVEY RESULTS

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INTRODUCTION

The purpose of this document is to present the methodology and data collected from crab trawl surveys conducted by the Alaska Department of Fish and Game (ADF&G) in the Westward Region during 1988. The South Peninsula and Kodiak management areas were the only areas surveyed in 1988. The South Peninsula survey is the initial ADF&G crab trawl survey for that management area.

METHODS

Explanation of Terms and Acronyms

The following definitions were developed for characterizing Tanner crab, Chionoecetes bairdi, examined in this report.

Newshell (NS) - Hard exoskeletal animal; the dorsal side of the carapace brownish-red; no apparent scratching on ventral side; epifauna absent or limited; and dactyli, pterygostomial and branchial spines sharp.

Oldshell (OS) - An apparent skip molt; carapace hard and brownish; thoracic sternum and ventral sides of legs with numerous scratches and abrasions; dactyli, pterygostomial and branchial spines worn; epifauna may be present.

Very Oldshell (VOS) - An obvious skipmolt; carapace hard, dark brown to blackish; thoracic sternum and ventral side of legs with multiple scratches and abrasions; underside of legs usually dark yellow-brown; dactyli, pterygostomial and branchial spines heavily worn; epifauna usually present: e.g.,large barnacles.

Molting - All physiological events leading up to ecdysis and including ecdysis.

Skip-molt - A crab which has retained its exoskeleton (not molted) for more than 12 months.

Crab Measurements - All crab measurements in mm refer to carapace width (CW) inside spines unless otherwise noted.

Prerecruit IV's - Male Tanner crab $\leq$ 69 mm in carapace width and four or more molts from attaining legal size. Note that this group includes prerecruit IV, V, and VI and younger crabs, but are referred to as prerecruit IV's herein.

Prerecruit III's - Male Tanner crab 70-91 mm in carapace width and three molts from attaining legal size.

Prerecruit II's - Male Tanner crab 92-114 mm in carapace width and two molts from attaining legal size.

Prerecruit I's - Male Tanner crab 115-139 mm in carapace width and one molt from attaining legal size.

Recruit Legals - New-shell male Tanner crab 140-164 mm in carapace width, recruited to legal size in year of capture.

Postrecruit Legals - Male crab that have been legal size at least one year: defined as oldshells and very oldshells 140-164 mm and all males > 164 mm in carapace width.

Total Legals - All male Tanner crab > 139 mm in carapace width.

Females - Identified as adult or immature by visual observation of abdominal flap.

The following definitions were developed for characterizing king crab, Paralithodes camtschatica, examined in this report.

Carapace length - The straight line distance across the carapace from the posterior margin of the right eye orbit to the medial-posterior margin of the carapace.

Legal Size - Male crab seven inches (178 MM) or greater in width of shell, including the spines, measured as the straight line distance across the carapace at a right angle to a line midway between the eyes to the midpoint of the posterior portion of the carapace.

Juvenile Females - Nonovigerous females with carapace lengths of less than 116 mm.

Adult Females - Ovigerous and nonovigerous females with carapace lengths greater than 115 mm.

Newshell Males - Individuals that molted during the last molting season (generally January through April).

Oldshell Males - (skipmolts) - Individuals that failed to molt during the last molting season.

Very Oldshell Males - (double skipmolts) - Individuals that failed to molt during the last two or more molting seasons.

Prerecruit Fours - Individuals estimated to be 4 or more years from legal size and less than 95 mm in length.

Prerecruit Threes - Individuals estimated to be three years from legal size and 95-112 mm in length.

Prerecruit Twos - Individuals estimated to be two years from legal size and 113-130 mm in length.

Prerecruit Ones - Individuals estimated to be one year from legal size which includes all sublegals greater than 130 mm in length.

Recruits - Newshell males which are legal size and are in their first year of availability to the fishery which includes crabs less than or equal to 164 mm in length.

Postrecruits - Males which are legal size or estimated to be so and are not classified as recruits. This includes all legal size oldshells and very oldshells and all newshells greater than 164 mm in length.

Trawl Description and Procedures

The following gear description is taken from Watson 1989.

> The R/V RESOLUTION towed a 400-mesh eastern otter trawl net. The net had a 21 m (70 ft) long headrope with 18 floats, 20 cm (8 in) in diameter. The footrope was 29 m (95 ft) long without roller gear or tickler chain. The footrope was weighted with 9 mm (3/8 in) chain attached every 100 inches to ensure that the footrope tended bottom. The two dandylines were 46 m (25 fm) long and consisted of an 18 m (10 fm) section of 16 mm (5/8 in) cable and a pair of 27 m (15 fm) sections of 13 mm (1/2 in) cable, one attached to the top and the other to the bottom of each net wing. The doors were Astoria "V" type weighing 340 kg (750 lb) each and measured 1.5 m x 2.1 m (5 ft x 7 ft). The net was constructed with 102 mm (4 in) stretch mesh at the mouth, 89 mm (3-1/2 in) stretch mesh in the body, and the cod end had a 32 mm (1-1/4 in) stretch mesh liner. The net was designed to sweep a 12 m (40 ft) path.

At each station the net was operated on the bottom for approximately 30 minutes and covered 1.0 nautical mile (nm). Variations occurred in the performance of some trawls that caused unequal coverage of bottom area per unit time. Catches were adjusted to 1.0 nm towed to account for this discrepancy.

Each offshore survey area was divided into approximately 5 nm square stations and each inshore or bay area was divided into 2.5 nm square stations. Considerable variation occurred in the size of some offshore and most bay stations based on land boundaries. Trawl placement within stations was randomly chosen except that untrawlable bottom was avoided. All tows were made during daylight hours.

The catch of crab from each tow was brought aboard, weighed, sorted by species and sex and carapace width or length measurements made as approximate to obtain size frequency information. Reproductive success was measured by examining mature female Tanner crab and mature sized female king crab for the presence of egg clutches. When eggs were present an estimate of egg clutch fullness was made. Catch sampling of fish species is described by Watson 1989.

Population Estimation

The estimator used in this report to derive population estimates from the 1988 trawl survey data for Tanner crab of a given sex-age class in a given region is

$$\hat{T}_{r,g} = 151.9 * \mathop{R}_{i=1}^{n(r)} A_i * C_{i,g}, \tag{1}$$

where $\hat{T}_{r,g}$ is the estimated total number of crabs of sex-age class g in region r, A_i is the area of station i, $C_{i,g}$ is the catch per tow-mile of crabs of sex-age class g in the tow for station i, n(r) is the number of stations in region

r, and 151.9 is a factor to convert catch-per-mile of a tow to catch per square mile (a one mile tow sweeps 1/151.9 square miles). The estimator simply expands the catch within the area of a tow for a station to the area of the entire station and sums these expanded values over all the stations within a region. The region, r, that a population total is estimated for may be an entire management district, a section within a management district, or an individual station. The sex-age class, g, may be all crabs or a subdivision based on any combination of sex, size, or ovigerity.

This estimator, $\hat{T}_{r,g}$, departs from the population estimation scheme used for the earlier pot surveys in which stratification of ocean and bay stations was employed. The presently used population estimator treats each station as an individual stratum. Implicit in the use of this estimator is the assumption that $C_{i,g}$ is the best single estimate of the density of crabs of sex-age class g in station i; that is, that variation in catch per tow-mile within a station is low relative to variation among stations. Although this assumption may be true and the estimator, $\hat{T}_{r,g}$, has an appealing simplicity, an unbiased estimate of the variance of $\hat{T}_{r,g}$ cannot be derived from the data.

Under the assumption that catch per tow-mile is independent among stations, the variance of the estimator, $\hat{T}_{r,g}$, is

$$\text{(2)} \qquad Var(\hat{T}_{r,g}) = (151.9)^2 * \mathop{R}_{i=1}^{n(r)} (A_i)^2 * Var(C_{i,g}),$$

where $Var(\hat{T}_{r,g})$ is the variance of $\hat{T}_{r,g}$ and $Var(C_{i,g})$ is the variance of catch per tow-mile of crabs from sex-age class g in station i. That is, the variance of the estimator, $\hat{T}_{r,g}$, depends on the variance of the catch per tow-mile, $C_{i,g}$, within each station. Hence, an estimate of $Var(\hat{T}_{r,g})$ requires estimation of the $Var(C_{i,g})$'s for i=1 to n(r) for sex-age class g. With only one tow per station, however, there is no way to obtain an unbiased estimate of $Var(C_{i,g})$ from data for a sex-age class in any of the stations.

$Var(C_{i,g})$ is a measure of the variation in catch of sex-age class g per tow-mile <u>within</u> station i that is due to random effects. These random effects include variation in tow location within a station relative to the intended location,

the spatial distribution of crabs within a station relative to the intended tow location, and other factors that create variation in trawl efficiency. Attempts to repeat a tow in station i will give differing values of $C_{i,g}$ due to these random effects. An unbiased estimate of $Var(C_{i,g})$ for a given station and sex-age class requires repeated measures of $C_{i,g}$ for station i and sex-age class g. With only one tow performed per station, however, these repeated measures are not available.

Despite this problem in estimating the variances of the $\hat{T}_{r,g}$'s, some idea of the precision of $\hat{T}_{r,g}$ is necessary for management decisions. To obtain rough estimates of the $Var(C_{i,g})$'s, the following procedure was used. Stations from the same bay and ocean stations from the same section were grouped and the sample variances in catch per tow-mile for each sex-age class of interest, $C_{i,g}$, within these groupings were calculated. The calculated among-stations variance of the $C_{i,g}$,s within a grouping was then used as an estimate, $\hat{V}ar(C_{i,g})$, of the within-station variance of catch of per tow-mile for each station within the grouping. For example, the within-station variances of the recruit male catch per tow-mile in each of the Chiniak Bay stations (stations "CHA" through "CHL") were all estimated by the sample variance of recruit male catch per tow-mile among those eight stations. Similarly, the within-station variance for the ocean stations in the Kodiak District South East section were all estimated by the among-station variance for the South East section ocean stations. For some sex-age classes, the geographic range of the groupings were expanded (by grouping ocean stations from two or more adjacent sections, for example) to avoid variance estimates of 0, as occurs when the $C_{i,g}$'s for all stations in a grouping are 0.
The resulting estimates of the $Var(C_{i,g})$'s were applied to equation (2) to give rough estimates of the $Var(\hat{T})$'s by

$$\hat{V}ar(\hat{T}_{r,g})=(151.9)^2 * \sum_{i=1}^{n(r)} (A_i)^2 * \hat{V}ar(C_{i,g}). \tag{3}$$

This method tends to overestimate $Var(\hat{T}_{r,g})$ since the among-station variances that are used to estimate $Var(C_{i,g})$ will be at least as large as the within-

station variances. The use of the estimator $\hat{T}_{r,g}$ assumes, after all, that variation in $C_{i,g}$ within stations is less than the variation among stations. So, the estimates of $Var(\hat{T}_{r,g})$ are biased high and the estimates of population totals are probably more precise than is reflected by the calculated $\hat{V}ar(\hat{T}_{r,g})$'s.

Variance estimates of population estimates, $\hat{V}ar(\hat{T}_{r,g})$, were computed only for the population estimates of male Tanner crab age classes "Prerecruit 1", "Recruit", and "Legal" for each section within the Kodiak District, for the total Kodiak District, for each section within the South Peninsula District, and for the total South Peninsula District.

Rather than reporting the estimated variance of the population estimates in the summary tables, we provide the estimated standard error of the population estimate -- the square root of the variance estimate. The ratio of the standard error of the population estimate to the population estimate (the "percent error" in the summary tables), gives an indication of the level of precision of the population estimate relative to its magnitude. Since the estimated variances of the population estimates are biased high, the levels of precision indicated here are conservative; i.e., the population estimates are expected to be at least as precise as their estimated standard errors and percent errors indicate.

Finally, it may be noted that the percent errors for a district's population estimate are lower than those of the individual sections comprising the district. This is due to the differing responses of $\hat{T}_{r,g}$ and $\hat{V}ar(\hat{T}_{r,g})$ to increasing the number of stations, n(r), that are included when expanding the region of interest, r. $\hat{T}_{r,g}$ will increase roughly proportional to increasing n(r), while $\hat{V}ar(\hat{T}_{r,g})$ will increase roughly proportional to the square root of n(r).

The Kodiak and South Peninsula surveys were conducted aboard the R/V Resolution. The Kodiak portion consisted of 217 successful tows in 39 fishing days which is a 15 % increase in effort over the 1987 survey. The South Peninsula survey consisted of 108 tows in 14 fishing days and was the first major crab trawl survey of this area. The surveys were conducted between 7/18 and 10/23. Appendix Tables A - G present individual tow data and population estimates for both Tanner and king crab.

ACTUAL CATCH DATA

Kodiak Tanner Crab

A total of 15,486 male and 8,161 female Tanners were captured, Figure 1. Tanners were captured in 82.5 % of all tows. The number of crab captured in a tow ranged from 0 to 1,973. A large cohort of 2 year old crab is evident for males and females at 30 to 40 mm, Figure 1. The majority of these small crab were captured in one tow.

Kodiak King Crab

A total of 145 male and 539 female red king crab were captured, Figure 2. Adults comprised the majority of crab captured, 96% for males and over 99% for females. Only 9 juvenile king crab were captured in the entire survey. Eighty seven percent of all tows produced no king crab.

South Peninsula Tanner Crab

Three thousand six hundred and eighty one males and 2,492 female Tanner crab were captured, Figure 3. Catch per tow ranged from 0 to 581. Two modes are apparent in the data for both sexes at age 2 and age 3 - 4 years and an additional mode is apparent for males at age 5 at about 85 mm. Age 5 females have recently or will at the next molt, mature and the age or modal group is indistinguishable from older cohorts of terminal molt adult females.

South Peninsula King Crab

A total of 75 males and 51 females were captured, Figure 4. Eighty percent of the females were juvenile and 88% of these were captured in one tow. Thirty percent of the males were juvenile and all except 1 were captured in the same tow that captured the majority of female juveniles. King crab were captured in 18% of all tows.

POPULATION ESTIMATES

The area considered in calculating the 1988 estimates for Kodiak was 3,467.4 square nm compared to 3,838.6 for 1987. This is a reduction of 10%. The reduced total area of the estimate in 1988 even with the 15% increase in number of tows is due to 1) increased effort in the bays where stations are smaller with an accompanying decreased effort offshore and 2) waters equal to or less than 10 fathoms deep were eliminated from the area considered to be part of a station in 1988.

The area considered in the South Peninsula estimate was 873.48 square nm.

Kodiak Tanner Crab

Figures 5 - 8 and 9 - 12 depict the calculated carapace width frequencies and population parameters for males and females respectively for 1988 along with comparative data for 1987. The estimated population of Tanner crab was 39.2 million animals down from 59.0 million animals in 1987, a decrease of 34%. Of the six management sections surveyed only the Northeast population estimate increased over the 1987 level for males due to strong cohorts of small crab 20 - 60 mm, Figure 5. Island wide the total population estimate fell from 34.7 to 23.8 million males, Figure 8. For females the Northeast, Westside and North

Mainland Sections showed an increase of small crab, Figures 9 and 11, but overall the population declined from 24.3 to 15.5 million females from 1987 to 1988. Legal males increased from 1987 to 1988, 3.8 to 4.6 million animals due a 33% increase in the number of recruit animals. The estimated sex ratio of the total population was 1.5 males per female. The sex ratio of mature animals was 2.4 males per female.

Kodiak King Crab

Figures 13 - 17 depict the calculated carapace length frequencies and population parameters for 1987 and 1988. The estimated total population increased from 548,655 to 728,000 between 1987 and 1988 due mostly to a greater catch of adult females in the Southwest District. Seventy four percent of these females were captured in one tow. Males decreased from 245,144 to 177,727 animals. The majority of the population, 88%, still resides in the Southwest District and is composed mostly of mature animals. The sex ratio of sexually mature crab from the 1988 survey was 3.2 females per male compared to 1.3 females per male from the 1987 survey. The number of legal males is the lowest since inception of crab surveys and the number of prerecruit crab remains very low.

South Peninsula Tanner Crab

Figures 18 - 22 depict the calculated carapace width frequencies and population parameters for 1988. The population of the area surveyed is estimated at 4.3 and 3.0 million males and females respectively. The composite male size frequency for the entire survey area is dominated by 3 juvenile modes at about 30 - 40 mm or 2 year olds, 50 - 70 mm or 3 and 4 year olds and 75 - 90 mm or 5 year olds. At larger sizes the cohorts tend to blend together. The female size frequency is dominated by juvenile cohorts at 2 years and 3 - 4 years old. The adult cohorts blend at the terminal molt to maturity. The sex ratio of males to females of the estimated population is 1.5 males per female. The sex ratio of the mature segment of the population was about 1 to 1.

South Peninsula King Crab

Figures 23 - 26 depict the calculated carapace length frequencies and population parameters for 1988. The total estimate for the area surveyed was 88,842 crab, 28% of which were females. The sex ratio of mature crab was 6.9 males per female. No king crab were captured in the Beaver and Balboa Bay areas.

REPRODUCTIVE SUCCESS

Percent egg clutch sizes are presented for Kodiak Tanner and king and South Peninsula Tanner and king crab in Figures 27 - 30 respectively. Overall the four female populations exibited good reproductive success.

RESEARCH CATCH BY STATION DATA

The actual catch by research fishing station is presented on the following figures: Kodiak male Tanner 31 - 40, Kodiak female Tanner 41 - 50, Kodiak male king 51 - 60, Kodiak female king 61 - 70, South Peninsula male Tanner 71 - 74, South Peninsula female Tanners 75 - 78, South Peninsula male kings 79 - 82 and South Peninsula female kings 83 - 86.

SHELL AGE

Tables 1 and 2 show the shell age composition of the actual research catch of male Tanner and king crab from both surveys. It is obvious from the data that the timing of these surveys avoided the molt season entirely for all king crab and was conducted when some Tanner crab were molting. As an example, 7% and 1%

of the four cohort in Kodiak and the South Peninsula were classed as soft shell condition respectively. It is also obvious that shell aging of Tanner crab is more complicated because of the greater degree of variability of shell ages in any one cohort group than for king crab.

LITERATURE CITED

Watson, Leslie. 1989. A bottom trawl survey for crab and groundfish in the Kodiak Island area and northern Shelikof Strait, Alaska, July through October 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K89-17, Kodiak.

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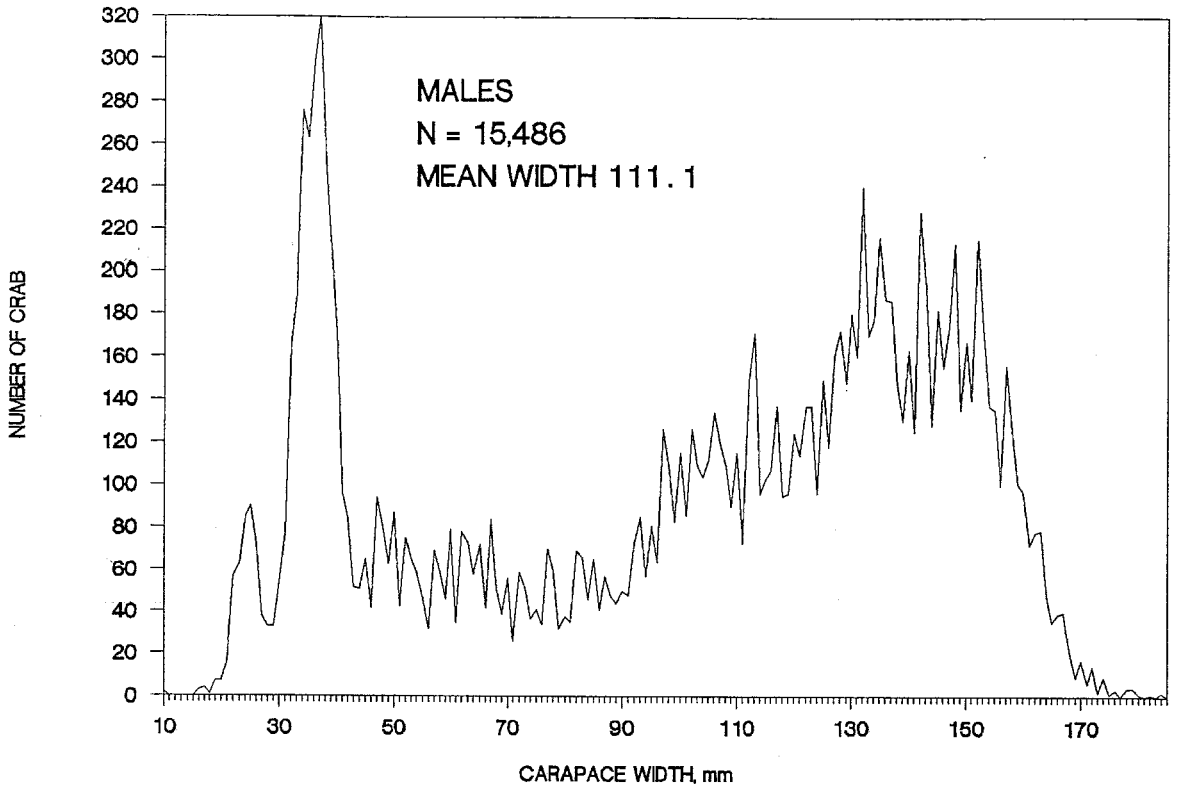
Table 1. Number of male king and Tanner crab by shell age and cohort from the Kodiak area crab trawl survey in 1988.

Cohort	Definition	Shell Condition: Soft	New	Old	Very Old
King Crab					
Four	<95mm	0	3	0	0
Three	95-112mm	0	5	0	0
Two	113-130mm	0	33	0	1
One	>130mm and sublegal	0	26	1	0
Recruit	<164mm and legal newshell	0	16	0	0
Post-Recruit	>163mm or legal and not newshell	0	17	16	27
Tanner Crab					
Four	<70mm	314	4290	3	0
Three	70-91mm	43	1013	13	4
Two	92-114mm	52	2150	143	42
One	>114mm and sublegal	13	2694	586	197
Recruit	<165mm and legal newshell	3	3474	0	0
Post-one	<165mm, legal but not newshell	0	0	212	31
Post-two	>164mm	0	199	10	209

Table 2. Number of male king and Tanner crab by shell age and cohort from the South Peninsula crab trawl survey in 1988.

Cohort	Definition	Shell Condition: Soft	New	Old	Very Old
King Crab					
Four	<79mm	0	25	0	0
Three	79-95mm	0	1	1	0
Two	96-115mm	0	1	0	1
One	>116mm and sublegal	0	2	0	0
Recruit	<152mm and legal newshell	0	11	0	0
Post-Recruit	>151mm or legal and not newshell	0	14	10	9
Tanner Crab					
Four	<70mm	8	769	2	0
Three	70-91mm	7	625	5	2
Two	92-114mm	0	831	55	7
One	>114mm and sublegal	2	606	143	42
Recruit	<165mm and legal newshell	1	332	0	0
Post-one	<165mm, legal but not newshell	0	0	119	24
Post-two	>164mm	0	88	12	1



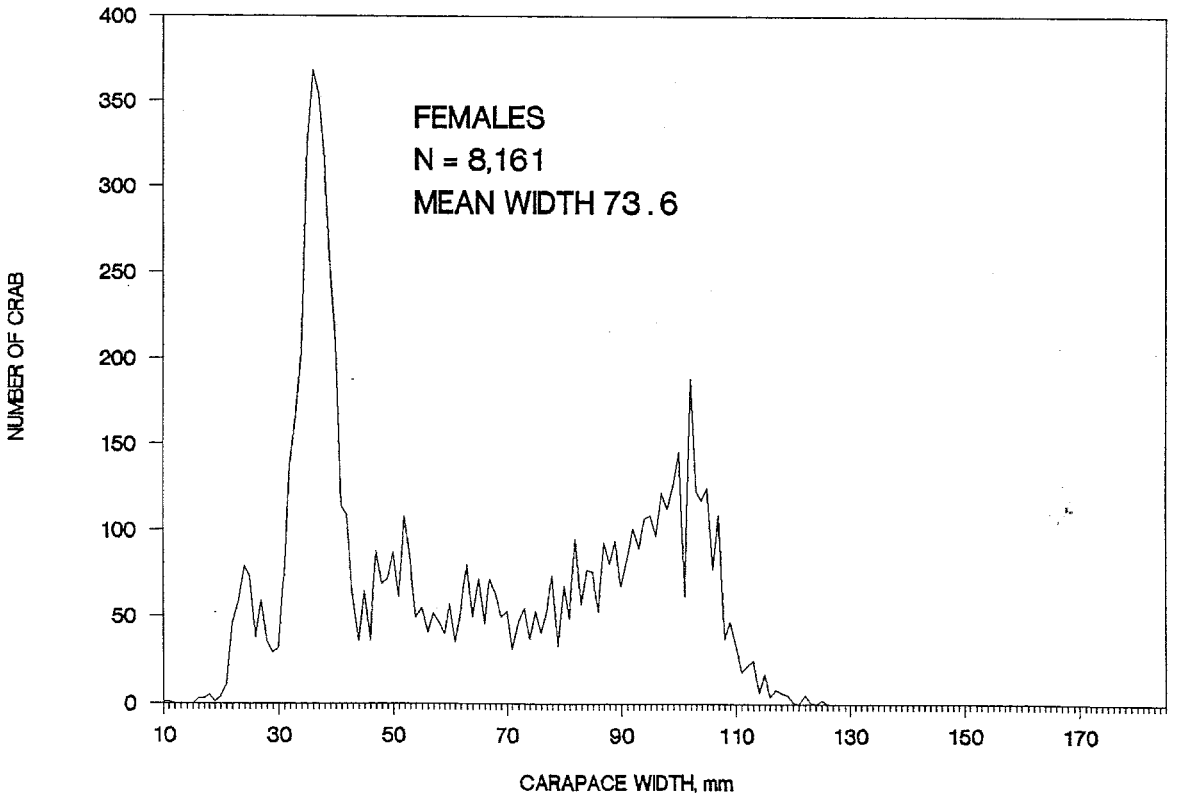
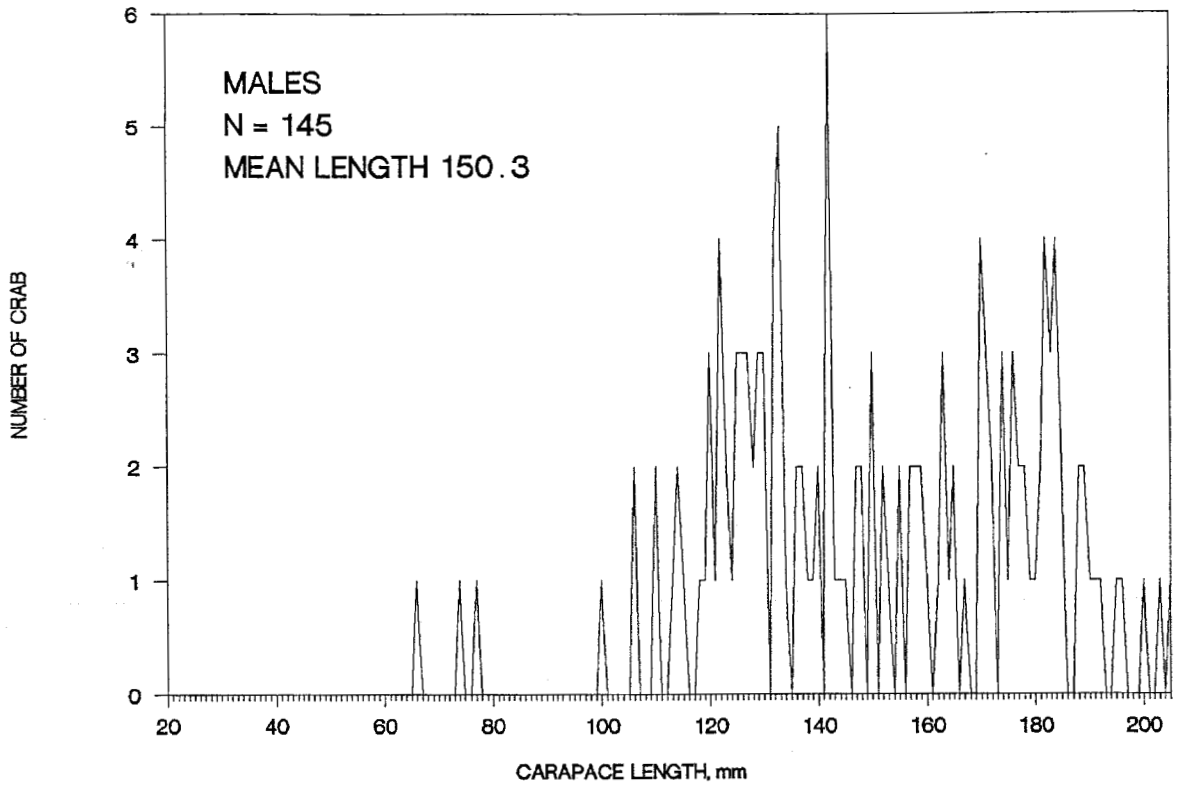


Figure 1. Carapace width frequency of all male and female Tanner crab, Chionoecetes bairdi, captured during the Kodiak trawl survey, 1988.



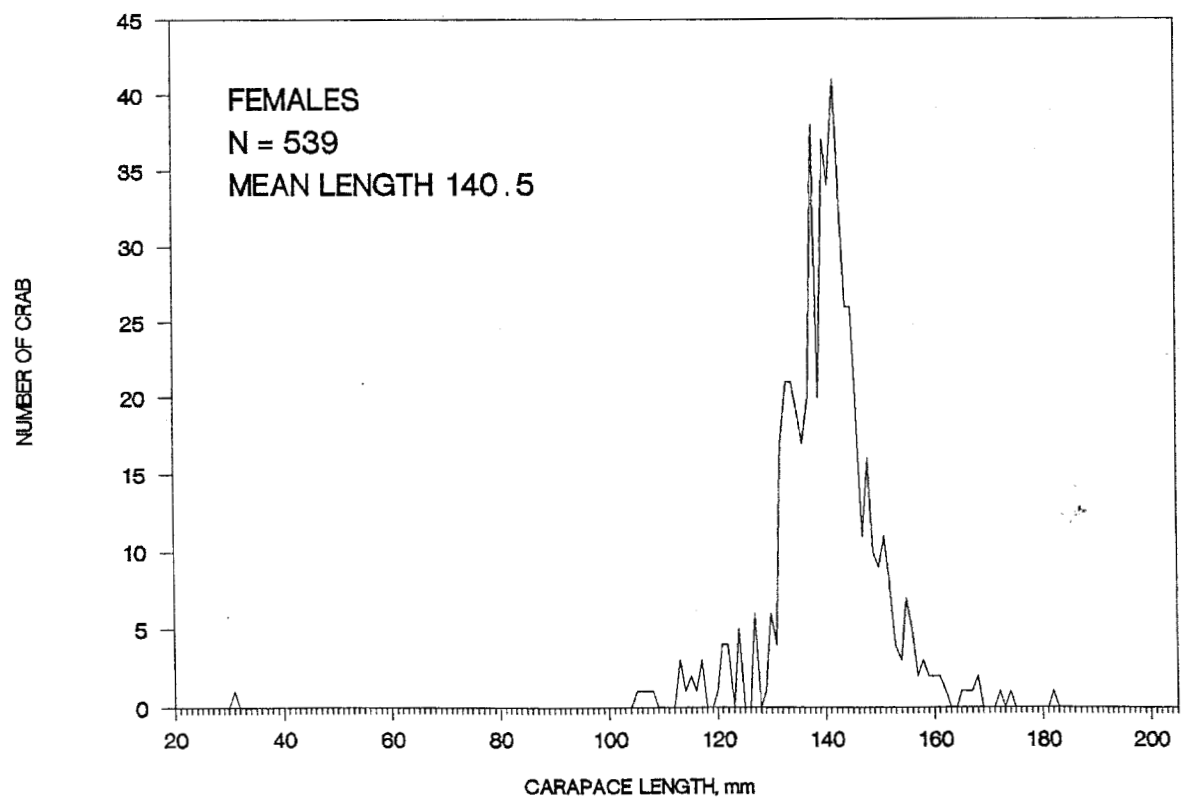
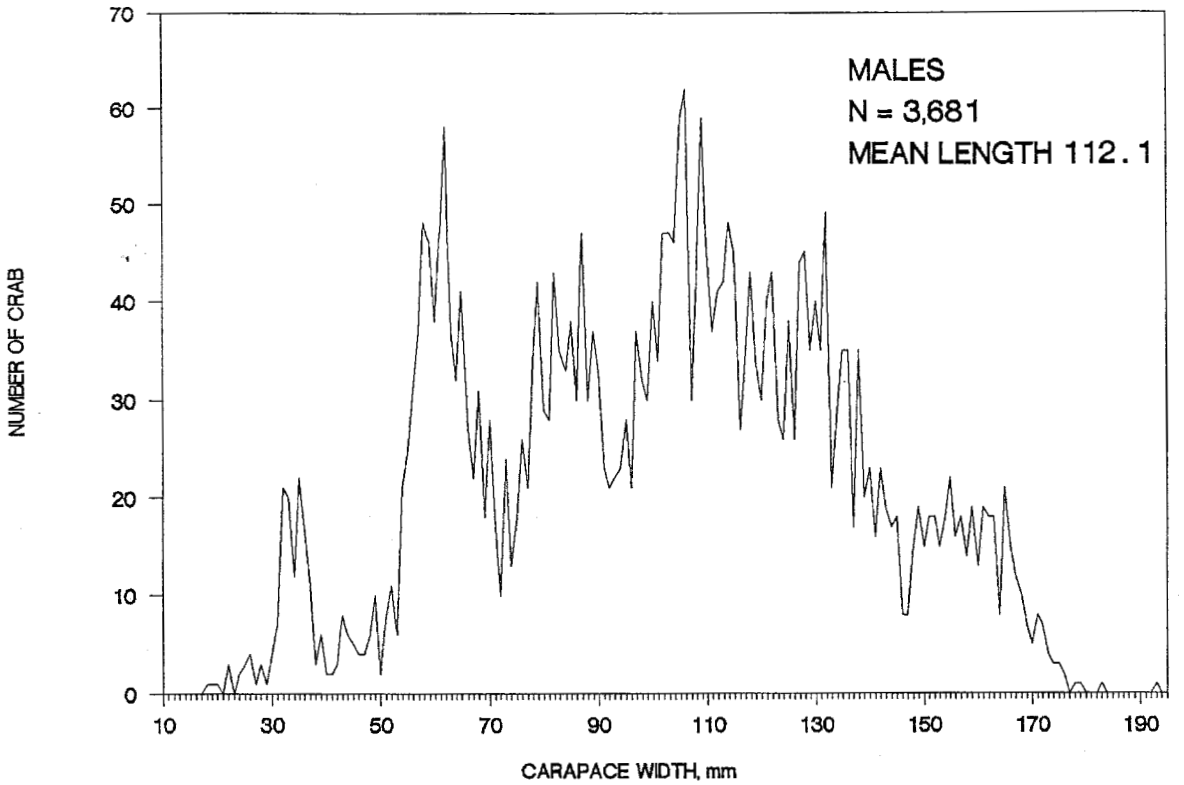


Figure 2. Carapace length frequency of all male and female king crab, Paralithodes camtschatica, captured during the Kodiak trawl survey, 1988.



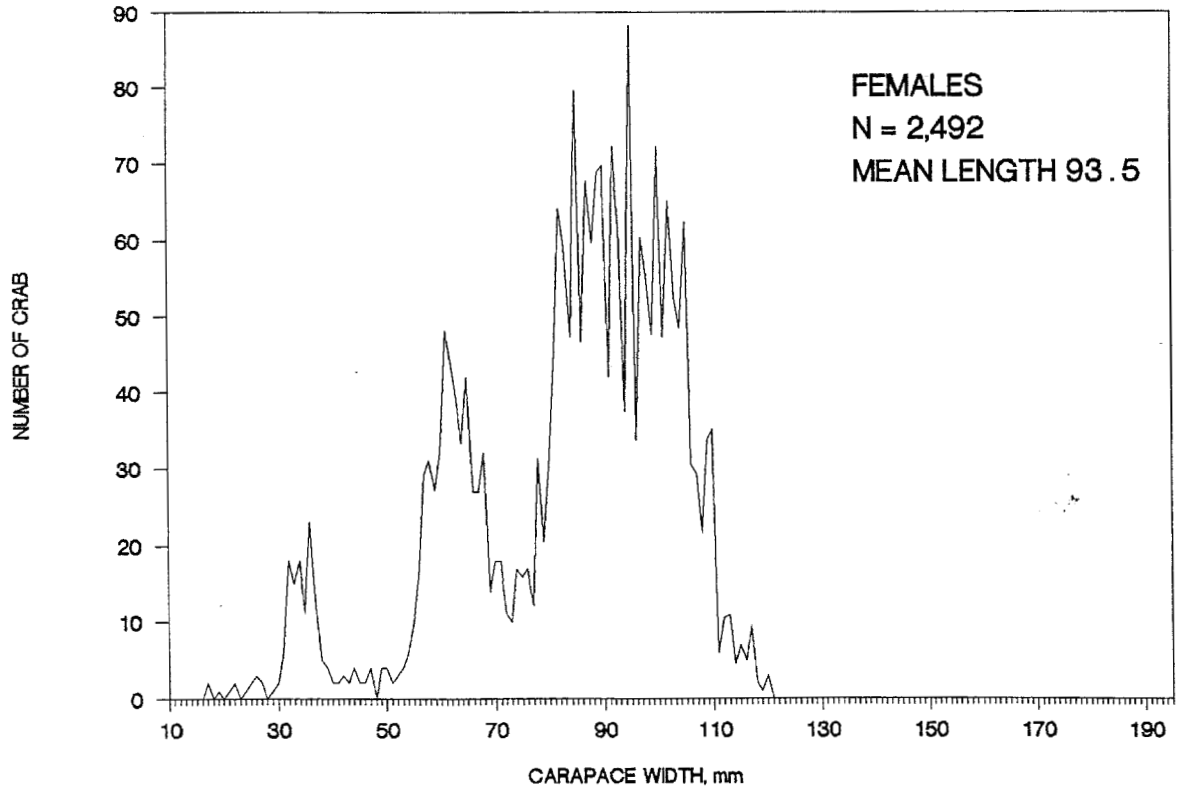


Figure 3. Carapace width frequency of all male and female Tanner crab, Chionoecetes bairdi, captured during the South Peninsula trawl survey, 1988.

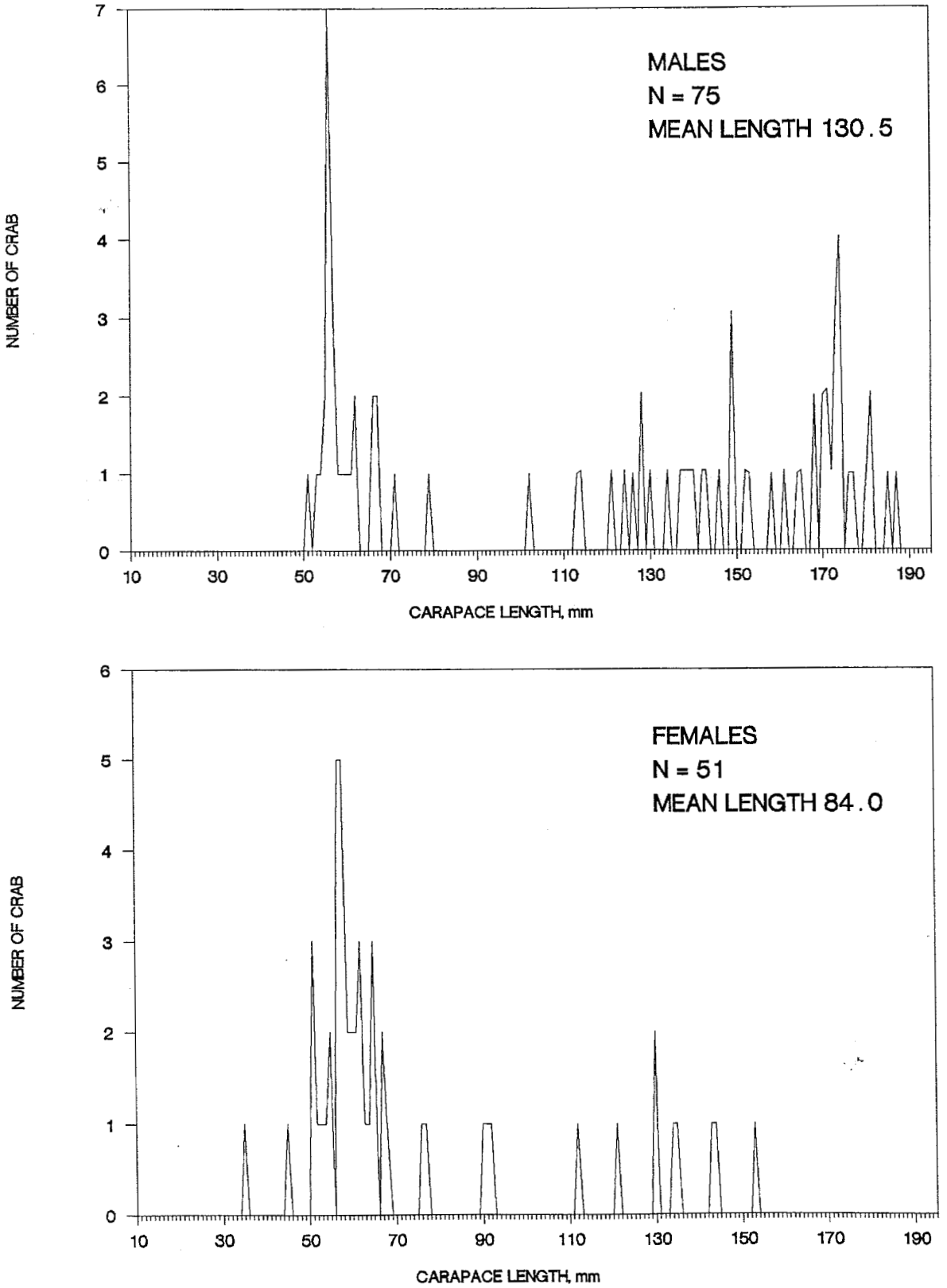


Figure 4. Carapace length frequency of all male and female king crab, Paralithodes camtschatica, captured during the South Peninsula trawl survey, 1988.

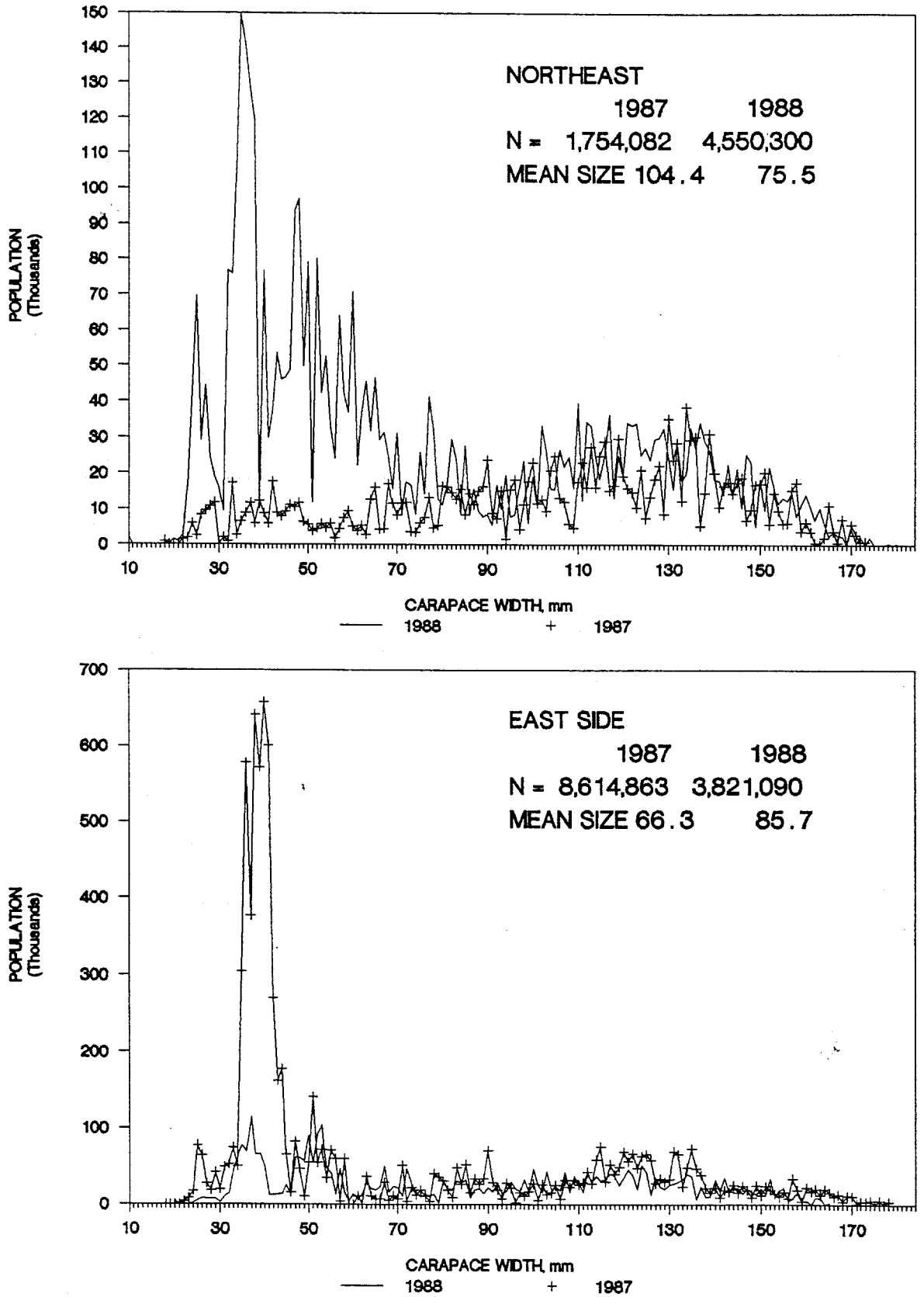
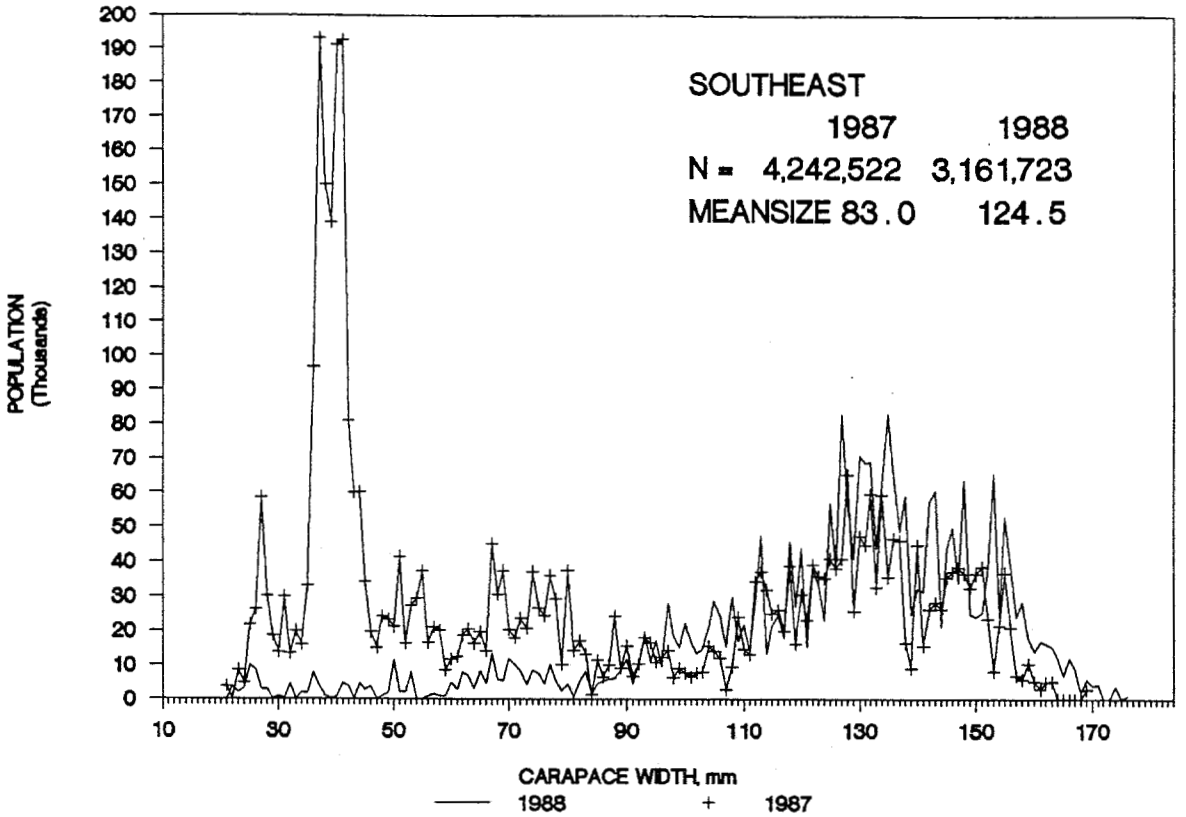


Figure 5. Carapace width frequency of estimated populations of male Tanner crab, Chionoecetes bairdi, for the Northeast and Eastside Sections, Kodiak trawl surveys 1987 and 1988.



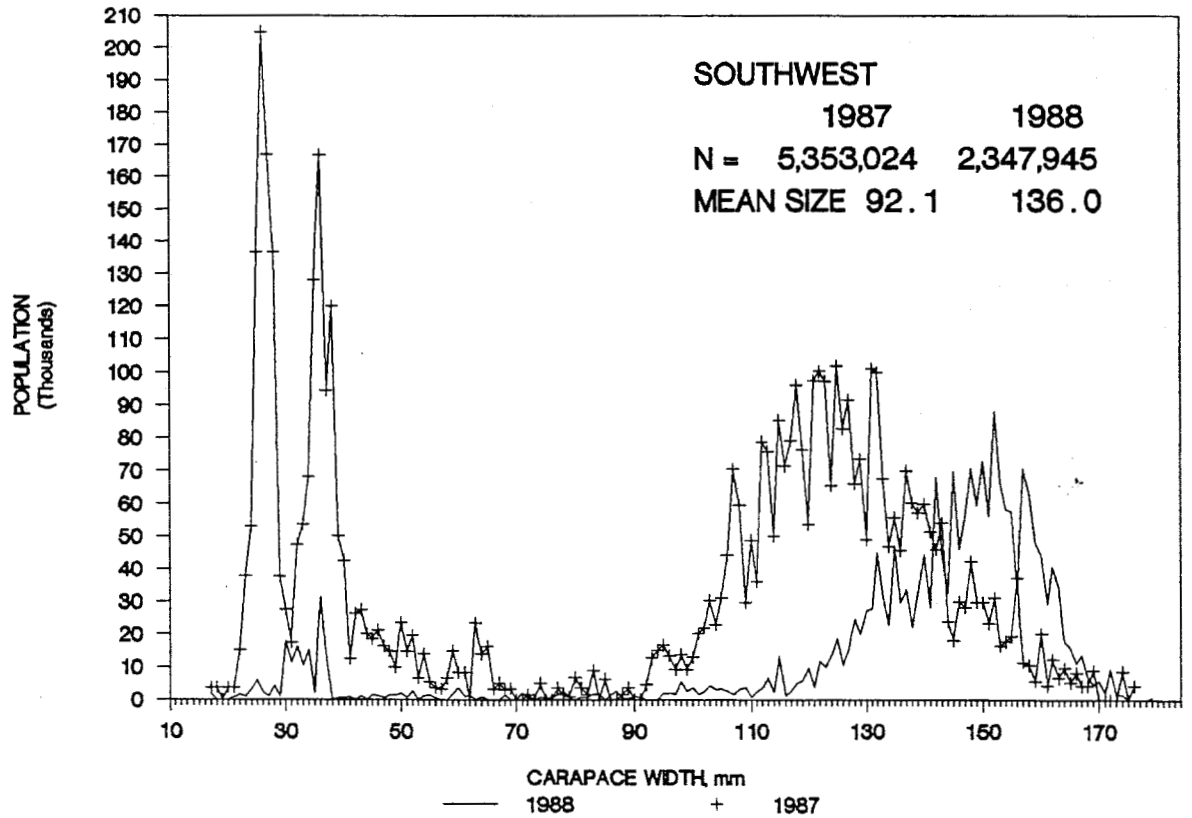


Figure 6. Carapace width frequency of estimated populations of male Tanner crab, Chionoecetes bairdi, for the Southeast and Southwest Sections, Kodiak trawl surveys 1987 and 1988.

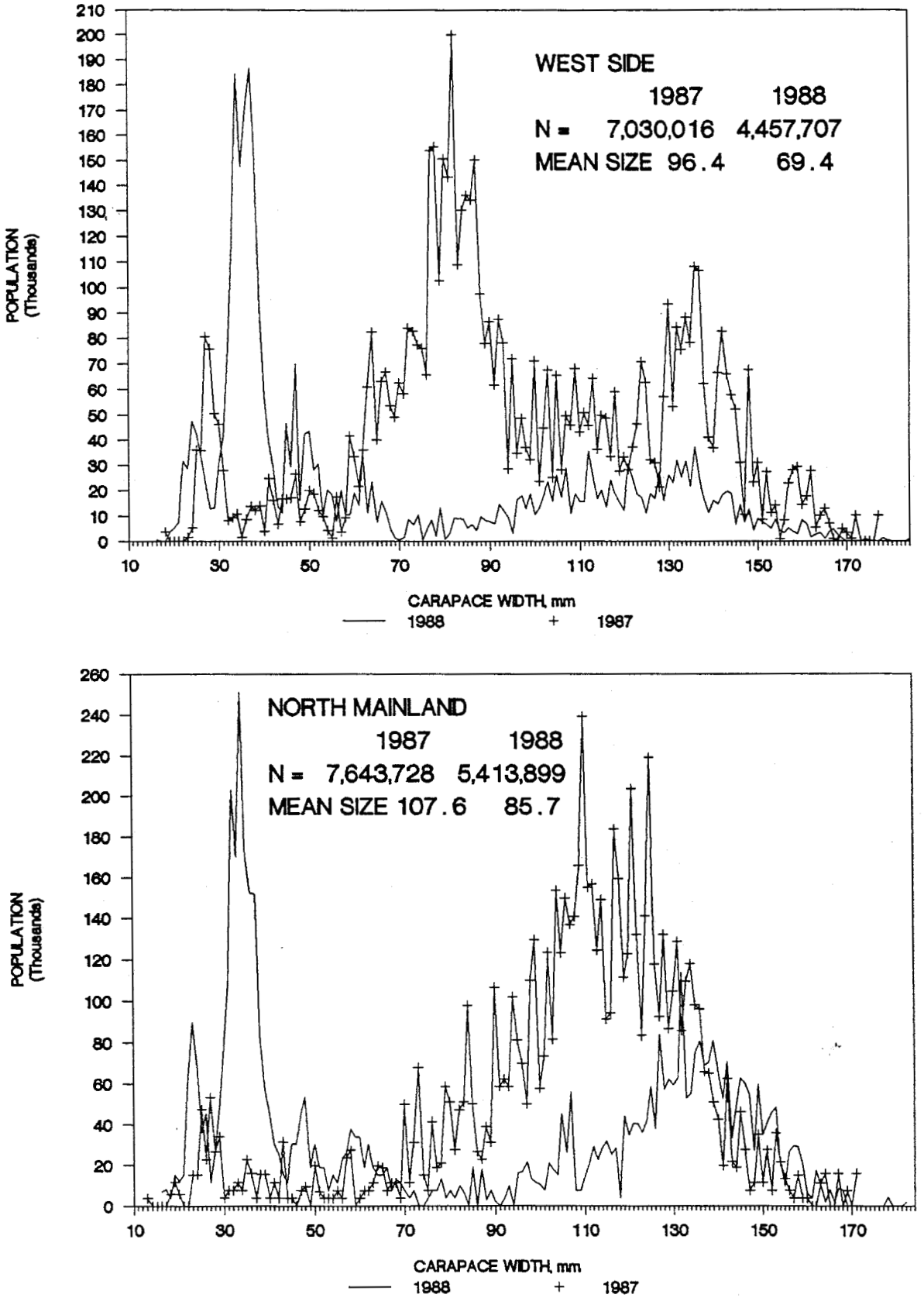


Figure 7. Carapace width frequency of estimated populations of male Tanner crab, Chionoecetes bairdi, for the Westside and North Mainland Sections, Kodiak trawl surveys 1987 and 1988.

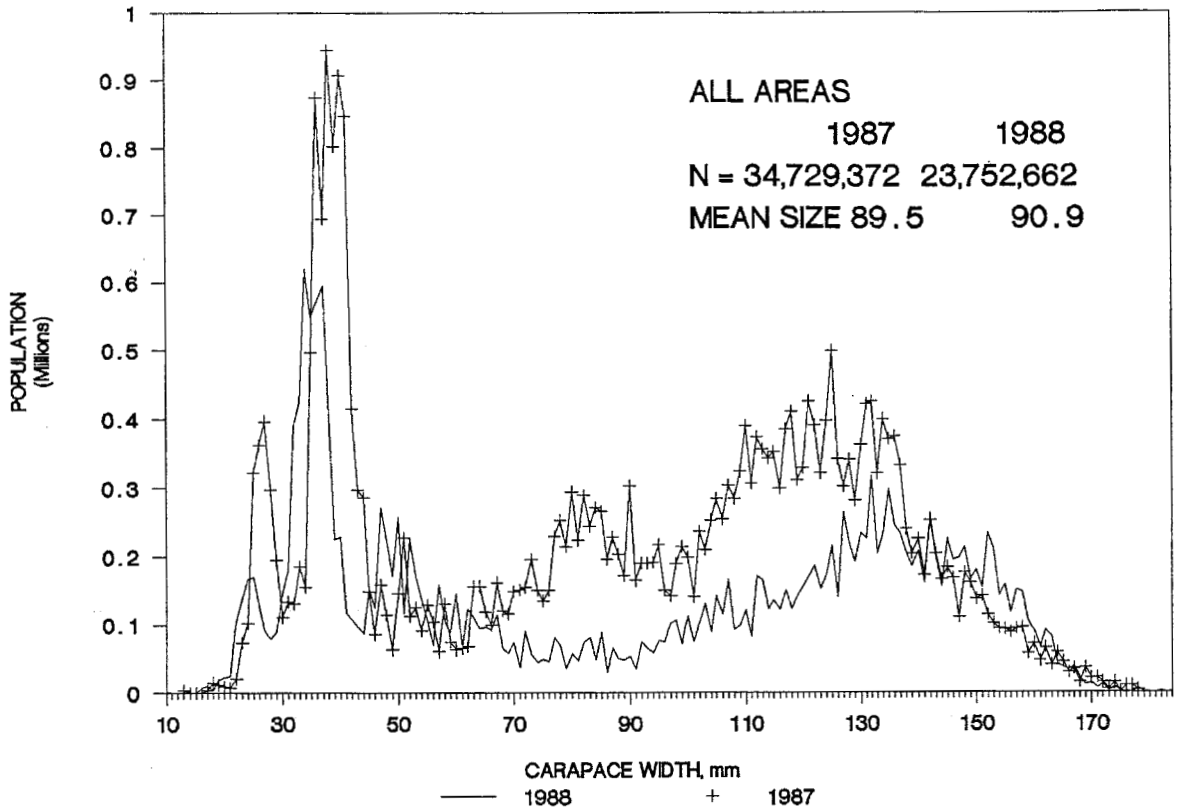


Figure 8. Carapace width frequency of estimated populations of male Tanner crab, Chionoecetes bairdi, for all sections combined, Kodiak trawl surveys 1987 and 1988.

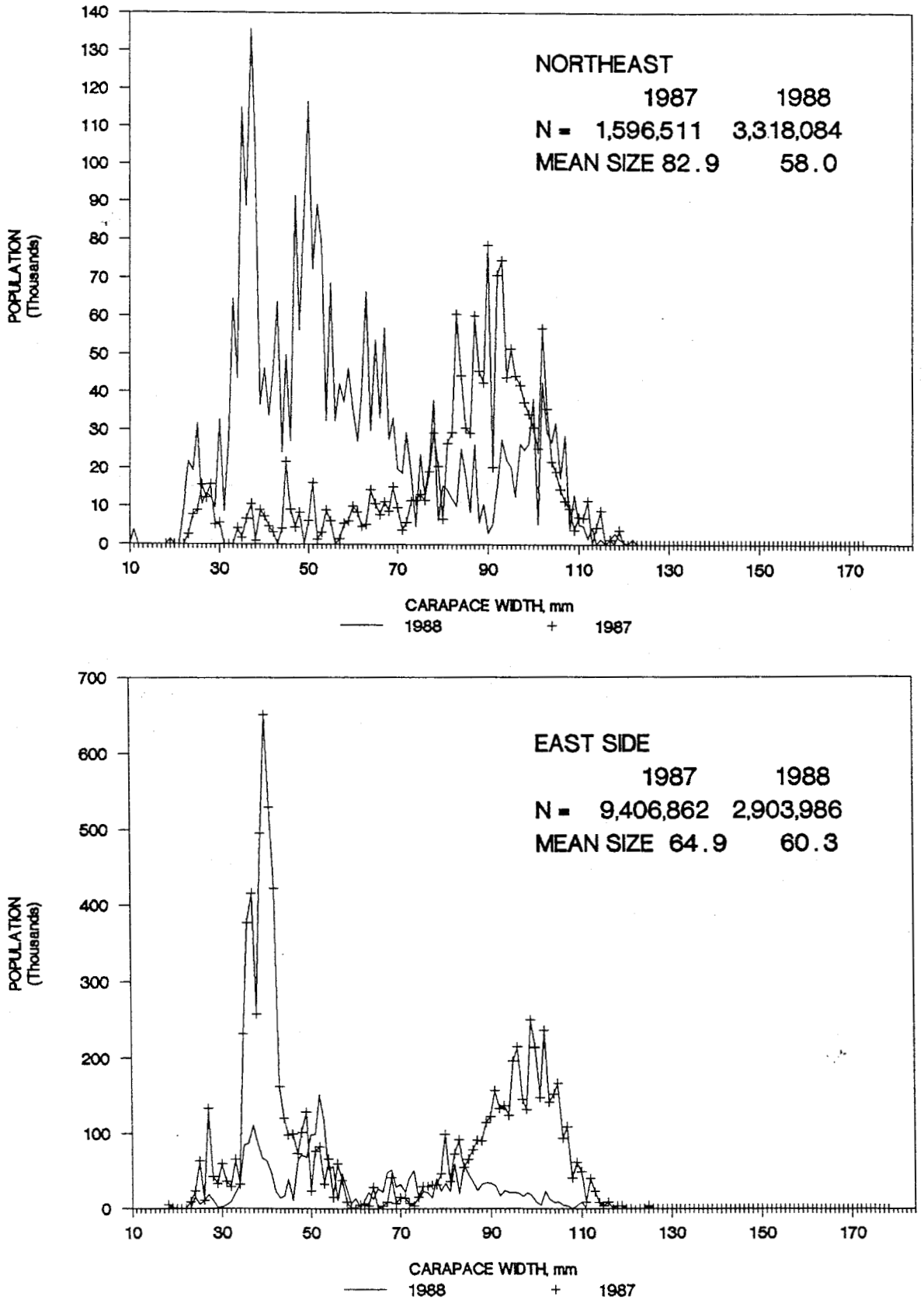
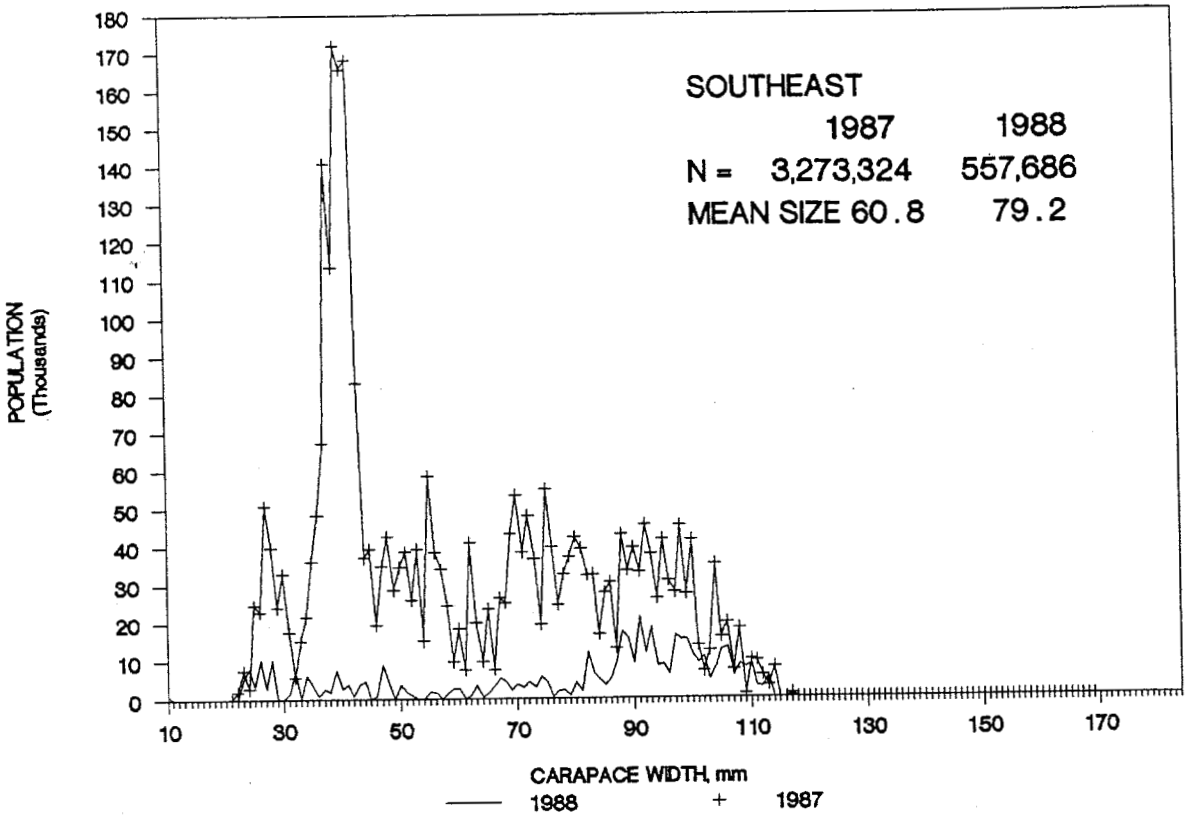


Figure 9. Carapace width frequency of estimated populations of female Tanner crab, Chionoecetes bairdi, for the Northeast and Eastside Sections, Kodiak trawl surveys 1987 and 1988.



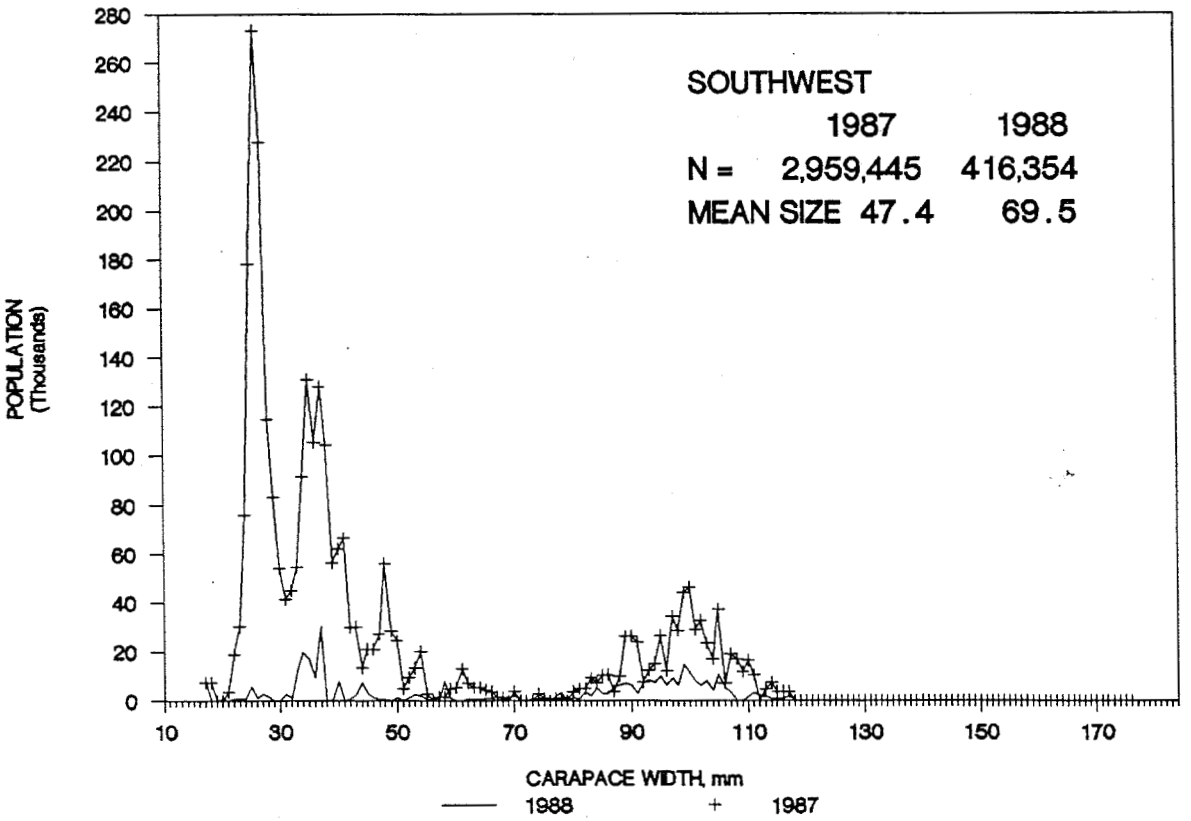
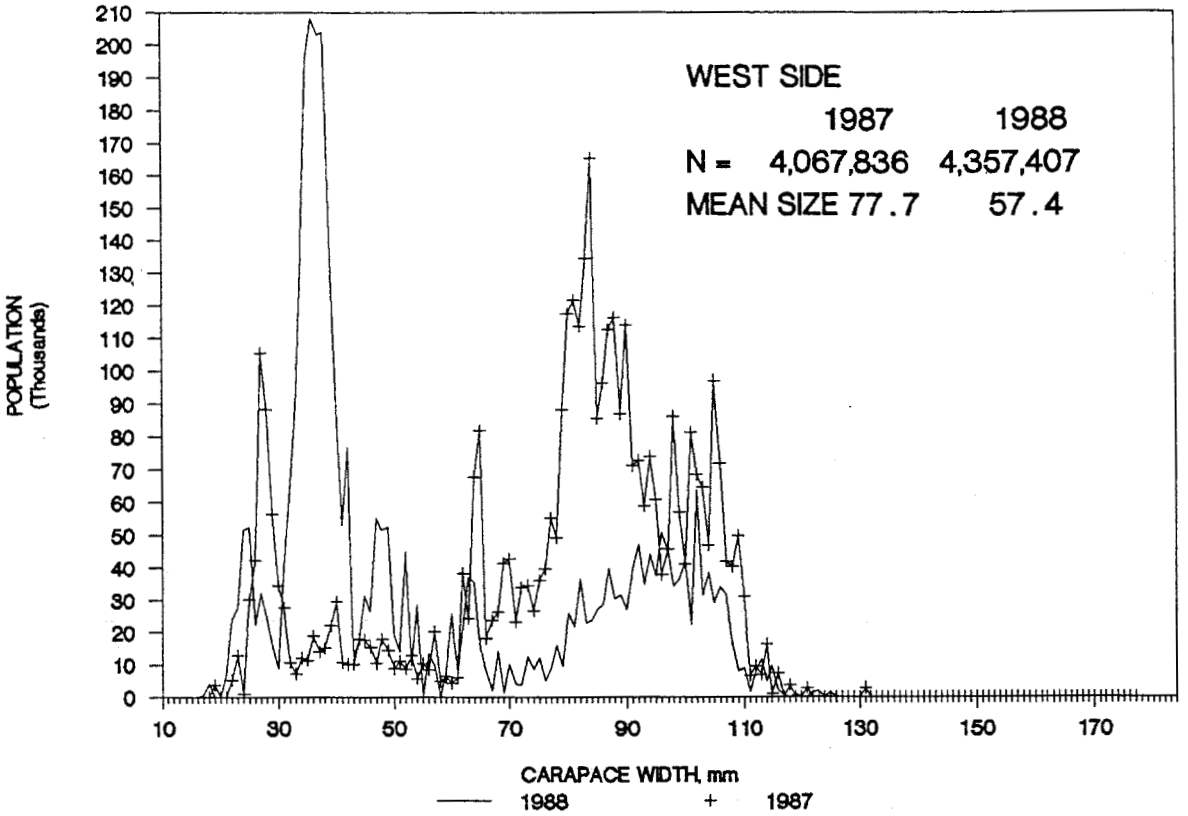


Figure 10. Carapace width frequency of estimted populations of female Tanner crab, Chionoecetes bairdi, for the Southeast and Southwest Sections, Kodiak trawl survey 1987 and 1988.



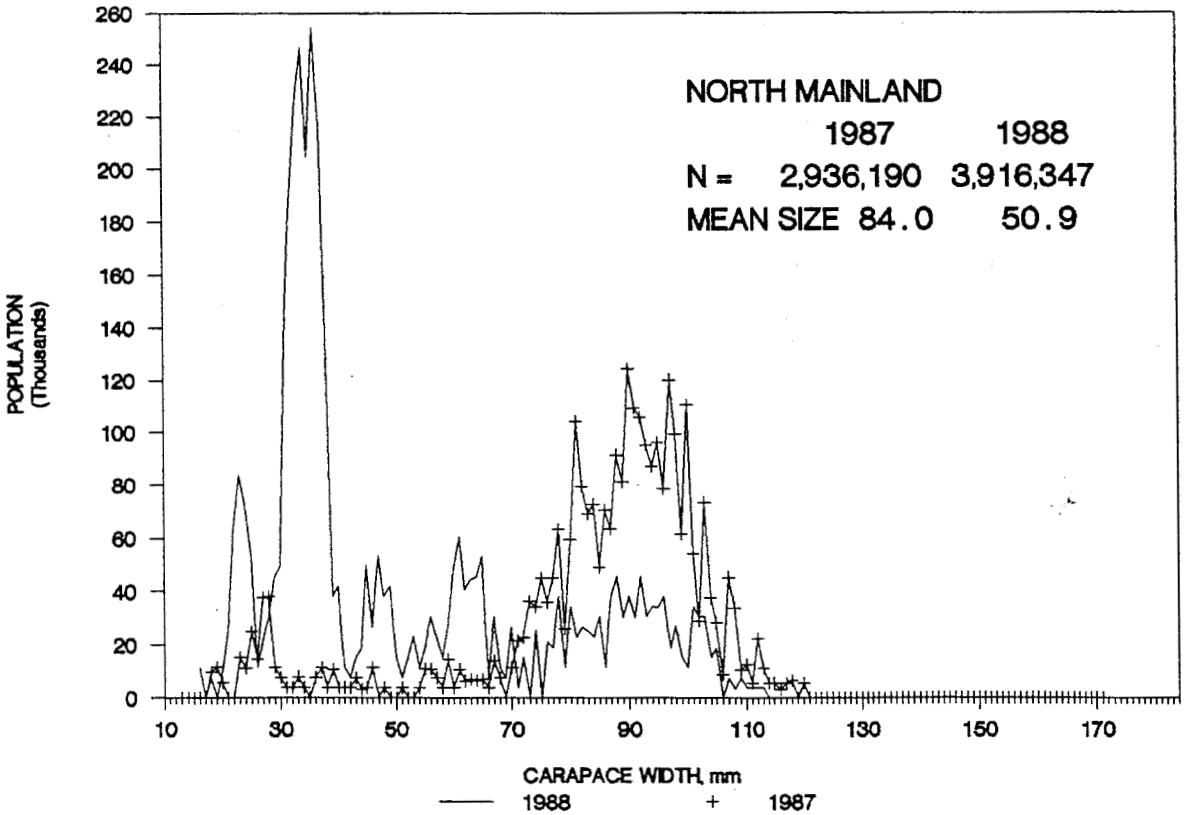


Figure 11. Carapace width frequency of estimated populations of female Tanner crab, Chionoecetes bairdi, for the Westside and North Mainland Sections, Kodiak trawl survey 1987 and 1988.

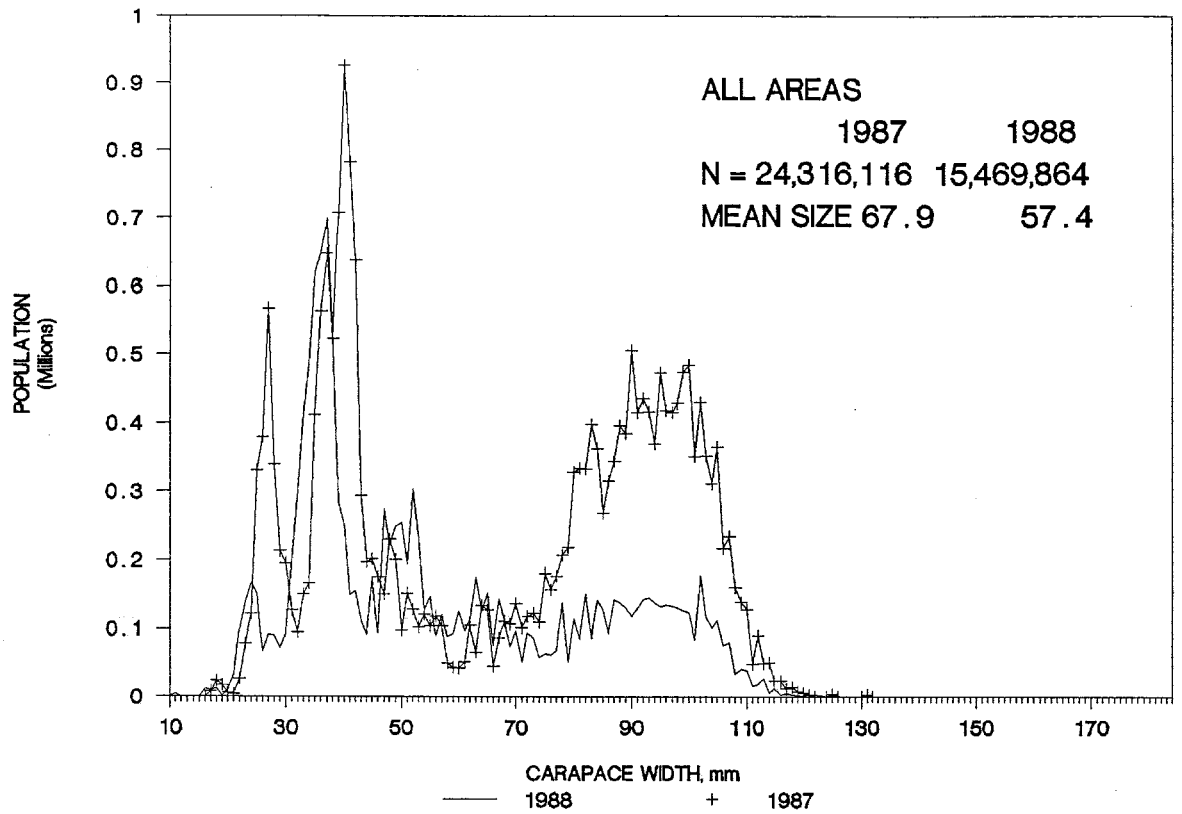


Figure 12. Carapace width frequency of estimated populations of female Tanner crab, Chionoecetes bairdi, for all surveyed sections combined, Kodiak trawl surveys 1987 and 1988.

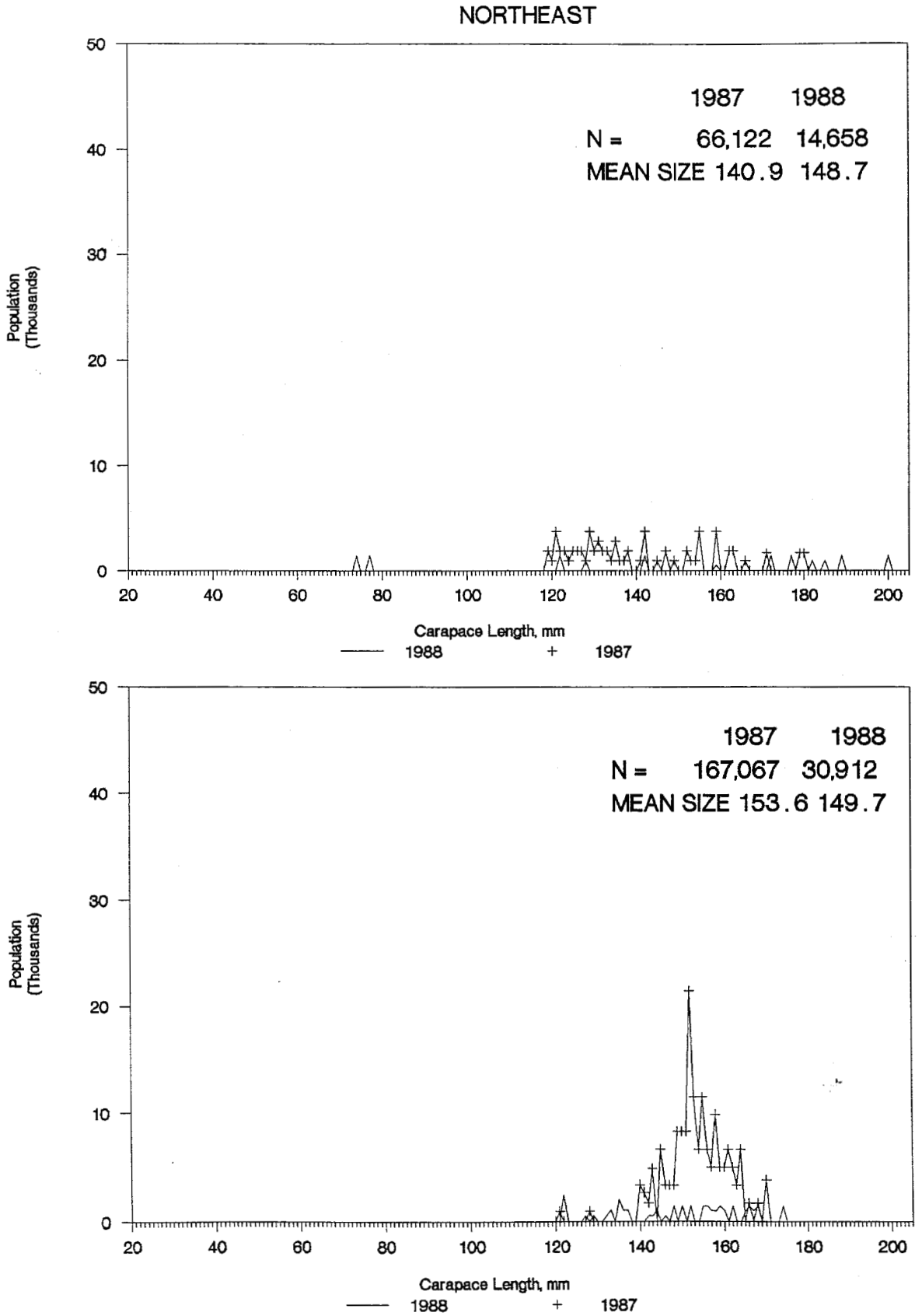


Figure 13. Carapace length frequency of estimated populations of male (top) and female king crab, Paralithodes camtschatica, for the Northeast District, Kodiak trawl surveys 1987 and 1988.

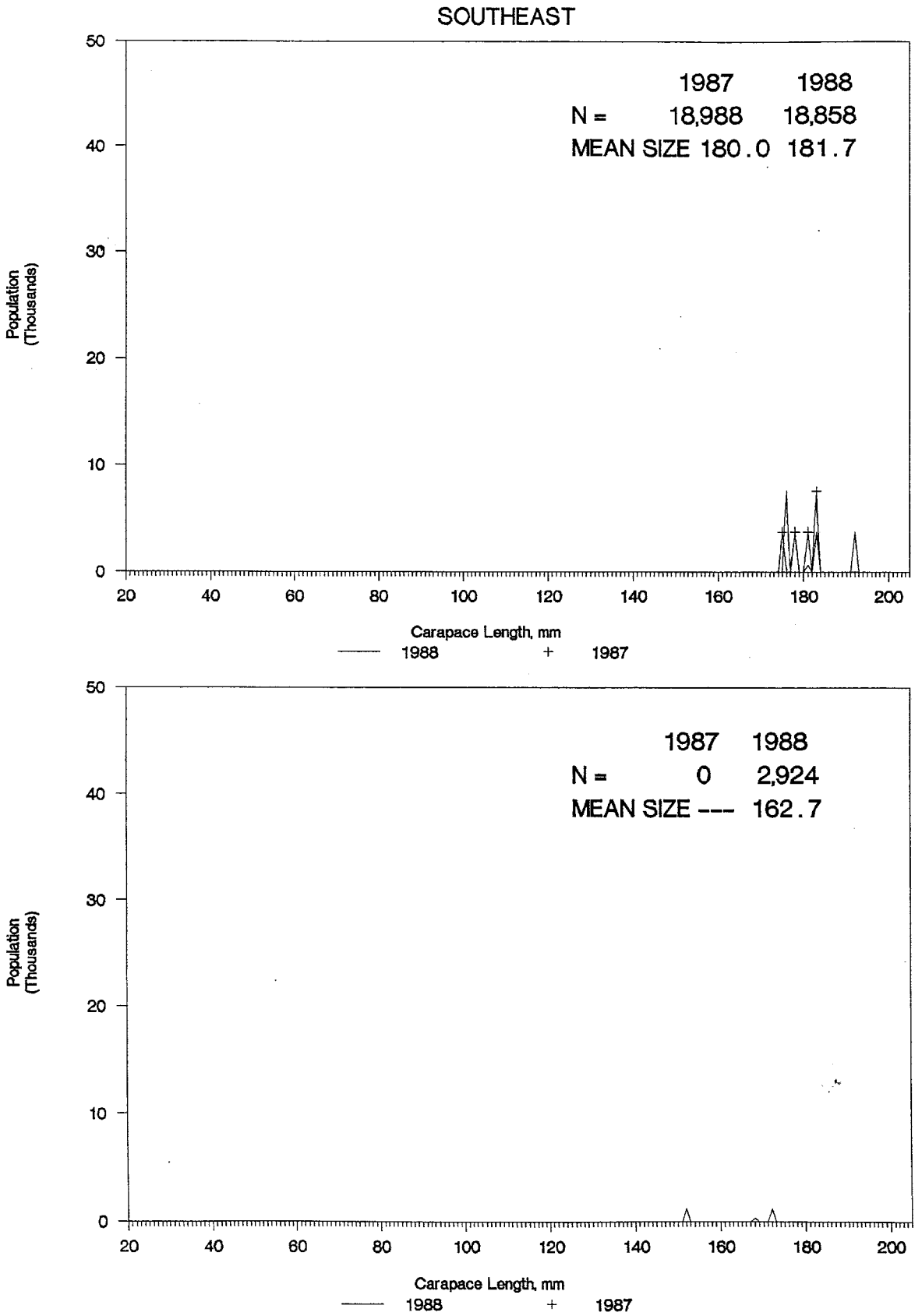


Figure 14. Carapace length frequency of estimated populations of male (top) and female king crab, Paralithodes camtschatica, for the Southeast District, Kodiak trawl surveys 1987 and 1988.

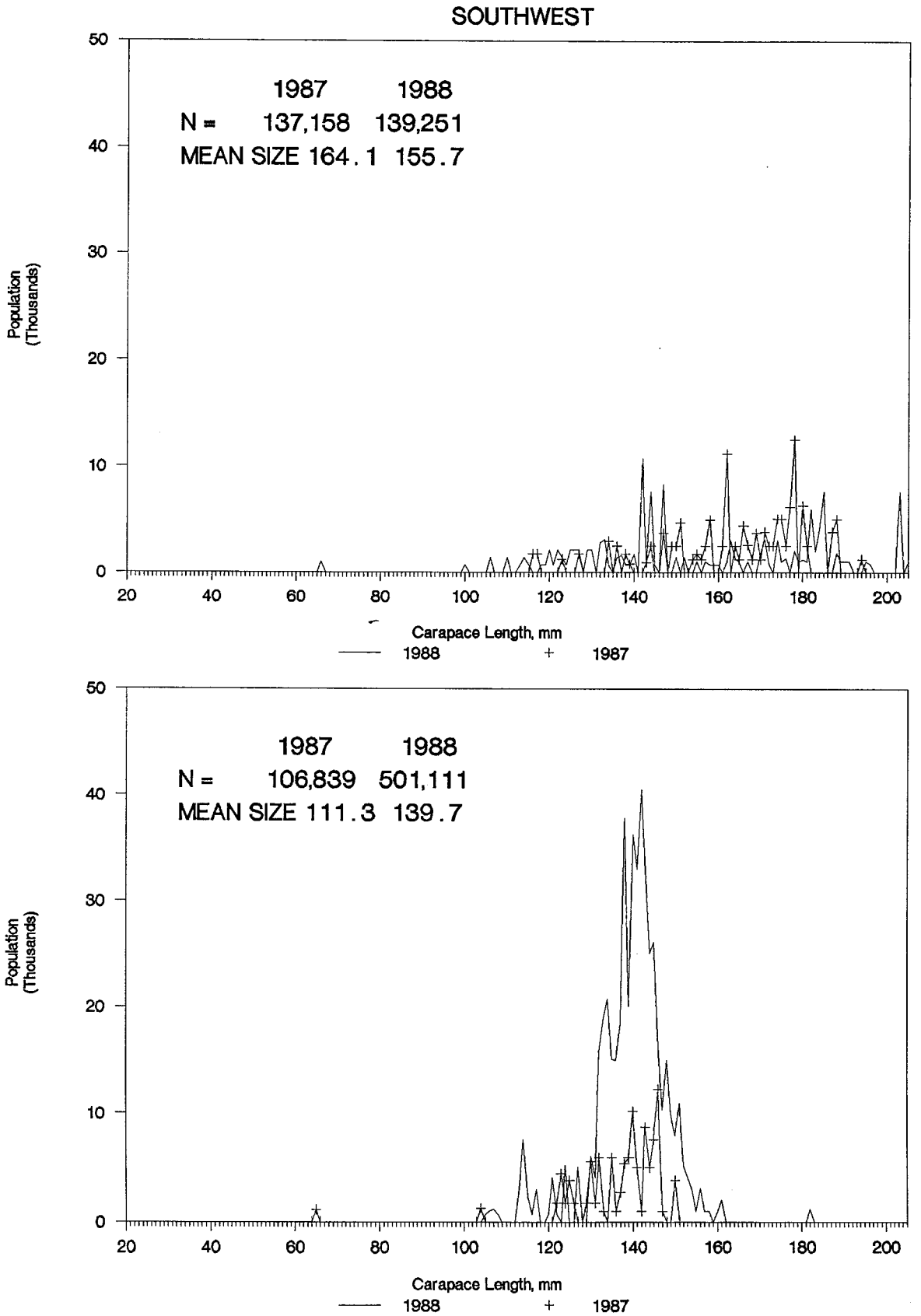


Figure 15. Carapace length frequency of estimated populations of male (top) and female king crab, Paralithodes camtschatica, for the Southwest District, Kodiak trawl surveys 1987 and 1988.

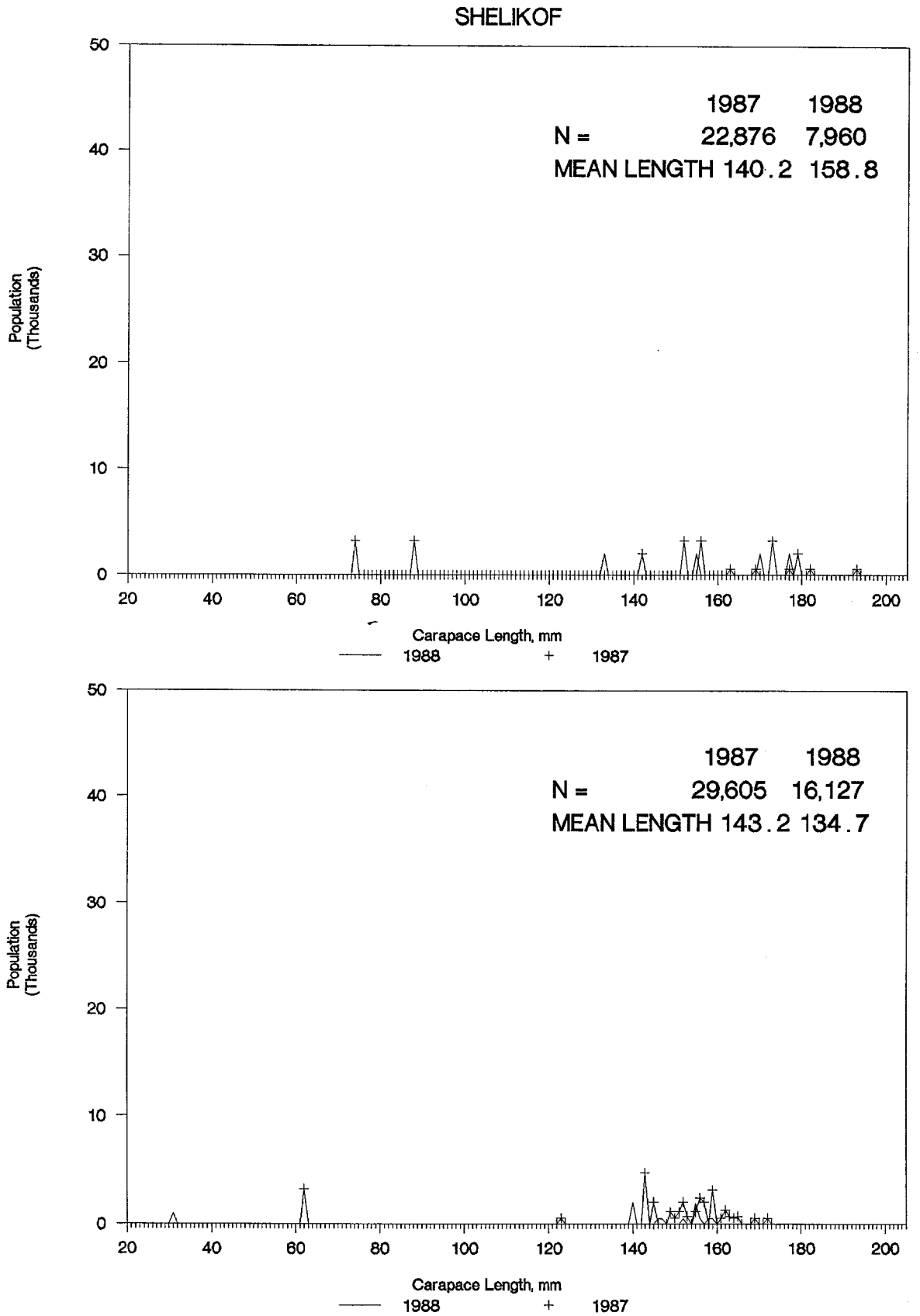


Figure 16. Carapace length frequency of estimated populations of male (top) and female king crab, Paralithodes camtschatica, for the Shelikof District, Kodiak trawl surveys 1987 and 1988.

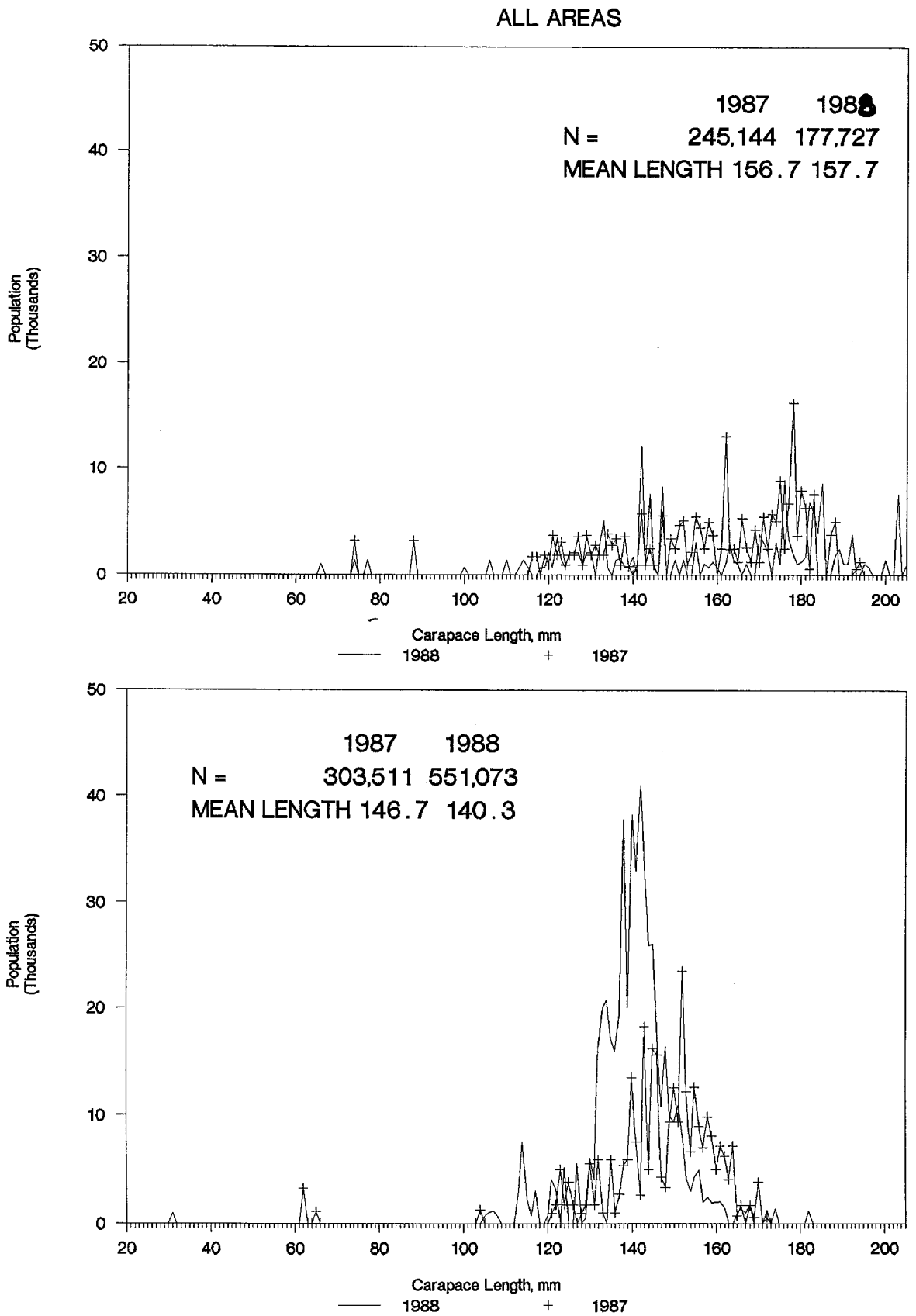
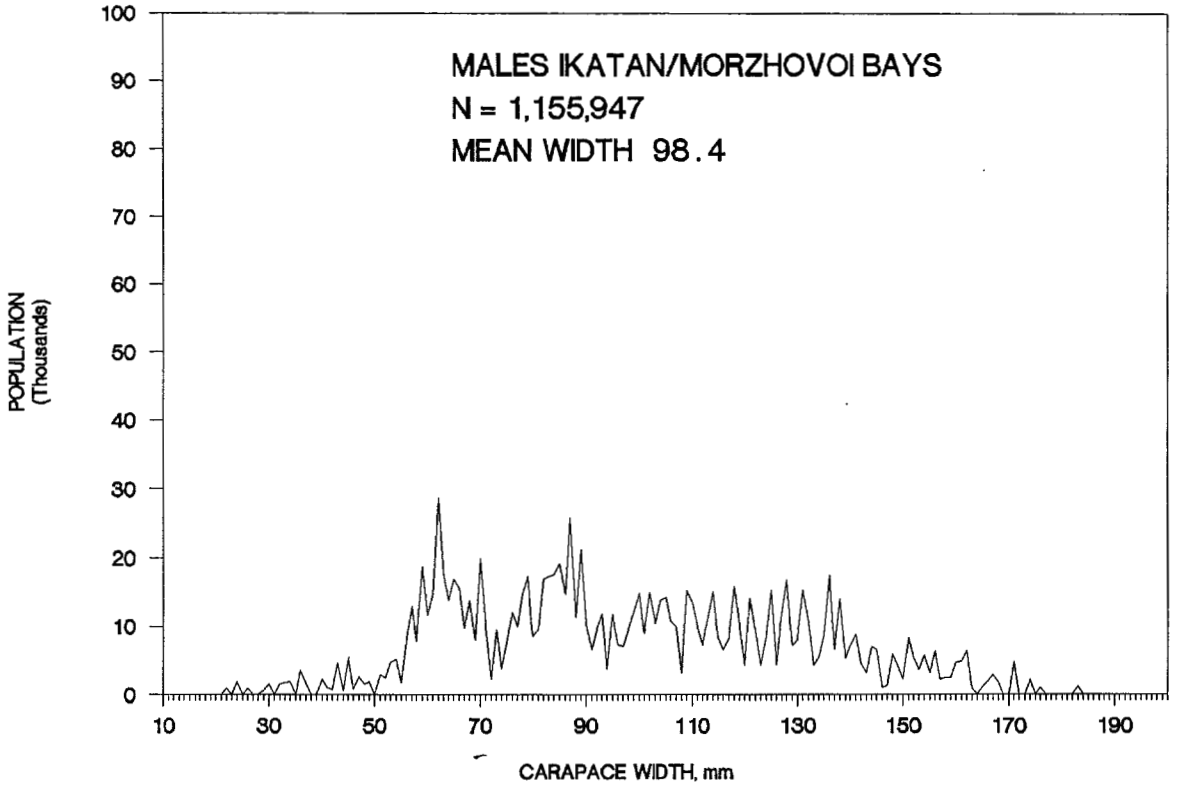


Figure 17. Carapace length frequency of estimated populations of male (top) and female king crab, Paralithodes camtschatica, for all surveyed districts combined, Kodiak trawl surveys 1987 and 1988.



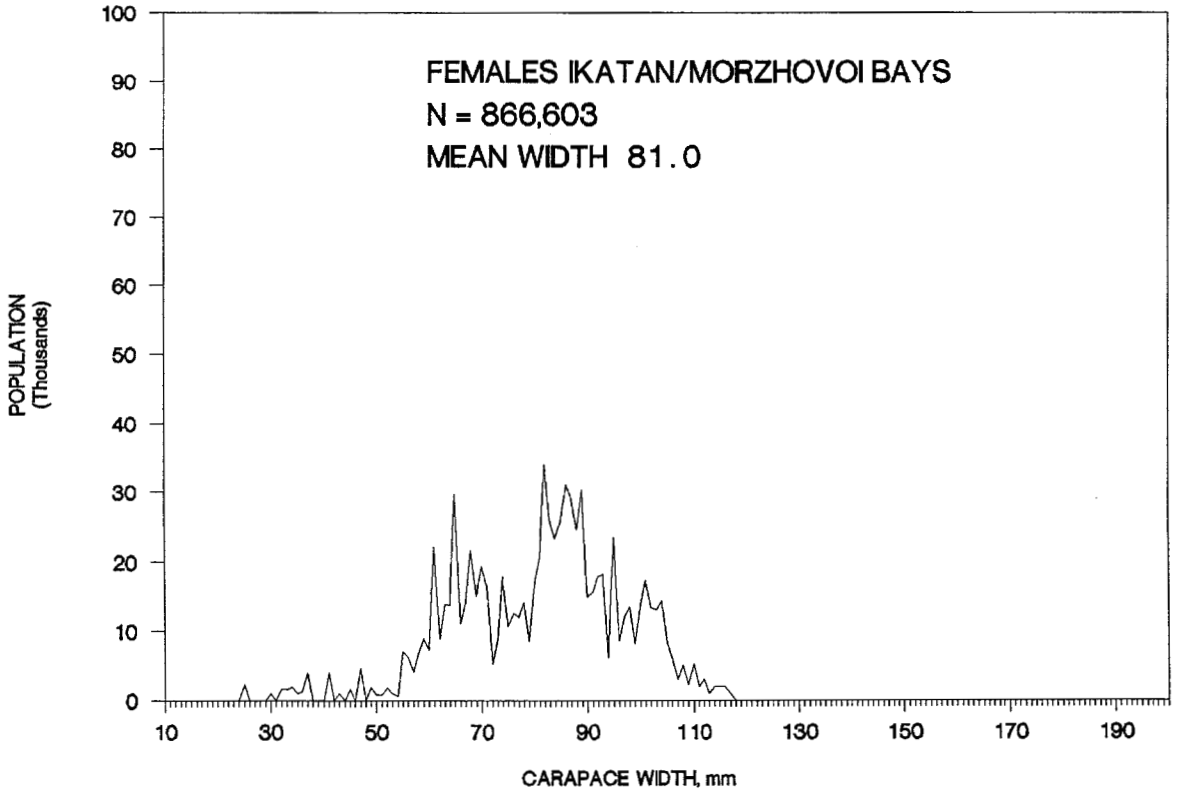
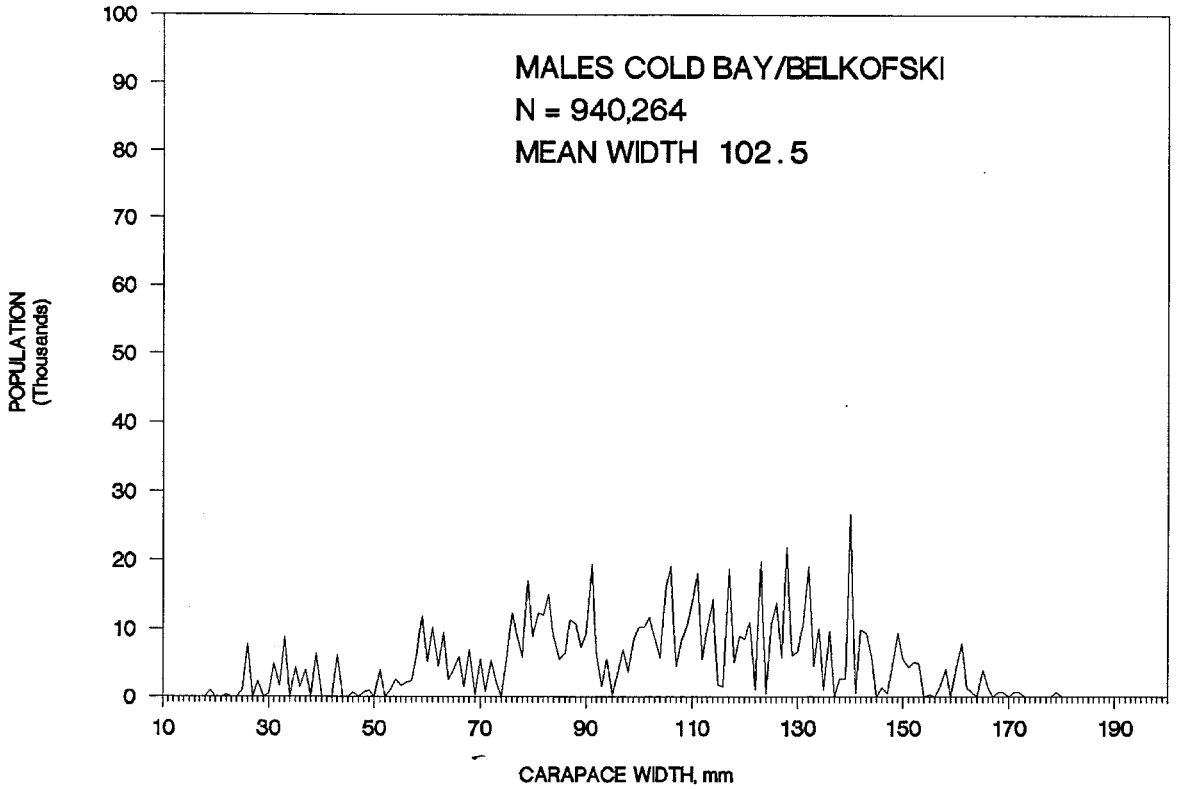


Figure 18. Carapace width frequency of estimated populations of Tanner crab, Chionoecetes bairdi, for Ikatan and Morzhovoi Bays, South Peninsula trawl survey, 1988.



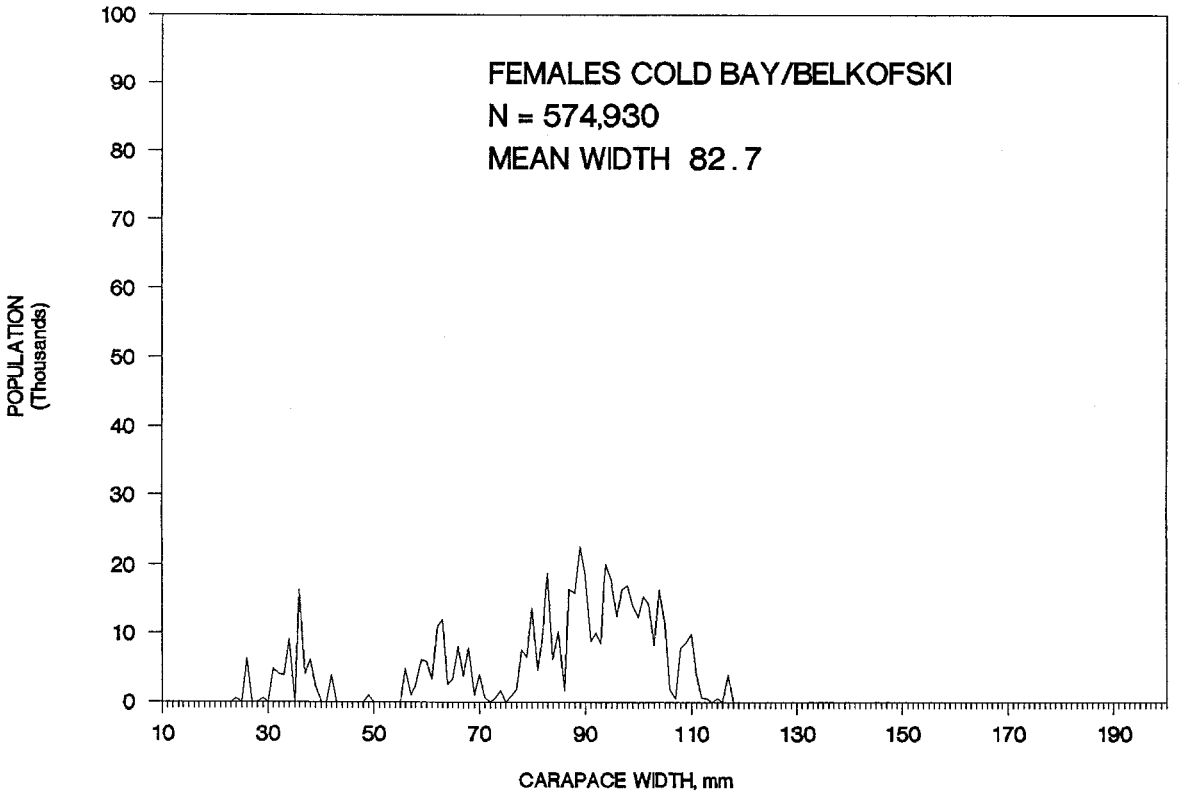
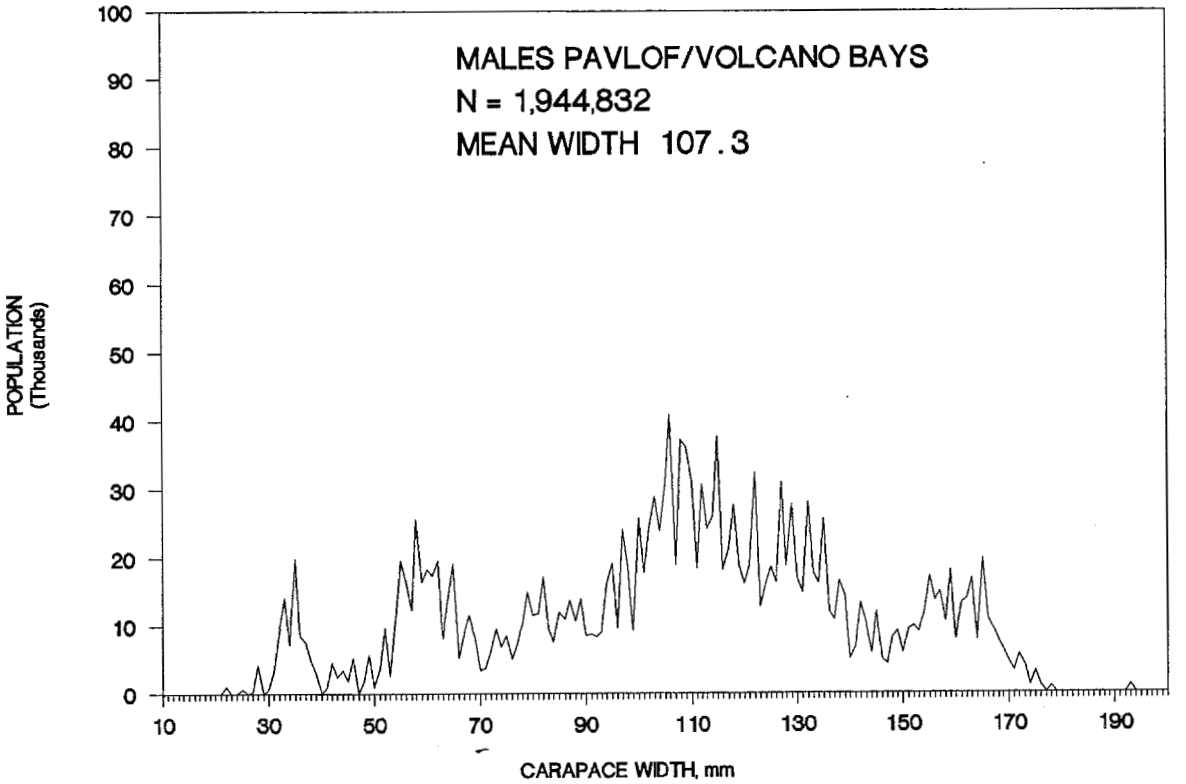


Figure 19. Carapace width frequency of estimated populations of Tanner crab, Chionoecetes bairdi, for Cold Bay and Belkofski area, South Peninsula trawl survey, 1988.



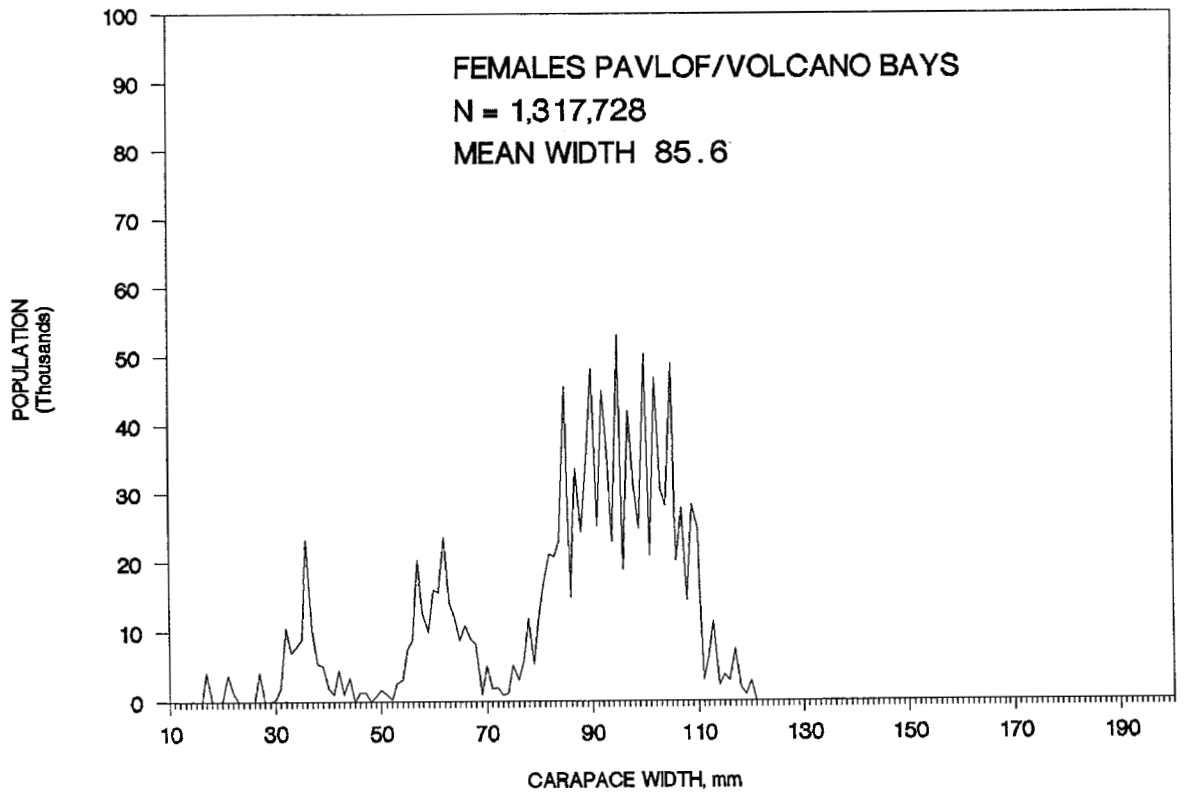
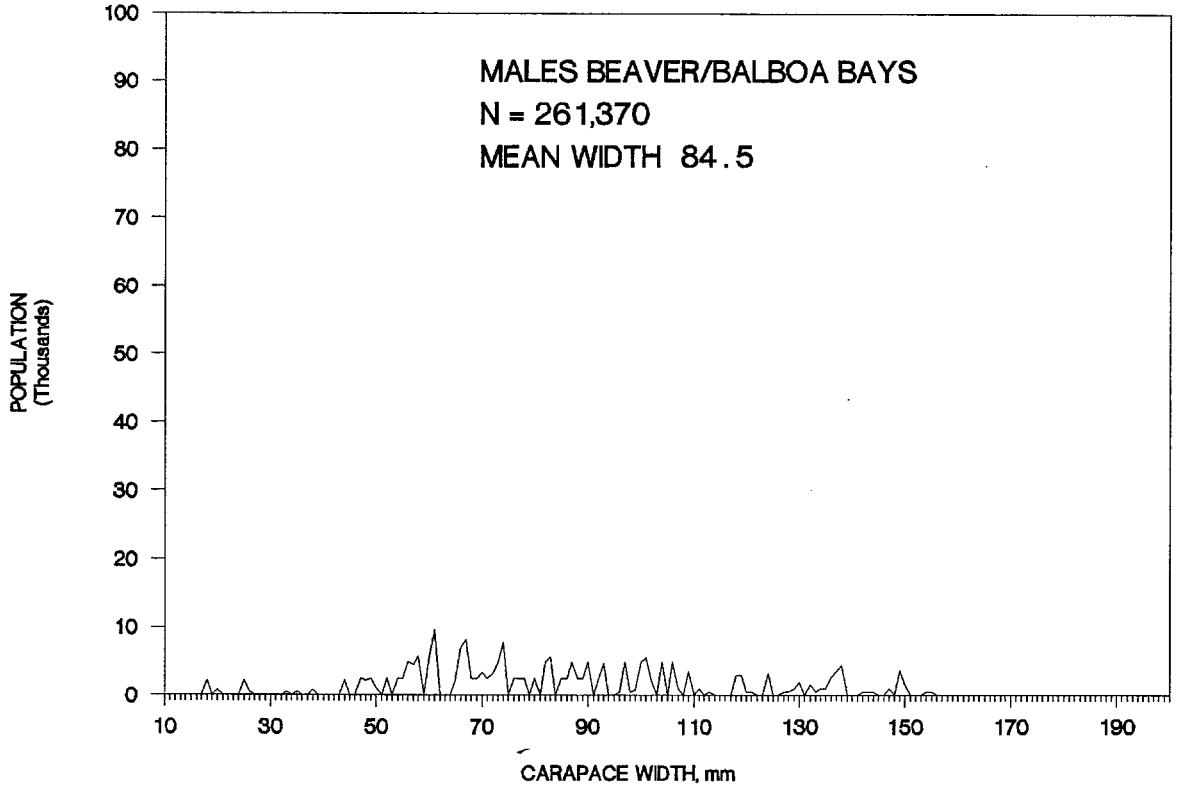


Figure 20. Carapace width frequency of estimated populations of Tanner crab, Chionoecetes bairdi, for Pavlof and Volcano Bays, South Peninsula trawl survey, 1988.



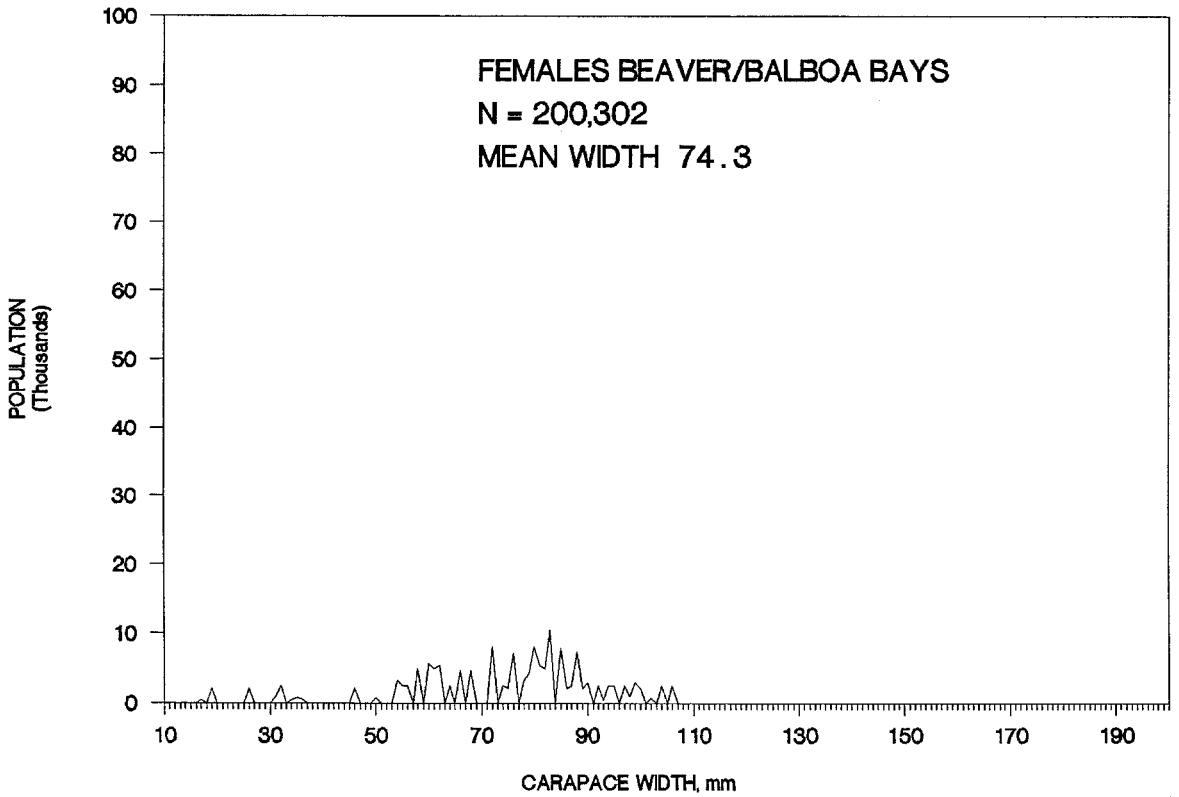
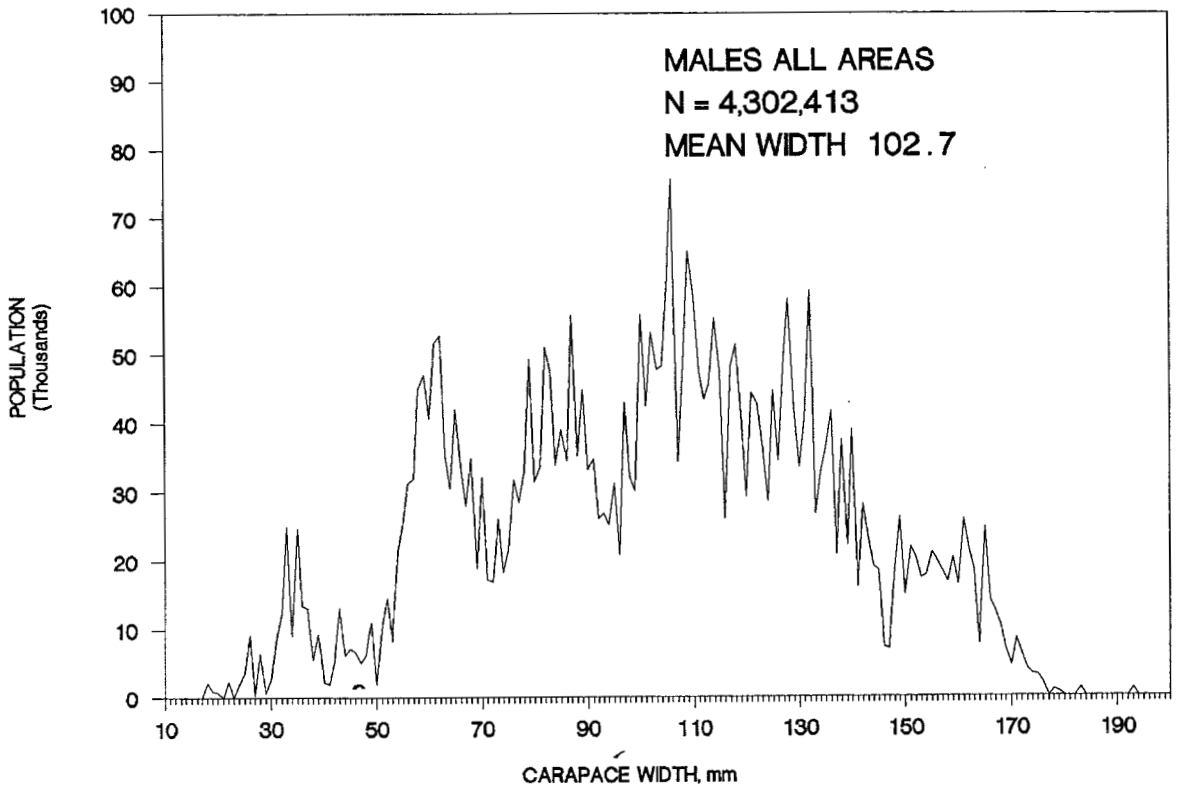


Figure 21. Carapace width frequency of estimated populations of Tanner crab, Chionoecetes bairdi, for Beaver and Balboa Bays, South Peninsula trawl survey, 1988.



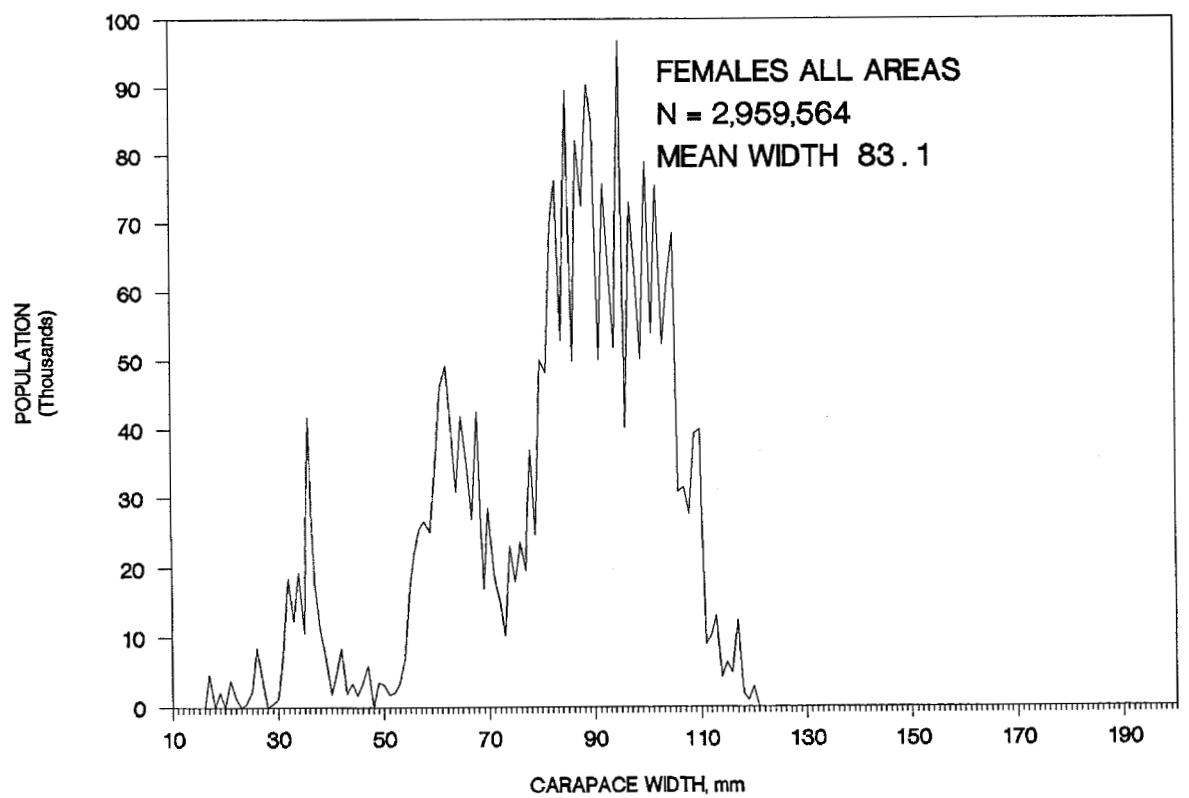
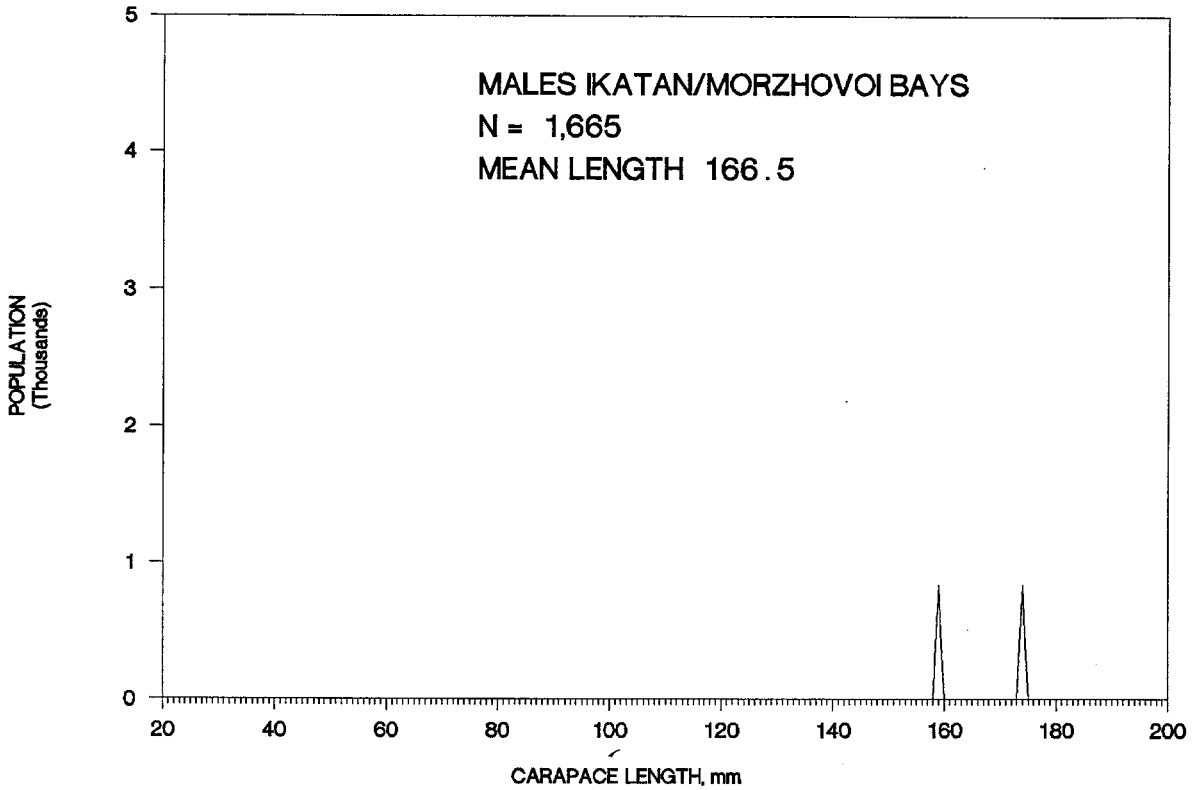


Figure 22. Carapace width frequency of estimated populations of Tanner crab, Chionoecetes bairdi, for all areas surveyed, South Peninsula trawl survey, 1988.



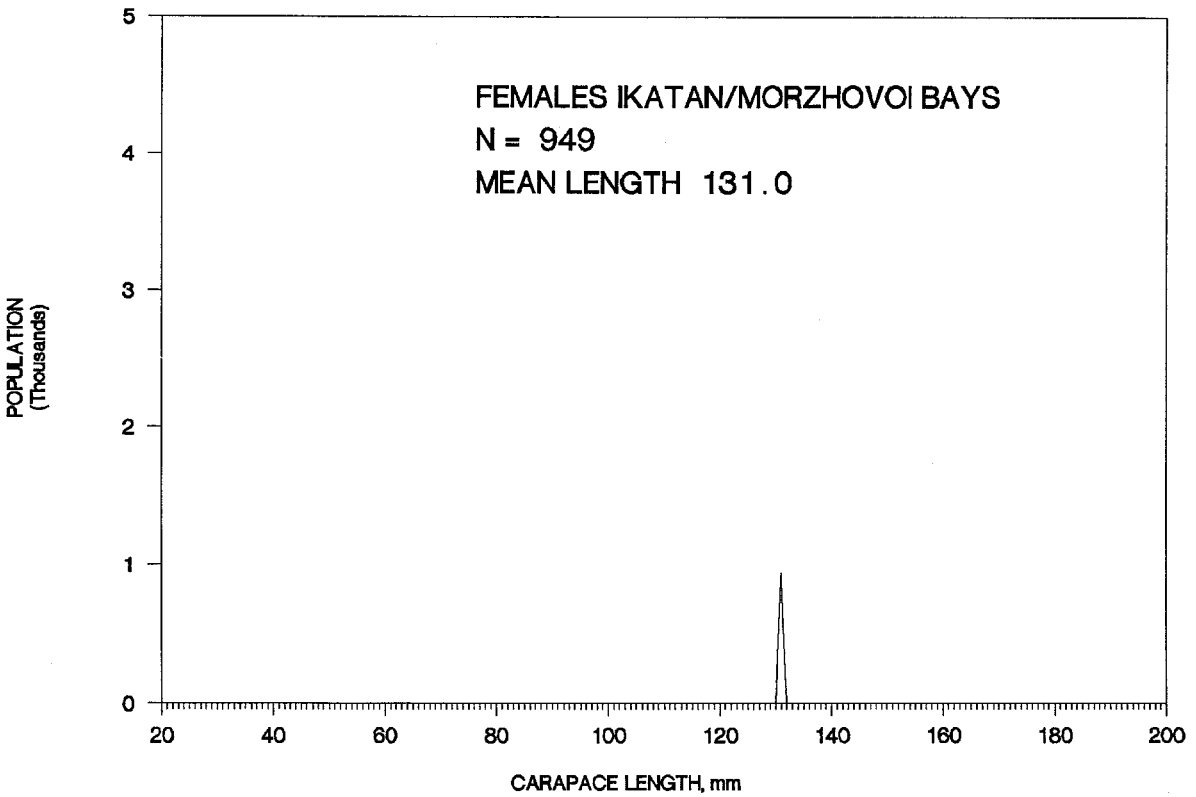
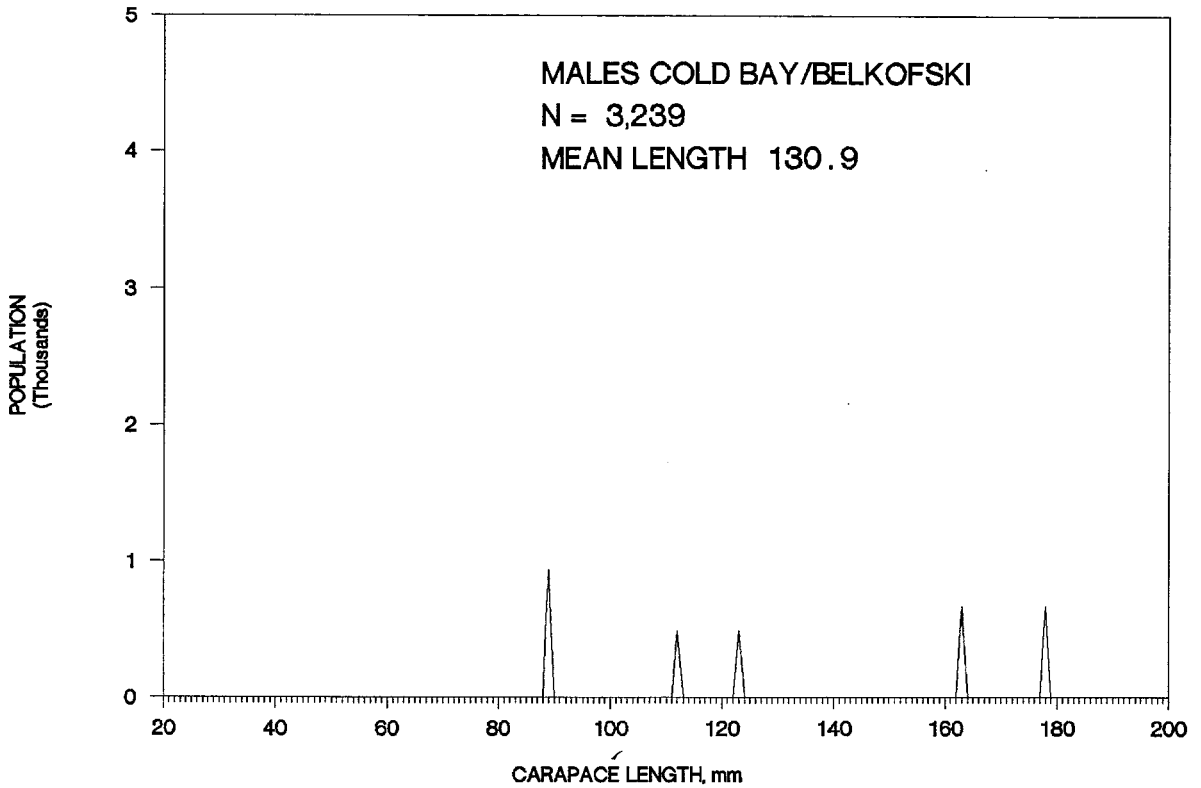


Figure 23. Carapace length frequency of estimated populations of king crab, Paralithodes camtschatica, for Ikatan and Morzhovoi Bays, South Peninsula trawl survey, 1988.



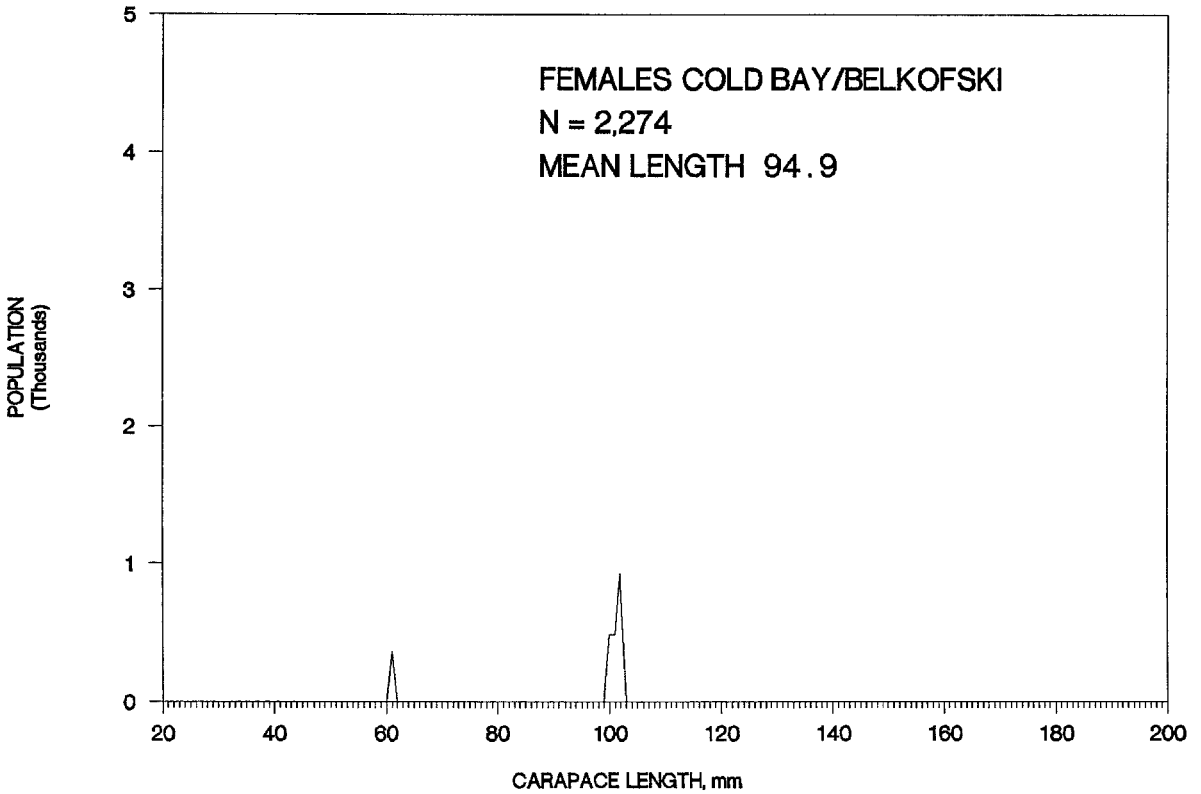
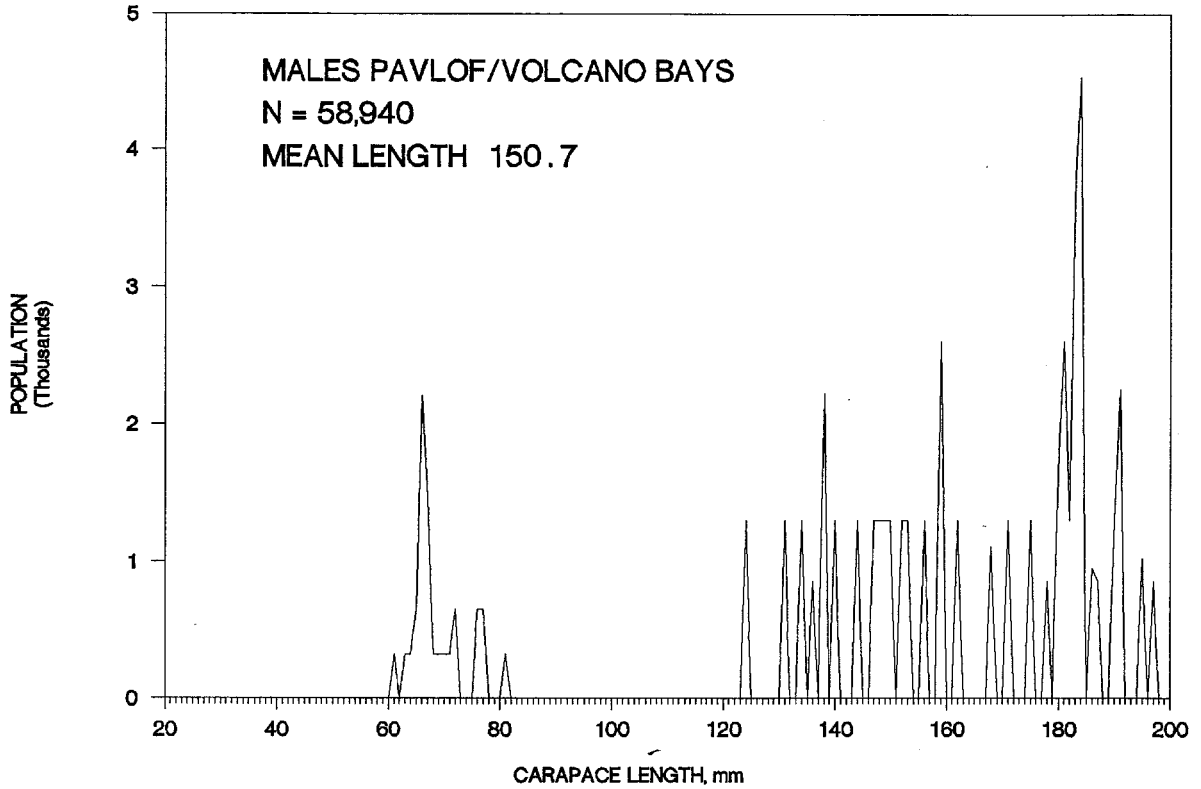


Figure 24. Carapace length frequency of estimated populations of king crab, Paralithodes camtschatica, for Cold Bay and Belkofski area, South Peninsula trawl survey, 1988.



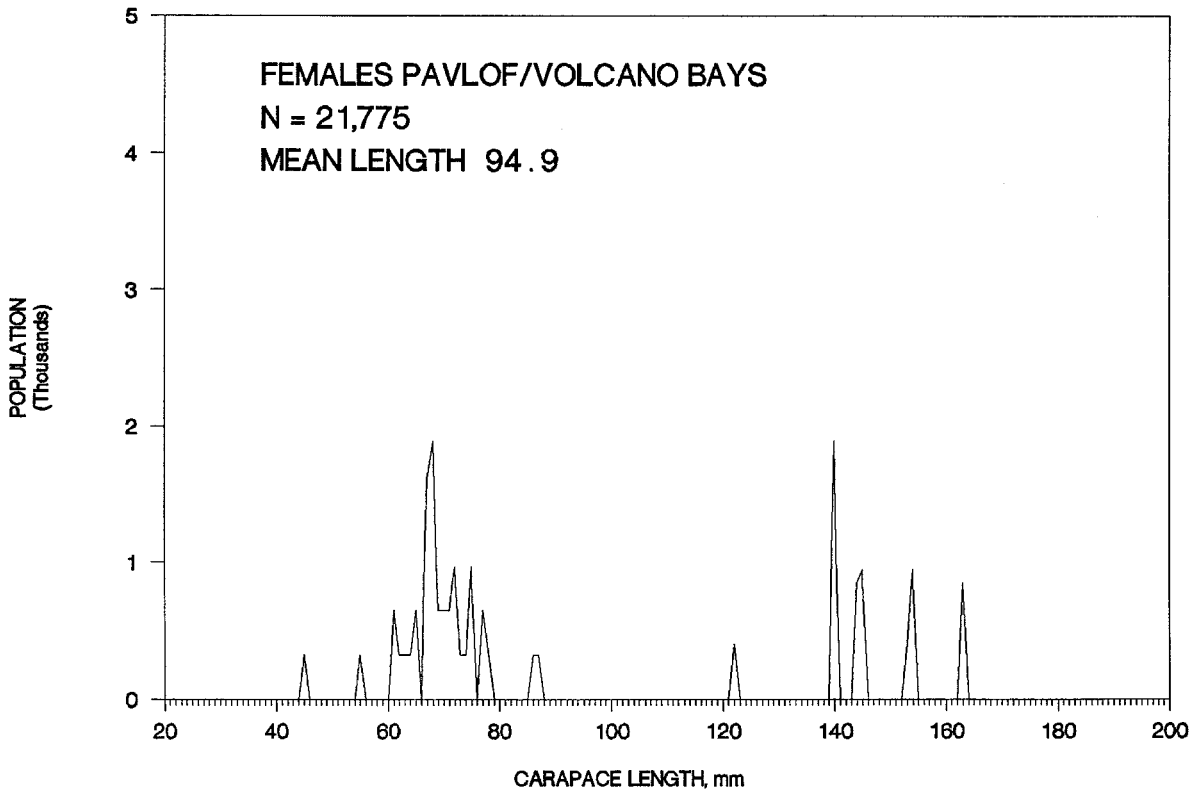
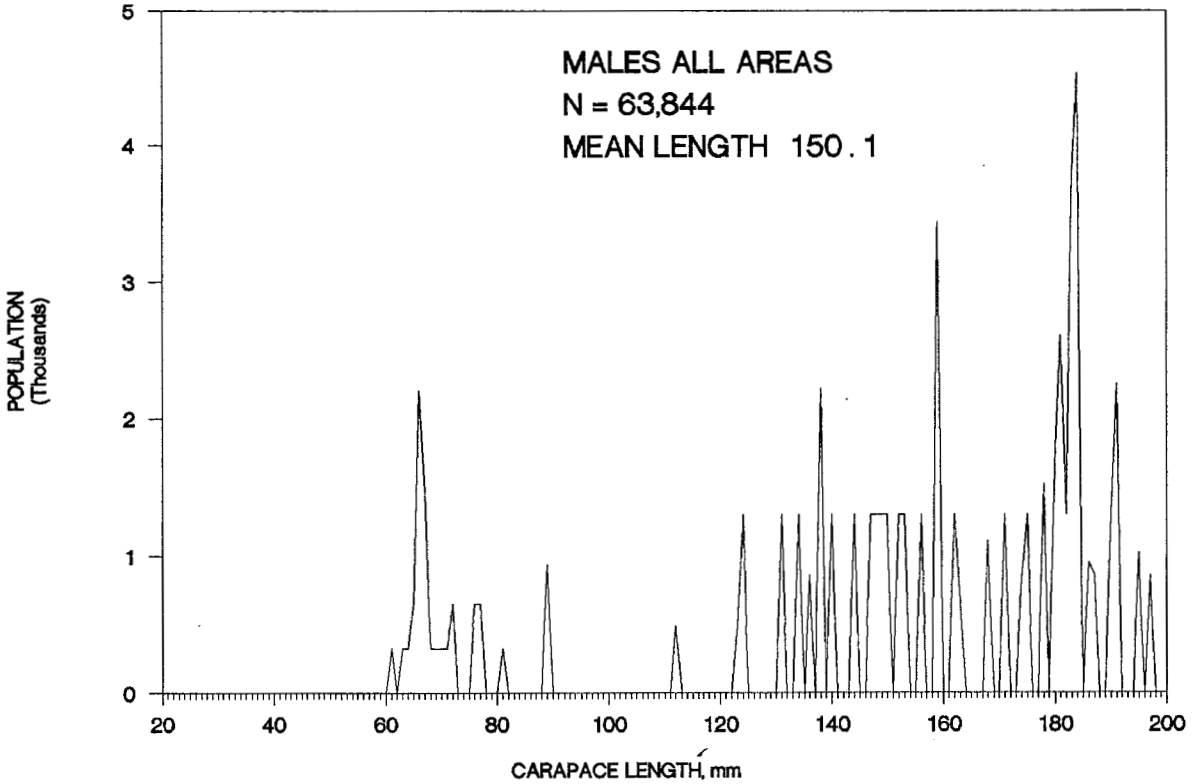


Figure 25. Carapace length frequency of estimated populations of king crab, Paralithodes camtschatica, for Pavlof and Volcano Bays, South Peninsula trawl survey, 1988.



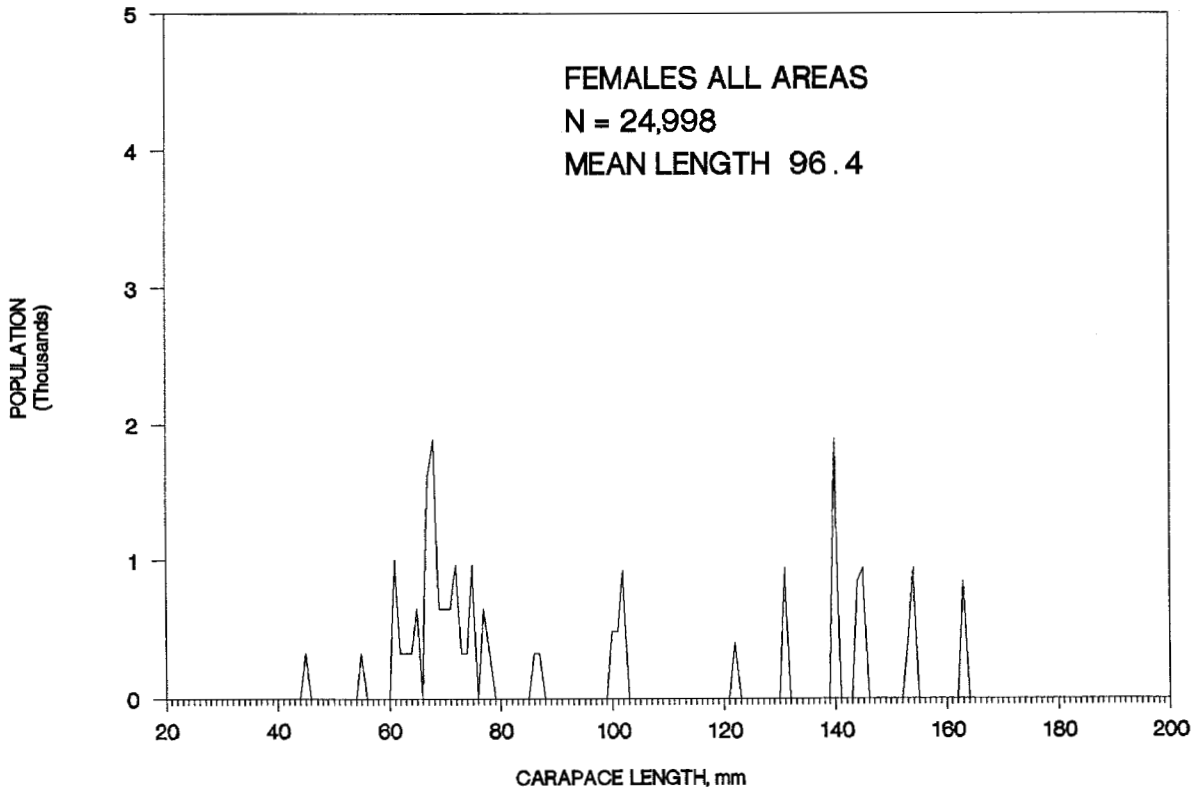


Figure 26. Carapace length frequency of estimated populations of king crab, Paralithodes camtschatica, for all areas surveyed, South Peninsula trawl survey, 1988.

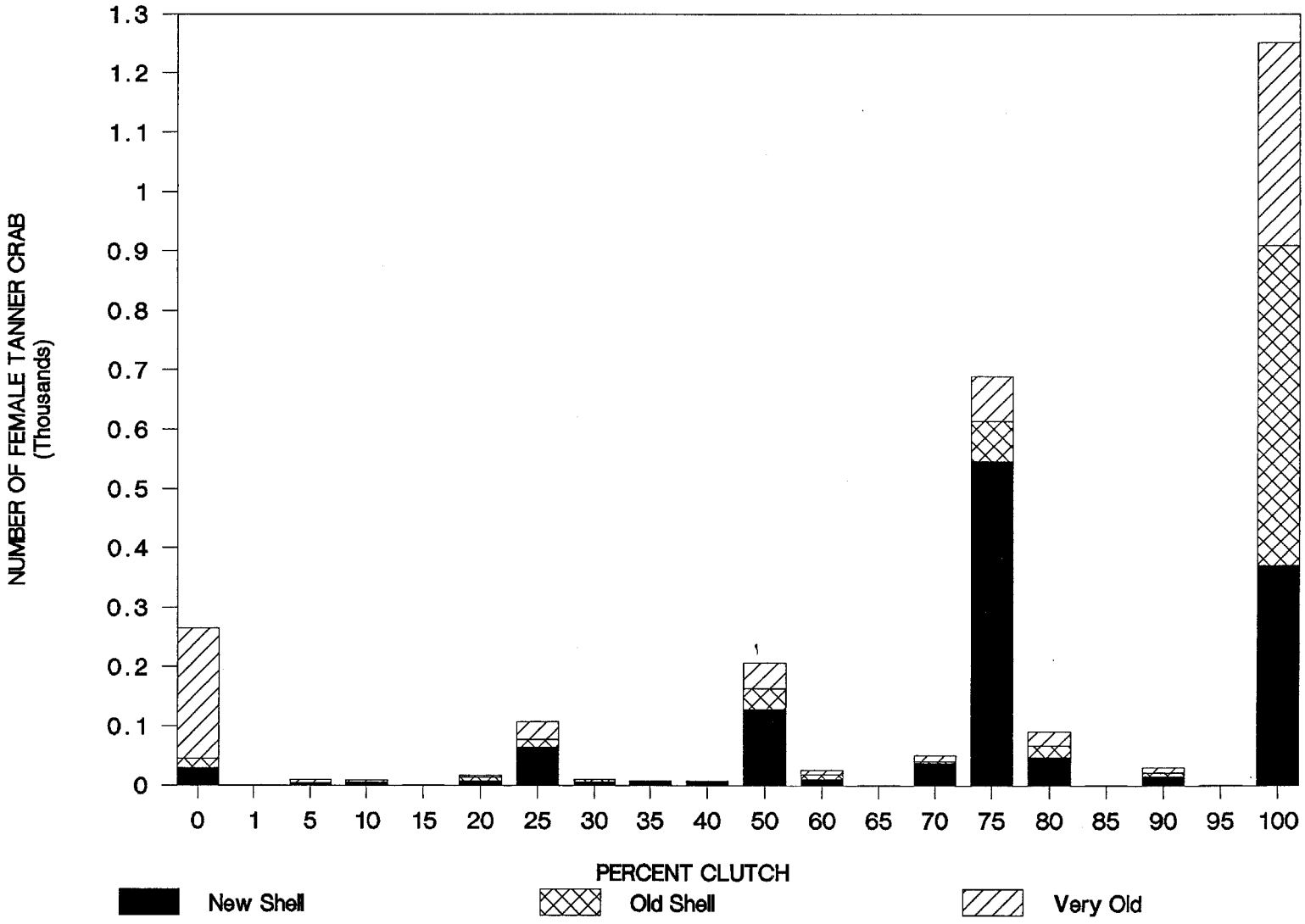


Figure 27. Percent ovigerity of female Tanner crab, Chionoecetes bairdi, captured during the Kodiak trawl survey, 1988.

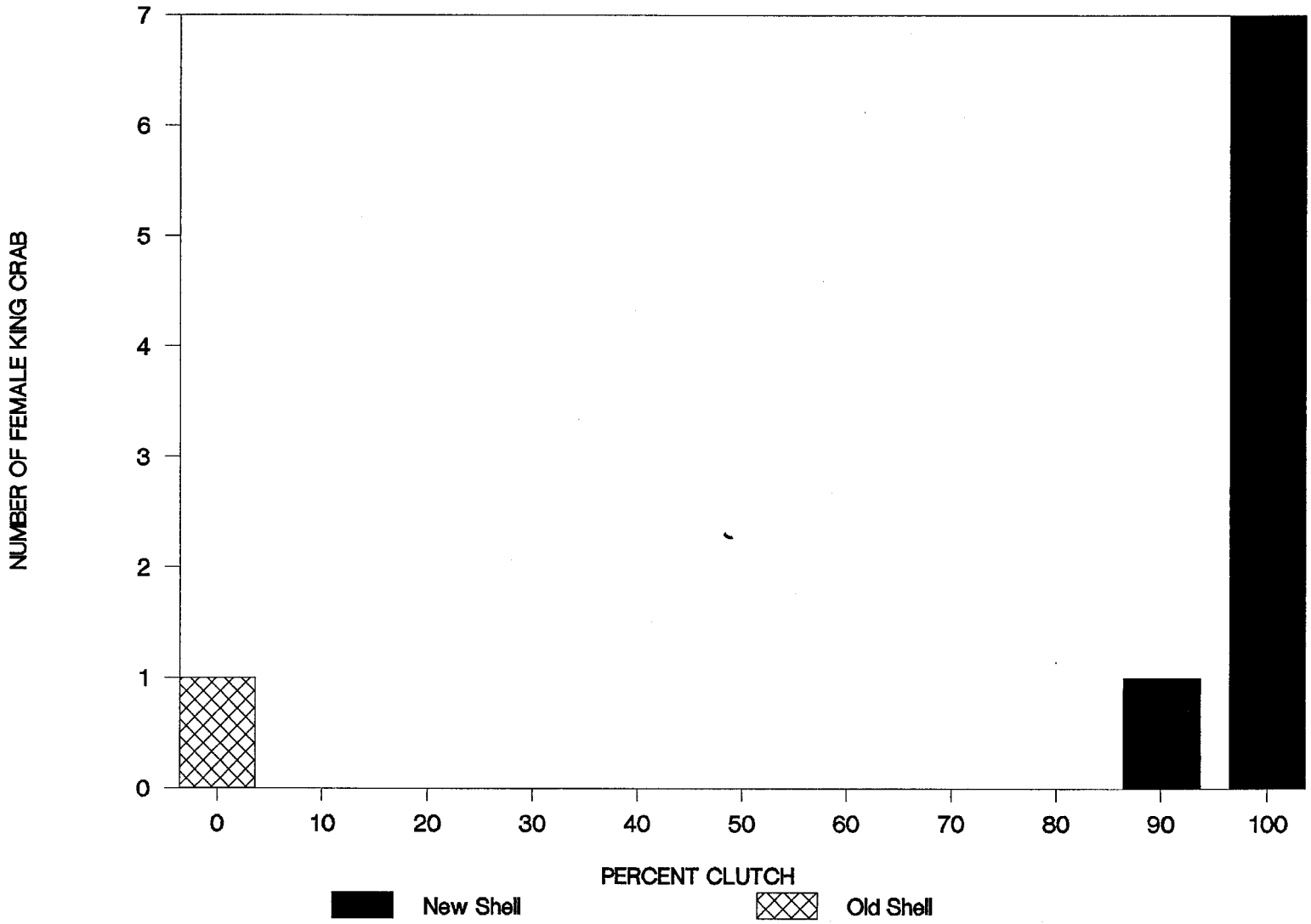


Figure 28. Percent ovigerity of female king crab, Paralithodes camtschatica, captured during the South Peninsula trawl survey, 1988.

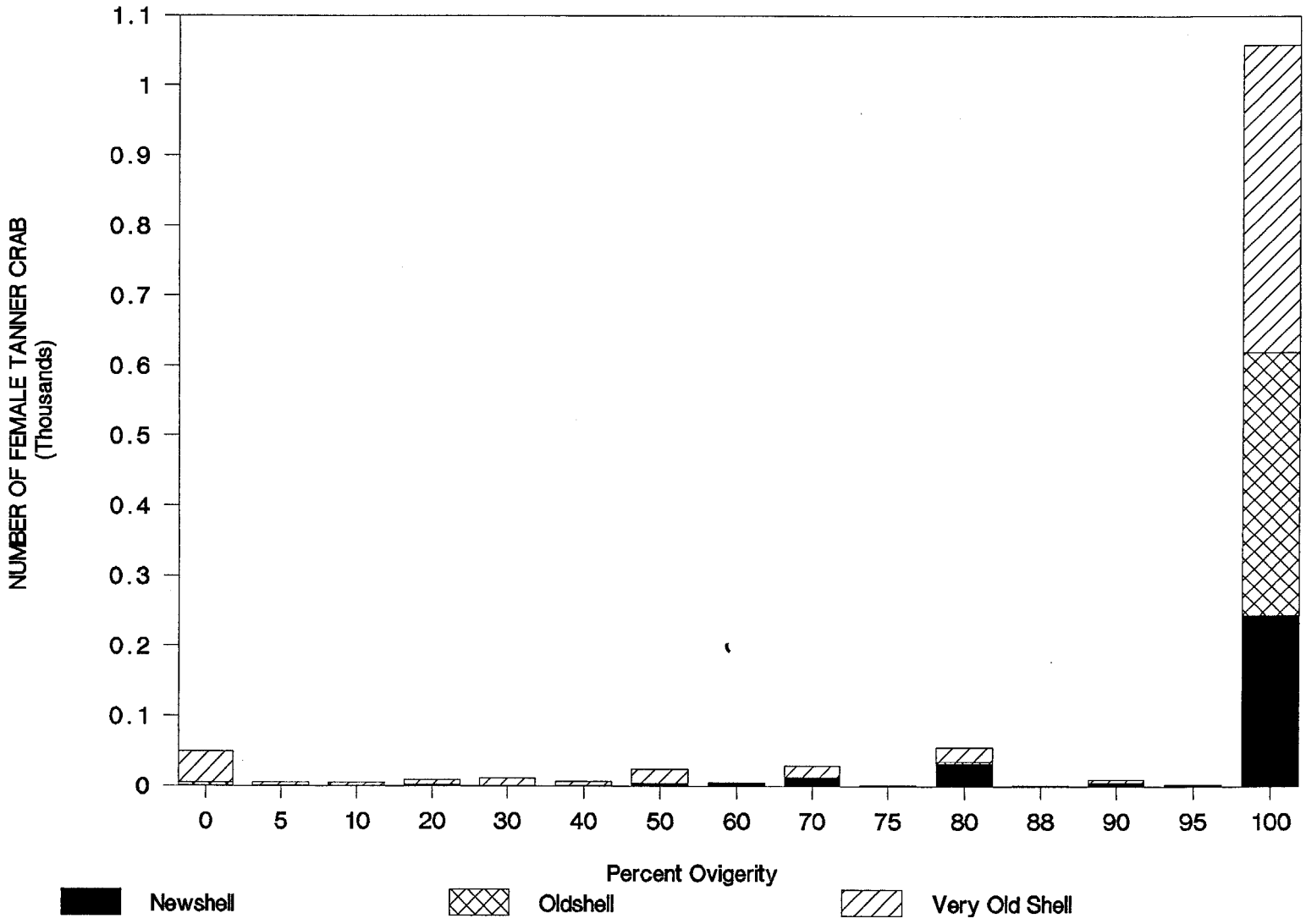


Figure 29. Percent ovigerity of female Tanner crab, Chionoecetes bairdi, captured during the South Peninsula trawl survey, 1988.

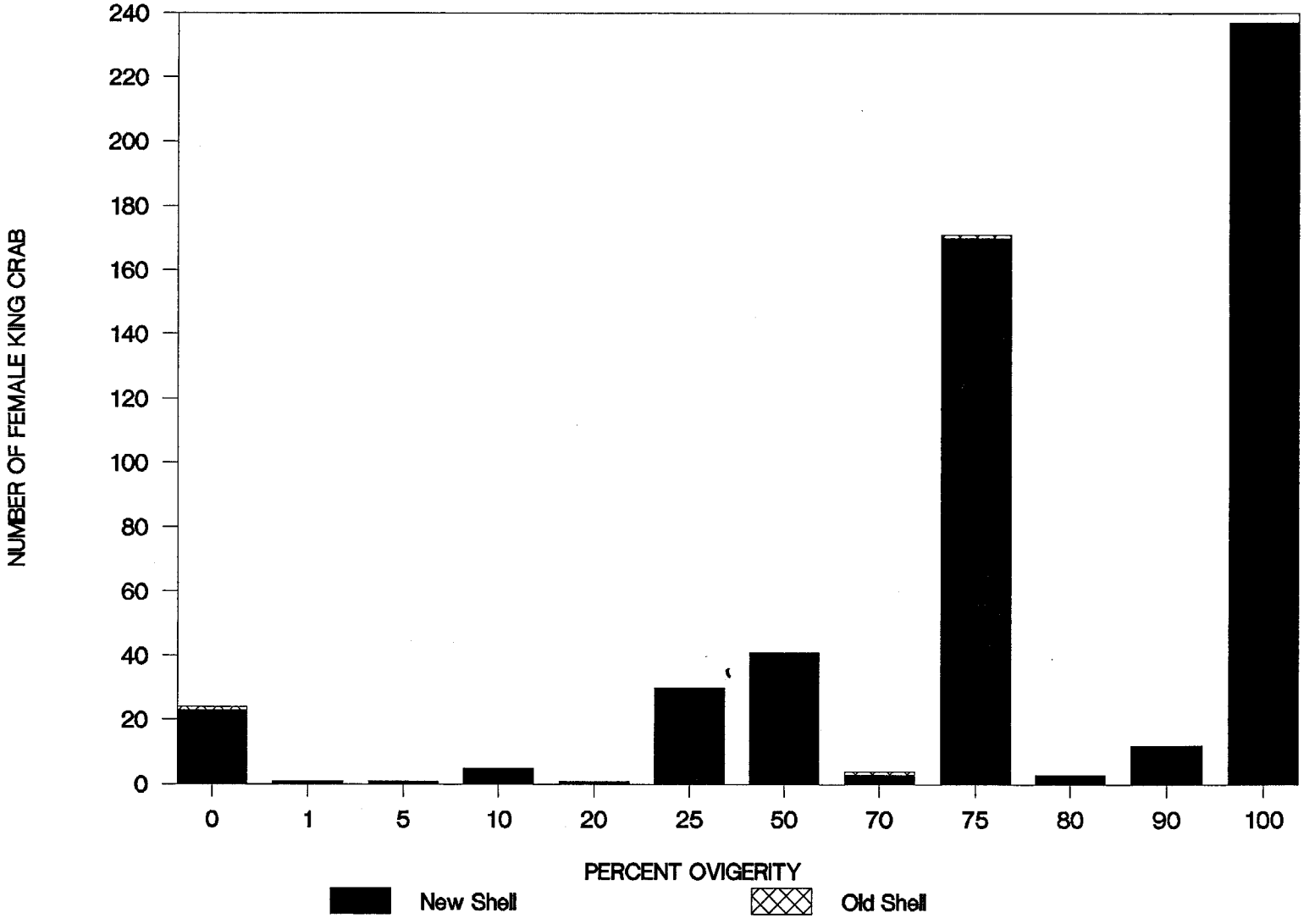


Figure 30. Percent ovigerity of female king crab, Paralithodes camtschatica, captured during the Kodiak trawl survey, 1988.

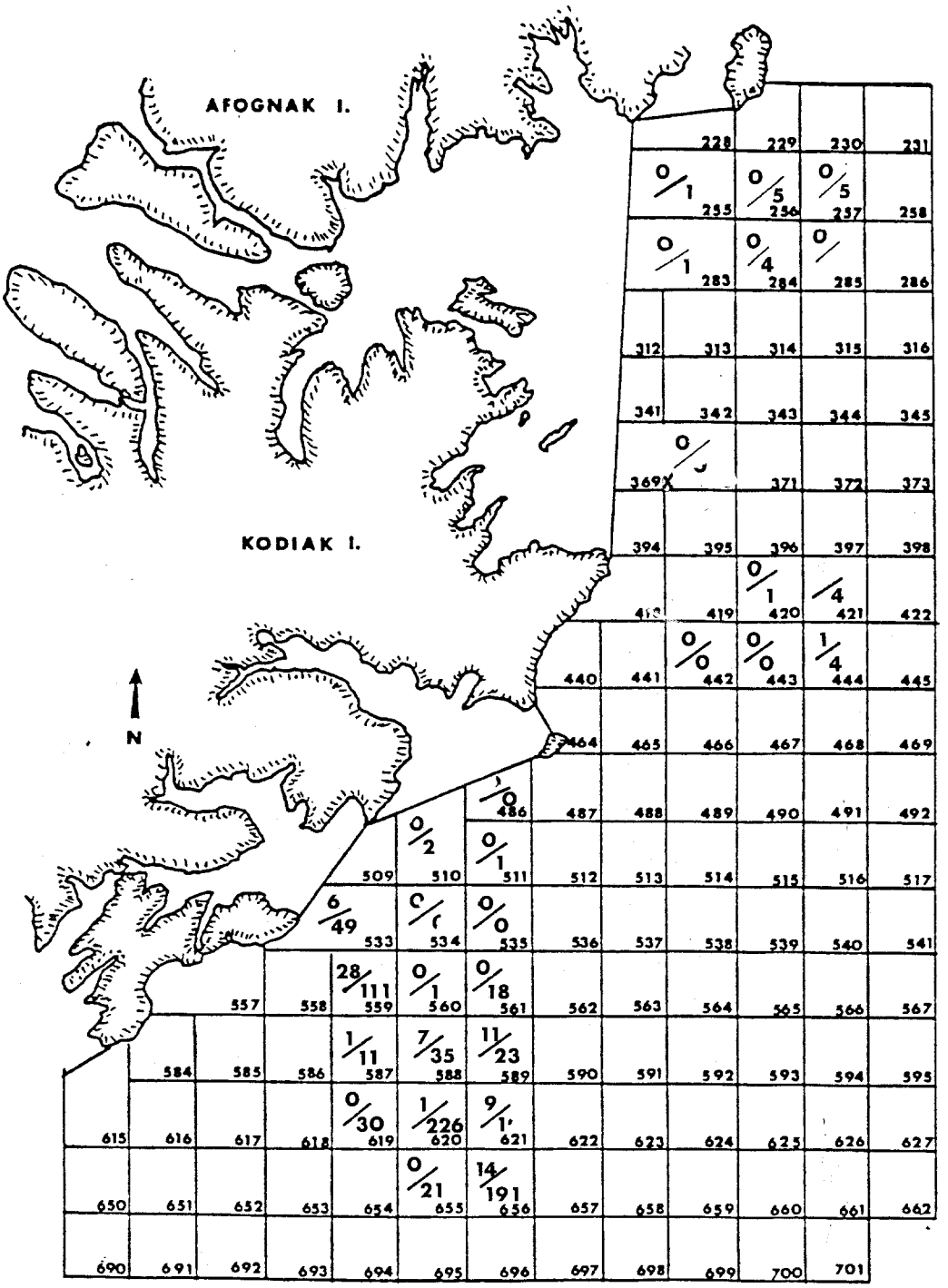


Figure 31. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

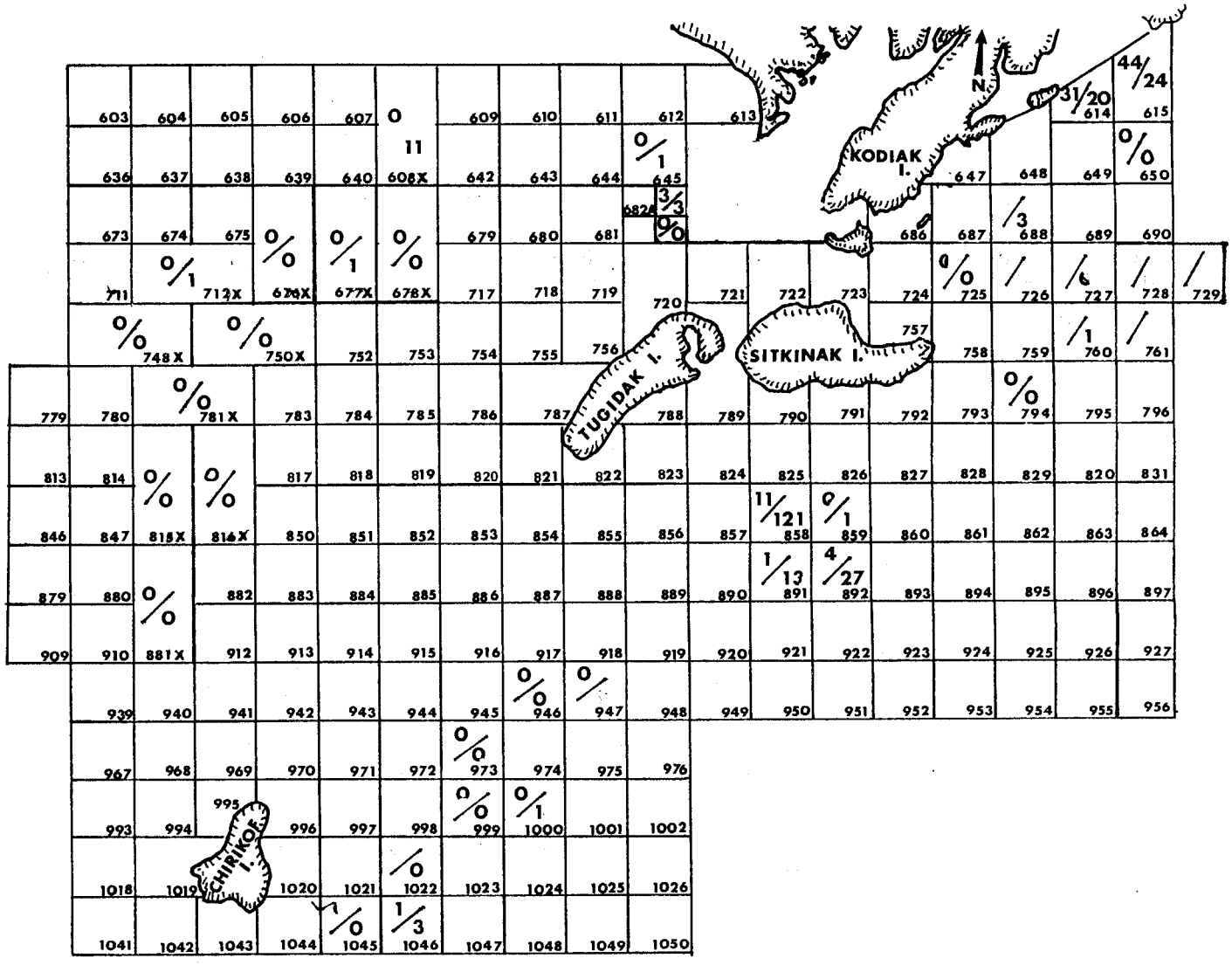


Figure 32. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

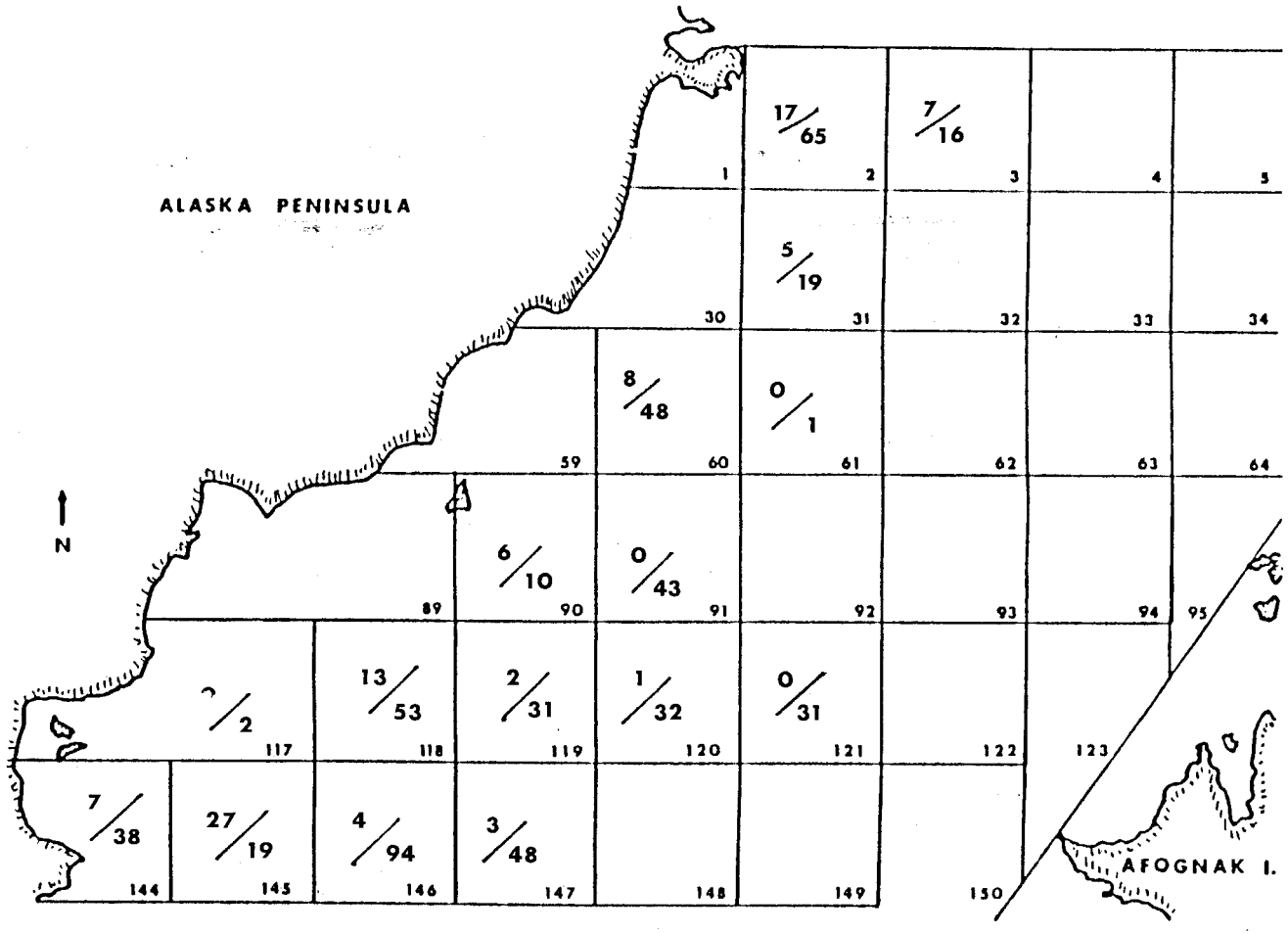


Figure 33. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

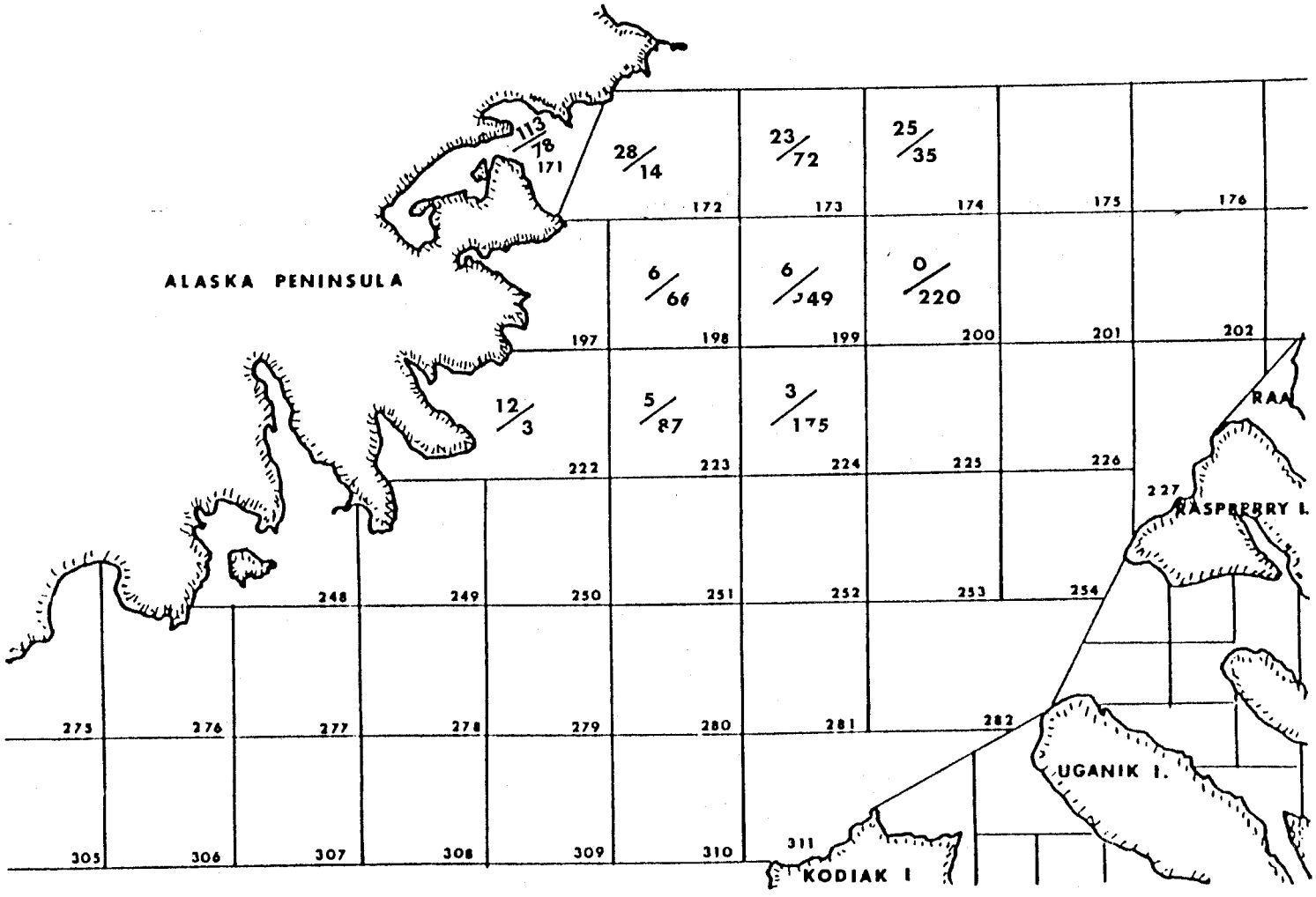


Figure 34. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

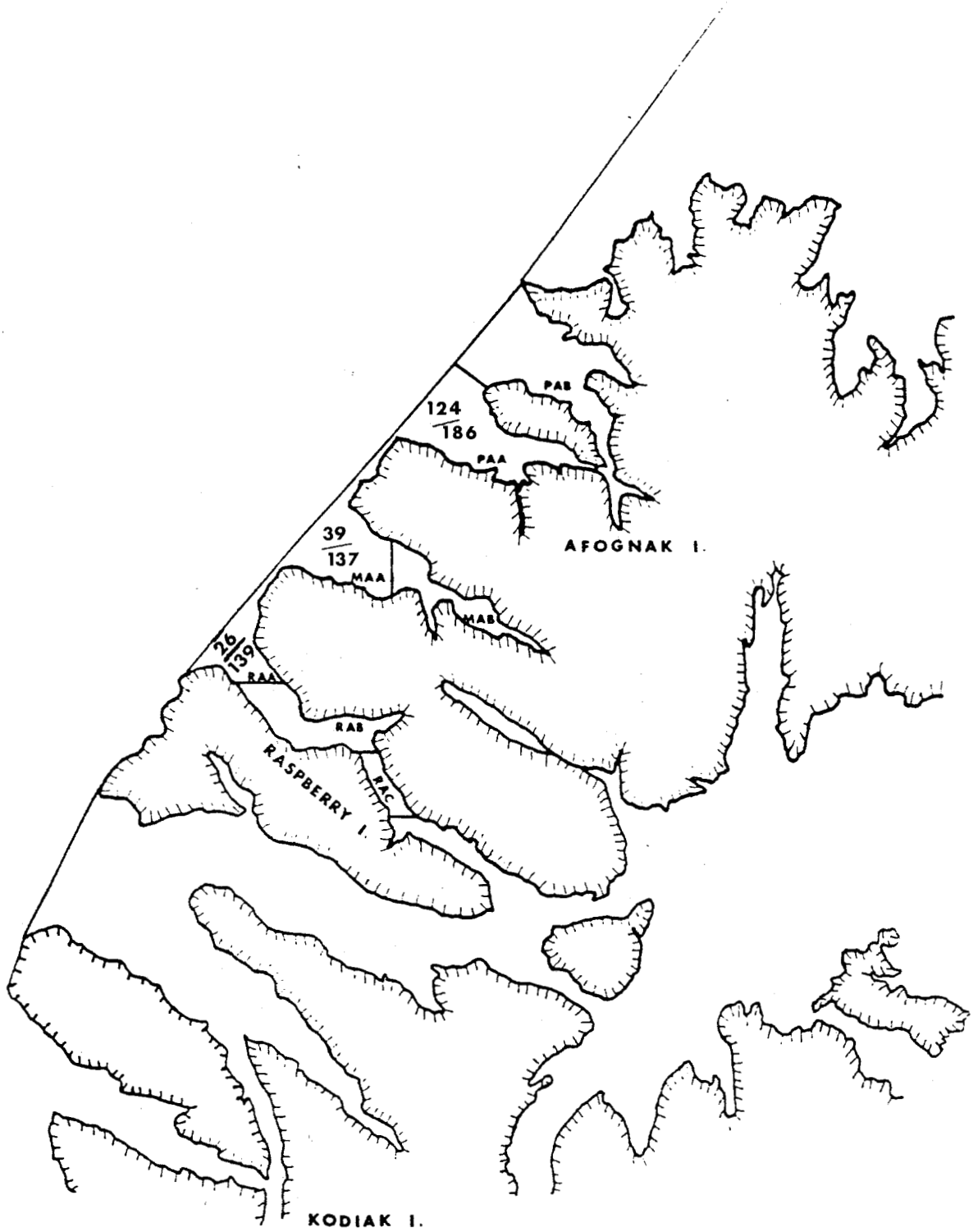


Figure 35. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

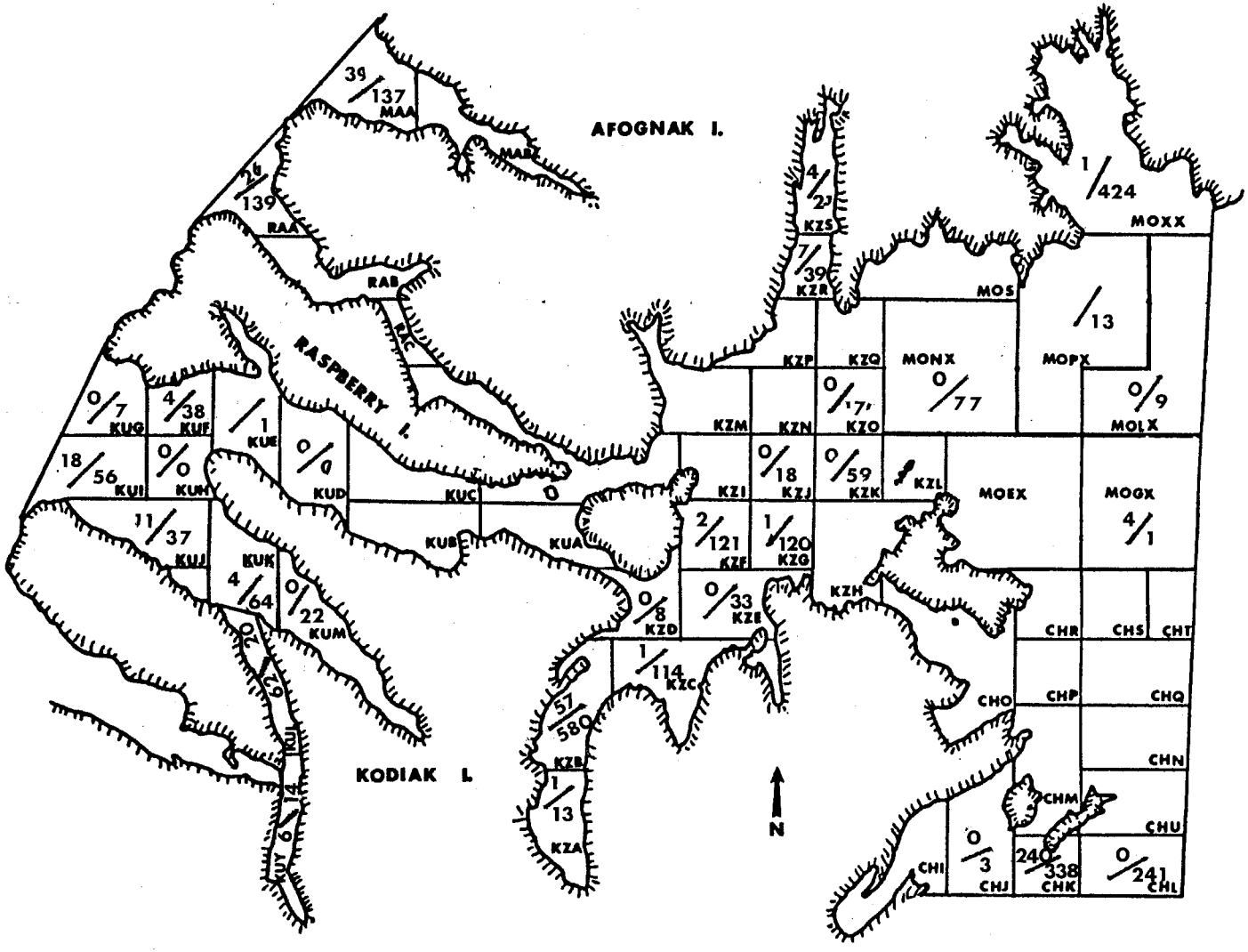


Figure 36. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

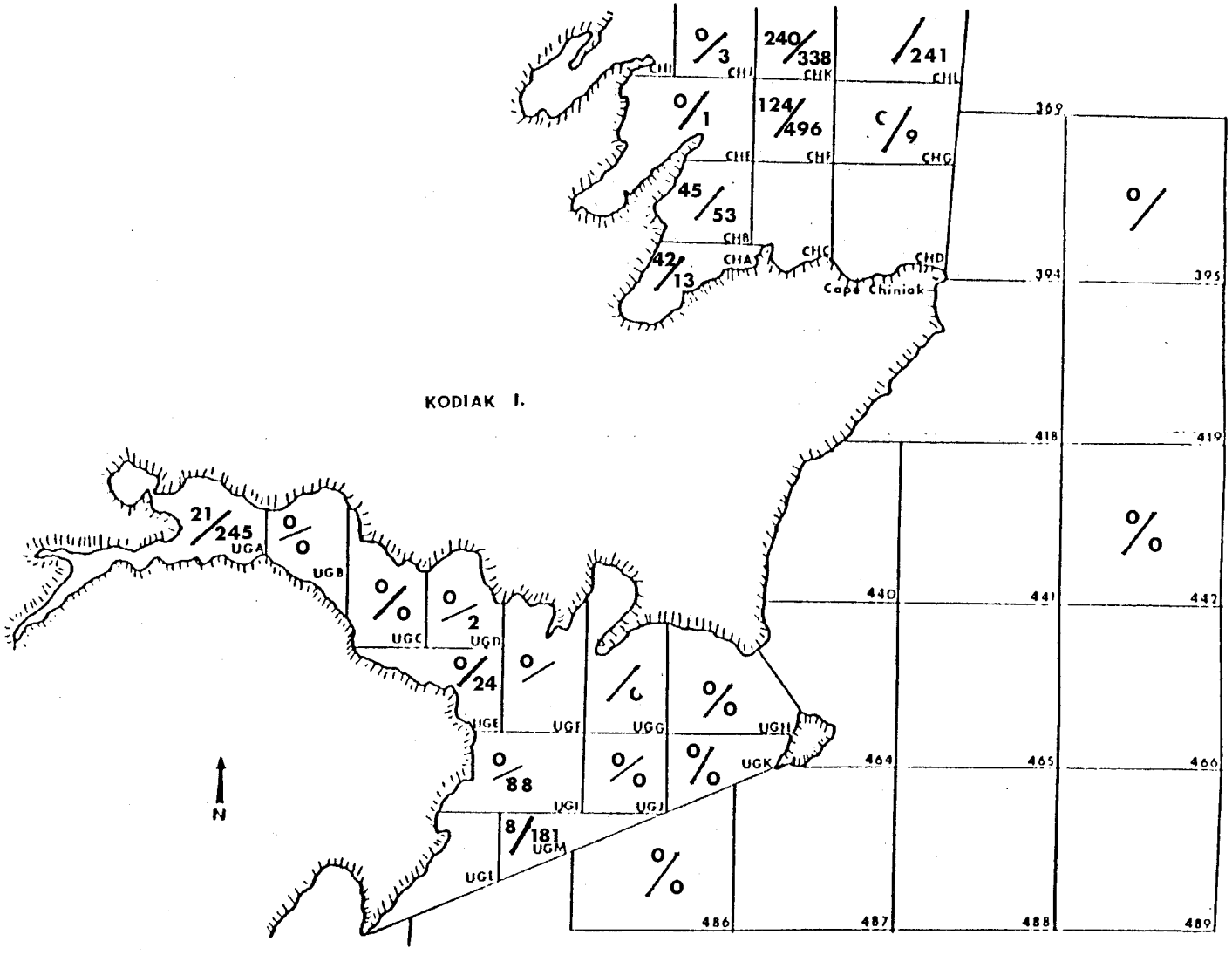


Figure 37. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

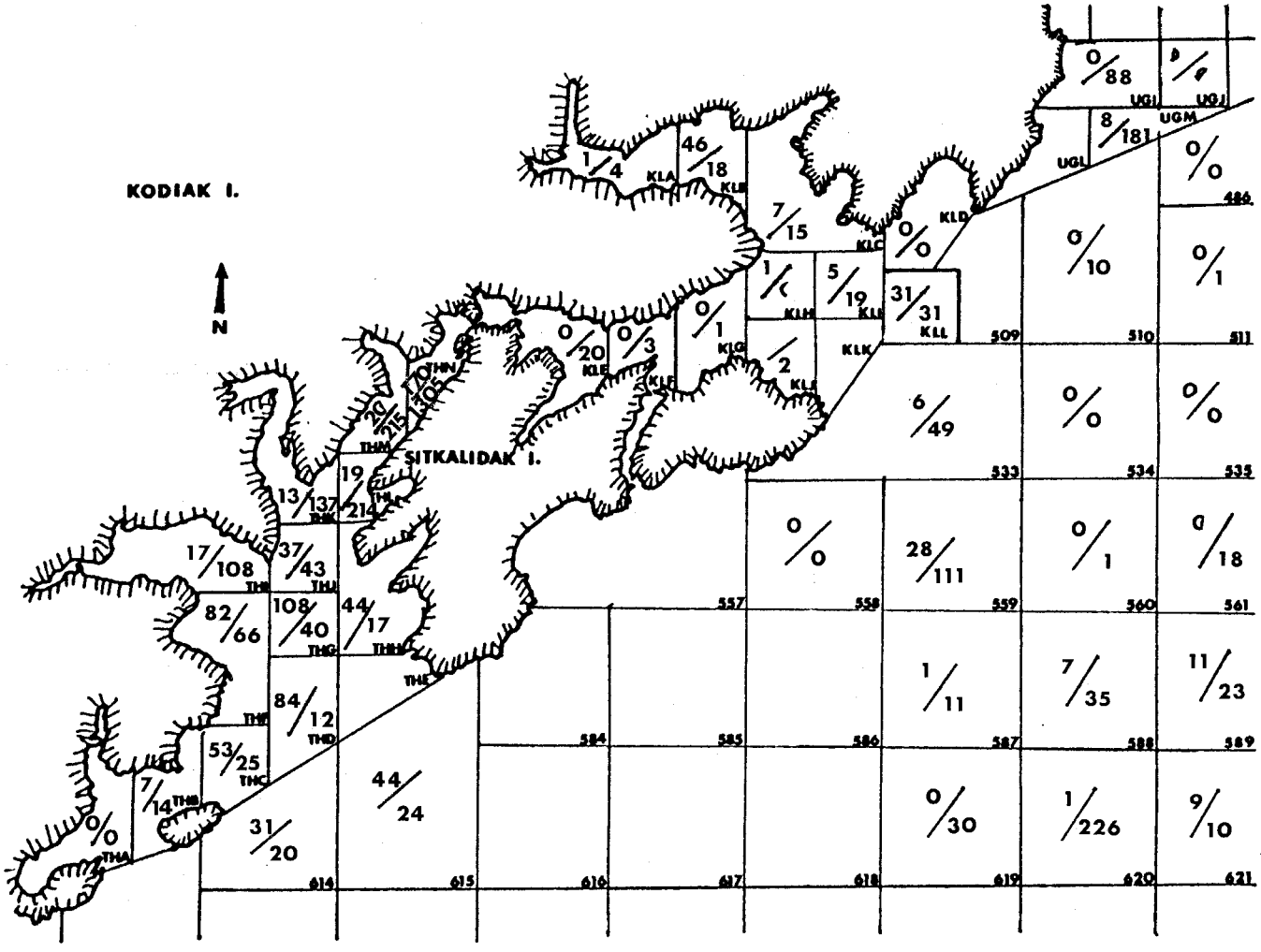


Figure 38. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

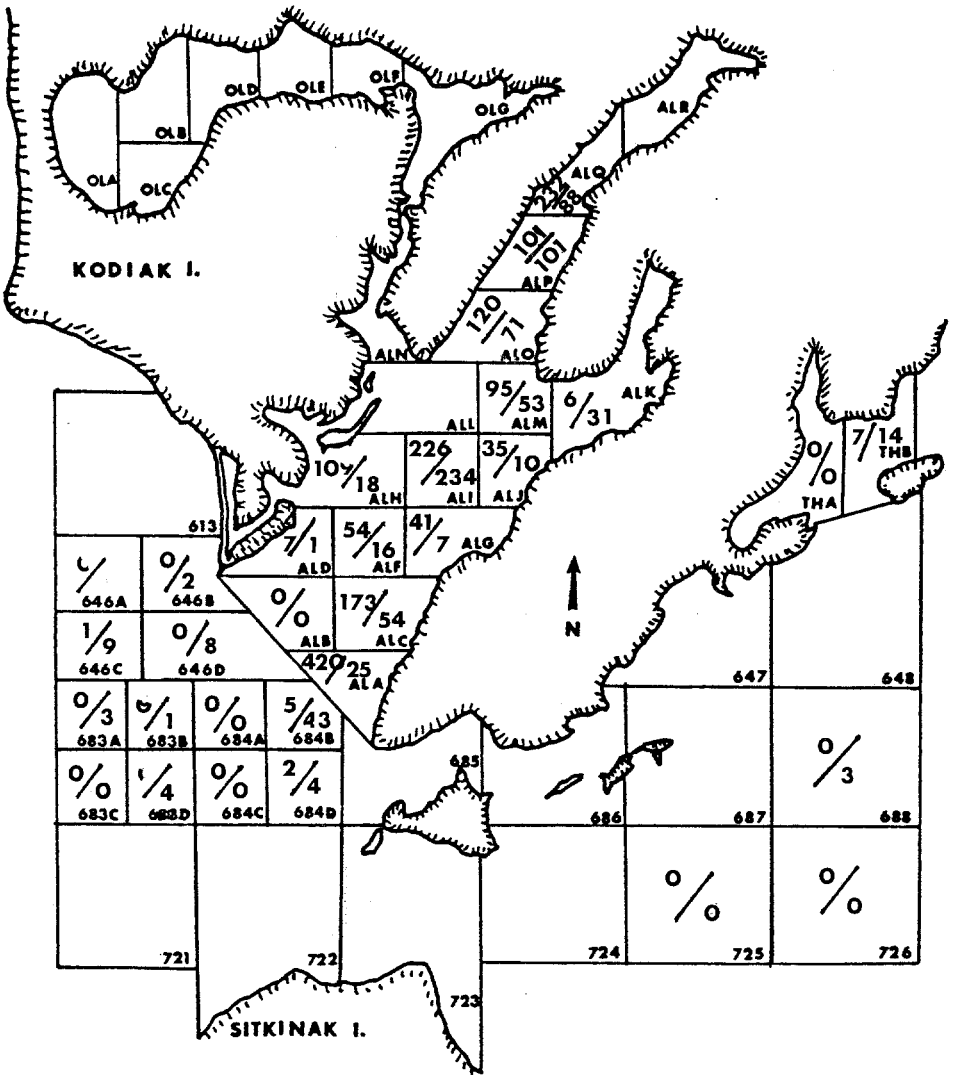


Figure 39. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

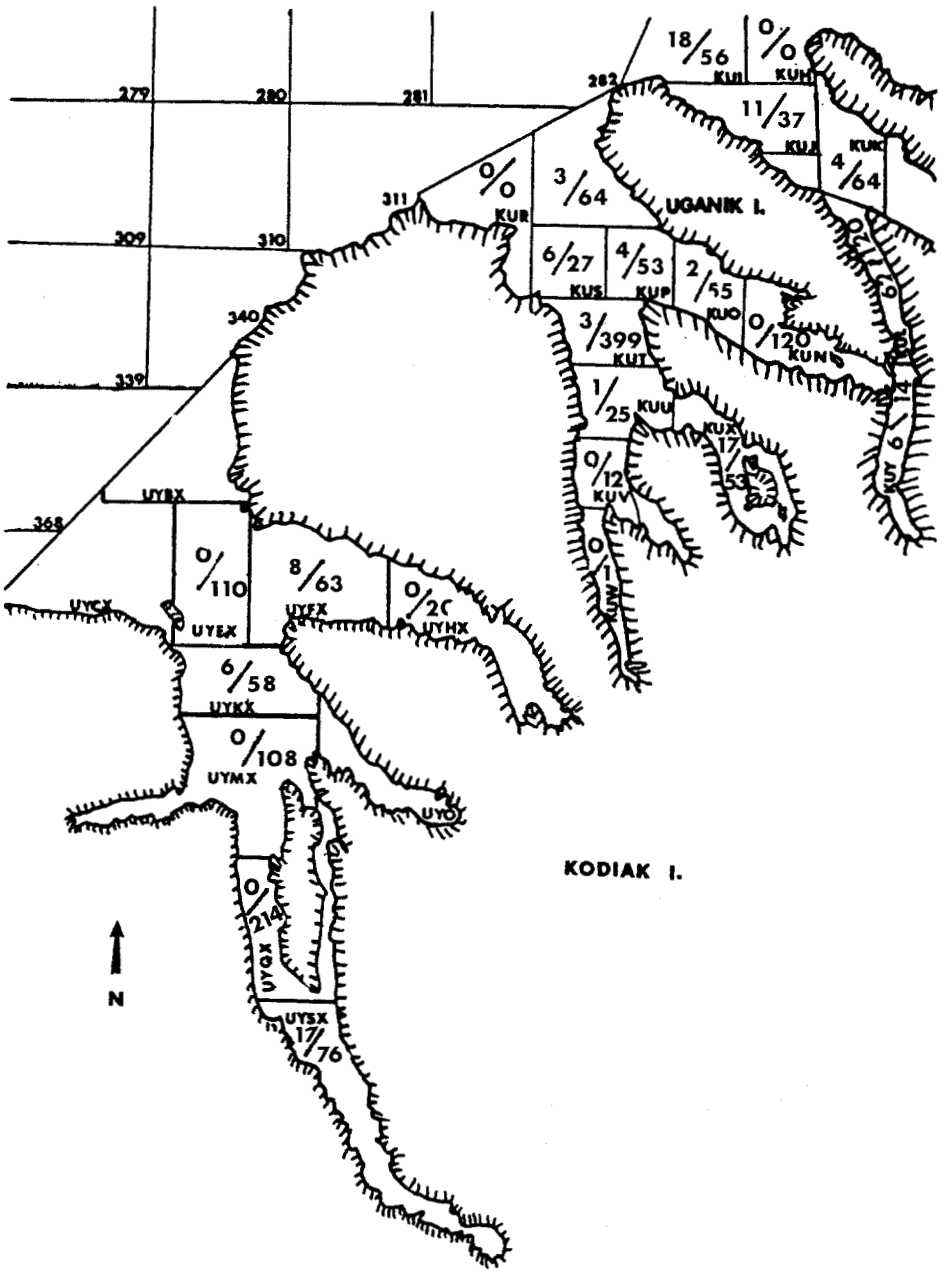


Figure 40. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

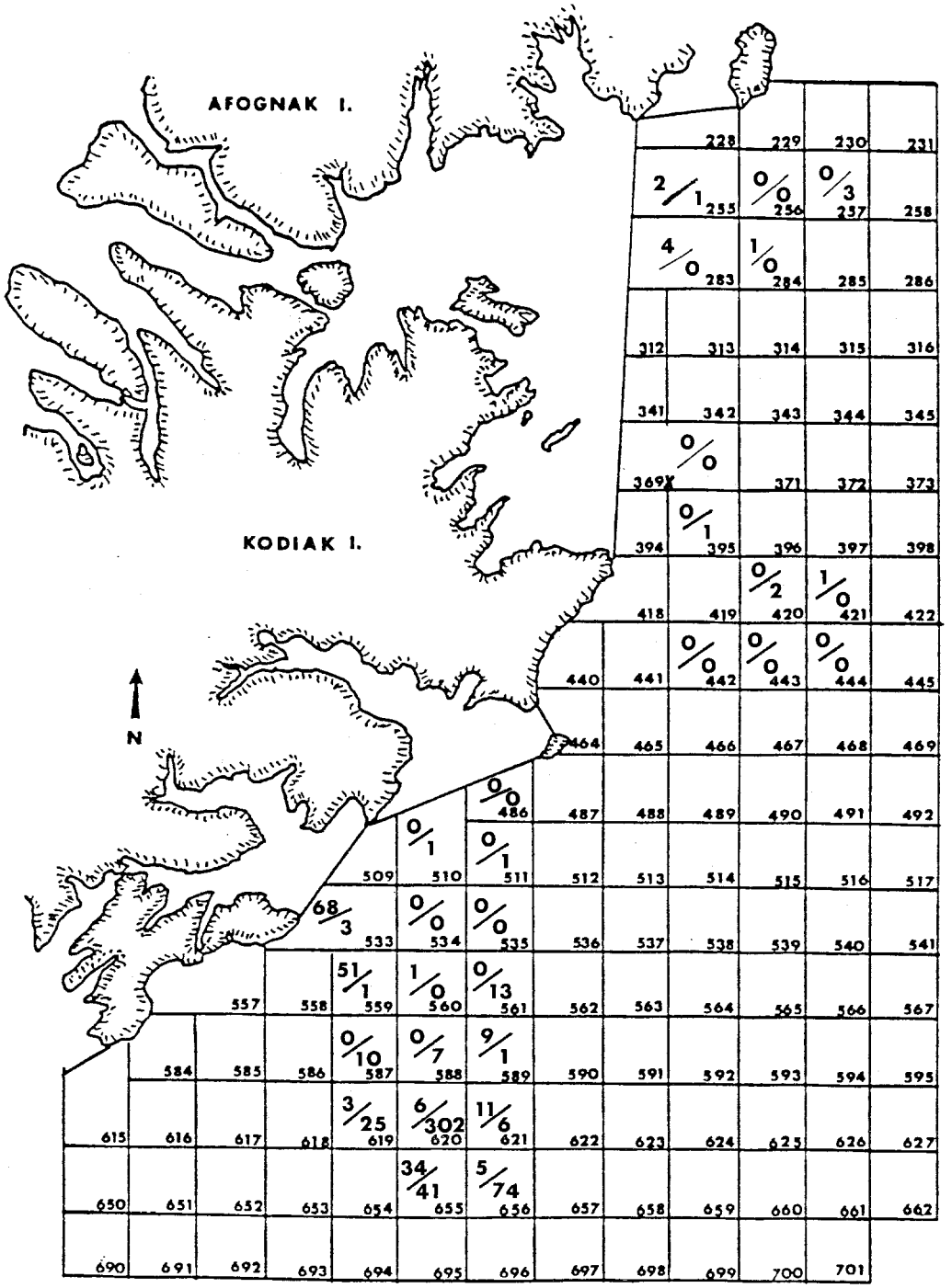


Figure 41. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

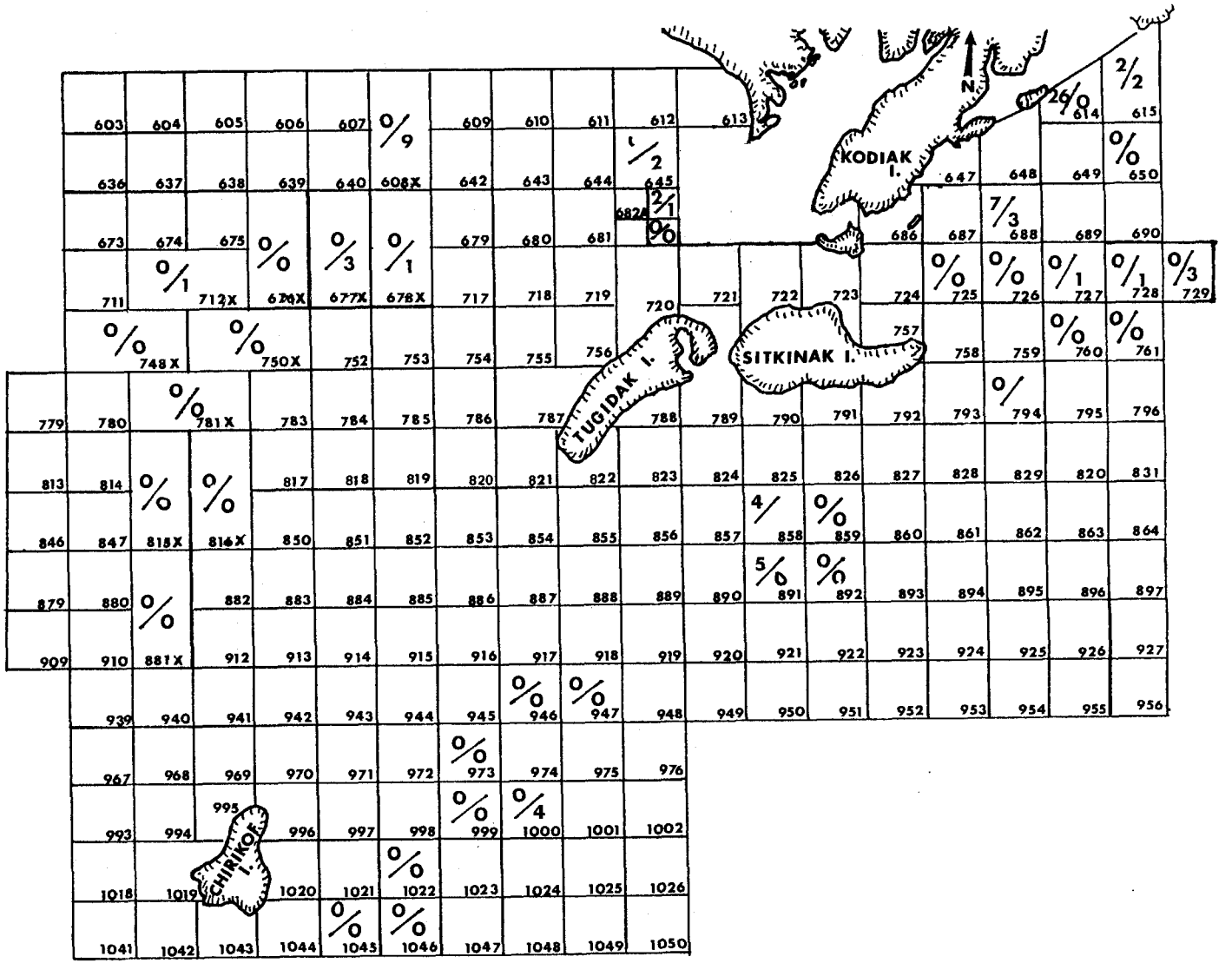


Figure 42. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

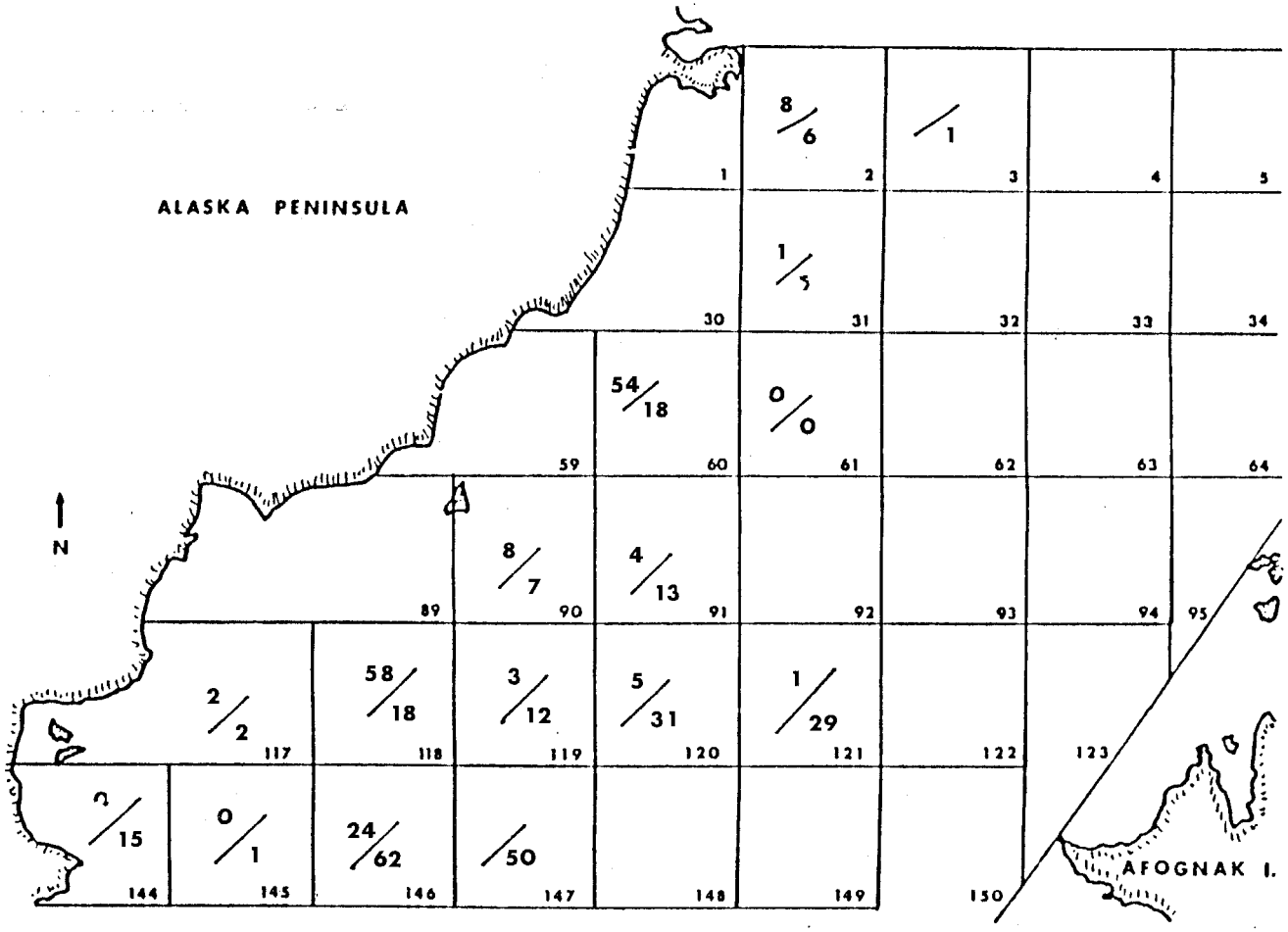


Figure 43. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

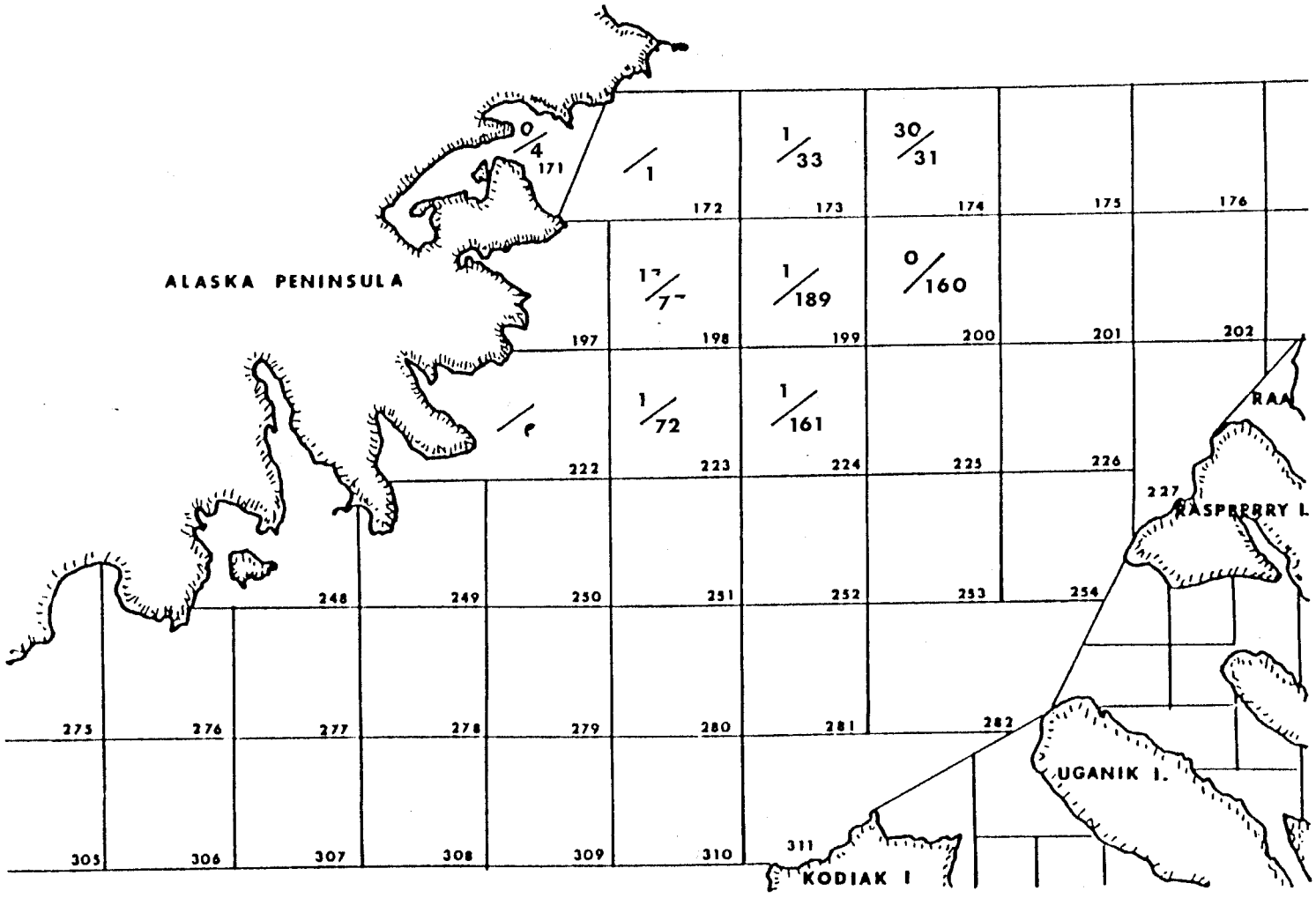


Figure 44. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

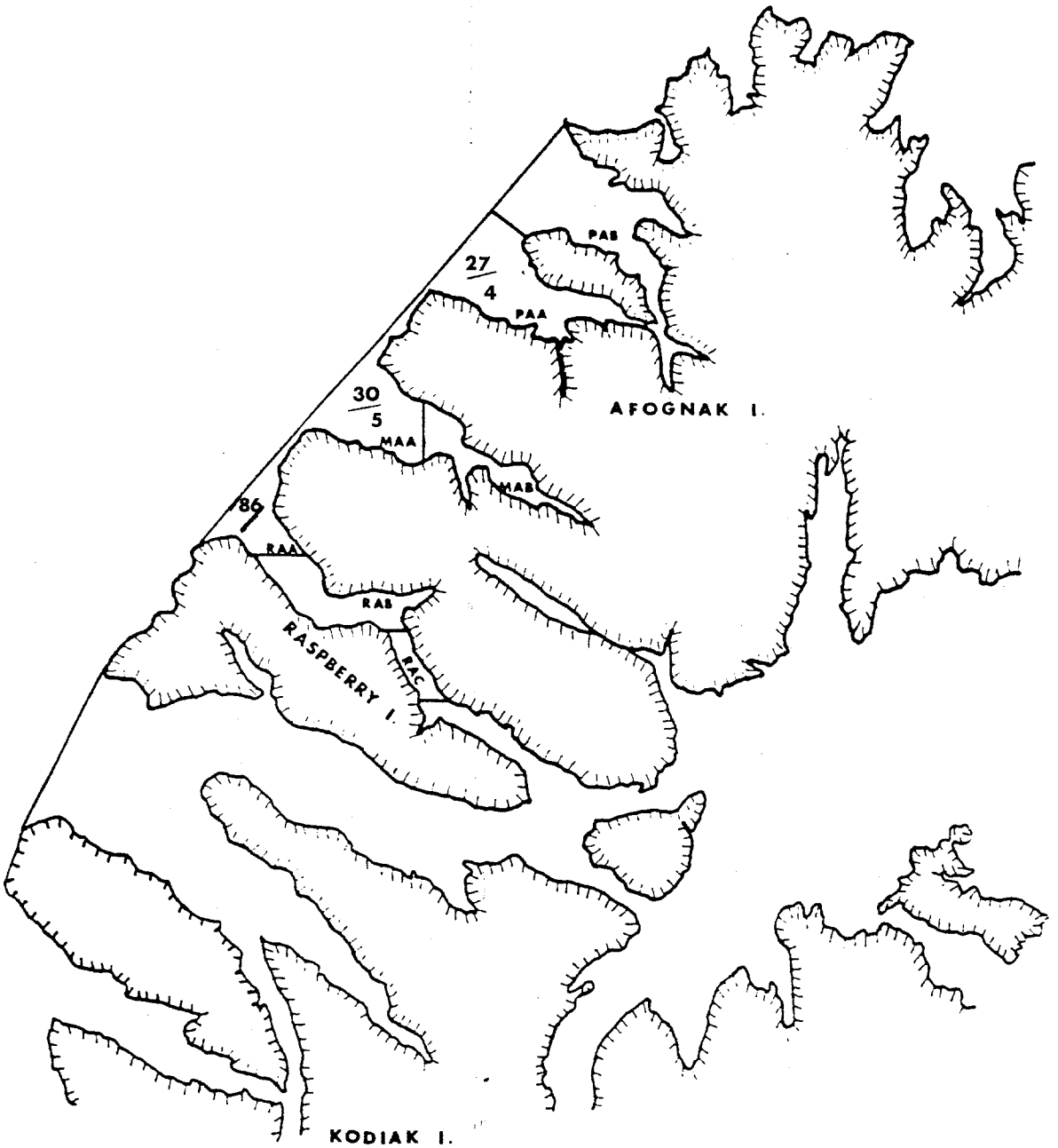


Figure 45. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

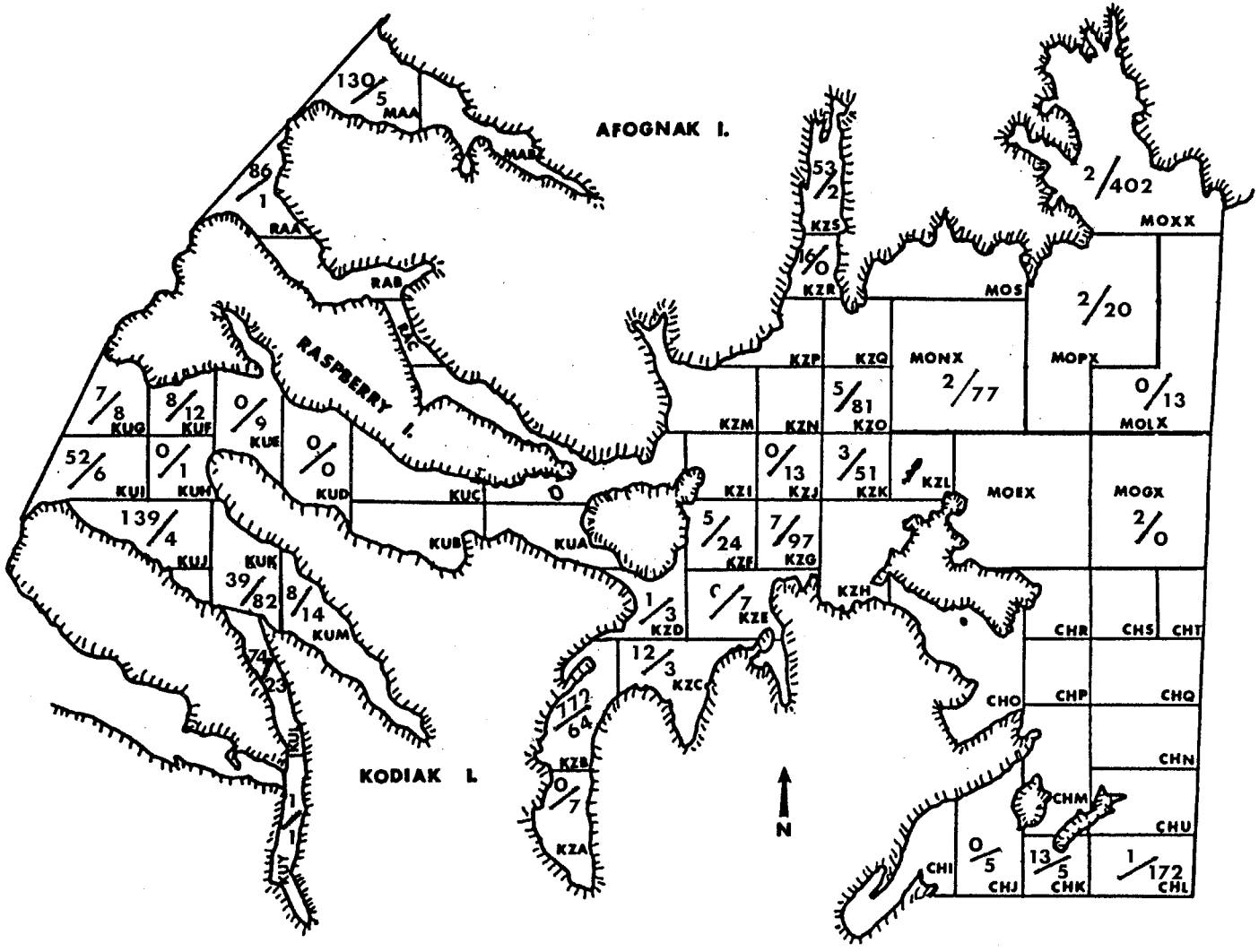


Figure 46. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

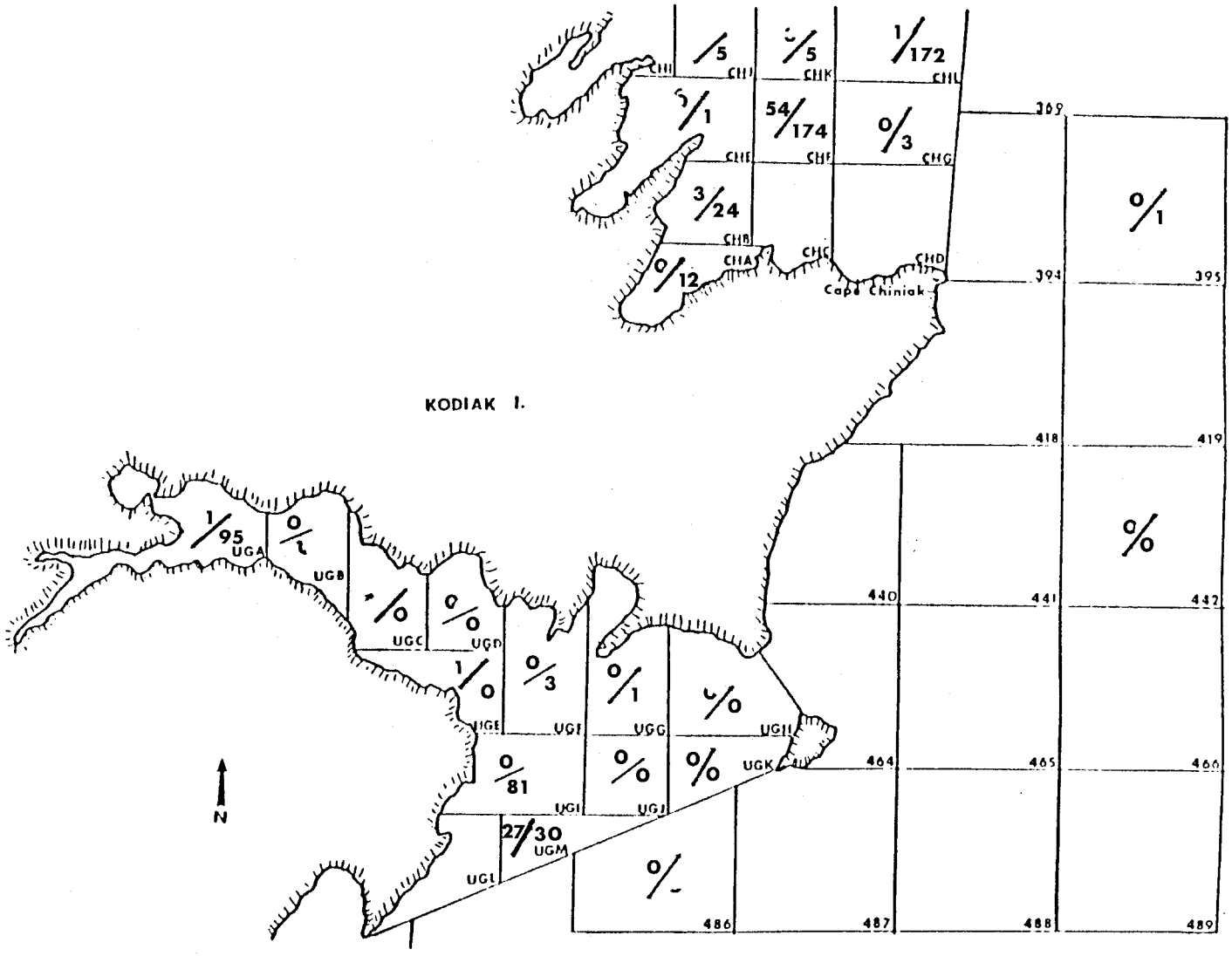


Figure 47. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

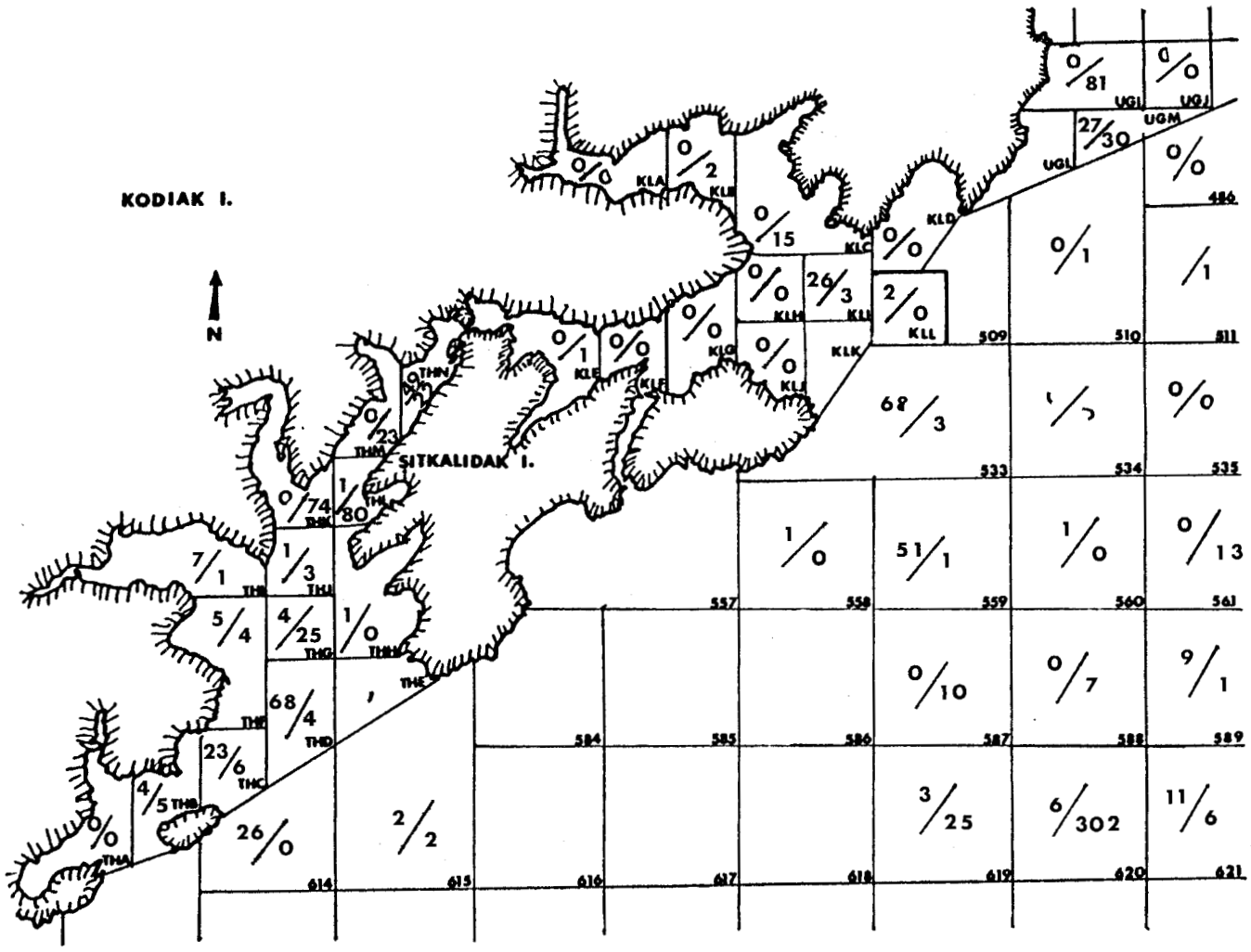


Figure 48. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

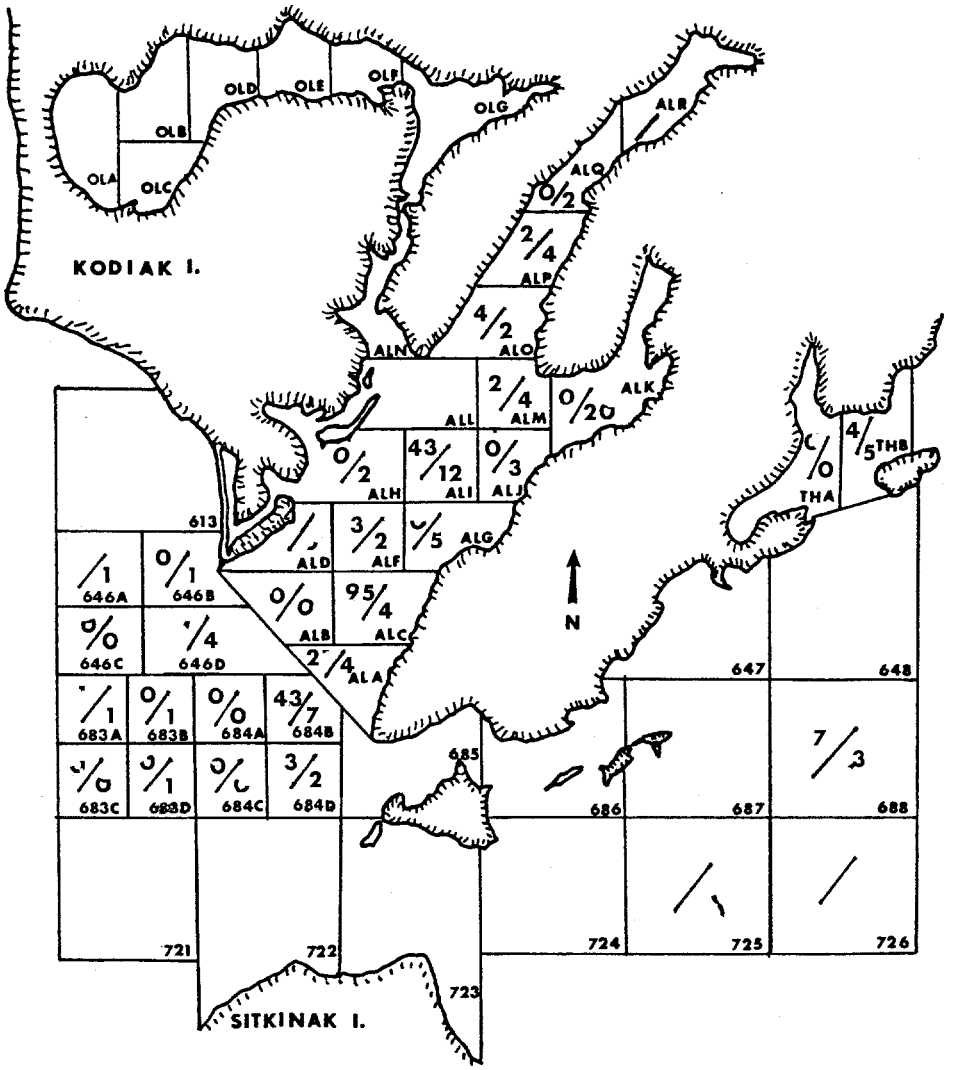


Figure 49. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

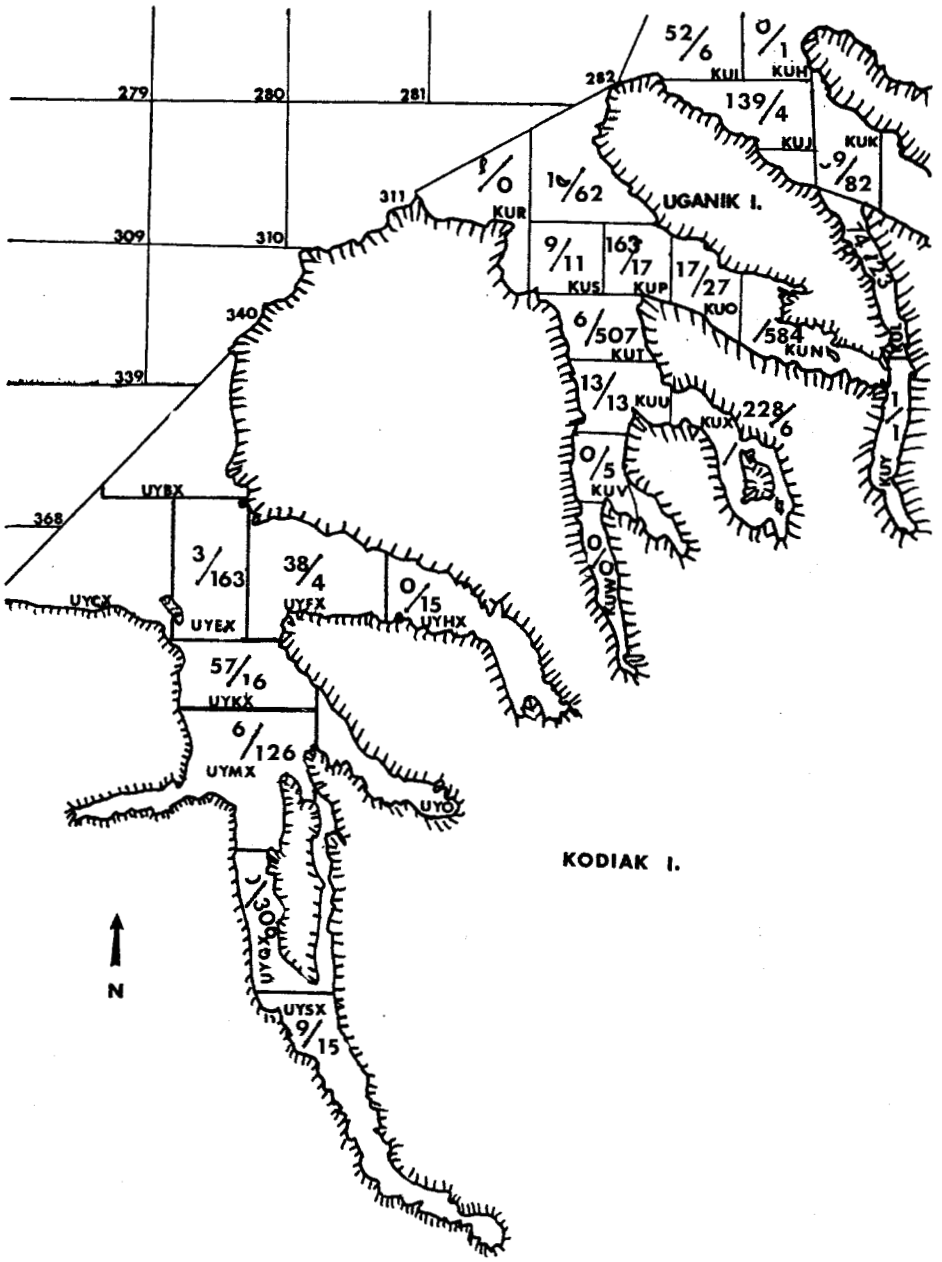


Figure 50. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, Kodiak trawl survey, 1988.

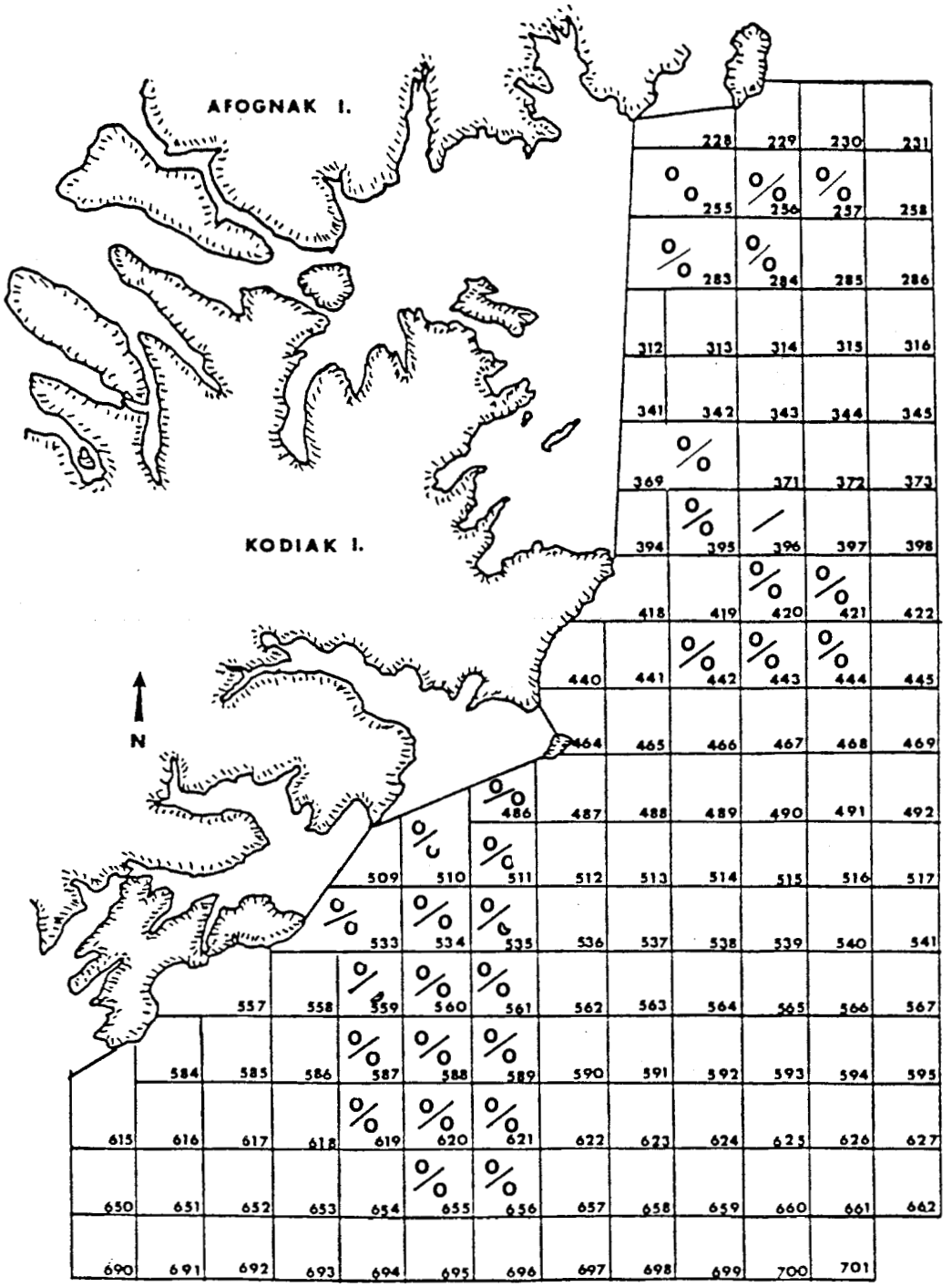


Figure 51. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

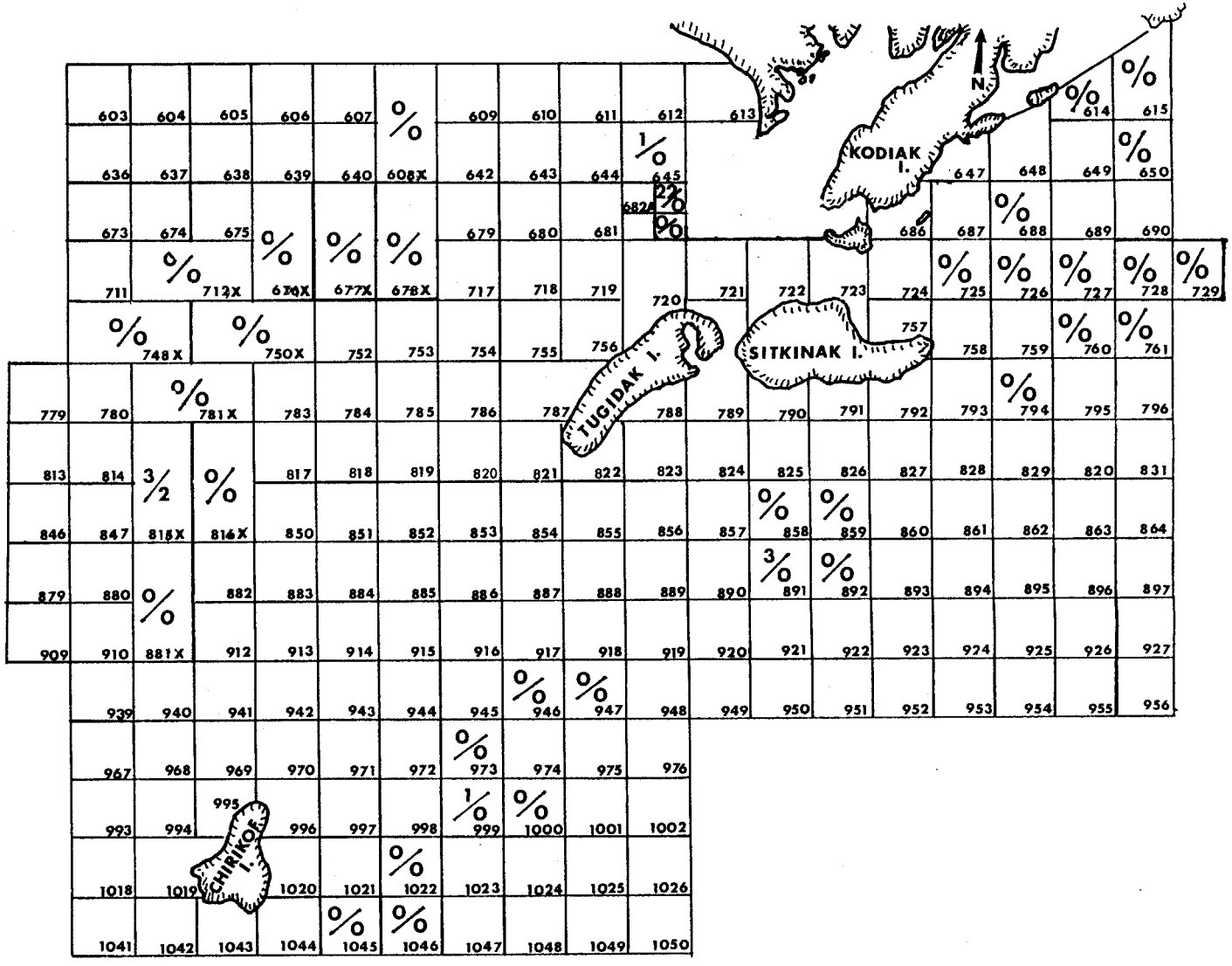


Figure 52. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

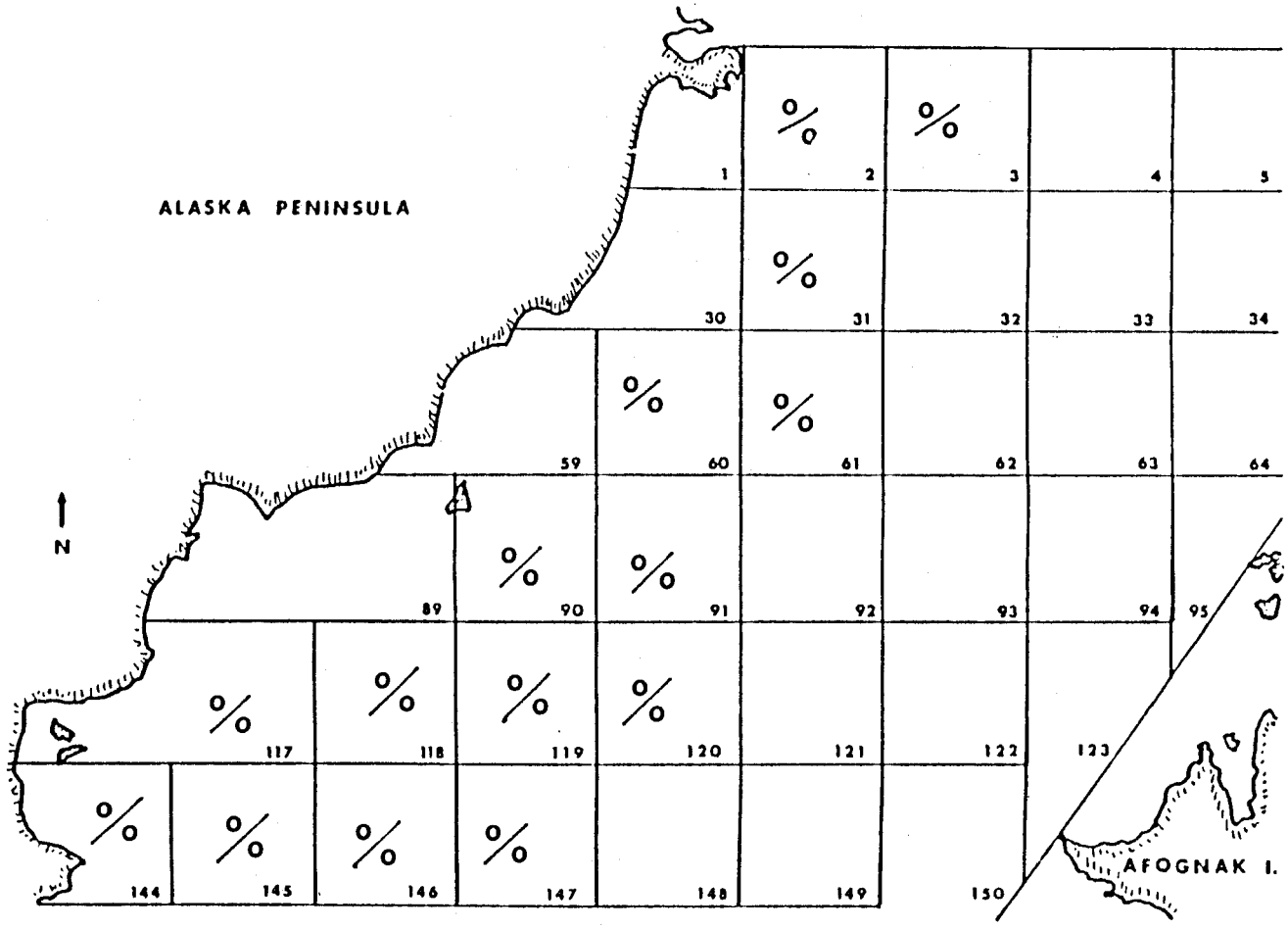


Figure 53. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

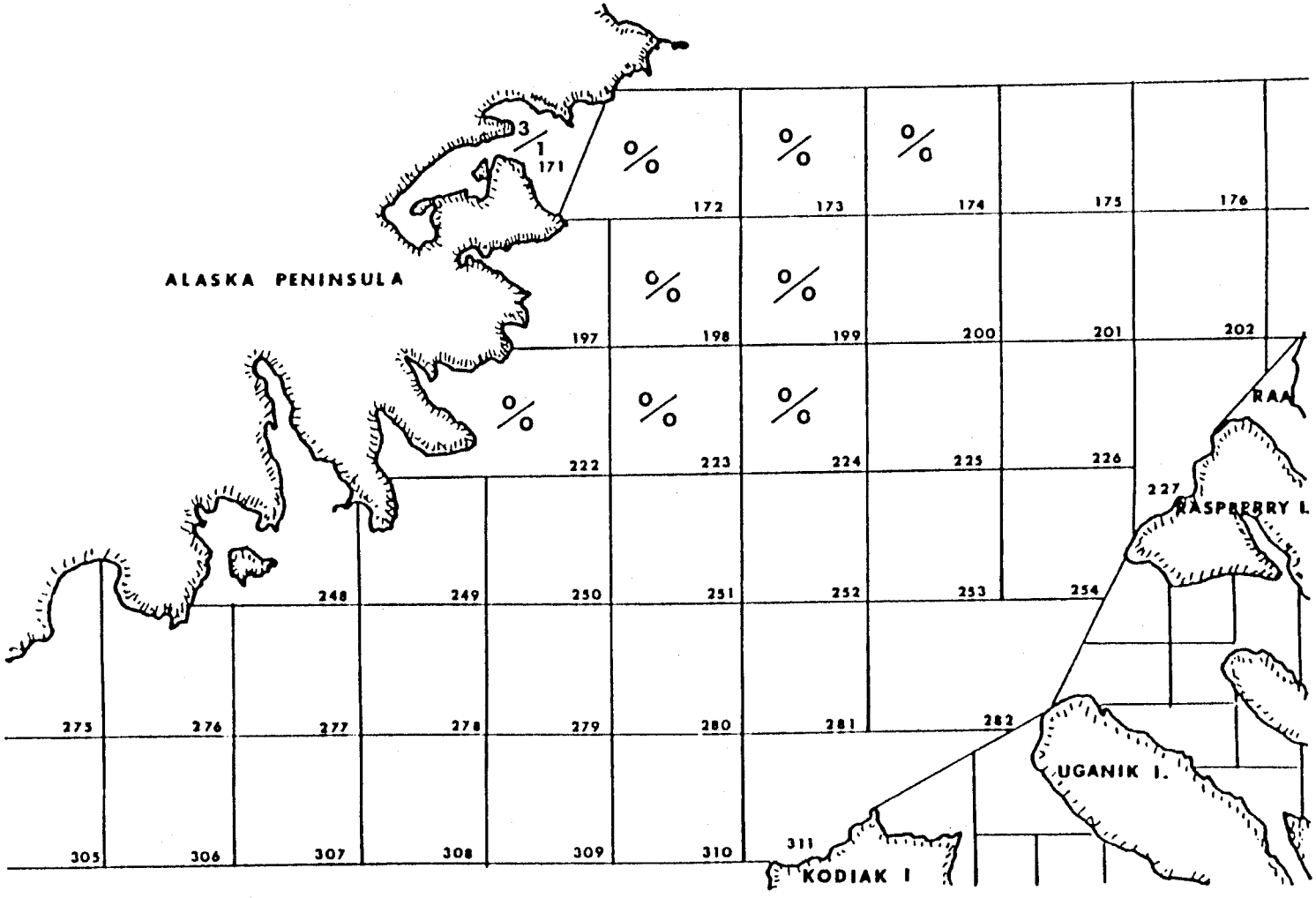


Figure 54. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

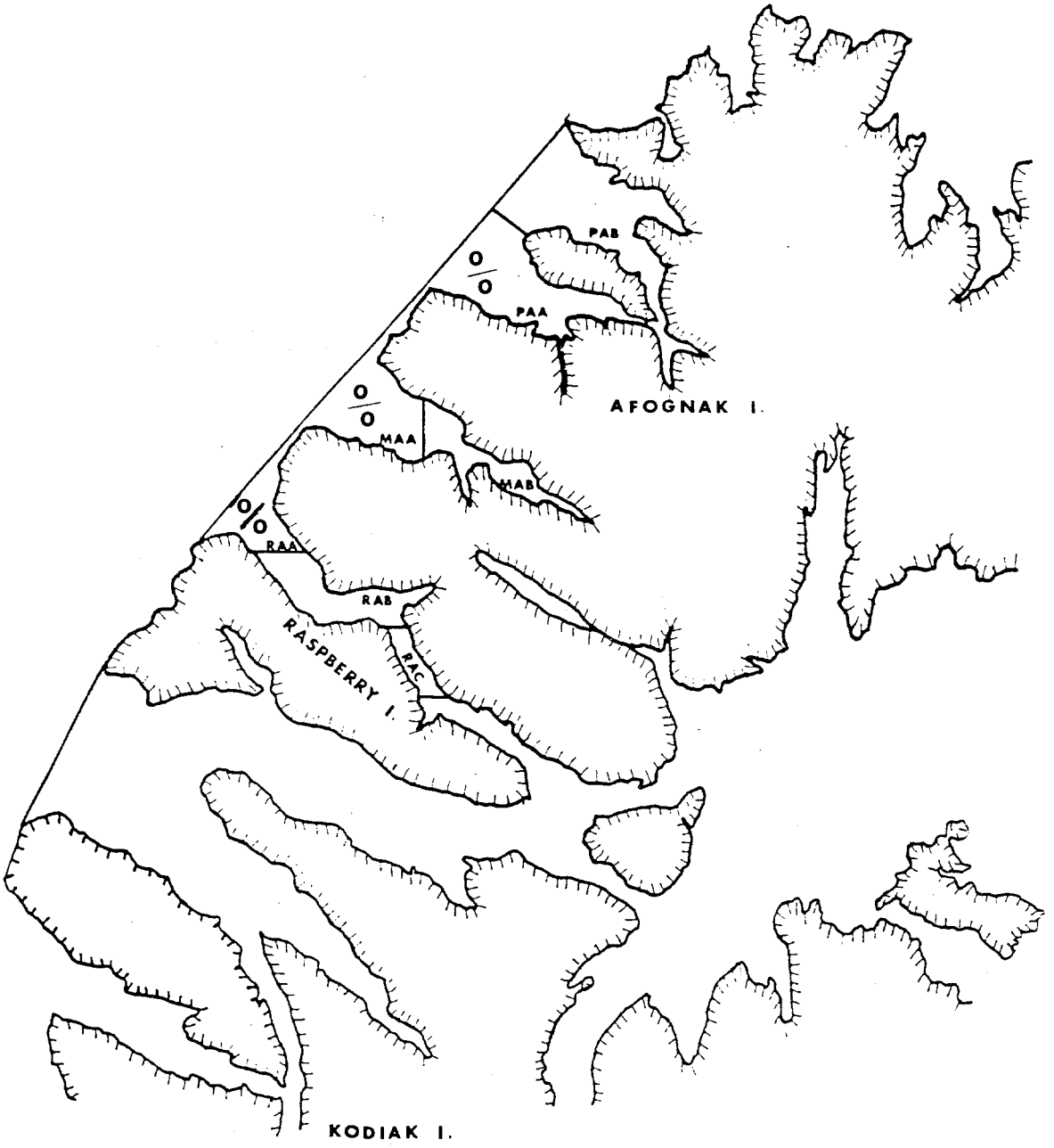


Figure 55. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

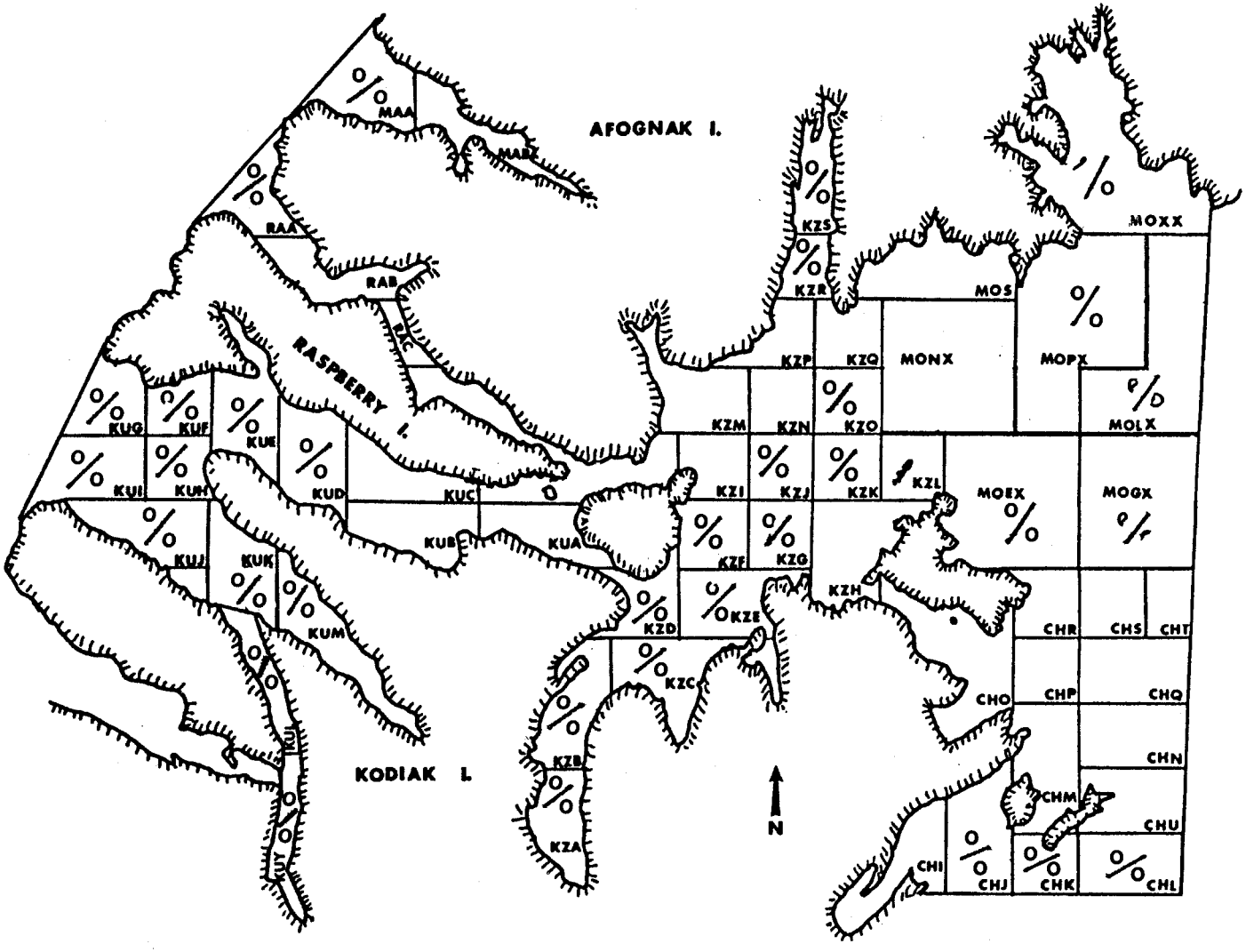


Figure 56. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

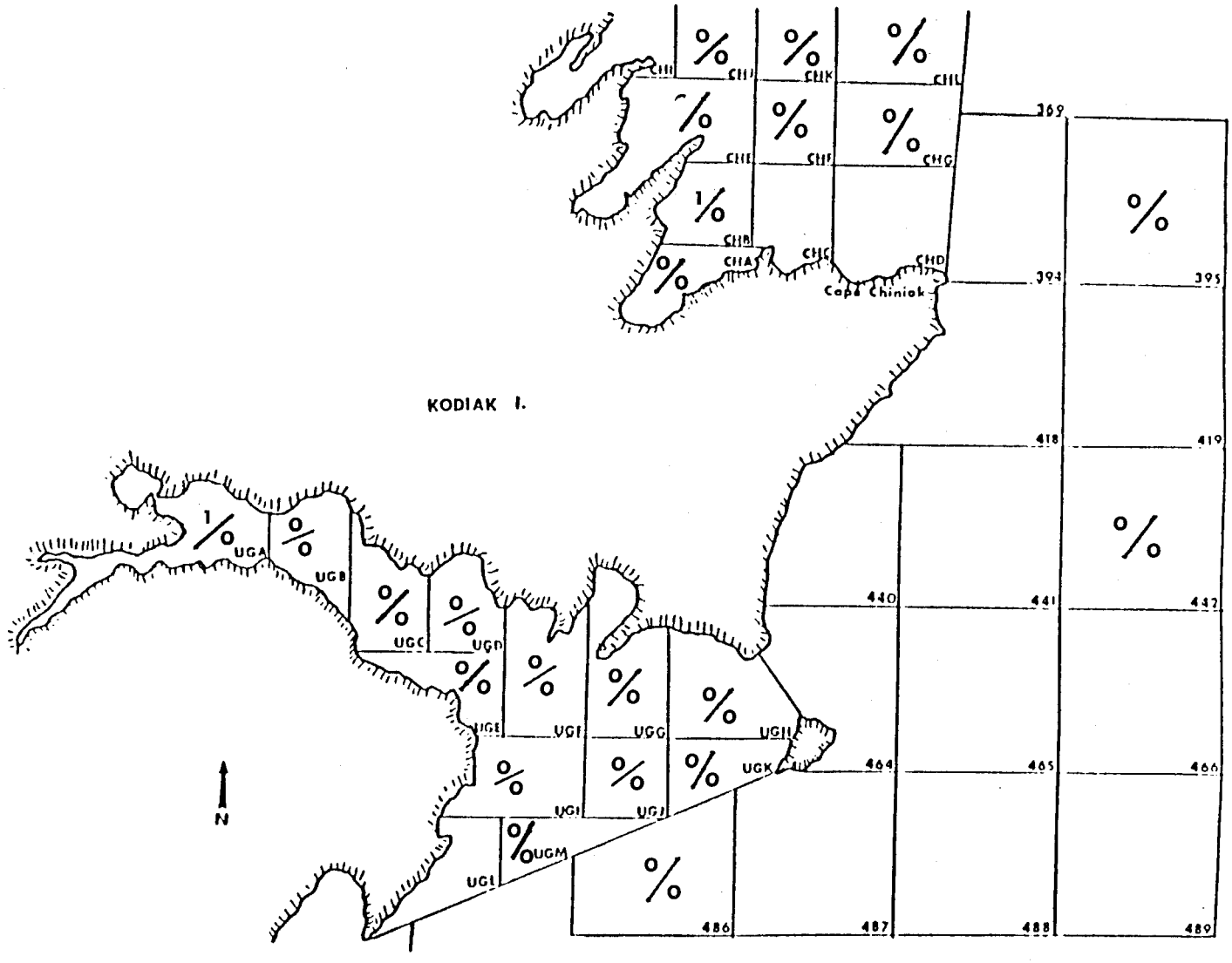


Figure 57. Catch of legal (top) and sublegal king crab, Paraltihodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

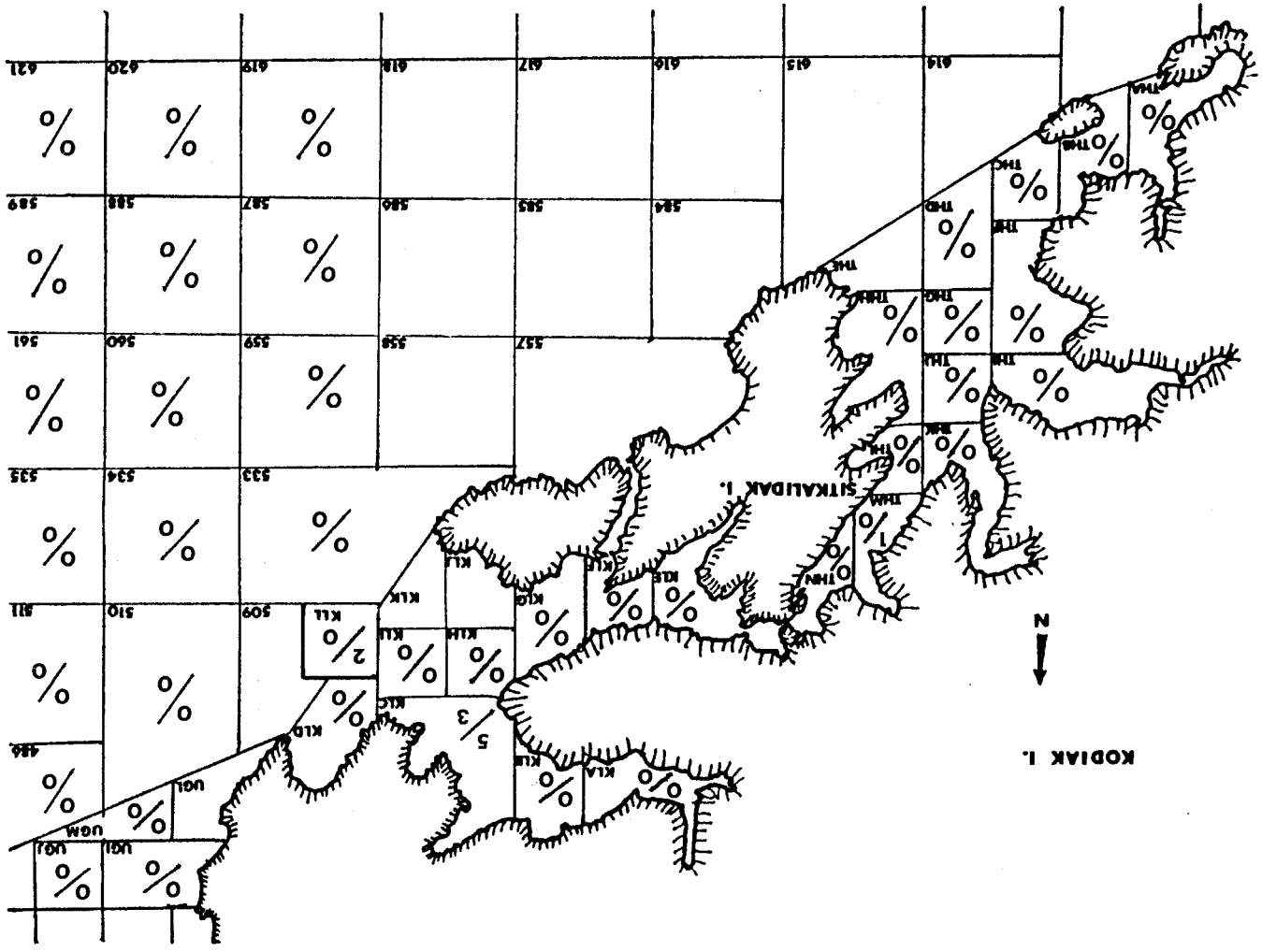


Figure 58. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

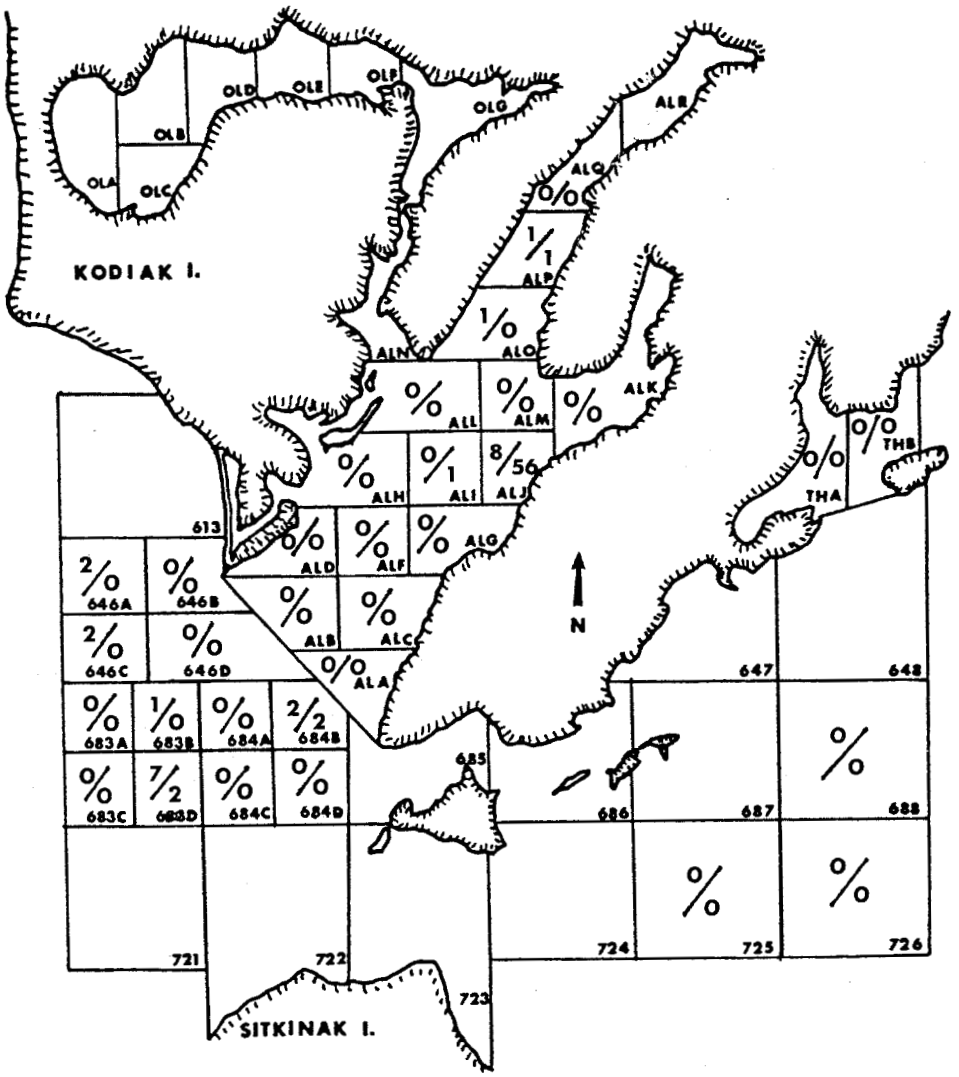


Figure 59. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

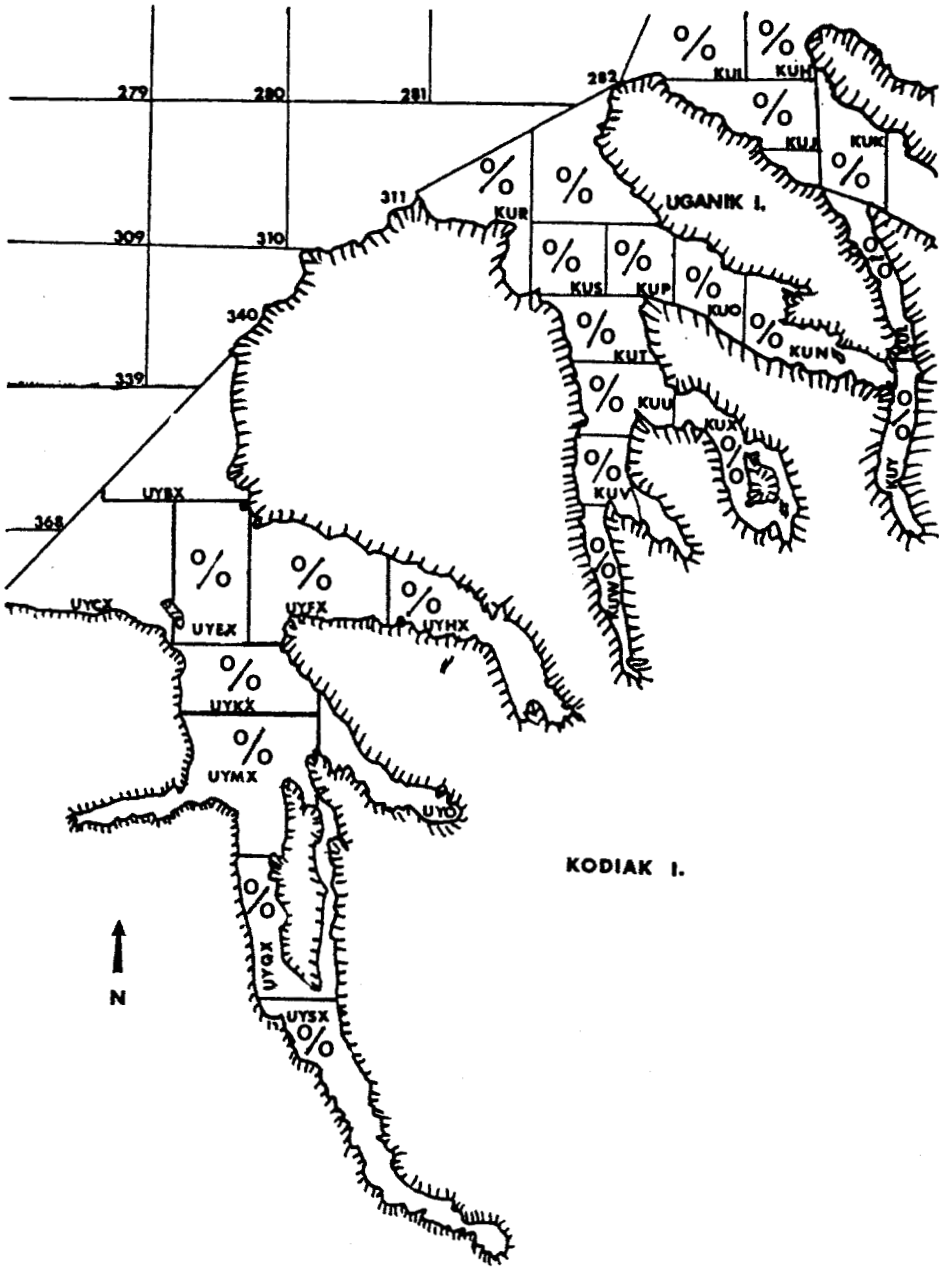


Figure 60. Catch of legal (top) and sublegal king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

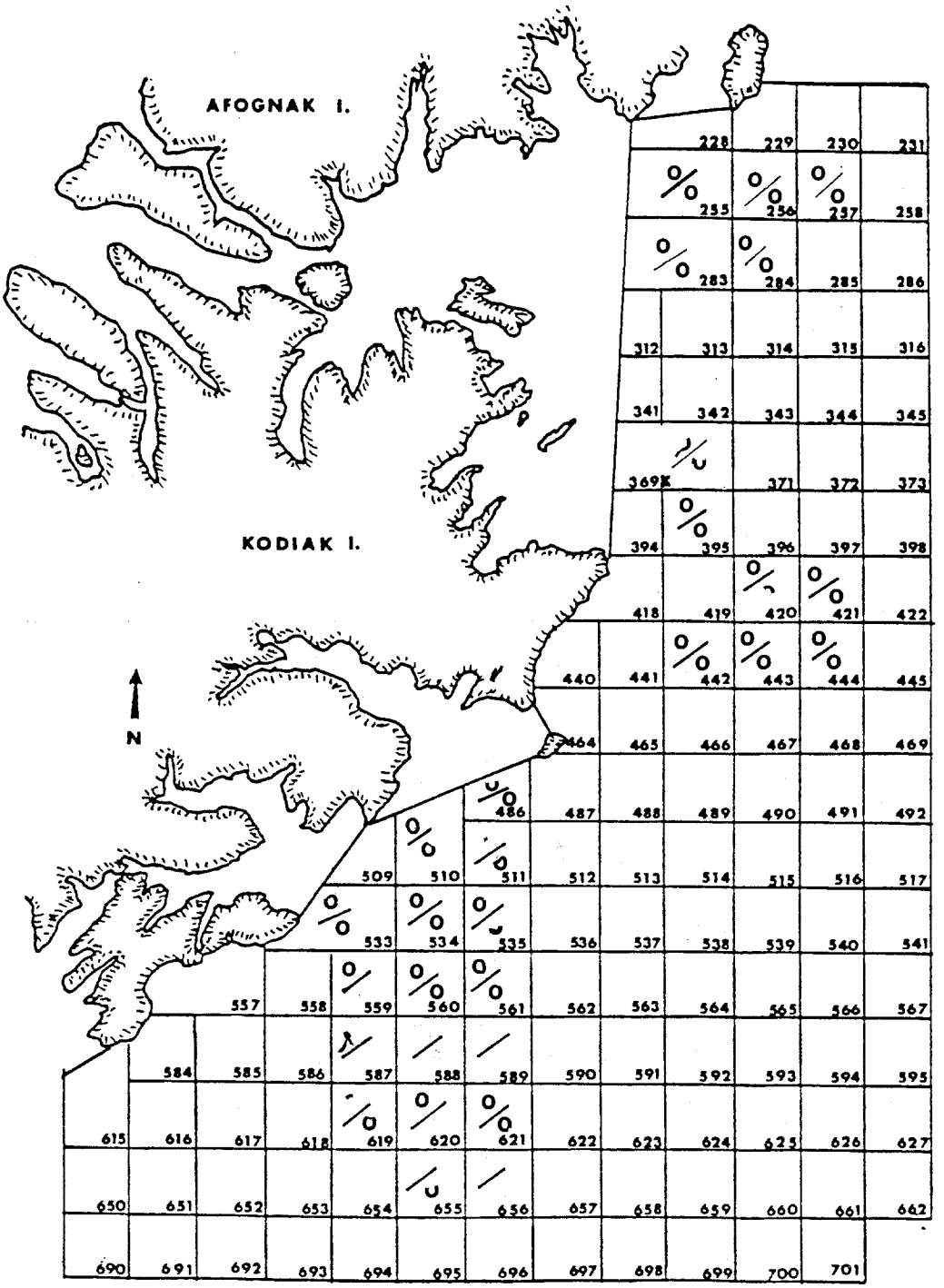


Figure 61. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

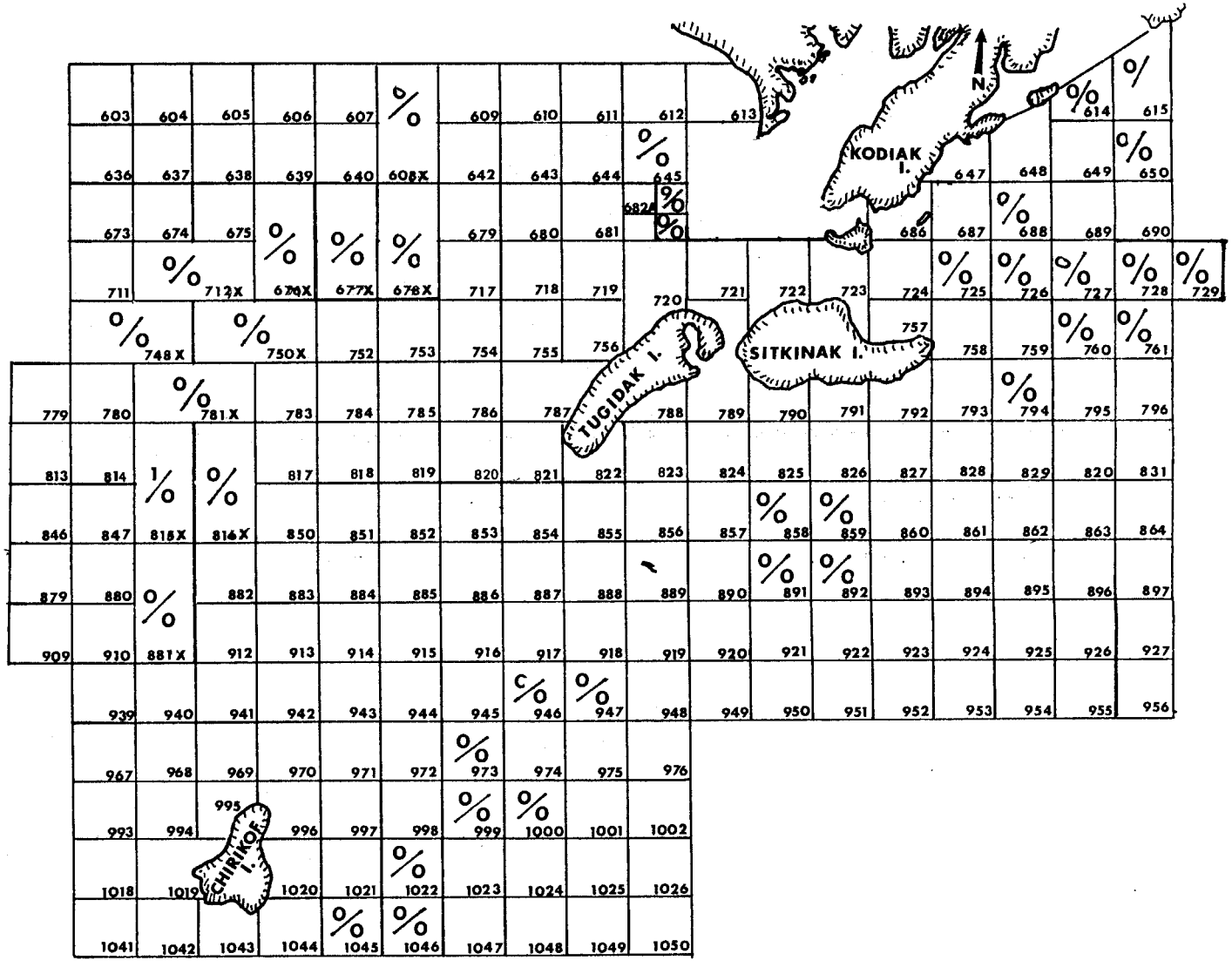


Figure 62. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

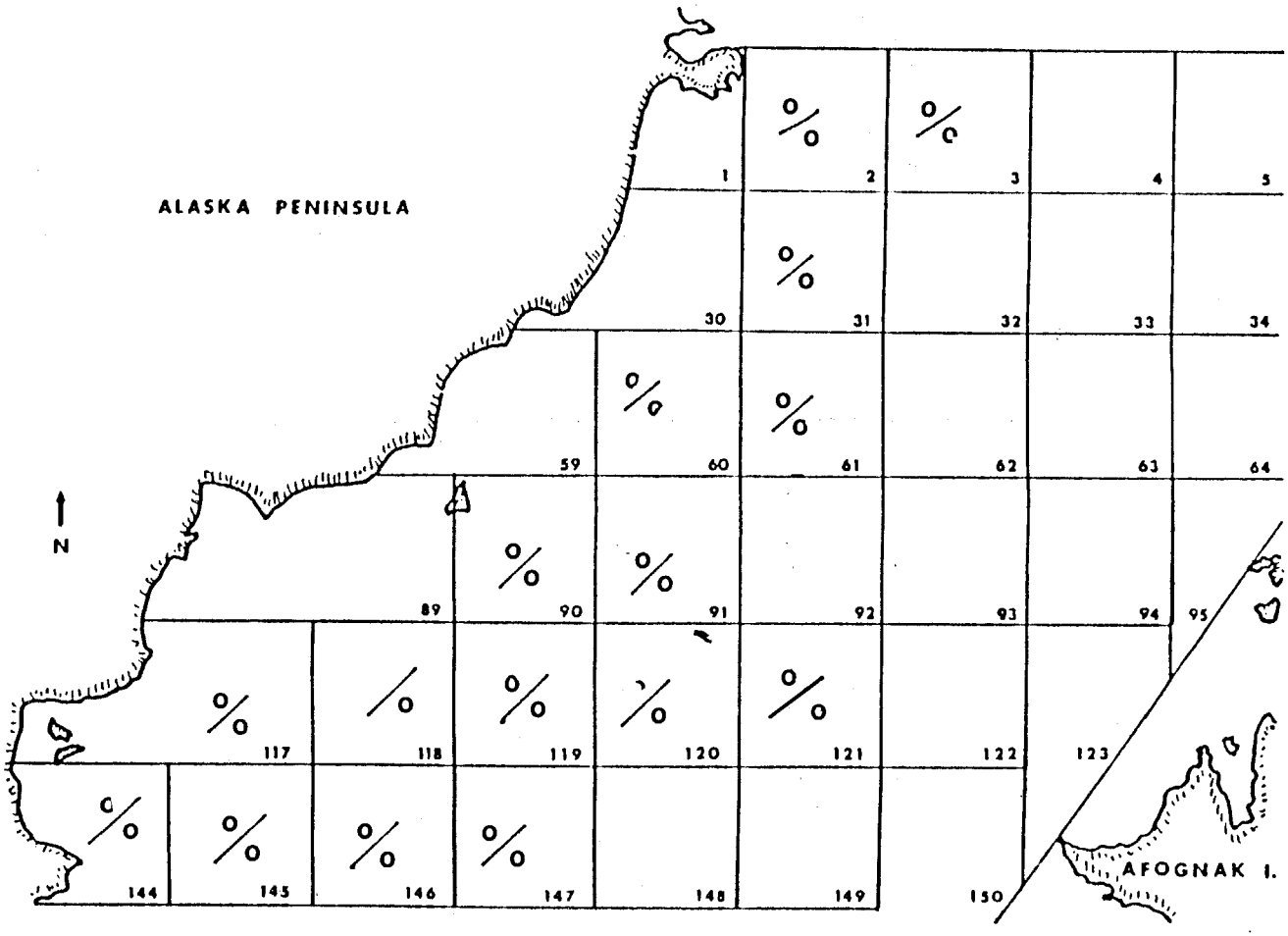


Figure 63. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

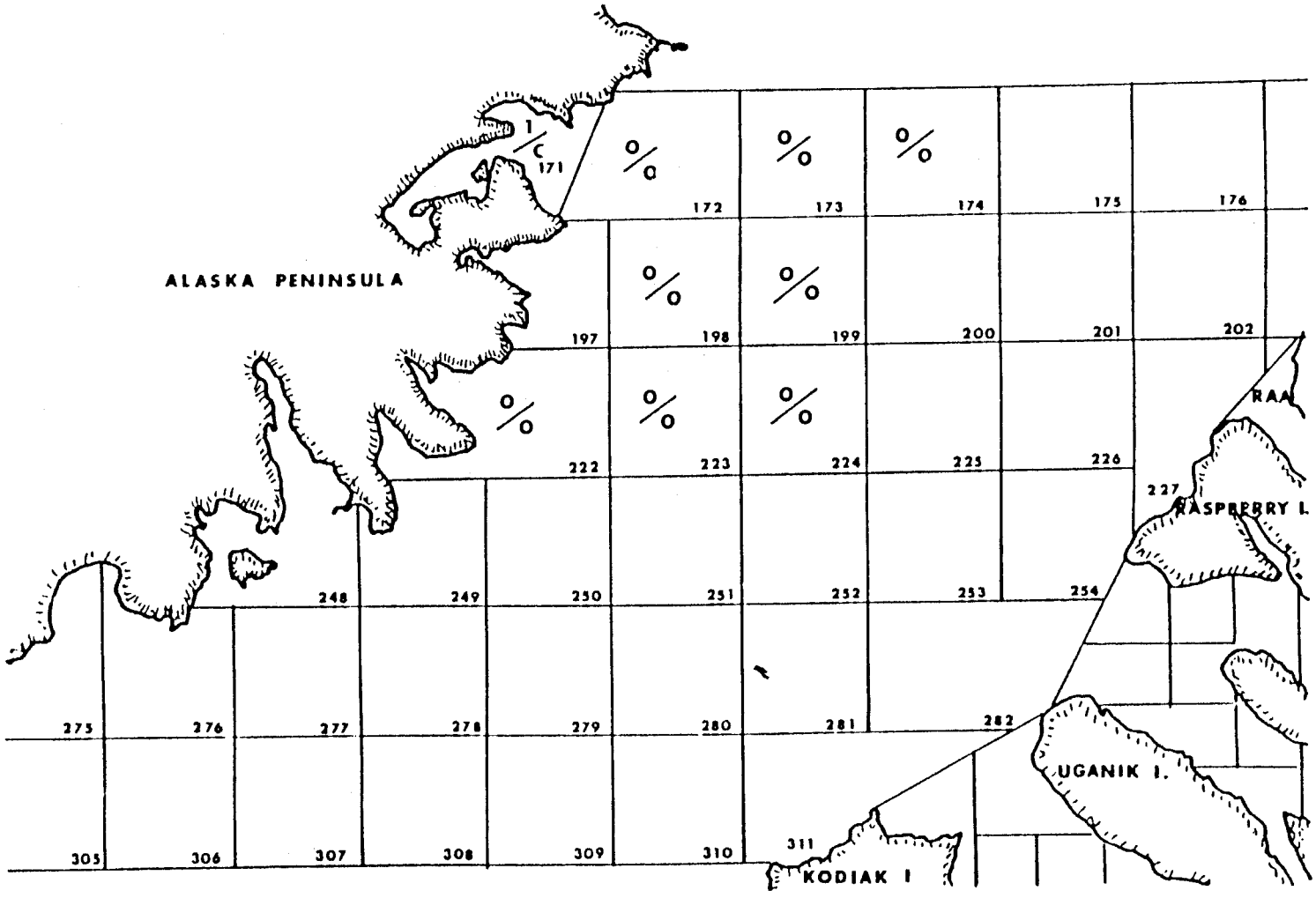


Figure 64. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

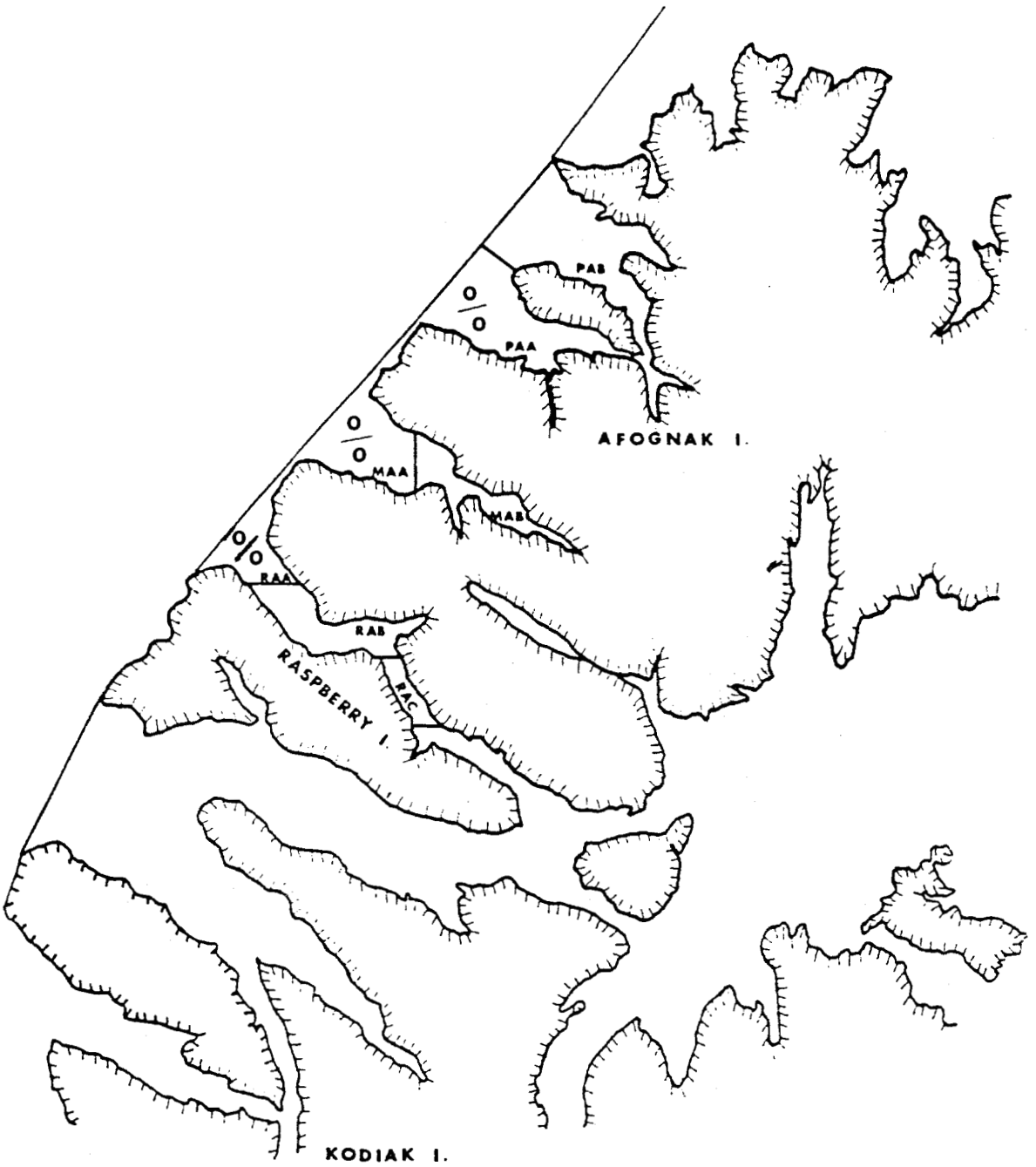


Figure 65. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

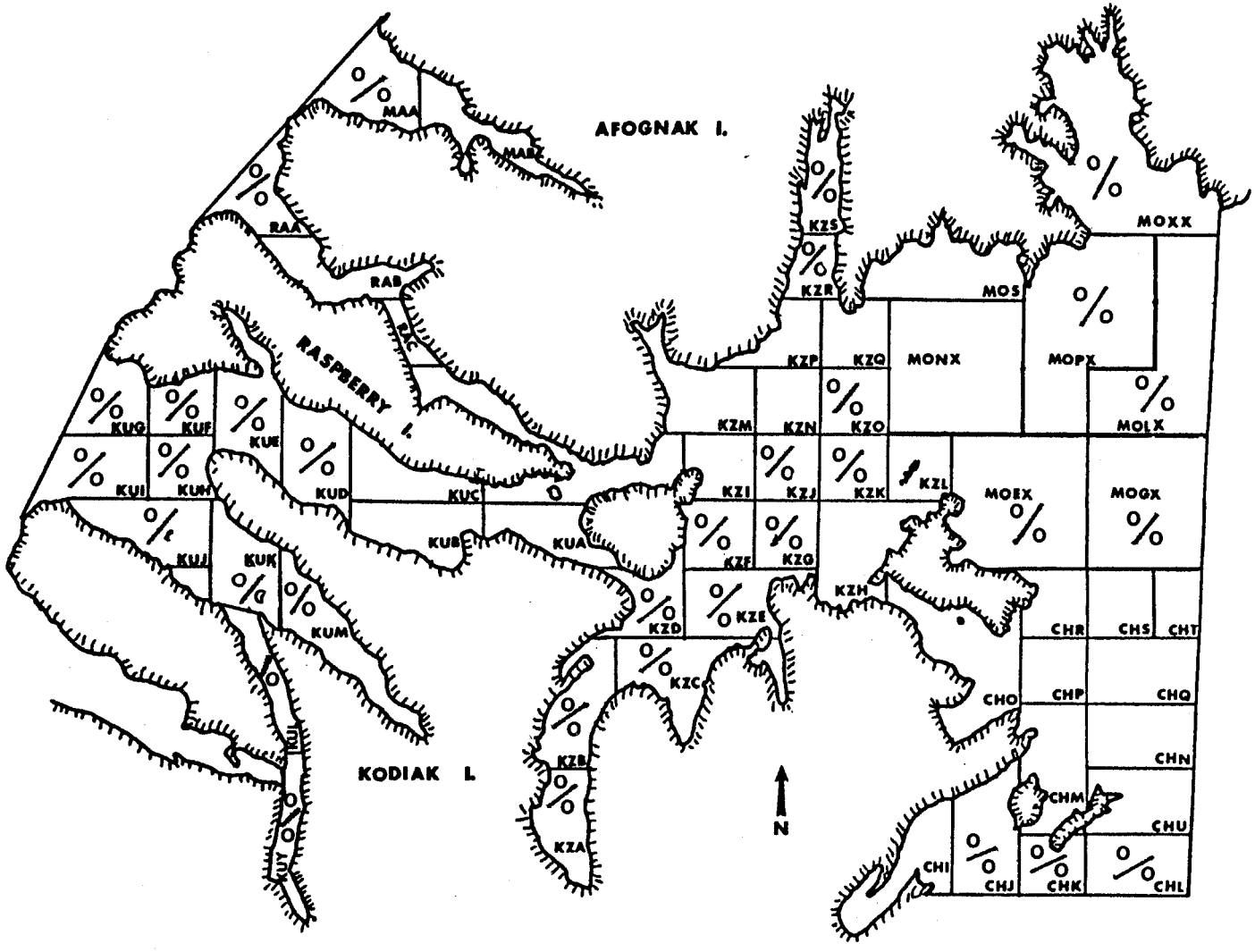


Figure 66. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

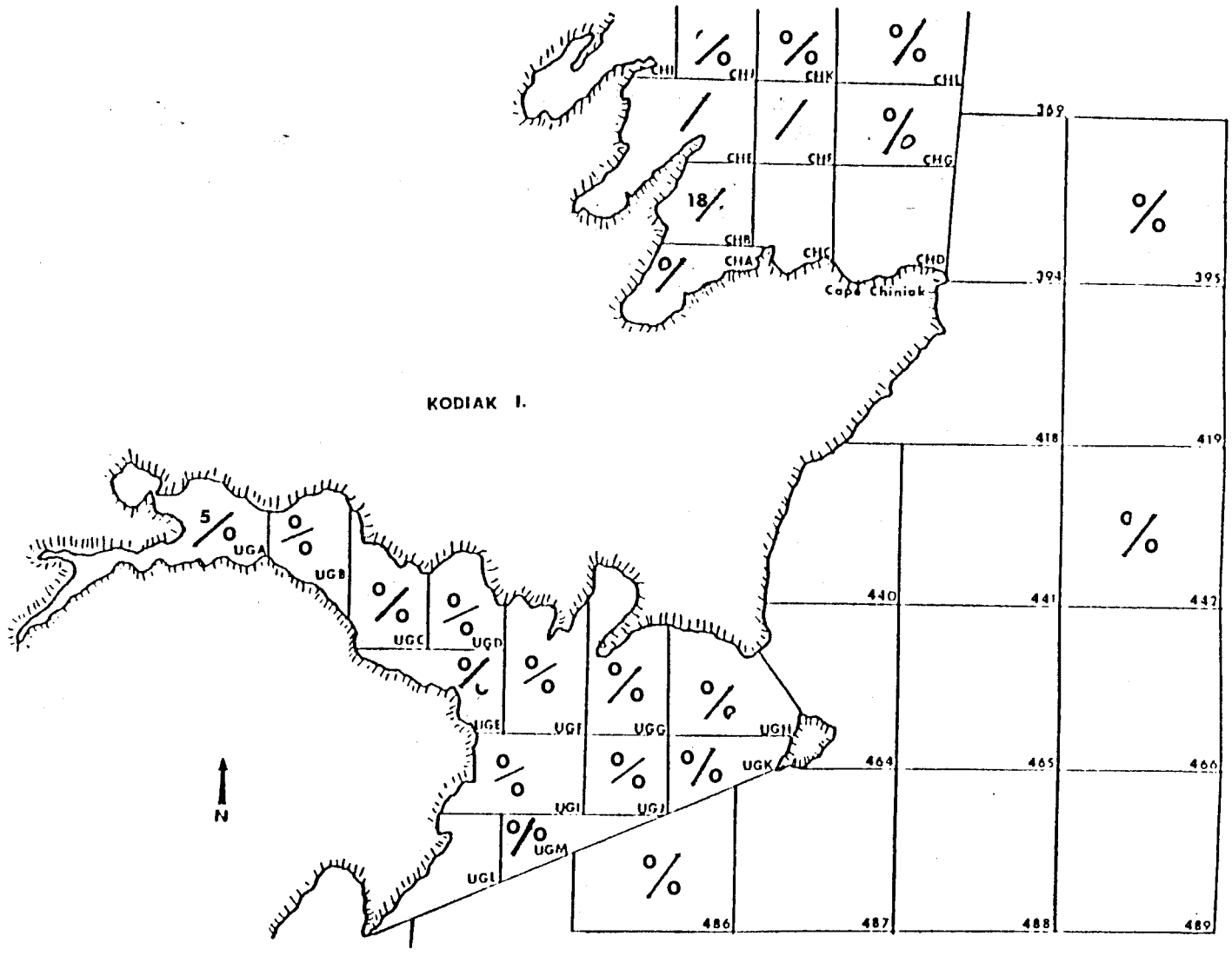


Figure 67. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

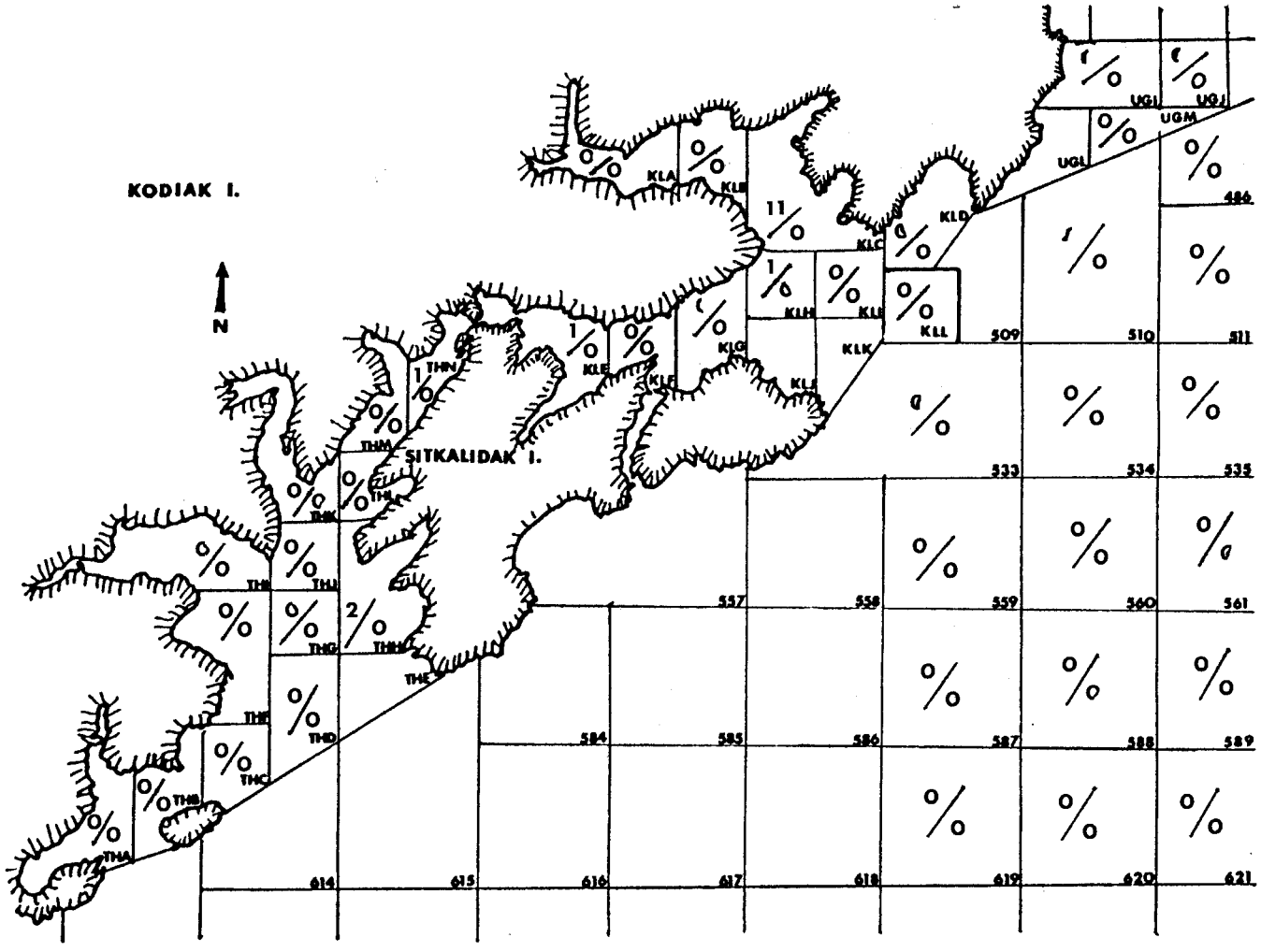


Figure 68. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

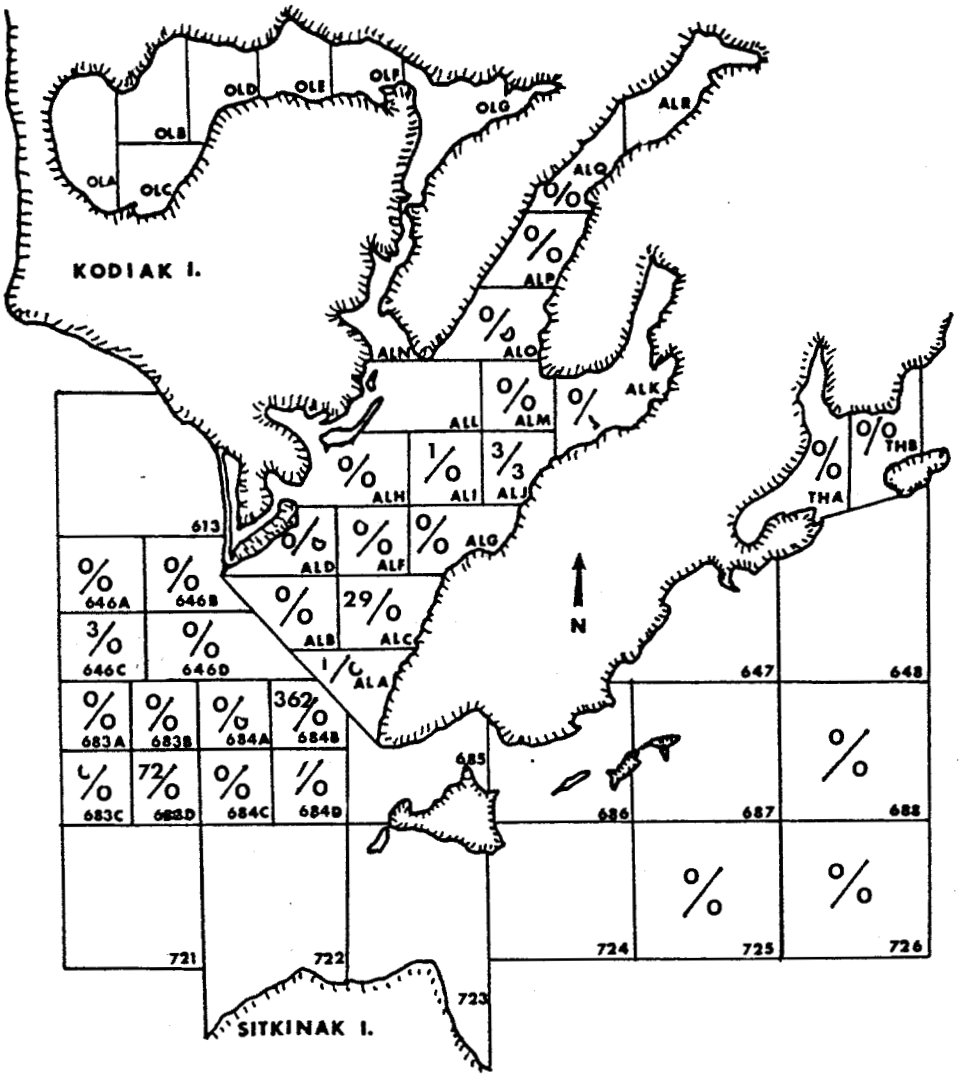


Figure 69. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

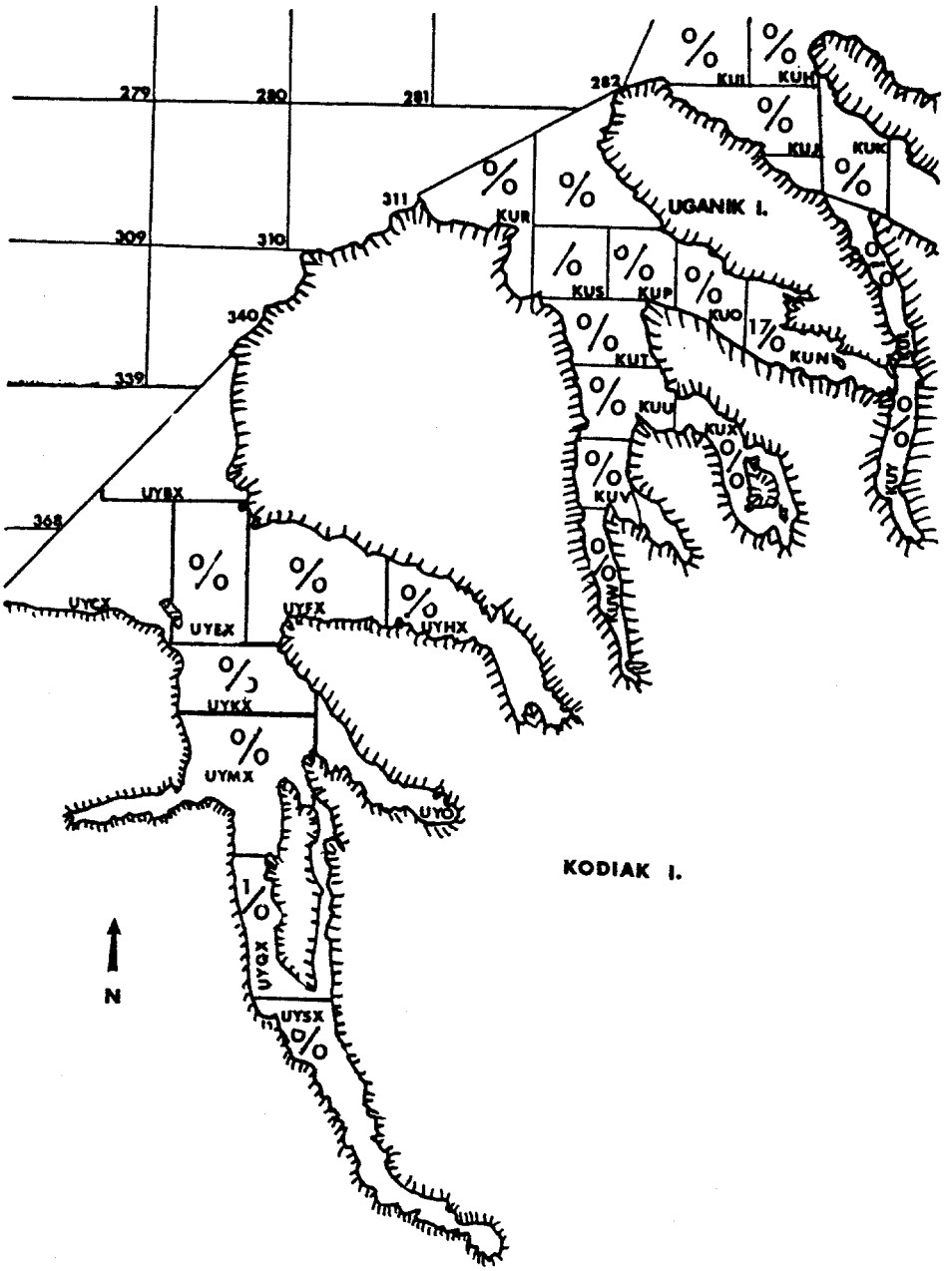


Figure 70. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, Kodiak trawl survey, 1988.

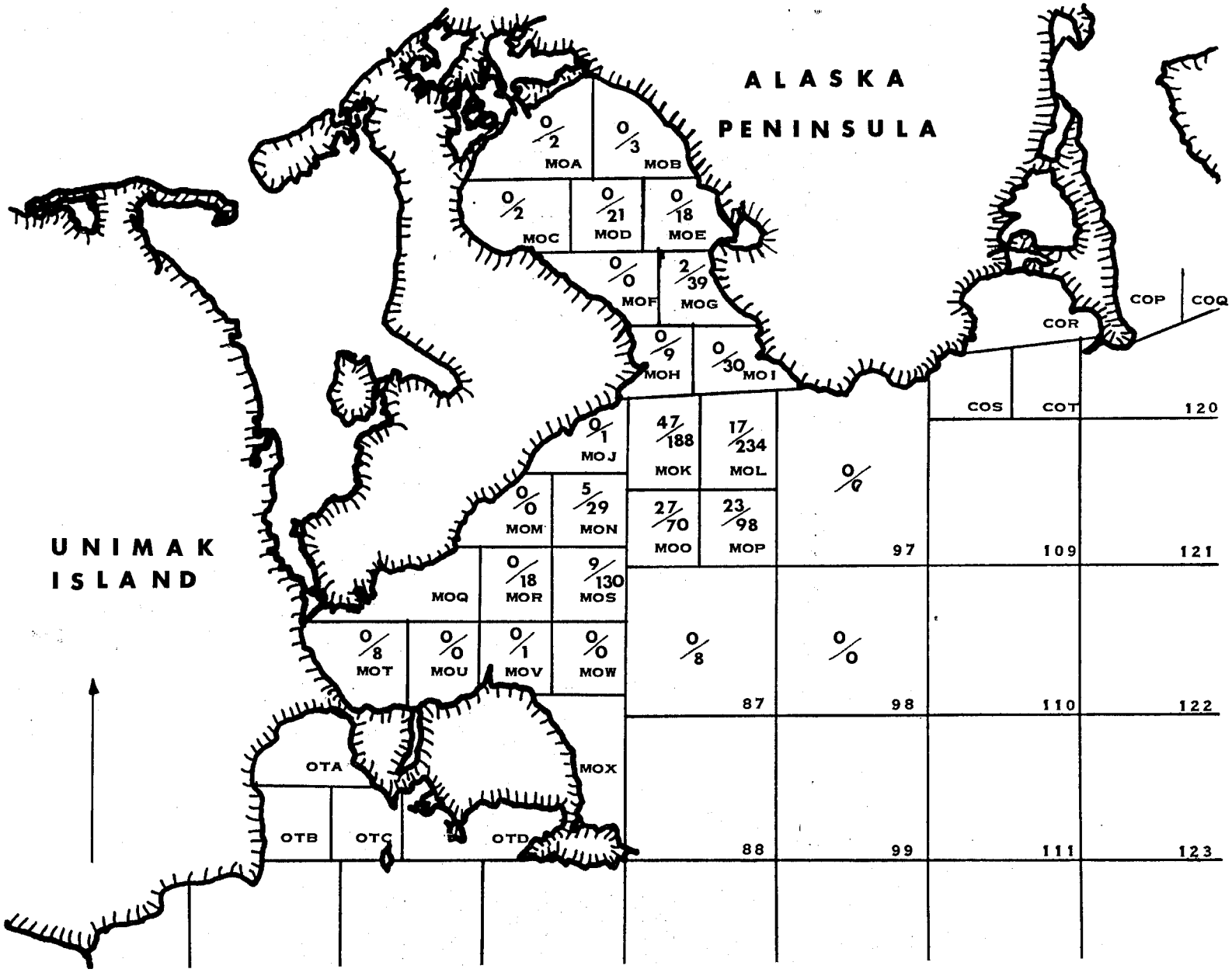


Figure 71. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

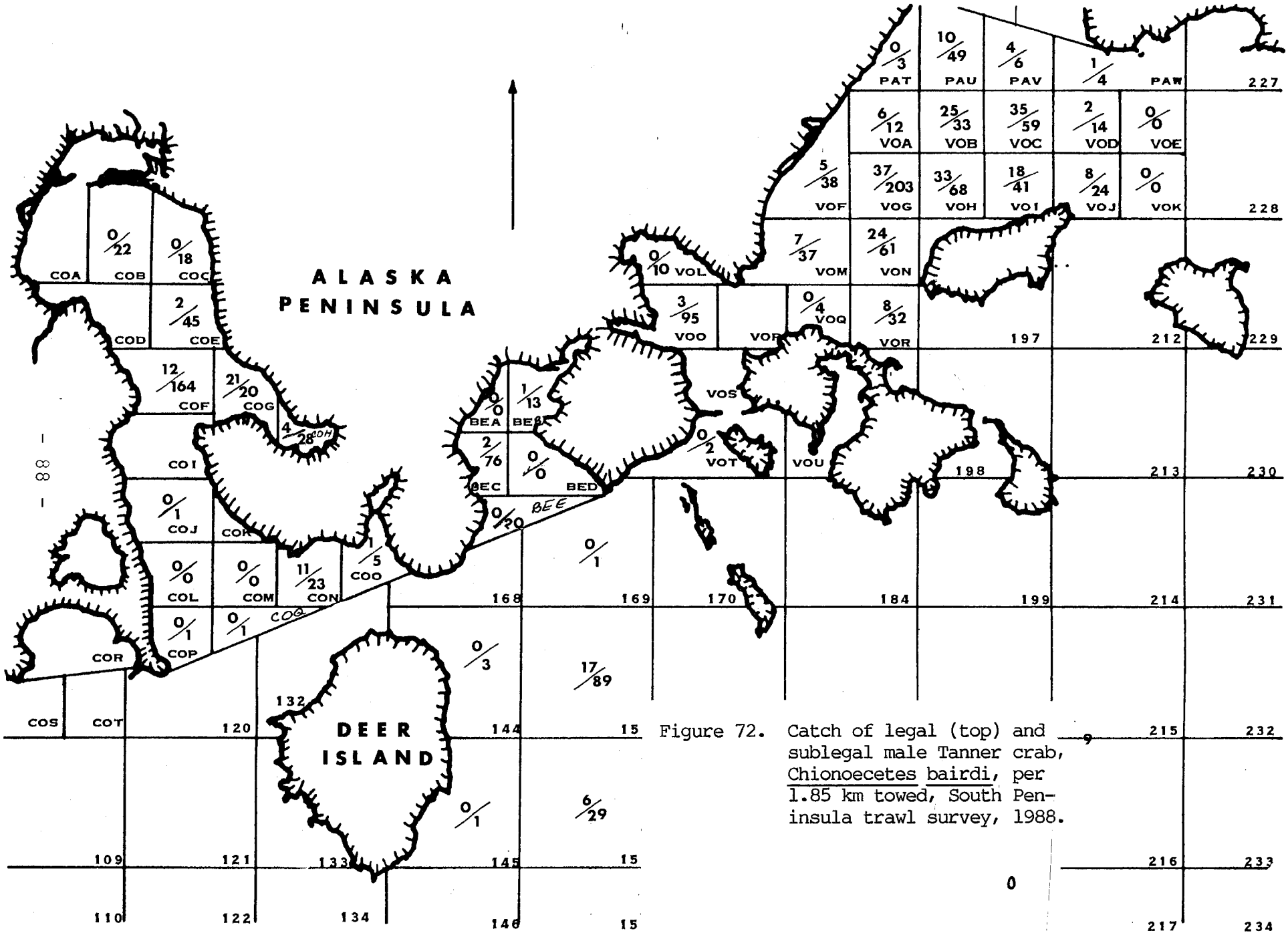


Figure 72. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

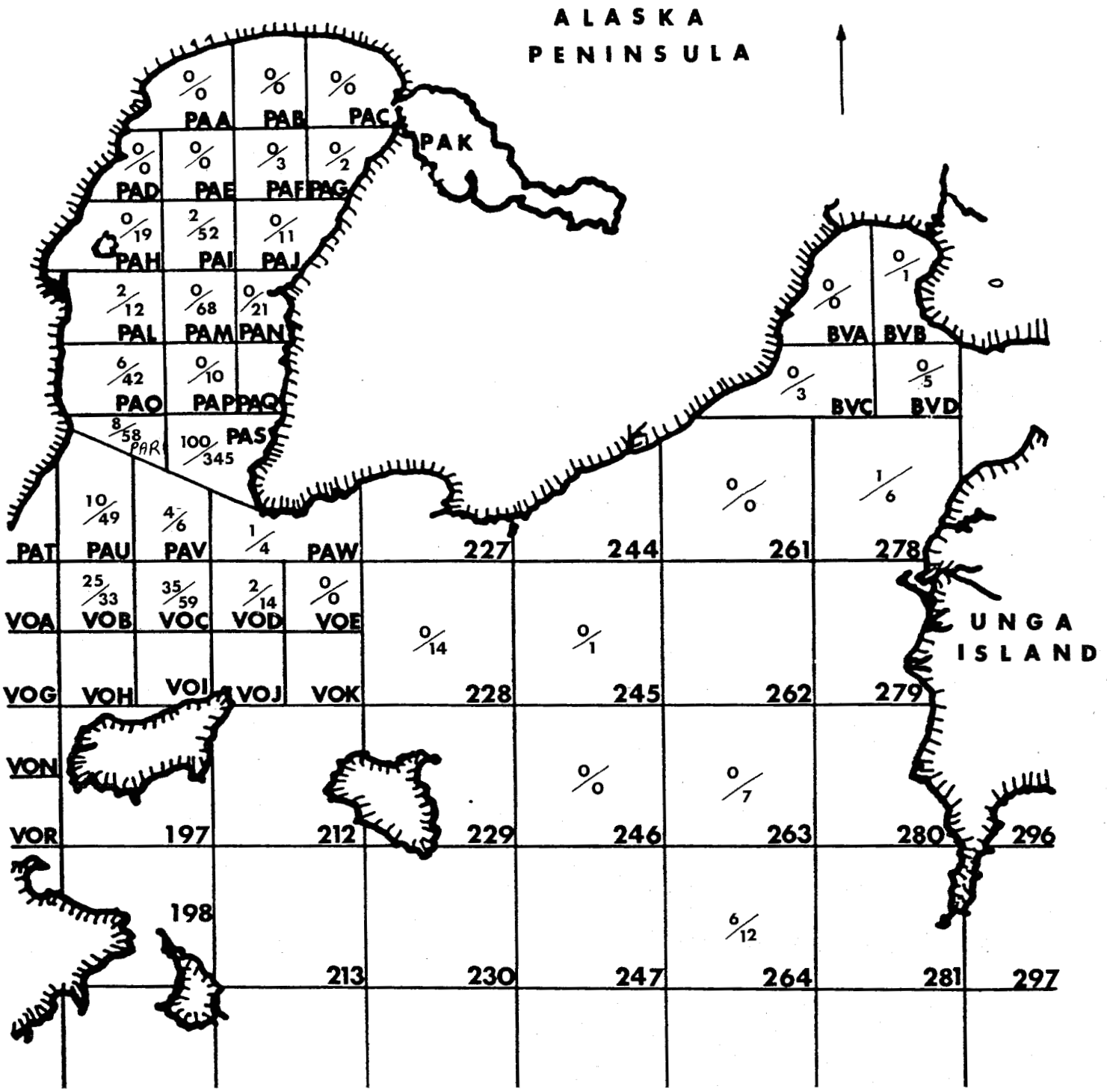


Figure 73. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

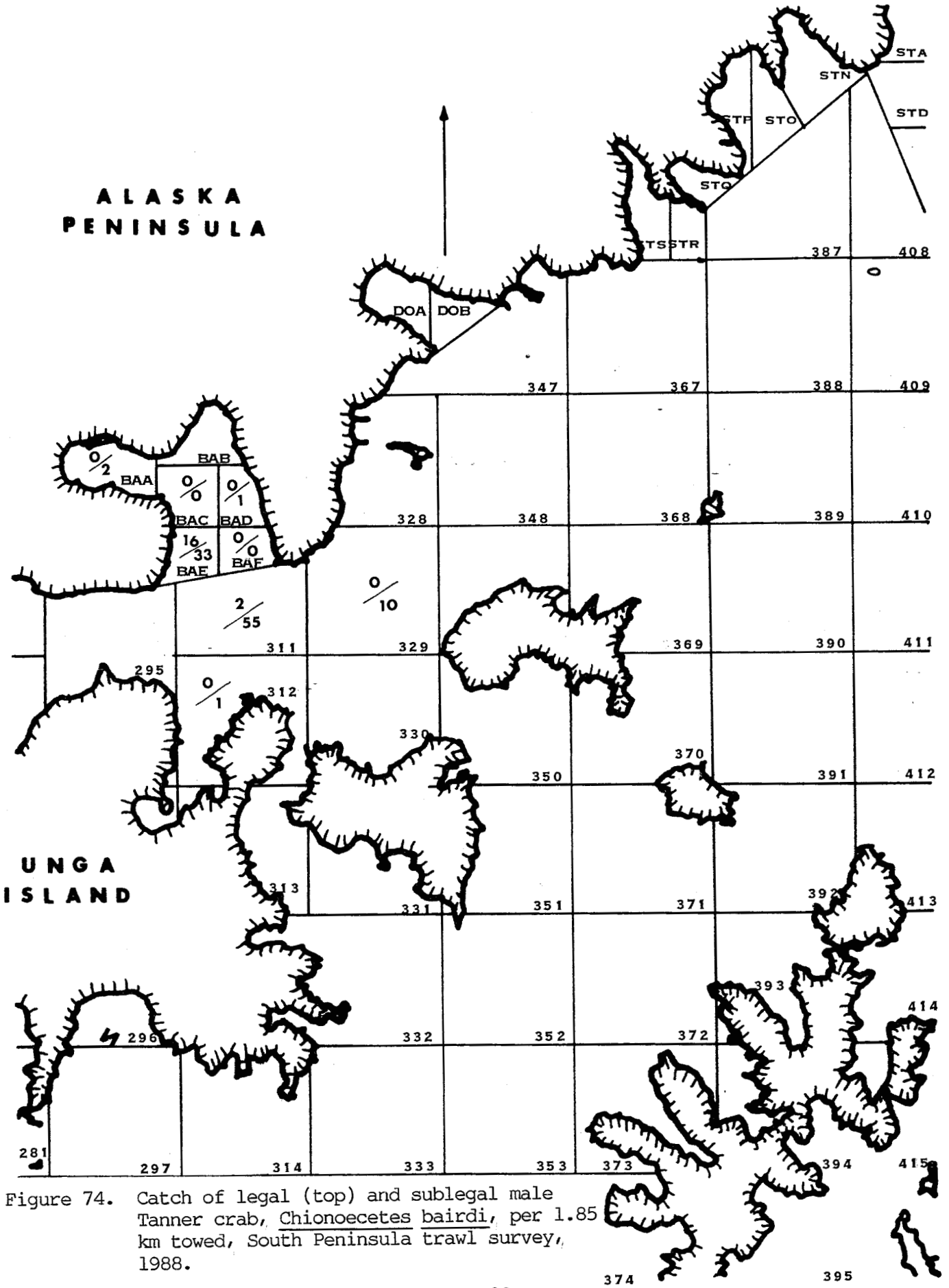


Figure 74. Catch of legal (top) and sublegal male Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

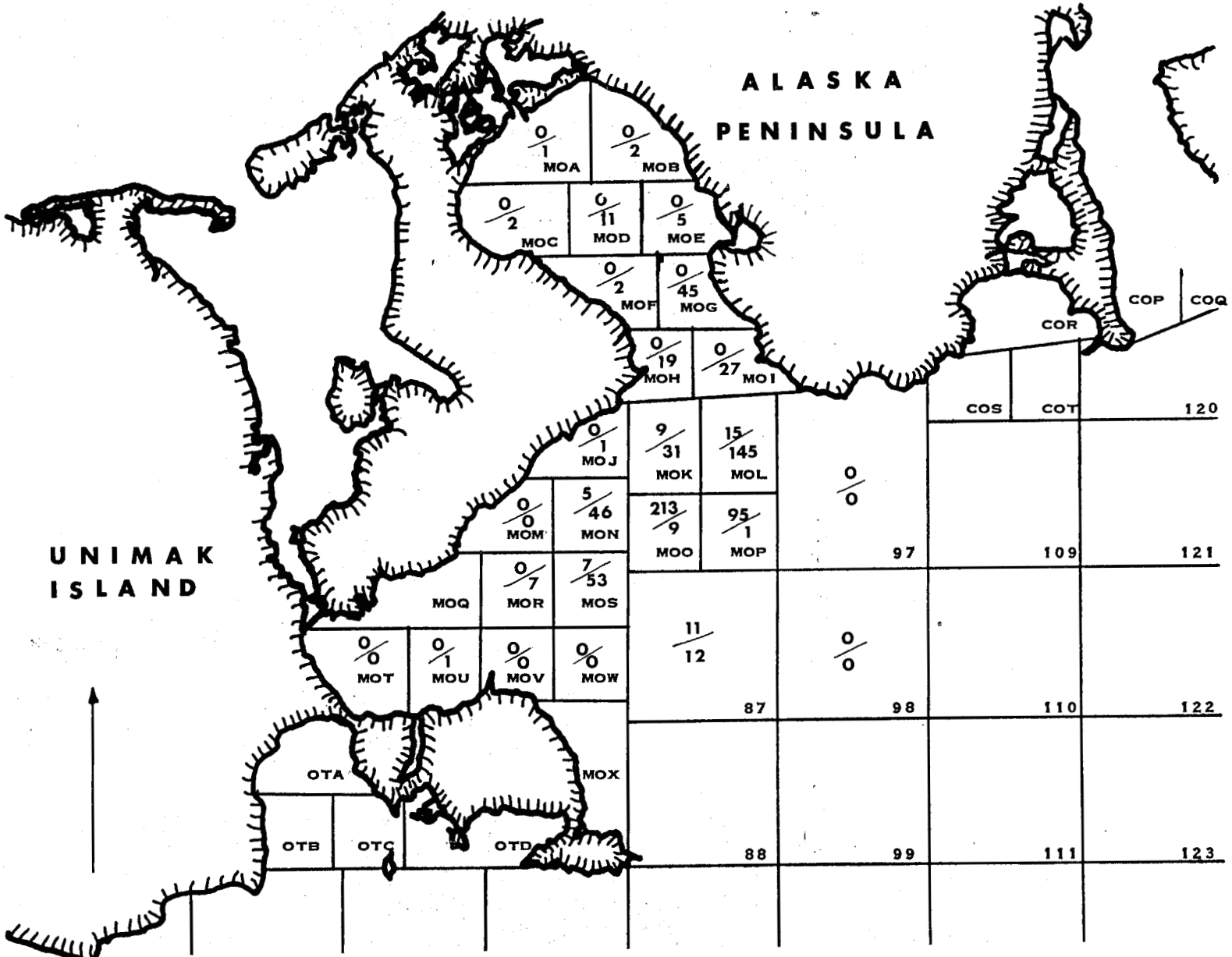


Figure 75. Catch of adult (top) and juvinile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

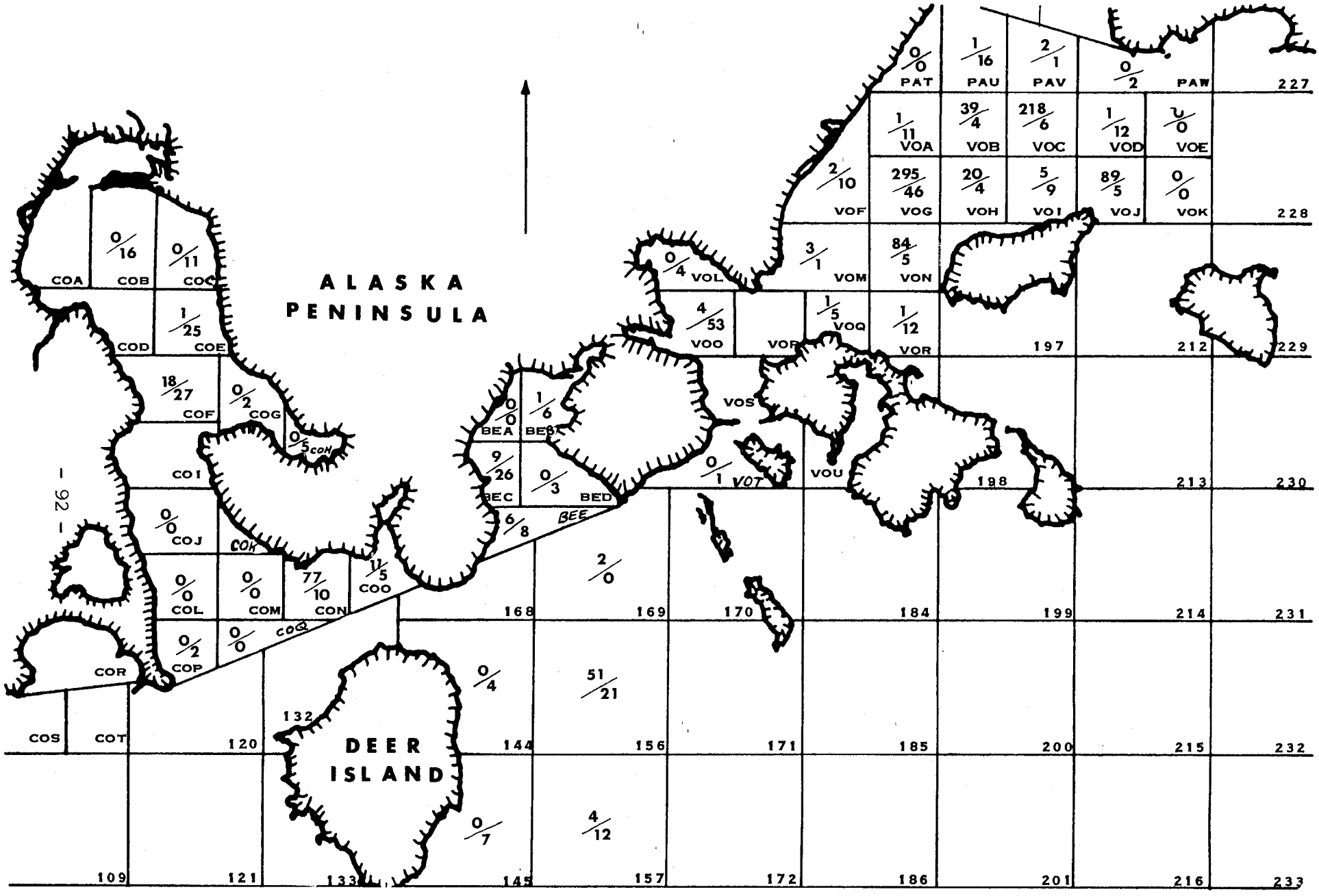


Figure 76. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

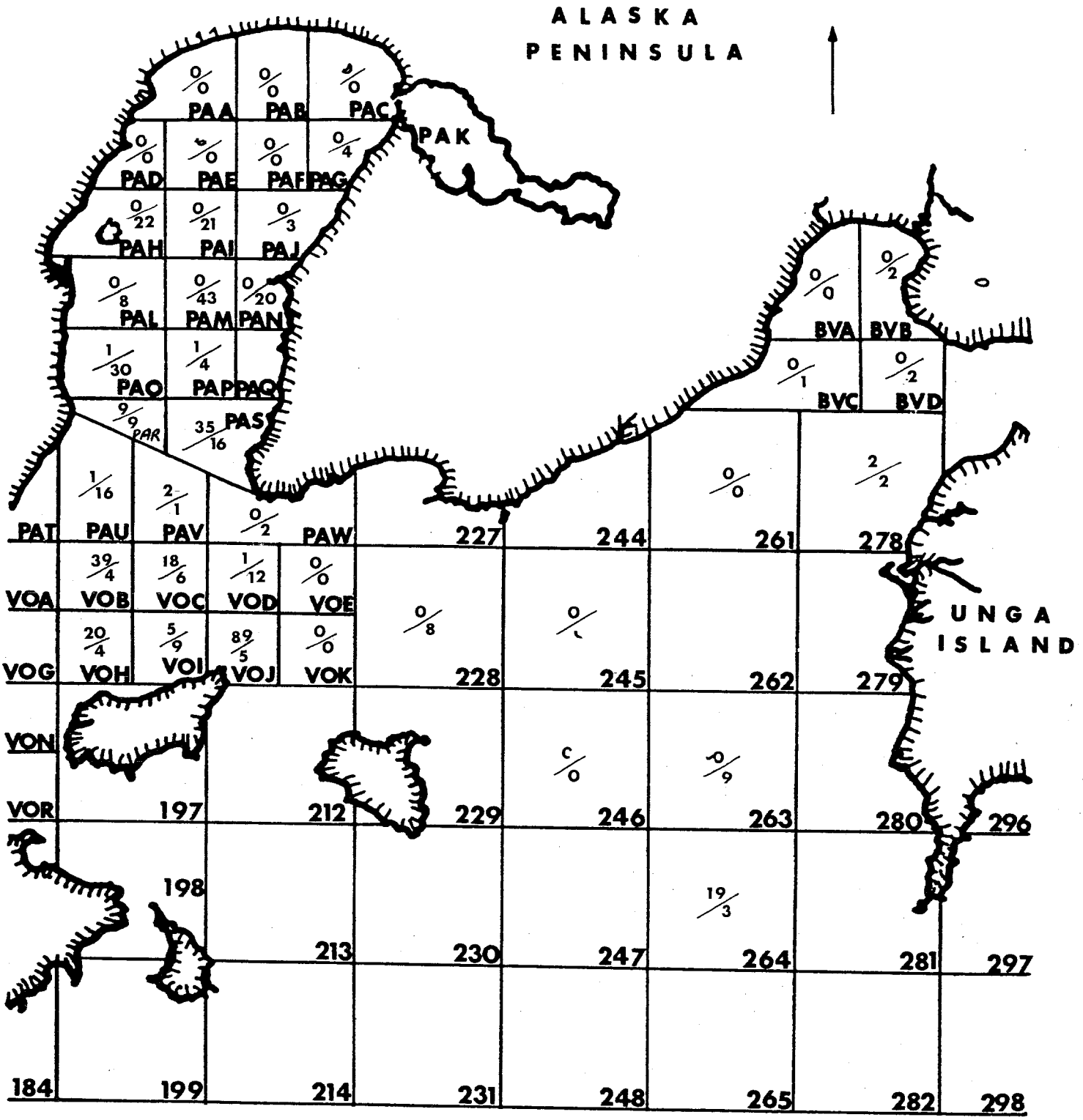


Figure 77. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988

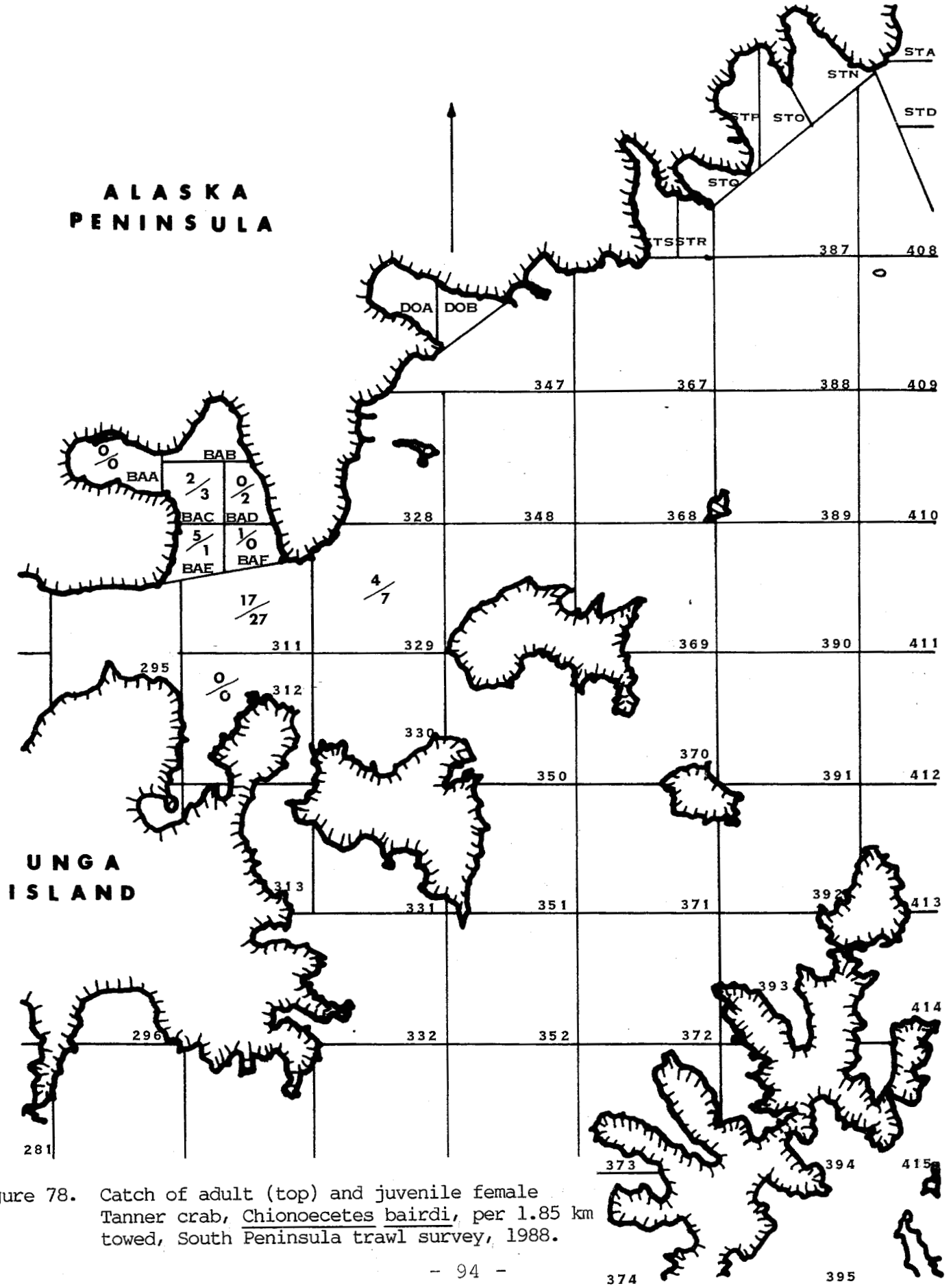


Figure 78. Catch of adult (top) and juvenile female Tanner crab, Chionoecetes bairdi, per 1.85 km towed, South Peninsula trawl survey, 1988.

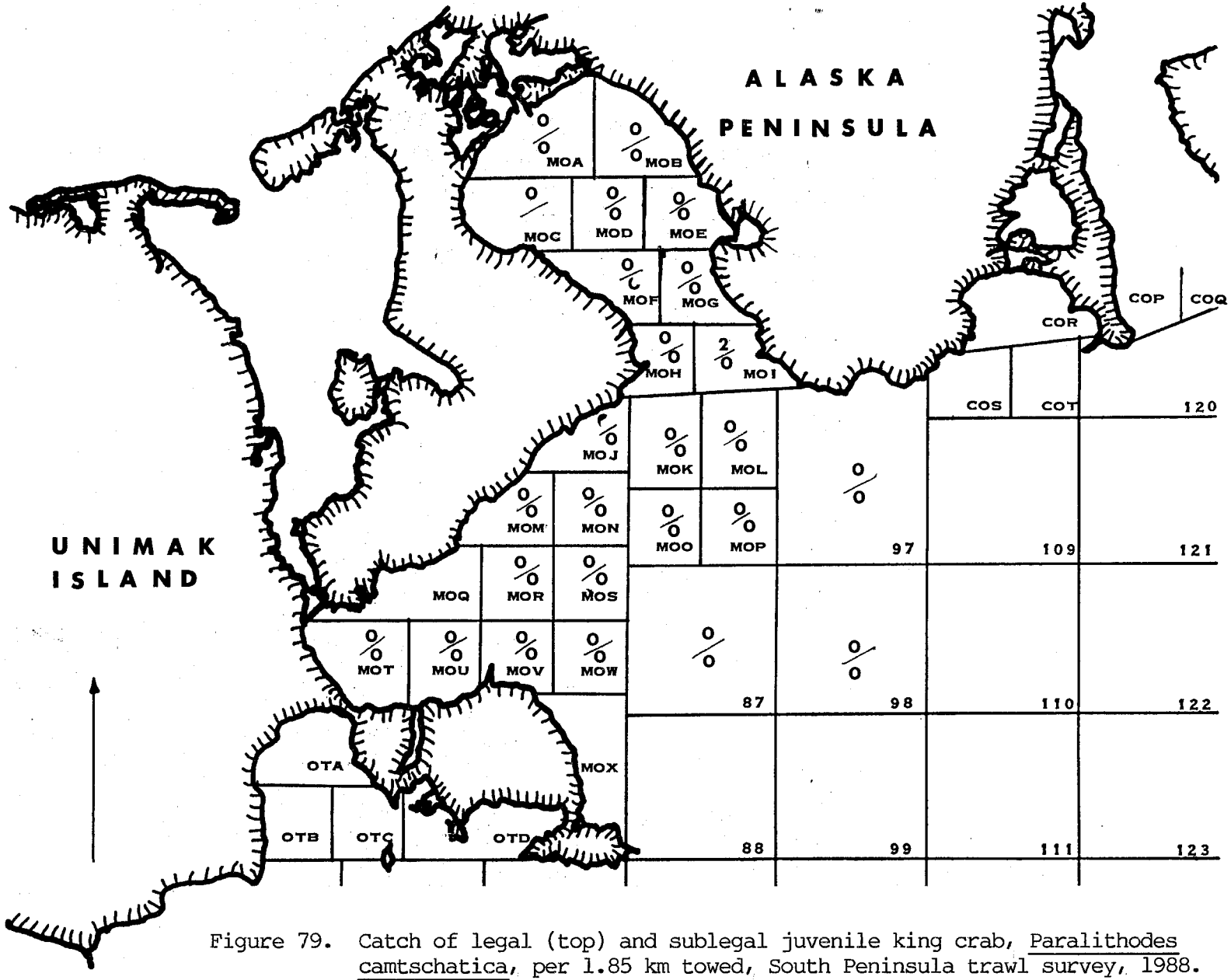


Figure 79. Catch of legal (top) and sublegal juvenile king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

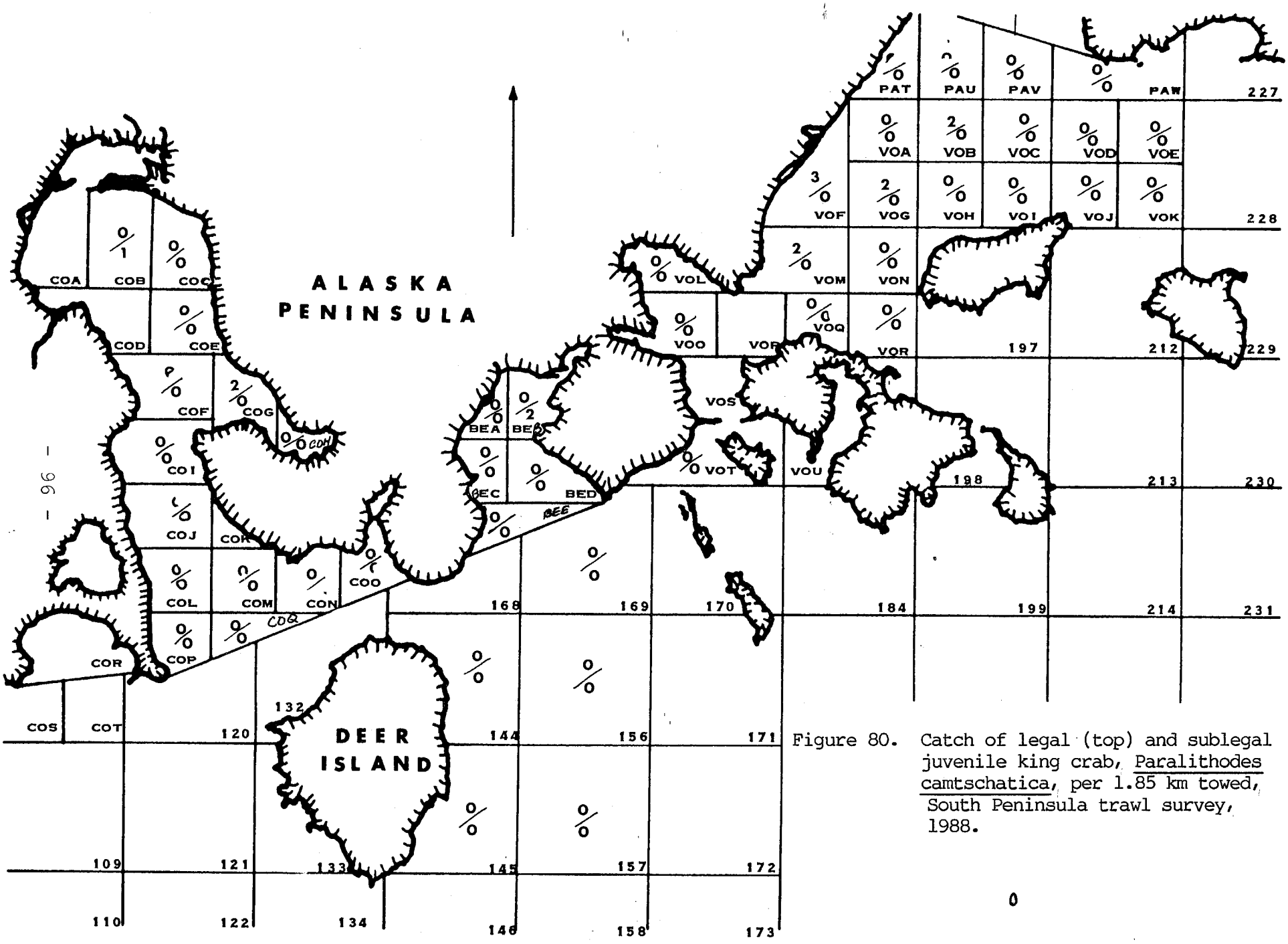


Figure 80. Catch of legal (top) and sublegal juvenile king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

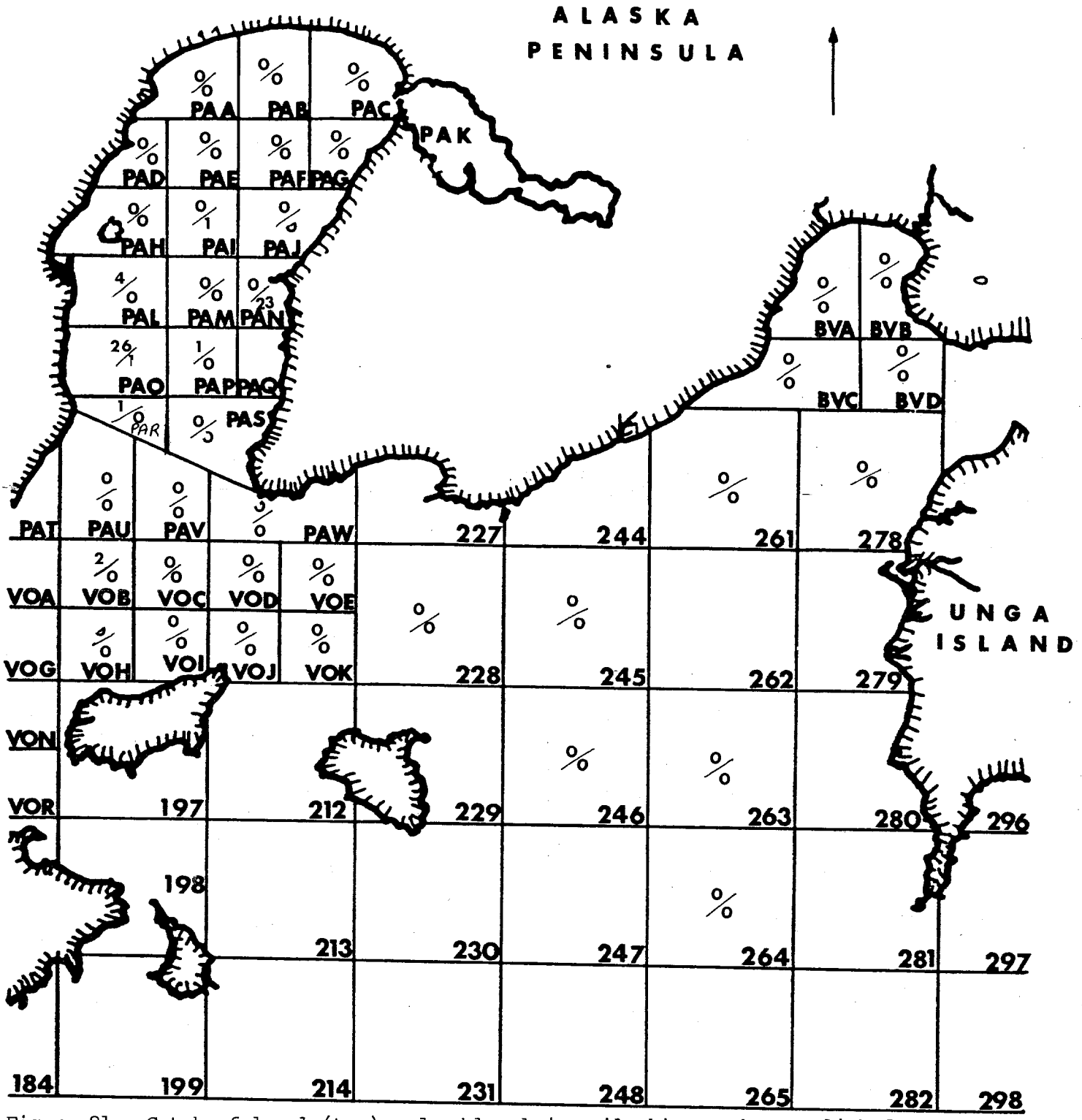


Figure 81. Catch of legal (top) and sublegal juvenile king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

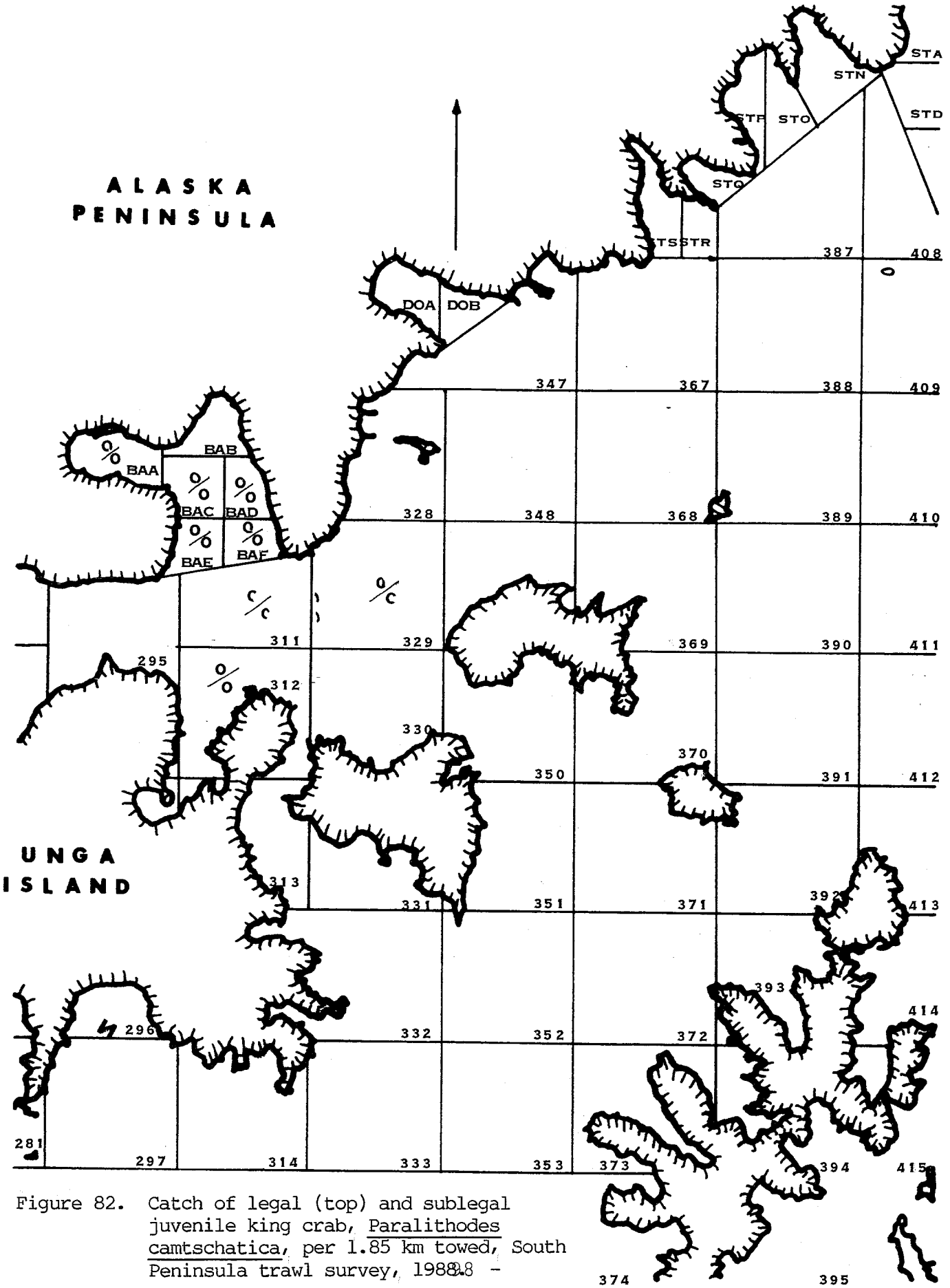


Figure 82. Catch of legal (top) and sublegal juvenile king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

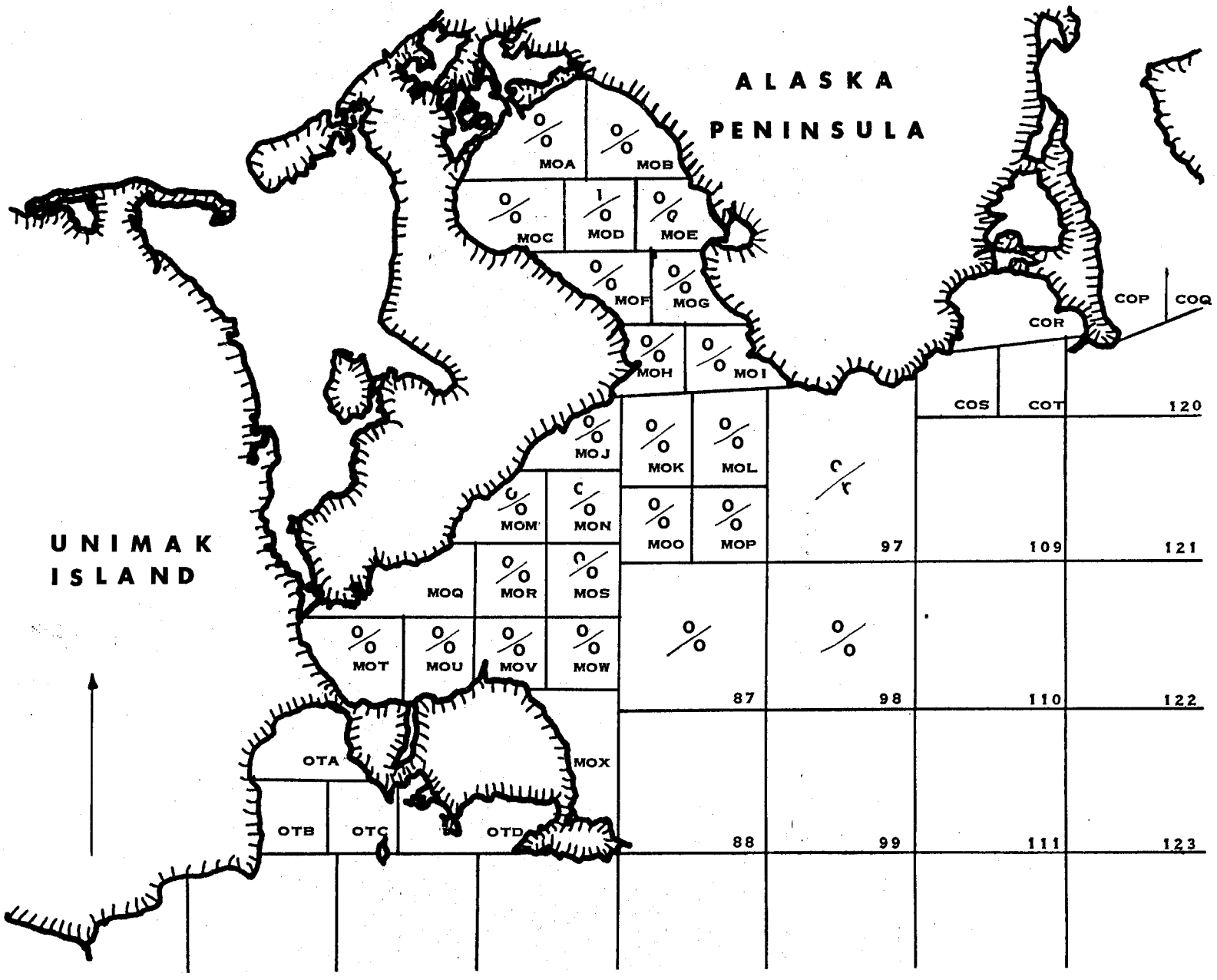


Figure 83. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl sruvey, 1988.

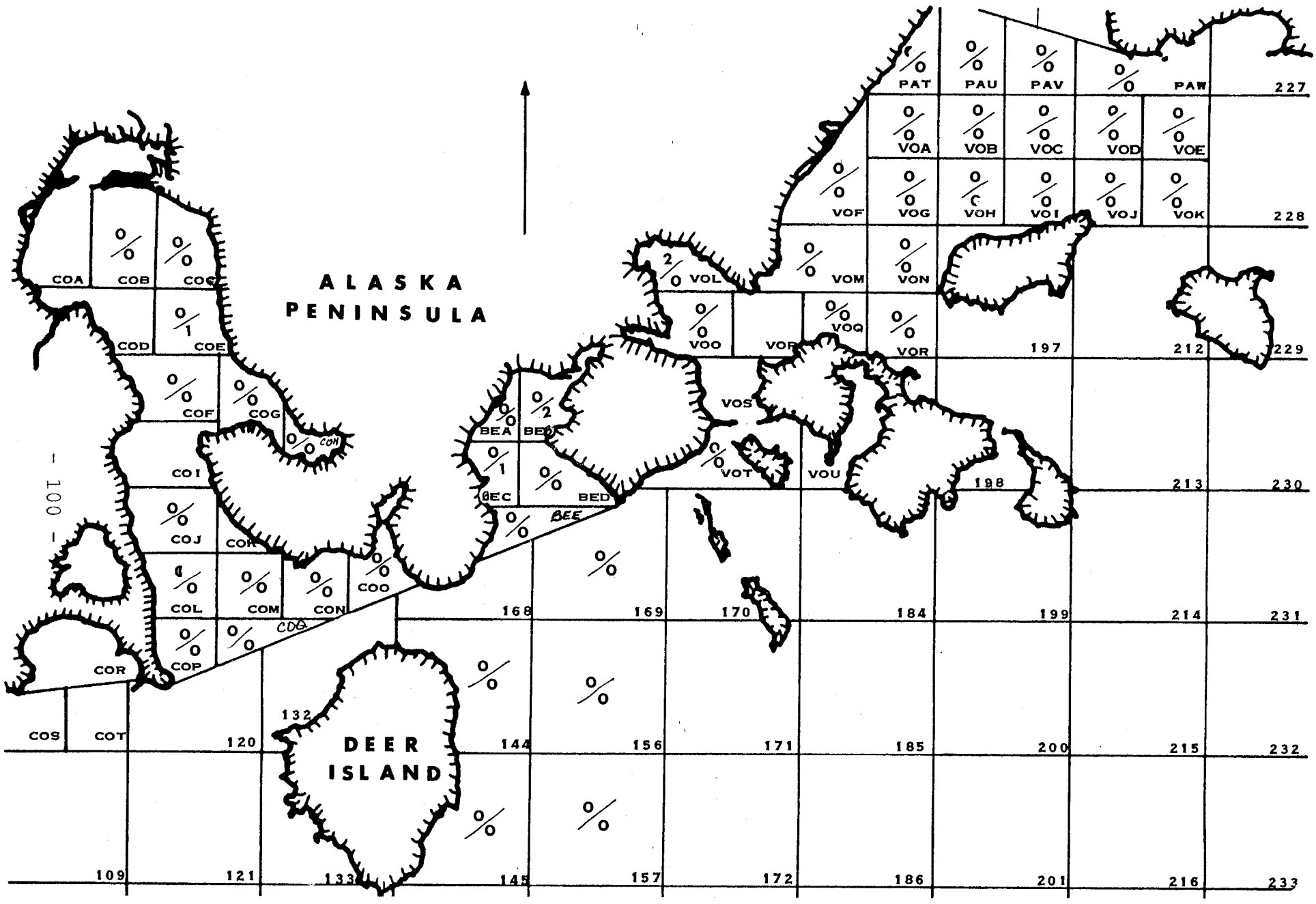


Figure 84. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

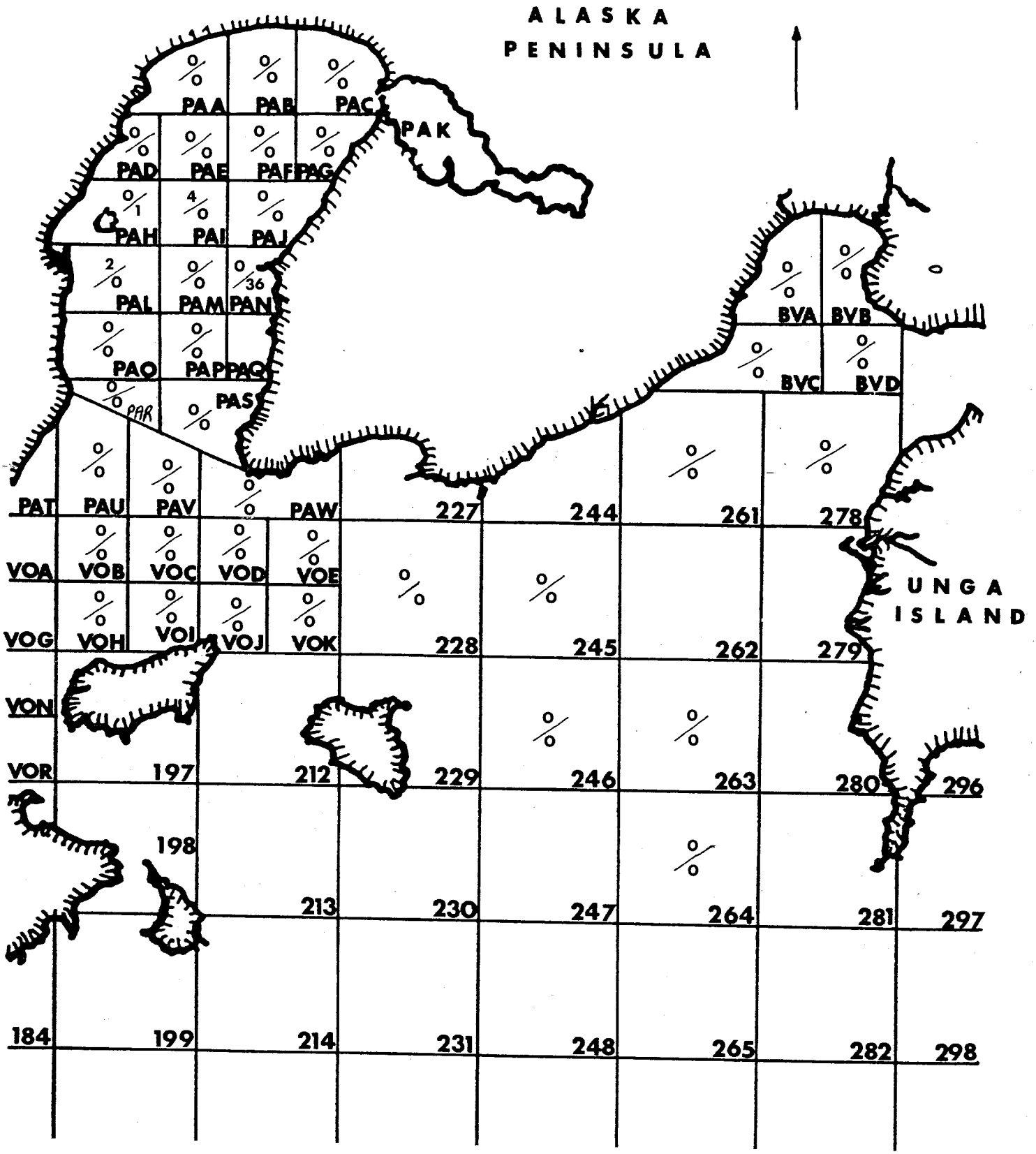


Figure 85. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

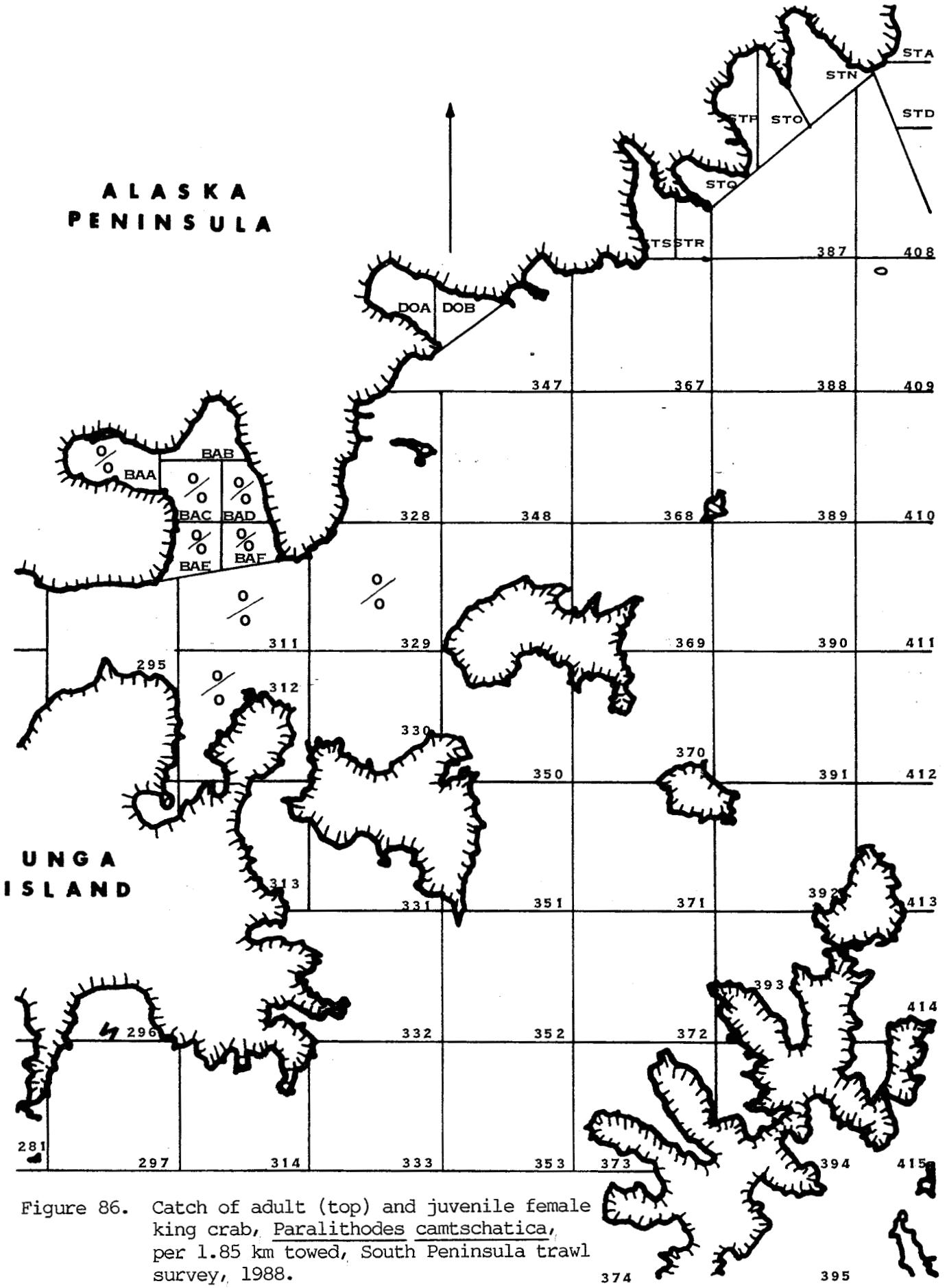


Figure 86. Catch of adult (top) and juvenile female king crab, Paralithodes camtschatica, per 1.85 km towed, South Peninsula trawl survey, 1988.

Appendix A.1. List of trawl by trawl data from the 1988 Kodiak trawl survey.

Tow No.	Station	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
1	chj	7	18	88	57 44.58	152 23.64	322746	431269	155	30	1.0	29	35	39
2	che	7	18	88	57 40.65	152 27.55	322971	431167	27	27	1.0	9	12	15
3	cha	7	18	88	57 37.04	152 26.06	323113	430867	50	28	1.0	22	30	36
4	chb	7	18	88	57 38.50	152 23.97	323020	430901	25	28	1.0	43	43	43
5	chf	7	18	88	57 41.48	152 20.00	322832	430956	35	27	1.0	75	79	83
6	chk	7	19	88	57 43.07	152 18.49	322757	431063	90	30	1.0	79	83	92
7	chl	7	19	88	57 43.26	152 15.70	322695	430954	53	30	1.0	81	90	112
8	859	8	23	88	56 19.93	154 5.14	327950	438217	247	26	1.0	46	47	47
9	858	8	23	88	56 18.82	154 13.20	328130	438709	250	26	1.0	49	50	50
10	891	8	23	88	56 14.80	154 12.91	328920	438828	208	27	1.0	69	70	70
11	892	8	23	88	56 14.15	154 7.97	328226	438564	10	27	1.0	72	73	74
12	947	8	23	88	56 5.00	154 41.14	329170	440742	277	27	1.0	66	69	71
13	946	8	23	88	56 5.03	154 50.48	329332	441274	244	27	1.0	58	58	60
14	973	8	23	88	56 0.87	154 58.45	329641	441860	230	26	1.0	50	53	55
15	1045	8	24	88	55 43.02	155 24.08	330799	446836	15	27	1.0	45	49	51
16	1046	8	24	88	55 44.05	155 14.20	330580	443247	10	28	1.0	69	70	74
17	1022	8	24	88	55 48.08	155 10.39	330354	442910	17	26	1.0	61	61	61
18	999	8	24	88	55 53.79	155 0.63	329956	442183	10	26	1.0	73	75	80
19	1000	8	24	88	55 54.22	154 55.32	329850	441879	199	25	1.0	113	116	117
20	881x	8	25	88	56 13.56	155 46.90	329987	444437	348	26	1.0	38	39	39
21	815x	8	25	88	56 21.95	155 46.85	329632	444261	351	26	1.0	49	51	51
22	816x	8	25	88	56 22.01	155 39.89	329505	443826	330	27	1.0	38	38	39
23	781x	8	25	88	56 28.73	155 42.73	329265	443873	340	14	0.5	84	86	88
24	750x	8	26	88	56 34.08	155 35.28	328901	443315	310	26	1.0	94	100	107
25	677x	8	26	88	56 42.11	155 20.91	328289	442247	338	25	1.0	85	92	100
26	678x	8	26	88	56 42.04	155 12.00	328136	441669	356	26	1.0	43	44	45
27	608x	8	26	88	56 52.13	155 11.48	327678	441484	340	25	1.0	106	110	114
28	alg	8	27	88	56 51.85	154 3.30	326570	437137	207	26	1.0	30	31	32
29	alc	8	27	88	56 49.89	154 6.72	326710	437390	180	27	1.0	25	33	41
30	ala	8	27	88	56 47.12	154 9.01	326865	437600	174	28	1.0	23	33	41
31	alj	8	27	88	56 53.23	154 1.44	326475	436970	350	27	1.0	39	40	40
32	alk	8	27	88	56 54.79	153 57.66	326343	436705	21	28	1.0	36	39	41
33	alf	8	27	88	56 51.56	154 8.42	326663	437458	250	26	1.0	29	31	34
34	684b	8	28	88	56 45.37	154 12.89	327004	437883	161	27	1.0	35	45	51
35	684d	8	28	88	56 43.71	154 13.24	327080	437946	323	16	0.6	18	20	22
36	684c	8	28	88	56 43.26	154 18.03	327181	438256	190	27	1.0	38	40	41
37	683d	8	28	88	56 42.95	154 21.36	327247	438471	262	26	1.0	37	38	40
38	683b	8	28	88	56 44.58	154 22.61	327194	438503	340	27	1.0	33	35	37
39	684a	8	28	88	56 45.56	154 18.39	327088	438219	158	28	1.0	28	29	31
40	646d	8	28	88	56 46.93	154 20.22	327054	438302	300	27	1.0	29	31	31
41	646b	8	28	88	56 49.17	154 22.83	326998	438411	331	26	1.0	33	34	36
42	646a	8	29	88	56 49.64	154 25.53	327025	438576	248	26	1.0	35	36	37
43	645	8	29	88	56 50.85	154 30.51	327053	438863	165	28	1.0	37	38	40
44	646c	8	29	88	56 48.11	154 27.52	327125	438728	140	28	1.0	33	35	35
45	683a	8	29	88	56 45.36	154 27.26	327239	438771	144	26	1.0	33	34	36
46	682b	8	29	88	56 45.02	154 29.93	327297	438950	300	27	1.0	39	39	41
47	alb	8	29	88	56 49.05	154 14.50	326868	437883	58	21	1.0	16	20	21

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Tow No.	Stat ion	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
48	ald	8	29	88	56 50.78	154 11.63	326750	437680	180	27	1.0	27	30	34
49	676x	8	30	88	56 41.47	155 29.85	328480	442835	219	28	1.0	123	123	123
50	712x	8	30	88	56 38.90	155 42.30	328814	443680	208	26	1.0	134	135	135
51	748x	8	30	88	56 34.12	155 49.41	329155	444215	204	27	1.0	134	135	136
52	alh	8	31	88	56 52.11	154 8.20	326321	437425	348	28	1.0	31	35	38
53	ALI	8	31	88	56 53.01	154 5.30	326543	437223	330	28	1.0	40	44	46
54	all	8	31	88	56 54.73	154 4.32	326454	437123	337	20	0.8	46	52	61
55	alm	8	31	88	56 56.19	154 1.09	326339	436887	355	29	1.0	41	50	58
56	alo	8	31	88	56 57.93	153 59.65	326244	436769	228	24	0.8	65	71	78
57	alp	8	31	88	57 0.93	153 58.18	326082	436604	350	28	1.0	85	88	90
58	alq	8	31	88	57 3.45	153 55.55	325928	436386	0	27	1.0	95	97	97
59	alr	8	31	88	57 5.38	153 51.64	325780	436100	5	18	0.6	71	74	85
60	683c	9	1	88	56 42.46	154 25.54	327339	438735	154	13	0.5	10	10	12
61	682d	9	1	88	56 42.27	154 30.57	327430	439059	280	13	0.5	12	13	13
62	725	9	1	88	56 39.20	153 48.64	326873	436617	331	25	1.0	51	55	58
63	726	9	1	88	56 37.14	153 35.30	326745	435933	345	27	1.0	60	62	69
64	759	9	2	88	56 35.06	153 36.81	326861	436104	178	18	0.6	62	64	67
65	794	9	2	88	56 30.43	153 36.91	327057	436290	204	27	1.0	73	74	79
66	760	9	3	88	56 33.97	153 31.26	326814	435843	315	26	1.0	84	86	89
67	761	9	3	88	56 34.39	153 21.38	326639	435303	24	29	1.0	55	59	70
68	728	9	3	88	56 38.75	153 18.93	326419	435000	345	27	1.0	69	74	79
69	533	9	21	88	57 8.59	152 44.70	324636	431956	130	26	1.0	78	79	79
70	559	9	21	88	57 3.66	152 44.36	324840	432155	25	27	1.0	84	85	86
71	560	9	21	88	57 2.44	152 30.32	324690	431594	331	27	1.0	69	70	73
72	534	9	21	88	57 6.52	152 30.10	324514	431373	314	27	1.0	59	61	66
73	KLI	9	21	88	57 12.72	152 50.26	324536	432106	280	28	1.0	62	64	71
74	KLC	9	21	88	57 15.79	152 55.08	324471	432309	306	28	1.0	49	52	53
75	535	9	22	88	57 9.01	152 26.12	324352	431090	135	27	1.0	70	74	77
76	561	9	22	88	57 3.83	152 26.33	324576	431372	147	28	1.0	81	81	82
77	589	9	22	88	56 58.91	152 26.24	324783	431630	160	27	1.0	76	78	78
78	621	9	22	88	56 54.27	152 25.98	324974	431862	149	28	1.0	87	88	91
79	621	9	22	88	56 53.49	152 25.62	324996	431882	341	27	1.0	83	86	92
80	656	9	22	88	56 49.47	152 26.55	325182	432131	144	27	1.0	91	92	94
81	655	9	22	88	56 48.85	152 34.82	325325	432468	322	27	1.0	70	73	77
82	558	9	23	88	57 3.57	152 48.60	324912	432380	140	28	1.0	58	60	63
83	587	9	23	88	56 58.88	152 43.30	325033	432336	154	27	1.0	83	83	87
84	619	9	23	88	56 54.35	152 43.25	325225	432557	151	28	1.0	72	73	74
85	620	9	23	88	56 54.14	152 36.21	325126	432257	37	28	1.0	82	85	87
86	588	9	23	88	56 58.41	152 34.95	324929	431991	323	27	1.0	85	87	87
87	KLD	9	23	88	57 15.12	152 44.15	324347	431677	225	18	0.6	14	16	20
88	KLB	9	24	88	57 17.66	152 58.75	324444	432496	160	26	1.0	43	45	47
89	KLA	9	24	88	57 17.61	153 4.06	324521	432835	15	28	1.0	49	52	53
90	KLH	9	24	88	57 12.97	152 53.71	324578	432305	230	28	1.0	61	62	69
91	KLJ	9	24	88	57 10.92	152 56.33	324700	432512	27	14	0.5	34	36	37
92	KLL	9	24	88	57 11.49	152 47.08	324543	431962	30	26	1.0	72	74	77
93	KLG	9	24	88	57 11.12	152 57.98	324721	432617	244	27	1.0	66	67	71
94	KLF	9	24	88	57 10.67	153 3.42	324821	432958	250	26	1.0	67	68	69
95	KLE	9	24	88	57 10.00	153 6.95	324902	433193	212	28	1.0	55	62	66
96	614	9	25	88	56 54.04	153 27.03	325901	434875	148	26	1.0	70	75	77

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Tow No.	Station	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
97	615	9	25	88	56 52.86	153 22.66	325880	434658	40	29	1.0	73	77	80
98	729	9	25	88	56 40.21	153 10.59	326233	434516	160	26	1.0	82	82	82
99	727	9	25	88	56 39.38	153 27.73	326534	435448	285	26	1.0	81	84	86
100	688	9	25	88	56 42.23	153 37.55	326571	435886	276	27	1.0	82	84	86
101	650	9	25	88	56 46.71	153 21.68	326128	434830	329	24	0.9	74	77	79
102	THA	9	26	88	56 52.58	153 40.57	326176	435727	234	26	1.0	26	28	31
103	THB	9	26	88	56 53.67	153 36.39	326060	435437	15	29	1.0	43	49	51
104	THC	9	26	88	56 55.34	153 29.93	325887	435003	325	28	1.0	71	72	73
105	THD	9	26	88	56 56.79	153 27.83	325792	434832	326	28	1.0	72	72	73
106	THG	9	26	88	56 59.89	153 27.33	325650	434709	354	29	1.0	63	64	66
107	THF	9	26	88	57 0.31	153 34.41	325742	435132	14	28	1.0	38	45	45
108	THI	9	26	88	57 2.79	153 35.31	325645	435121	82	28	1.0	48	53	56
109	THJ	9	27	88	57 3.62	153 25.73	325463	434514	196	26	1.0	63	64	66
110	THH	9	27	88	57 1.50	153 23.81	325528	434453	174	28	1.0	52	59	62
111	THK	9	27	88	57 8.30	153 29.13	325305	434611	159	26	1.0	51	56	58
112	THL	9	27	88	57 6.26	153 23.55	325314	434304	346	27	1.0	66	68	69
113	THM	9	27	88	57 8.46	153 20.43	324062	435169	180	27	1.0	59	67	69
114	THN	9	27	88	57 9.46	153 19.72	325115	433995	180	24	0.8	51	68	69
115	UGC	9	28	88	57 26.82	152 42.39	323800	431349	102	27	1.0	50	52	53
116	UGB	9	28	88	57 26.98	152 44.65	323825	431499	117	26	1.0	49	50	50
117	UGA	9	28	88	57 28.77	152 51.19	323836	431953	100	26	1.0	39	44	49
118	UGI	9	29	88	57 21.73	152 32.69	323891	430772	131	26	1.0	53	54	55
119	UGM	9	29	88	57 18.79	152 31.62	324003	430826	30	27	1.0	53	54	58
120	510	9	29	88	57 15.09	152 33.17	324186	431076	160	26	1.0	45	49	50
121	511	9	29	88	57 14.04	152 24.74	324114	430767	155	26	1.0	37	38	40
122	486	9	29	88	57 16.37	152 21.98	323973	430541	331	27	1.0	39	41	42
123	UGJ	9	29	88	57 20.21	152 26.16	323860	430490	337	27	1.0	37	40	43
124	UGD	9	29	88	57 25.26	152 37.47	323806	431037	292	28	1.0	53	54	56
125	442	9	30	88	57 27.90	151 57.59	323135	430020	4	26	1.0	52	54	56
126	443	9	30	88	57 30.50	151 45.89	322286	430059	302	27	1.0	56	60	69
127	420	9	30	88	57 33.19	152 48.32	322782	430124	323	27	1.0	83	84	85
128	421	9	30	88	57 33.28	151 39.85	322667	430113	107	27	1.0	66	74	82
129	444	9	30	88	57 29.41	151 38.60	322817	430037	85	27	1.0	68	73	76
130	UGE	10	1	88	57 24.47	152 38.19	323830	430991	82	27	1.0	52	54	55
131	UGF	10	1	88	57 23.30	152 34.57	323833	430780	130	26	1.0	45	47	49
132	UGG	10	1	88	57 22.11	152 29.27	323810	430505	55	26	1.0	33	35	38
133	UGH	10	1	88	57 22.47	152 23.22	323715	430222	65	23	1.0	17	19	21
134	UGK	10	1	88	57 21.10	152 24.75	-0-	-0-	123	26	1.0	27	28	29
135	KZA	10	2	88	57 45.83	152 53.31	323085	432724	331	27	1.0	20	23	25
136	KZB	10	2	88	57 48.51	152 52.56	322957	432820	178	23	0.8	28	29	31
137	KZC	10	2	88	57 52.11	152 45.25	322686	432659	190	28	1.0	28	38	41
138	KZD	10	2	88	57 52.39	152 46.61	322689	432748	316	24	0.9	64	69	72
139	KZE	10	2	88	57 55.07	152 42.49	322515	432711	199	28	1.0	60	64	67
140	KZF	10	2	88	57 55.85	152 42.53	322479	432762	200	23	0.8	73	75	76
141	KZG	10	2	88	57 56.73	152 40.47	322405	432723	15	28	1.0	60	70	77
142	KZJ	10	2	88	57 57.73	152 39.62	322347	432752	343	27	1.0	72	74	75
143	KZK	10	3	88	57 58.12	152 33.22	322245	432518	223	26	1.0	84	92	100
144	KZO	10	3	88	58 1.02	152 33.71	322115	432718	0	27	1.0	103	108	110
145	MONX	10	3	88	58 2.55	152 30.05	321995	432677	25	28	1.0	108	116	126

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Tow No.	Stat ion	Date Mon	Date Day	Date Yr	Starting Position Latitude		Longitude		Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
146	KZR	10	3	88	58	6.44	152	36.03	321892	433150	323	27	1.0	63	65	67
147	KZS	10	3	88	58	8.77	152	35.31	321774	433264	131	26	1.0	43	46	57
148	MOPX	10	3	88	58	4.32	152	17.60	321756	432372	40	27	1.0	93	94	97
149	MOLX	10	3	88	58	3.69	152	10.29	321691	432123	340	28	1.0	78	85	103
150	MOXX	10	3	88	58	8.77	152	14.10	321505	432555	287	27	1.0	83	90	105
151	255	10	4	88	58	3.40	152	1.82	321601	431883	98	26	1.0	67	69	71
152	256	10	4	88	58	3.78	151	49.28	321425	431645	133	27	1.0	81	87	89
153	257	10	4	88	58	4.10	151	40.72	321307	431513	73	26	1.0	87	90	91
154	284	10	4	88	57	59.80	151	47.62	321589	431386	226	26	1.0	73	74	76
155	283	10	4	88	57	59.49	152	0.88	321770	431623	224	26	1.0	-0-	-0-	-0-
156	MOGX	10	4	88	57	58.38	152	10.52	321943	431788	223	27	1.0	94	95	98
157	CHG	10	12	88	57	41.83	152	13.46	522730	430800	36	28	1.0	50	57	63
158	369X	10	12	88	57	43.79	152	3.02	322508	430716	179	27	1.0	58	64	68
159	395	10	12	88	57	40.72	152	1.99	322631	430527	164	28	1.0	92	101	109
160	KUD	10	13	88	57	58.14	153	9.79	322734	434250	277	19	0.7	24	30	32
161	KUE	10	13	88	58	0.77	153	17.87	322719	434805	167	24	0.9	55	64	74
162	KUF	10	13	88	58	0.91	153	19.33	322729	434898	240	26	1.0	79	95	110
163	KUH	10	13	88	57	58.78	153	20.92	322850	434889	300	27	1.0	26	31	36
164	KUG	10	13	88	58	1.20	153	24.67	322788	435200	140	17	0.6	60	70	76
165	KUY	10	14	88	57	46.07	153	12.34	323337	433830	329	28	1.0	34	38	45
166	KUL	10	14	88	57	50.72	153	13.66	323136	434107	324	27	1.0	49	50	59
167	KUM	10	14	88	57	52.16	153	9.85	323018	433942	100	28	1.0	36	38	41
168	KUK	10	14	88	57	54.27	153	14.40	322980	434310	257	28	1.0	69	75	79
169	KUJ	10	14	88	57	55.83	153	19.09	433969	434648	300	29	1.0	85	90	99
170	KUI	10	14	88	57	58.01	153	23.78	322929	435012	293	27	1.0	121	135	142
171	224	10	15	88	58	8.28	153	48.89	322768	436886	352	26	1.0	107	107	107
172	223	10	15	88	58	10.01	153	57.49	322806	437454	228	26	1.0	114	116	119
173	222	10	15	88	58	8.70	154	11.89	323069	438242	80	28	1.0	50	62	75
174	198	10	15	88	58	13.14	153	56.76	322632	437535	355	26	1.0	120	124	126
175	199	10	15	88	58	12.92	153	48.66	322532	437069	347	27	1.0	107	107	109
176	200	10	15	88	58	13.05	153	38.55	322391	436519	340	27	1.0	99	100	102
177	171	10	16	88	58	17.79	154	15.72	322660	438810	18	28	1.0	59	62	64
178	172	10	16	88	58	17.98	154	1.76	322453	438019	25	27	1.0	58	65	72
179	144	10	16	88	58	26.12	153	58.50	321997	438196	27	29	1.0	48	52	56
180	145	10	16	88	58	25.35	153	49.69	321920	437691	178	27	1.0	61	69	79
181	173	10	16	88	58	20.20	153	49.20	322178	437426	140	27	1.0	110	112	115
182	174	10	16	88	58	18.22	153	39.22	322141	436800	340	28	1.0	95	97	99
183	146	10	16	88	58	22.98	153	38.62	321893	436998	343	28	1.0	88	90	94
184	147	10	16	88	58	23.37	153	29.80	321757	436572	345	27	1.0	98	100	101
185	121	10	17	88	58	28.21	153	9.61	321257	435872	340	27	1.0	92	93	94
186	120	10	17	88	58	29.77	153	18.42	321295	436362	261	26	1.0	94	95	96
187	119	10	17	88	58	29.90	153	27.11	321398	436782	259	26	1.0	78	80	81
188	90	10	17	88	58	33.42	153	29.21	321241	437064	337	26	1.0	57	60	69
189	91	10	17	88	58	34.72	153	21.29	321081	436758	130	27	1.0	79	82	82
190	118	10	17	88	58	30.33	153	38.25	321519	437341	149	27	1.0	61	68	72
191	117	10	17	88	58	29.30	153	45.54	321667	437664	170	27	1.0	40	45	46
192	60	10	19	88	58	38.02	153	10.00	320889	436857	25	26	1.0	69	71	72
193	61	10	19	88	58	38.05	153	9.80	320767	436430	333	27	1.0	93	93	96
194	31	10	19	88	58	42.90	153	9.48	320516	436691	335	26	1.0	95	96	97

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Tow No.	Station	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
195	2	10	19	88	58 47.38	153 12.42	320322	437066	327	27	1.0	77	85	92
196	3	10	19	88	58 48.85	152 59.62	320097	436621	345	26	1.0	82	83	87
197	PAA	10	20	88	58 17.68	152 55.78	321605	434655	292	29	0.7	58	64	78
198	MAA	10	20	88	58 12.78	153 5.79	321973	434829	274	27	1.0	66	69	71
199	RAA	10	20	88	58 8.15	153 13.90	322305	434974	299	28	1.0	61	63	69
200	KUN	10	21	88	57 49.65	153 23.43	323323	434631	85	16	0.6	65	66	69
201	KUO	10	21	88	57 50.73	153 26.68	323318	434877	292	27	1.0	79	82	89
202	KUP	10	21	88	57 51.41	153 29.07	323319	435049	280	27	1.0	88	92	97
203	KUQ	10	21	88	57 53.23	153 32.80	323285	435334	123	26	1.0	96	102	110
204	KUR	10	21	88	57 53.54	153 42.00	323390	435892	90	27	1.0	23	24	26
205	KUS	10	21	88	57 52.17	153 34.62	323361	435398	80	26	1.0	94	98	102
206	KUT	10	21	88	57 49.49	153 32.19	323456	435159	142	28	1.0	100	101	102
207	KUX	10	22	88	57 43.95	153 23.00	323585	434407	323	27	1.0	54	60	64
208	KUU	10	22	88	57 46.25	153 29.08	323565	434868	297	27	1.0	79	82	90
209	KUW	10	22	88	57 40.29	153 31.60	323882	434847	317	27	1.0	33	37	41
210	KUV	10	22	88	57 44.00	153 31.40	323723	434962	344	22	0.8	40	45	50
211	UYHX	10	23	88	57 39.15	153 44.25	324120	435650	283	28	1.0	46	50	54
212	UYFX	10	23	88	57 39.77	153 50.27	324181	436051	260	26	0.9	68	75	85
213	UYEX	10	23	88	57 38.51	153 55.69	324313	436375	317	27	1.0	94	100	101
214	UYKX	10	23	88	57 34.91	153 55.63	324487	436319	289	18	0.7	63	69	71
215	UYMX	10	23	88	57 33.18	153 54.09	324545	436187	327	27	1.0	58	60	62
216	UYQX	10	23	88	57 29.33	153 54.80	324738	436193	147	27	1.0	69	80	89
217	UYSX	10	23	88	57 24.15	153 49.48	324895	435813	316	23	0.8	36	40	60

Appendix B.1. Population estimates for Tanner crab, Chionoecetes bairdi, from the 1988 trawl survey, Kodiak.

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
North East														
255	151	1	2	3	0	0	0	1	0	0	0	0	1	4
256	152	0	0	0	3	0	1	1	0	0	0	0	5	5
257	153	3	0	3	5	0	0	0	0	0	0	0	5	8
283	155	0	4	4	0	0	0	1	0	0	0	0	1	5
284	154	0	1	1	2	0	0	2	0	0	0	0	4	5
395	159	1	0	1	0	0	0	0	0	0	0	0	0	1
420	127	2	0	2	1	0	0	0	0	0	0	0	1	3
421	128	0	1	1	2	2	0	0	0	0	0	0	4	5
442	125	0	0	0	0	0	0	0	0	0	0	0	0	0
443	126	0	0	0	0	0	0	0	0	0	0	0	0	0
444	129	1	0	1	2	0	0	2	0	1	0	1	5	6
cha	3	12	0	12	11	1	0	1	27	0	15	42	55	67
chb	4	24	3	27	23	0	1	29	38	0	7	45	98	125
che	2	1	0	1	1	0	0	0	0	0	0	0	1	2
chf	5	174	54	228	100	122	110	164	110	6	8	124	620	848
CHG	157	3	0	3	9	0	0	0	0	0	0	0	9	12
chj	1	5	0	5	0	1	2	0	0	0	0	0	3	8
chk	6	5	13	18	4	4	70	260	232	2	6	240	578	596
chl	7	172	1	173	224	13	3	1	0	0	0	0	241	414
KZA	135	7	0	7	10	1	2	0	0	1	0	1	14	21
KZB	136	64	772	836	0	25	290	265	52	5	0	57	637	1474
KZC	137	3	12	15	6	14	64	30	1	0	0	1	115	130
KZD	138	3	1	4	7	0	1	0	0	0	0	0	8	12
KZE	139	7	0	7	30	2	0	1	0	0	0	0	33	40
KZF	140	24	5	29	30	24	57	10	2	0	0	2	124	152
KZG	141	97	7	104	52	27	24	17	0	0	1	1	121	225
KZJ	142	13	0	13	15	1	2	0	0	0	0	0	18	31
KZK	143	51	3	54	33	23	3	0	0	0	0	0	59	113
KZO	144	81	5	86	85	30	2	0	0	0	0	0	117	203
KZR	146	0	16	16	0	3	9	27	6	1	0	7	46	62
KZS	147	2	53	55	1	5	5	10	2	2	0	4	25	80
369X	158	0	0	0	0	0	0	0	0	0	0	0	0	0
MOGX	156	0	2	2	0	0	1	0	2	2	0	4	5	7
MOLX	149	13	0	13	7	1	0	1	0	0	0	0	9	22
MONX	145	77	2	79	52	24	0	1	0	0	0	0	77	156

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Appendix B.1. (page 2 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
MOPX	148	20	2	22	10	1	2	0	0	0	0	0	13	35
MOXX	150	402	2	404	412	4	6	2	1	0	0	1	425	829
Pop Est		2,643,594	674,490	3,318,084	2,495,836	395,350	545,140	685,327	384,565	23,104	20,977	428,647	4,550,300	7,868,384
East Side														
486	122	0	0	0	0	0	0	0	0	0	0	0	0	0
510	120	1	0	1	1	1	0	0	0	0	0	0	2	3
511	121	1	0	1	1	0	0	0	0	0	0	0	1	2
533	69	3	68	71	0	3	9	37	3	3	0	6	55	126
534	72	0	0	0	0	0	0	0	0	0	0	0	0	0
535	75	0	0	0	0	0	0	0	0	0	0	0	0	0
559	70	1	51	52	0	1	25	85	23	5	0	28	139	191
560	71	0	1	1	0	1	0	0	0	0	0	0	1	2
561	76	13	0	13	17	1	0	0	0	0	0	0	18	31
587	83	10	0	10	9	2	0	0	0	1	0	1	12	22
588	86	7	0	7	6	0	12	17	7	0	0	7	42	49
589	77	1	9	10	2	5	10	6	1	10	0	11	34	44
619	84	25	3	28	25	2	1	2	0	0	0	0	30	58
620	85	302	6	308	221	1	4	0	0	1	0	1	227	535
621	79	6	11	17	4	0	2	4	9	0	0	9	19	36
655	81	41	34	75	14	3	3	1	0	0	0	0	21	96
656	80	74	5	79	61	51	69	10	10	4	0	14	205	284
KLA	89	0	0	0	3	1	0	0	0	1	0	1	5	5
KLB	88	2	0	2	0	0	0	18	46	0	0	46	64	66
KLC	74	15	0	15	8	5	0	2	6	1	0	7	22	37
KLD	87	0	0	0	0	0	0	0	0	0	0	0	0	0
KLE	95	1	0	1	1	4	10	5	0	0	0	0	20	21
KLF	94	0	0	0	2	0	0	1	0	0	0	0	3	3
KLG	93	0	0	0	1	0	0	0	0	0	0	0	1	1
KLH	90	0	0	0	0	0	0	0	1	0	0	1	1	1
KLI	73	3	26	29	15	0	0	4	4	1	0	5	24	53
KLJ	91	0	0	0	0	2	10	8	0	0	0	0	20	20
KLL	92	0	2	2	1	0	2	28	28	3	0	31	62	64
UGA	117	95	1	96	98	110	28	9	18	1	2	21	266	362
UGB	116	0	0	0	0	0	0	0	0	0	0	0	0	0
UGC	115	0	0	0	0	0	0	0	0	0	0	0	0	0
UGD	124	0	0	0	2	0	0	0	0	0	0	0	2	2

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Appendix B.1. (page 3 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
UGE	130	10	1	11	16	8	0	0	0	0	0	0	24	35
UGF	131	3	0	3	6	1	0	0	0	0	0	0	7	10
UGG	132	1	0	1	0	0	0	0	0	0	0	0	0	1
UGH	133	0	0	0	0	0	0	0	0	0	0	0	0	0
UGI	118	81	0	81	81	3	3	1	0	0	0	0	88	169
UGJ	123	0	0	0	0	0	0	0	0	0	0	0	0	0
UGK	134	0	0	0	0	0	0	0	0	0	0	0	0	0
UGM	119	30	27	57	16	58	80	27	8	0	0	8	189	246
Pop Est		2,083,954	820,032	2,903,986	1,616,718	443,776	627,028	732,705	298,165	100,786	1,914	400,864	3,821,090	6,725,077
South East														
558	82	0	1	1	0	0	0	0	0	0	0	0	0	1
614	96	0	26	26	0	0	2	18	14	13	4	31	51	77
615	97	2	2	4	1	2	4	17	40	2	2	44	68	72
650	101	0	0	0	0	0	0	0	0	0	0	0	0	0
688	100	3	7	10	1	0	0	2	0	0	0	0	3	13
725	62	0	0	0	0	0	0	0	0	0	0	0	0	0
726	63	0	0	0	0	0	0	0	0	0	0	0	0	0
727	99	1	0	1	0	0	0	0	0	0	0	0	0	1
728	68	1	0	1	0	0	0	0	0	0	0	0	0	1
729	98	3	0	3	0	0	0	0	0	0	0	0	0	3
760	66	0	0	0	0	1	0	0	0	0	0	0	1	1
761	67	0	0	0	0	0	0	0	0	0	0	0	0	0
794	65	0	0	0	0	0	0	0	0	0	0	0	0	0
858	9	0	4	4	0	0	14	107	0	11	0	11	132	136
859	8	0	0	0	1	0	0	0	0	0	0	0	1	1
891	10	0	5	5	0	0	1	12	0	1	0	1	14	19
892	11	0	0	0	0	0	2	25	1	3	0	4	31	31
946	13	0	0	0	0	0	0	0	0	0	0	0	0	0
947	12	0	0	0	0	0	0	0	0	0	0	0	0	0
973	14	0	0	0	0	0	0	0	0	0	0	0	0	0
999	18	0	0	0	0	0	0	0	0	0	0	0	0	0
THA	102	0	0	0	0	0	0	0	0	0	0	0	0	0
THB	103	5	4	9	1	0	3	10	6	0	1	7	21	30
THC	104	6	23	29	4	3	9	9	50	0	3	53	78	107
THD	105	4	68	72	0	1	2	9	75	1	8	84	96	168
THF	107	4	5	9	3	0	5	58	78	3	1	82	148	157

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Appendix B.1. (page 4 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
THG	106	25	4	29	35	0	0	5	96	3	9	108	148	177
THH	110	0	1	1	0	1	3	13	42	0	2	44	61	62
THI	108	1	7	8	8	8	42	50	17	0	0	17	125	133
THJ	109	3	1	4	1	2	5	35	36	1	0	37	80	84
THK	111	74	0	74	57	35	15	30	10	2	1	13	150	224
THL	112	80	1	81	22	117	63	12	13	3	3	19	233	314
THM	113	23	0	23	21	90	112	92	17	3	0	20	335	358
THN	114	22	49	71	45	60	775	425	150	20	0	170	1475	1546
1000	19	4	0	4	7	1	0	2	0	0	0	0	10	14
1022	17	0	0	0	0	0	0	0	0	0	0	0	0	0
1045	15	0	0	0	0	0	0	0	0	0	0	0	0	0
1046	16	0	0	0	0	0	1	2	0	1	0	1	4	4
Pop Est		243,200	314,486	557,686	188,394	221,880	607,570	1,185,633	777,880	129,593	50,773	958,246	3,161,723	3,719,408
South West														
645	43	2	0	2	1	0	0	0	0	0	0	0	1	3
ala	30	4	21	25	5	0	1	19	378	4	38	420	445	470
alb	47	0	0	0	0	0	0	0	0	0	0	0	0	0
alc	29	4	95	99	2	1	6	45	148	15	10	173	227	326
ald	48	0	0	0	1	0	0	0	6	0	1	7	8	8
alf	33	2	3	5	5	1	1	9	51	1	2	54	70	75
alg	28	5	0	5	2	0	0	5	39	0	2	41	48	53
alh	52	2	0	2	0	0	0	18	105	2	2	109	127	129
ALI	53	12	43	55	2	0	14	218	182	36	8	226	460	515
alj	31	3	0	3	4	3	1	2	29	0	6	35	45	48
alk	32	20	0	20	29	1	0	1	6	0	0	6	37	57
alm	55	4	2	6	3	2	6	42	88	3	4	95	148	154
alo	56	2	4	6	1	2	9	59	117	0	2	120	191	197
alp	57	4	2	6	2	5	10	84	96	0	5	101	202	208
alq	58	2	0	2	0	0	2	86	228	0	4	232	320	322
608x	27	9	0	9	10	0	0	1	0	0	0	0	11	20
646a	42	1	0	1	0	0	0	0	0	0	0	0	0	1
646b	41	1	0	1	2	0	0	0	0	0	0	0	2	3
646c	44	0	0	0	0	0	0	10	1	0	0	1	11	11
646d	40	4	0	4	8	0	0	0	0	0	0	0	8	12
676x	49	0	0	0	0	0	0	0	0	0	0	0	0	0
677x	25	3	0	3	1	0	0	0	0	0	0	0	1	4

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Appendix B.1. (page 5 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
678x	26	1	0	1	0	0	0	0	0	0	0	0	0	1
682b	46	1	2	3	0	0	0	3	3	0	0	3	6	9
682d	61	0	0	0	0	0	0	0	0	0	0	0	0	0
683a	45	1	1	2	1	0	0	2	0	0	0	0	3	5
683b	38	1	0	1	1	0	0	0	0	0	0	0	1	2
683c	60	0	0	0	0	0	0	0	0	0	0	0	0	0
683d	37	1	0	1	3	0	0	1	0	0	0	0	4	5
684a	39	0	0	0	0	0	0	0	0	0	0	0	0	0
684b	34	7	43	50	6	3	15	19	3	1	1	5	48	98
684c	36	0	0	0	0	0	0	0	0	0	0	0	0	0
684d	35	2	3	5	2	0	2	0	2	0	0	2	5	10
712x	50	1	0	1	1	0	0	0	0	0	0	0	1	2
748x	51	0	0	0	0	0	0	0	0	0	0	0	0	0
750x	24	0	0	0	0	0	0	0	0	0	0	0	0	0
781x	23	0	0	0	0	0	0	0	0	0	0	0	0	0
815x	21	0	0	0	0	0	0	0	0	0	0	0	0	0
816x	22	0	0	0	0	0	0	0	0	0	0	0	0	0
881x	20	0	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		191,219	225,135	416,354	168,051	16,405	63,339	591,313	1,370,943	61,725	76,170	1,508,838	2,347,945	2,764,299
West Side														
121	185	29	1	30	29	2	0	0	0	0	0	0	31	61
200	176	160	0	160	187	8	12	13	0	0	0	0	220	380
KUD	160	0	0	0	0	0	0	0	0	0	0	0	0	0
KUE	161	9	0	9	9	2	1	0	0	0	0	0	12	21
KUF	162	12	8	20	18	3	12	5	1	3	0	4	42	62
KUG	164	8	7	15	7	2	3	0	0	0	0	0	12	27
KUH	163	1	0	1	0	0	0	0	0	0	0	0	0	1
KUI	170	6	52	58	3	14	16	23	6	12	0	18	74	132
KUJ	169	4	139	143	5	4	11	17	8	3	0	11	48	191
KUK	168	82	39	121	49	6	5	4	3	1	0	4	68	189
KUL	166	23	74	97	6	12	58	44	44	3	15	62	182	279
KUM	167	14	0	14	22	0	0	0	0	0	0	0	22	36
KUN	200	973	0	973	992	0	0	8	0	0	0	0	1000	1973
KUO	201	27	17	44	12	16	20	7	2	0	0	2	57	101
KUP	202	17	163	180	8	2	13	30	0	4	0	4	57	237
KUQ	203	62	10	72	59	0	1	4	3	0	0	3	67	139

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Appendix B.1. (page 6 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
KUR	204	0	0	0	0	0	0	0	0	0	0	0	0	0
KUS	205	11	9	20	3	5	3	16	5	1	0	6	33	53
KUT	206	507	6	513	390	0	3	6	3	0	0	3	402	915
KUU	208	13	13	26	8	2	11	4	1	0	0	1	26	52
KUV	210	5	0	5	9	4	2	0	0	0	0	0	15	20
KUW	209	0	0	0	0	0	1	0	0	0	0	0	1	1
KUX	207	6	228	234	3	2	9	39	14	0	3	17	70	304
KUY	165	1	1	2	0	1	9	4	4	0	2	6	20	22
MAA	198	5	130	135	5	3	45	84	32	6	1	39	176	311
PAA	197	14	27	41	0	7	70	109	110	1	13	124	310	351
RAA	199	1	86	87	0	5	70	64	24	2	0	26	165	252
UYEX	213	163	3	166	110	0	0	0	0	0	0	0	110	276
UYFX	212	4	38	42	3	4	23	39	9	0	0	9	79	121
UYHX	211	15	0	15	20	0	0	0	0	0	0	0	20	35
UYKX	214	16	57	73	7	16	36	24	4	4	0	9	91	164
UYMX	215	126	6	132	104	0	2	2	0	0	0	0	108	240
UYQX	216	306	0	306	214	0	0	0	0	0	0	0	214	520
UYSX	217	15	9	24	7	11	39	37	19	1	1	21	116	140
Pop Est		3,232,321	1,125,086	4,357,407	2,903,179	160,149	477,223	606,182	243,134	45,969	21,869	310,973	4,457,707	8,815,114
North Mainland														
2	195	6	8	14	2	10	12	41	9	8	0	17	82	96
3	196	1	0	1	1	2	1	12	7	0	0	7	23	24
31	194	7	1	8	2	0	3	14	4	1	0	5	24	32
60	192	18	54	72	8	1	9	30	3	5	0	8	56	128
61	193	0	0	0	0	1	0	0	0	0	0	0	1	1
90	188	7	8	15	2	0	3	5	5	1	0	6	16	31
91	189	13	4	17	6	3	21	13	0	0	0	0	43	60
117	191	2	2	4	1	0	1	0	0	0	0	0	2	6
118	190	18	58	76	17	5	9	22	13	0	0	13	66	142
119	187	12	3	15	12	0	4	15	1	1	0	2	33	48
120	186	31	5	36	28	0	0	4	1	0	0	1	33	69
144	179	15	0	15	17	3	8	10	6	1	0	7	45	60
145	180	1	0	1	3	1	1	14	26	1	0	27	46	47
146	183	62	24	86	78	1	6	9	4	0	0	4	98	184
147	184	50	0	50	46	0	0	2	3	0	0	3	51	101
171	177	4	0	4	5	3	10	60	105	0	8	113	191	195

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Appendix B.1. (page 7 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
172	178	1	0	1	6	0	0	8	25	1	2	28	42	43
173	181	33	1	34	27	0	6	39	23	0	0	23	95	129
174	182	31	30	61	18	0	3	14	24	1	0	25	60	121
198	174	77	17	94	47	0	5	14	4	1	1	6	72	166
199	175	189	1	190	147	0	2	0	5	0	1	6	155	345
222	173	0	0	0	0	0	0	3	12	0	0	12	15	15
223	172	72	10	82	76	2	5	4	4	1	0	5	92	174
224	171	161	1	162	140	5	10	20	3	0	0	3	178	340
Pop Est		3,055,286	861,060	3,916,347	2,592,371	131,758	424,485	1,227,352	922,762	82,755	32,415	1,037,933	5,413,899	9,330,245
Grand Total		11,449,574	4,020,290	15,469,864	9,964,549	1,369,319	2,744,783	5,028,512	3,997,449	443,932	204,119	4,645,500	23,752,662	39,222,528

Appendix C.1. Population estimmates for king crab, Paralithodes camtschatica, from the 1988 trawl survey, Kodiak.

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
North East													
255	151	0	0	0	0	0	0	0	0	0	0	0	0
256	152	0	0	0	0	0	0	0	0	0	0	0	0
257	153	0	0	0	0	0	0	0	0	0	0	0	0
283	155	0	0	0	0	0	0	0	0	0	0	0	0
284	154	0	0	0	0	0	0	0	0	0	0	0	0
395	159	0	0	0	0	0	0	0	0	0	0	0	0
420	127	0	0	0	0	0	0	0	0	0	0	0	0
421	128	0	0	0	0	0	0	0	0	0	0	0	0
442	125	0	0	0	0	0	0	0	0	0	0	0	0
443	126	0	0	0	0	0	0	0	0	0	0	0	0
444	129	0	0	0	0	0	0	0	0	0	0	0	0
486	122	0	0	0	0	0	0	0	0	0	0	0	0
510	120	0	0	0	0	0	0	0	0	0	0	0	0
511	121	0	0	0	0	0	0	0	0	0	0	0	0
533	69	0	0	0	0	0	0	0	0	0	0	0	0
534	72	0	0	0	0	0	0	0	0	0	0	0	0
535	75	0	0	0	0	0	0	0	0	0	0	0	0
559	70	0	0	0	0	0	0	0	0	0	0	0	0
560	71	0	0	0	0	0	0	0	0	0	0	0	0
561	76	0	0	0	0	0	0	0	0	0	0	0	0
587	83	0	0	0	0	0	0	0	0	0	0	0	0
588	86	0	0	0	0	0	0	0	0	0	0	0	0
589	77	0	0	0	0	0	0	0	0	0	0	0	0
619	84	0	0	0	0	0	0	0	0	0	0	0	0
620	85	0	0	0	0	0	0	0	0	0	0	0	0
621	79	0	0	0	0	0	0	0	0	0	0	0	0
655	81	0	0	0	0	0	0	0	0	0	0	0	0
656	80	0	0	0	0	0	0	0	0	0	0	0	0
cha	3	0	0	0	0	0	0	0	0	0	0	0	0
chb	4	0	18	18	0	0	0	0	1	0	1	1	19
che	2	0	0	0	0	0	0	0	0	0	0	0	0
chf	5	0	0	0	0	0	0	0	0	0	0	0	0
CHG	157	0	0	0	0	0	0	0	0	0	0	0	0
chj	1	0	0	0	0	0	0	0	0	0	0	0	0
chk	6	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix C.1. (page 2 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
chl	7	0	0	0	0	0	0	0	0	0	0	0	0
KLA	89	0	0	0	0	0	0	0	0	0	0	0	0
KLB	88	0	0	0	0	0	0	0	0	0	0	0	0
KLC	74	0	11	11	2	0	1	0	1	4	5	8	19
KLD	87	0	0	0	0	0	0	0	0	0	0	0	0
KLE	95	0	1	1	0	0	0	0	0	0	0	0	1
KLF	94	0	0	0	0	0	0	0	0	0	0	0	0
KLG	93	0	0	0	0	0	0	0	0	0	0	0	0
KLH	90	0	1	1	0	0	0	0	0	0	0	0	1
KLI	73	0	0	0	0	0	0	0	0	0	0	0	0
KLJ	91	0	0	0	0	0	0	0	0	0	0	0	0
KLL	92	0	0	0	0	0	0	0	0	2	2	2	2
KZA	135	0	0	0	0	0	0	0	0	0	0	0	0
KZB	136	0	0	0	0	0	0	0	0	0	0	0	0
KZC	137	0	0	0	0	0	0	0	0	0	0	0	0
KZD	138	0	0	0	0	0	0	0	0	0	0	0	0
KZE	139	0	0	0	0	0	0	0	0	0	0	0	0
KZF	140	0	0	0	0	0	0	0	0	0	0	0	0
KZG	141	0	0	0	0	0	0	0	0	0	0	0	0
KZJ	142	0	0	0	0	0	0	0	0	0	0	0	0
KZK	143	0	0	0	0	0	0	0	0	0	0	0	0
KZO	144	0	0	0	0	0	0	0	0	0	0	0	0
KZR	146	0	0	0	0	0	0	0	0	0	0	0	0
KZS	147	0	0	0	0	0	0	0	0	0	0	0	0
UGA	117	0	5	5	0	0	0	1	0	0	0	1	6
UGB	116	0	0	0	0	0	0	0	0	0	0	0	0
UGC	115	0	0	0	0	0	0	0	0	0	0	0	0
UGD	124	0	0	0	0	0	0	0	0	0	0	0	0
UGE	130	0	0	0	0	0	0	0	0	0	0	0	0
UGF	131	0	0	0	0	0	0	0	0	0	0	0	0
UGG	132	0	0	0	0	0	0	0	0	0	0	0	0
UGH	133	0	0	0	0	0	0	0	0	0	0	0	0
UGI	118	0	0	0	0	0	0	0	0	0	0	0	0
UGJ	123	0	0	0	0	0	0	0	0	0	0	0	0
UGK	134	0	0	0	0	0	0	0	0	0	0	0	0
UGM	119	0	0	0	0	0	0	0	0	0	0	0	0
369X	158	0	0	0	0	0	0	0	0	0	0	0	0
MOGX	156	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix C.1. (page 3 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
MOLX	149	0	0	0	0	0	0	0	0	0	0	0	0
MONX	145	0	0	0	0	0	0	0	0	0	0	0	0
MOPX	148	0	0	0	0	0	0	0	0	0	0	0	0
MOXX	150	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		0	30,912	30,912	2,825	0	1,413	957	1,914	7,549	9,463	14,658	45,570
South East													
558	82	0	0	0	0	0	0	0	0	0	0	0	0
614	96	0	0	0	0	0	0	0	0	0	0	0	0
615	97	0	0	0	0	0	0	0	0	0	0	0	0
650	101	0	0	0	0	0	0	0	0	0	0	0	0
688	100	0	0	0	0	0	0	0	0	0	0	0	0
725	62	0	0	0	0	0	0	0	0	0	0	0	0
726	63	0	0	0	0	0	0	0	0	0	0	0	0
727	99	0	0	0	0	0	0	0	0	0	0	0	0
728	68	0	0	0	0	0	0	0	0	0	0	0	0
729	98	0	0	0	0	0	0	0	0	0	0	0	0
760	66	0	0	0	0	0	0	0	0	0	0	0	0
761	67	0	0	0	0	0	0	0	0	0	0	0	0
794	65	0	0	0	0	0	0	0	0	0	0	0	0
858	9	0	0	0	0	0	0	0	0	0	0	0	0
859	8	0	0	0	0	0	0	0	0	0	0	0	0
891	10	0	0	0	0	0	0	0	0	3	3	3	3
892	11	0	0	0	0	0	0	0	0	0	0	0	0
946	13	0	0	0	0	0	0	0	0	0	0	0	0
947	12	0	0	0	0	0	0	0	0	0	0	0	0
973	14	0	0	0	0	0	0	0	0	0	0	0	0
999	18	0	0	0	0	0	0	0	0	1	1	1	1
THA	102	0	0	0	0	0	0	0	0	0	0	0	0
THB	103	0	0	0	0	0	0	0	0	0	0	0	0
THC	104	0	0	0	0	0	0	0	0	0	0	0	0
THD	105	0	0	0	0	0	0	0	0	0	0	0	0
THF	107	0	0	0	0	0	0	0	0	0	0	0	0
THG	106	0	0	0	0	0	0	0	0	0	0	0	0
THH	110	0	2	2	0	0	0	0	0	0	0	0	2
THI	108	0	0	0	0	0	0	0	0	0	0	0	0
THJ	109	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix C.1. (page 4 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
THK	111	0	0	0	0	0	0	0	0	0	0	0	0
THL	112	0	0	0	0	0	0	0	0	0	0	0	0
THM	113	0	0	0	0	0	0	0	0	1	1	1	1
THN	114	0	1	1	0	0	0	0	0	0	0	0	1
1000	19	0	0	0	0	0	0	0	0	0	0	0	0
1022	17	0	0	0	0	0	0	0	0	0	0	0	0
1045	15	0	0	0	0	0	0	0	0	0	0	0	0
1046	16	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		0	2,924	2,924	0	0	0	0	0	15,858	15,858	15,858	18,782
South West													
645	43	0	0	0	0	0	0	0	0	1	1	1	1
ala	30	0	1	1	0	0	0	0	0	0	0	0	1
alb	47	0	0	0	0	0	0	0	0	0	0	0	0
alc	29	0	29	29	0	0	0	0	0	0	0	0	29
ald	48	0	0	0	0	0	0	0	0	0	0	0	0
alf	33	0	0	0	0	0	0	0	0	0	0	0	0
alg	28	0	0	0	0	0	0	0	0	0	0	0	0
alh	52	0	0	0	0	0	0	0	0	0	0	0	0
ALI	53	0	1	1	0	0	1	0	3	5	8	9	10
alj	31	3	3	6	0	5	31	20	6	2	8	64	70
alk	32	0	0	0	0	0	0	0	0	0	0	0	0
alm	55	0	0	0	0	0	0	0	0	0	0	0	0
alo	56	0	0	0	0	0	0	0	0	1	1	1	1
alp	57	0	0	0	0	0	0	1	0	1	1	2	2
alq	58	0	0	0	0	0	0	0	0	0	0	0	0
608x	27	0	0	0	0	0	0	0	0	0	0	0	0
646a	42	0	0	0	0	0	0	0	0	2	2	2	2
646b	41	0	0	0	0	0	0	0	0	0	0	0	0
646c	44	0	3	3	0	0	0	0	0	2	2	2	5
646d	40	0	0	0	0	0	0	0	0	0	0	0	0
676x	49	0	0	0	0	0	0	0	0	0	0	0	0
677x	25	0	0	0	0	0	0	0	0	0	0	0	0
678x	26	0	0	0	0	0	0	0	0	0	0	0	0
682b	46	0	9	9	0	0	0	0	2	20	22	22	31
682d	61	0	0	0	0	0	0	0	0	0	0	0	0
683a	45	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix C.1. (page 5 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
683b	38	0	0	0	0	0	0	0	0	1	1	1	1
683c	60	0	0	0	0	0	0	0	0	0	0	0	0
683d	37	0	72	72	0	0	0	2	1	6	7	9	81
684a	39	0	0	0	0	0	0	0	0	0	0	0	0
684b	34	0	362	362	1	0	0	1	0	2	2	4	366
684c	36	0	0	0	0	0	0	0	0	0	0	0	0
684d	35	0	7	7	0	0	0	0	0	0	0	0	7
712x	50	0	0	0	0	0	0	0	0	0	0	0	0
748x	51	0	0	0	0	0	0	0	0	0	0	0	0
750x	24	0	0	0	0	0	0	0	0	0	0	0	0
781x	23	0	0	0	0	0	0	0	0	0	0	0	0
815x	21	0	1	1	0	0	0	2	1	2	3	5	6
816x	22	0	0	0	0	0	0	0	0	0	0	0	0
881x	20	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		2,096	499,014	501,111	1,003	3,494	22,610	33,053	17,658	61,432	79,091	139,251	640,361
Shelikof													
2	195	0	0	0	0	0	0	0	0	0	0	0	0
3	196	0	0	0	0	0	0	0	0	0	0	0	0
31	194	0	0	0	0	0	0	0	0	0	0	0	0
60	192	0	0	0	0	0	0	0	0	0	0	0	0
61	193	0	0	0	0	0	0	0	0	0	0	0	0
90	188	0	0	0	0	0	0	0	0	0	0	0	0
91	189	0	0	0	0	0	0	0	0	0	0	0	0
117	191	0	0	0	0	0	0	0	0	0	0	0	0
118	190	0	0	0	0	0	0	0	0	0	0	0	0
119	187	0	0	0	0	0	0	0	0	0	0	0	0
120	186	0	0	0	0	0	0	0	0	0	0	0	0
121	185	0	0	0	0	0	0	0	0	0	0	0	0
144	179	0	0	0	0	0	0	0	0	0	0	0	0
145	180	0	0	0	0	0	0	0	0	0	0	0	0
146	183	0	0	0	0	0	0	0	0	0	0	0	0
147	184	0	0	0	0	0	0	0	0	0	0	0	0
171	177	0	1	1	0	0	0	1	1	2	3	4	5
172	178	0	0	0	0	0	0	0	0	0	0	0	0
173	181	0	0	0	0	0	0	0	0	0	0	0	0
174	182	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix C.1. (page 6 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
198	174	0	0	0	0	0	0	0	0	0	0	0	0
199	175	0	0	0	0	0	0	0	0	0	0	0	0
200	176	0	0	0	0	0	0	0	0	0	0	0	0
222	173	0	0	0	0	0	0	0	0	0	0	0	0
223	172	0	0	0	0	0	0	0	0	0	0	0	0
224	171	0	0	0	0	0	0	0	0	0	0	0	0
KUD	160	0	0	0	0	0	0	0	0	0	0	0	0
KUE	161	0	0	0	0	0	0	0	0	0	0	0	0
KUF	162	0	0	0	0	0	0	0	0	0	0	0	0
KUG	164	0	0	0	0	0	0	0	0	0	0	0	0
KUH	163	0	0	0	0	0	0	0	0	0	0	0	0
KUI	170	0	0	0	0	0	0	0	0	0	0	0	0
KUJ	169	0	0	0	0	0	0	0	0	0	0	0	0
KUK	168	0	0	0	0	0	0	0	0	0	0	0	0
KUL	166	0	0	0	0	0	0	0	0	0	0	0	0
KUM	167	0	0	0	0	0	0	0	0	0	0	0	0
KUN	200	0	17	17	0	0	0	0	0	0	0	0	17
KUO	201	0	0	0	0	0	0	0	0	0	0	0	0
KUP	202	0	0	0	0	0	0	0	0	0	0	0	0
KUQ	203	0	0	0	0	0	0	0	0	0	0	0	0
KUR	204	0	0	0	0	0	0	0	0	0	0	0	0
KUS	205	0	0	0	0	0	0	0	0	0	0	0	0
KUT	206	0	0	0	0	0	0	0	0	0	0	0	0
KUU	208	0	0	0	0	0	0	0	0	0	0	0	0
KUV	210	0	0	0	0	0	0	0	0	0	0	0	0
KUW	209	0	0	0	0	0	0	0	0	0	0	0	0
KUX	207	0	0	0	0	0	0	0	0	0	0	0	0
KUY	165	0	0	0	0	0	0	0	0	0	0	0	0
MAA	198	0	0	0	0	0	0	0	0	0	0	0	0
PAA	197	0	0	0	0	0	0	0	0	0	0	0	0
RAA	199	0	0	0	0	0	0	0	0	0	0	0	0
UYEX	213	0	0	0	0	0	0	0	0	0	0	0	0
UYFX	212	0	0	0	0	0	0	0	0	0	0	0	0
UYHX	211	0	0	0	0	0	0	0	0	0	0	0	0
UYKX	214	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix C.1. (page 7 of 7)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
UYMX	215	0	0	0	0	0	0	0	0	0	0	0	0
UYQX	216	1	0	1	0	0	0	0	0	0	0	0	1
UYSX	217	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		972	15,155	16,127	0	0	0	1,990	1,990	3,980	5,970	7,960	24,086
Grand Total		3,068	548,005	551,073	3,828	3,494	24,023	36,000	21,562	88,820	110,382	177,727	728,800

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Appendix D.1. List of trawl by trawl data from the 1988 South Peninsula trawl survey.

Tow No.	Station	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
1	MOV	8	5	88	54 47.53	163 11.22	-0-	-0-	15	26	1.0	45	47	50
2	MOW	8	5	88	54 47.70	163 5.98	-0-	-0-	258	25	0.9	18	20	21
3	87	8	5	88	54 46.18	162 57.95	-0-	-0-	335	27	1.0	40	44	51
4	98	8	5	88	54 47.11	162 53.39	-0-	-0-	335	27	1.0	27	29	36
5	97	8	5	88	54 51.27	162 50.37	-0-	-0-	228	27	1.0	22	23	24
6	MOP	8	5	88	54 50.98	162 58.61	-0-	-0-	317	26	1.0	38	41	43
7	MOO	8	5	88	54 52.15	163 1.23	-0-	-0-	217	27	1.0	47	47	50
8	MOS	8	5	88	54 50.27	163 5.29	-0-	-0-	226	29	1.0	46	47	48
9	MOR	8	5	88	54 50.25	163 9.33	-0-	-0-	241	27	1.0	48	49	52
10	MOT	8	6	88	54 47.39	163 17.21	-0-	-0-	15	20	0.8	49	50	52
11	MOU	8	6	88	54 47.91	163 15.07	-0-	-0-	18	27	1.0	45	48	49
12	MOM	8	6	88	54 51.86	163 10.00	-0-	-0-	216	26	1.0	22	23	24
13	MON	8	6	88	54 51.35	163 6.94	-0-	-0-	17	28	1.0	53	53	54
14	MOJ	8	6	88	54 54.34	163 3.93	-0-	-0-	186	26	1.0	36	38	40
15	MOK	8	6	88	54 54.52	163 0.18	-0-	-0-	39	29	1.0	56	60	66
16	MOL	8	6	88	54 55.34	162 58.66	-0-	-0-	217	30	1.0	56	69	71
17	MOI	8	6	88	54 57.44	162 58.75	-0-	-0-	315	27	1.0	53	55	59
18	MOG	8	6	88	54 59.15	162 59.78	-0-	-0-	313	26	1.0	50	51	52
19	MOC	8	7	88	55 2.33	163 9.01	-0-	-0-	0	26	1.0	27	29	32
20	MOA	8	7	88	55 4.33	163 8.15	-0-	-0-	5	27	1.0	22	23	25
21	MOB	8	7	88	55 4.83	163 4.53	-0-	-0-	154	26	1.0	26	35	42
22	MOD	8	7	88	55 2.82	163 4.34	-0-	-0-	138	28	1.0	46	-0-	-0-
23	MOE	8	7	88	55 1.24	163 1.36	-0-	-0-	292	27	1.0	48	49	50
24	MOF	8	7	88	55 0.64	163 4.81	-0-	-0-	135	26	1.0	42	43	43
25	MOH	8	7	88	54 57.74	163 0.31	-0-	-0-	129	27	1.0	53	57	59
26	144	8	8	88	54 58.75	162 11.63	-0-	-0-	147	26	1.0	43	45	47
27	156	8	8	88	54 58.66	162 6.64	-0-	-0-	134	28	1.0	50	51	52
28	157	8	8	88	54 55.28	162 7.76	-0-	-0-	162	27	1.0	41	42	43
29	145	8	8	88	54 52.76	162 9.75	-0-	-0-	352	27	1.0	34	40	42
30	COB	8	9	88	55 13.69	162 36.27	-0-	-0-	109	27	1.0	28	30	35
31	COC	8	9	88	55 12.97	162 33.66	-0-	-0-	329	26	1.0	23	30	34
32	COE	8	9	88	55 11.83	162 33.79	-0-	-0-	128	30	1.0	30	-0-	-0-
33	COF	8	9	88	55 10.25	162 31.96	-0-	-0-	148	21	0.7	42	-0-	-0-
34	COG	8	9	88	55 8.69	162 29.98	-0-	-0-	321	27	1.0	48	-0-	-0-
35	COH	8	9	88	55 7.36	162 26.40	-0-	-0-	306	25	1.0	30	30	34
36	COJ	8	10	88	55 3.75	162 33.76	-0-	-0-	160	27	1.0	16	19	22
37	COL	8	10	88	55 1.67	162 31.17	-0-	-0-	142	27	1.0	24	31	38
38	COP	8	10	88	55 3.31	162 31.79	-0-	-0-	157	27	1.0	18	20	22
39	COQ	8	10	88	55 0.00	162 29.53	-0-	-0-	33	26	1.0	20	22	27
40	COM	8	10	88	55 1.28	162 28.68	-0-	-0-	325	25	1.0	31	34	37
41	CON	8	10	88	55 0.19	162 23.54	-0-	-0-	24	26	1.0	52	60	66
42	COO	8	10	88	55 0.35	162 21.19	-0-	-0-	21	19	0.6	61	62	64
43	169	8	10	88	55 0.97	162 7.42	-0-	-0-	326	27	1.0	46	50	52
44	BEA	8	11	88	55 8.06	162 11.23	-0-	-0-	180	25	1.0	15	18	19
45	BEB	8	11	88	55 7.09	162 10.15	-0-	-0-	333	26	1.0	38	40	42
46	BED	8	11	88	55 6.01	162 10.24	-0-	-0-	175	25	1.0	43	49	51
47	BEC	8	11	88	55 5.83	162 11.08	-0-	-0-	128	27	1.0	37	39	40

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Tow No.	Stat ion	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
48	BEE	8	11	88	55 3.72	162 9.42	-0-	-0-	156	26	1.0	38	42	45
49	VOT	8	11	88	55 6.63	161 51.89	-0-	-0-	292	25	1.0	43	45	47
50	VOO	8	11	88	55 10.64	161 57.10	-0-	-0-	324	27	1.0	41	42	42
51	VOP	8	11	88	55 11.32	161 55.46	-0-	-0-	22	27	1.0	44	55	60
52	VOL	8	12	88	55 13.73	161 59.79	-0-	-0-	101	26	1.0	35	37	38
53	VOQ	8	12	88	55 11.69	161 50.27	-0-	-0-	59	26	1.0	46	49	51
54	VOR	8	12	88	55 11.69	161 45.53	-0-	-0-	81	21	0.8	59	62	68
55	VON	8	12	88	55 13.48	161 45.34	-0-	-0-	341	28	1.0	57	61	65
56	VOM	8	12	88	55 13.66	161 49.55	-0-	-0-	329	27	1.0	51	52	54
57	VOF	8	12	88	55 15.56	161 49.63	-0-	-0-	20	26	1.0	50	53	55
58	VOG	8	12	88	55 15.53	161 46.29	-0-	-0-	49	28	1.0	57	58	59
59	VOH	8	12	88	55 16.60	161 42.95	-0-	-0-	358	26	1.0	56	56	57
60	VOI	8	12	88	55 17.26	161 37.05	-0-	-0-	20	26	1.0	57	59	60
61	VOJ	8	12	88	55 17.55	161 32.68	-0-	-0-	38	27	1.0	44	48	49
62	PAH	8	13	88	55 32.11	161 36.97	-0-	-0-	176	-0-	1.0	16	20	25
63	PAI	8	13	88	55 30.51	161 35.69	-0-	-0-	340	28	1.0	-0-	-0-	37
64	PAD	8	13	88	55 33.20	161 36.84	-0-	-0-	344	27	1.0	10	12	13
65	PAA	8	13	88	55 35.28	161 33.57	-0-	-0-	0	27	1.0	9	10	10
66	PAB	8	13	88	55 35.27	161 31.54	-0-	-0-	69	25	1.0	12	12	14
67	PAC	8	13	88	55 36.34	161 26.39	-0-	-0-	205	26	1.0	12	13	14
68	PAG	8	13	88	55 35.07	161 26.24	-0-	-0-	224	27	1.0	12	12	14
69	PAF	8	13	88	55 34.86	161 29.54	-0-	-0-	217	26	1.0	15	17	17
70	PAE	8	13	88	55 34.28	161 34.25	-0-	-0-	175	26	1.0	11	12	14
71	PAJ	8	13	88	55 32.42	161 31.58	-0-	-0-	183	25	1.0	18	18	20
72	PAL	8	14	88	55 30.02	161 36.46	-0-	-0-	195	23	0.9	37	43	44
73	PAO	8	14	88	55 27.28	161 38.61	-0-	-0-	195	26	1.0	53	56	57
74	PAR	8	14	88	55 25.43	161 40.38	-0-	-0-	115	27	1.0	54	58	59
75	PAU	8	14	88	55 22.72	161 40.99	-0-	-0-	169	27	1.0	64	67	71
76	PAT	8	14	88	55 22.33	161 43.07	-0-	-0-	354	13	0.5	41	42	44
77	VOA	8	14	88	55 19.40	161 44.67	-0-	-0-	186	26	1.0	47	50	52
78	VOB	8	14	88	55 18.47	161 41.25	-0-	-0-	4	27	1.0	55	56	57
79	VOC	8	14	88	55 19.20	161 37.38	-0-	-0-	60	29	1.0	53	54	55
80	PAV	8	14	88	55 20.79	161 35.11	-0-	-0-	330	27	1.0	51	53	55
81	PAS	8	14	88	55 24.01	161 35.62	-0-	-0-	325	28	1.0	44	47	50
82	PAM	8	15	88	55 29.12	161 33.14	-0-	-0-	185	29	1.0	31	33	38
83	PAN	8	15	88	55 28.55	161 31.44	-0-	-0-	170	24	0.9	19	21	25
84	PAQ	8	15	88	55 26.85	161 32.06	-0-	-0-	169	24	0.7	21	25	26
85	PAP	8	15	88	55 27.04	161 35.96	-0-	-0-	146	26	1.0	40	41	43
86	PAW	8	15	88	55 22.21	161 33.44	-0-	-0-	111	26	1.0	35	38	42
87	VOD	8	15	88	55 18.77	161 32.90	-0-	-0-	109	27	1.0	51	54	56
88	VOE	8	15	88	55 19.11	161 28.37	-0-	-0-	59	28	1.0	34	35	37
89	VOK	8	16	88	55 17.15	161 28.27	-0-	-0-	135	14	0.5	24	28	30
90	228	8	16	88	55 16.17	161 18.77	-0-	-0-	20	27	1.0	38	40	40
91	278	8	16	88	55 22.98	160 54.82	-0-	-0-	229	29	1.0	41	43	47
92	BVC	8	16	88	55 24.96	160 55.94	-0-	-0-	323	25	1.0	74	77	79
93	BVA	8	16	88	55 28.62	160 54.88	-0-	-0-	341	25	1.0	24	25	27
94	261	8	17	88	55 23.08	160 58.84	-0-	-0-	216	25	1.0	22	24	26
95	245	8	17	88	55 16.67	161 11.73	-0-	-0-	160	27	1.0	36	37	37
96	246	8	17	88	55 0.00	161 12.03	-0-	-0-	110	13	0.5	-0-	-0-	-0-

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Appendix D.1. (page 3 of 3)

Tow No.	Station	Date Mon	Date Day	Date Yr	Starting Position Latitude	Starting Position Longitude	Loran	Loran	Compass Heading	Tow Min	Tow Miles	Fathoms Min	Fathoms Avg	Fathoms Max
97	264	8	17	88	55 6.60	161 2.32	-0-	-0-	160	27	1.0	73	73	75
98	263	8	17	88	55 11.14	161 2.37	-0-	-0-	301	29	1.0	56	60	65
99	BVD	8	17	88	55 27.16	160 53.91	-0-	-0-	148	20	0.7	48	49	52
100	BVB	8	17	88	55 28.66	160 53.41	-0-	-0-	323	27	1.0	22	23	25
101	329	8	18	88	55 27.24	160 27.10	-0-	-0-	352	20	0.6	81	85	87
102	311	8	18	88	55 26.57	160 33.27	-0-	-0-	282	26	1.0	71	74	76
103	BAF	8	18	88	55 29.11	160 34.08	-0-	-0-	313	24	0.9	44	47	53
104	BAD	8	18	88	55 30.47	160 35.01	-0-	-0-	306	28	1.0	51	53	54
105	BAA	8	18	88	55 32.22	160 41.12	-0-	-0-	256	26	1.0	14	18	22
106	BAC	8	18	88	55 31.55	160 37.43	-0-	-0-	148	26	1.0	46	52	57
107	BAE	8	18	88	55 29.61	160 36.85	-0-	-0-	130	25	1.0	57	62	65
108	312	8	18	88	55 24.46	160 34.90	-0-	-0-	298	18	0.7	42	44	47

Appendix E.1. Population estimates for Tanner crab, Chionoecetes bairdi, from the 1988 trawl survey, South Peninsula.

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
Ikatan/Morzhovoi														
87	3	12	11	23	3	4	1	0	0	0	0	0	8	31
97	5	0	0	0	0	0	0	0	0	0	0	0	0	0
98	4	0	0	0	0	0	0	0	0	0	0	0	0	0
MOA	20	1	0	1	2	0	0	0	0	0	0	0	2	3
MOB	21	2	0	2	3	0	0	0	0	0	0	0	3	5
MOC	19	2	0	2	2	0	0	0	0	0	0	0	2	4
MOD	22	11	0	11	19	2	0	0	0	0	0	0	21	32
MOE	23	5	0	5	17	0	0	1	0	0	0	0	18	23
MOF	24	2	0	2	0	0	0	0	0	0	0	0	0	2
MOG	18	45	0	45	32	4	1	2	1	0	1	2	41	86
MOH	25	19	0	19	6	3	0	0	0	0	0	0	9	28
MOI	17	27	0	27	25	3	2	0	0	0	0	0	30	57
MOJ	14	1	0	1	1	0	0	0	0	0	0	0	1	2
MOK	15	31	9	40	8	52	77	51	40	2	5	47	235	275
MOL	16	145	15	160	48	114	54	18	16	0	1	17	251	411
MOM	12	0	0	0	0	0	0	0	0	0	0	0	0	0
MON	13	46	5	51	15	2	5	7	4	0	1	5	34	85
MOO	7	9	213	222	1	17	20	32	14	8	5	27	97	319
MOP	6	1	95	96	1	0	22	75	2	20	1	23	121	217
MOR	9	7	0	7	13	4	1	0	0	0	0	0	18	25
MOS	8	53	7	60	52	29	29	20	7	0	2	9	139	199
MOT	10	0	0	0	7	1	0	0	0	0	0	0	8	8
MOU	11	1	0	1	0	0	0	0	0	0	0	0	0	1
MOV	1	0	0	0	0	1	0	0	0	0	0	0	1	1
MOW	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		473,143	393,460	866,603	256,652	287,299	245,461	221,888	96,780	30,848	17,019	144,647	1,155,947	2,022,550
Cold Bay/Belkofski														
144	26	4	0	4	3	0	0	0	0	0	0	0	3	7
145	29	7	0	7	1	0	0	0	0	0	0	0	1	8
156	27	21	51	72	5	27	32	25	12	5	0	17	106	178
157	28	12	4	16	12	3	3	11	5	0	1	6	35	51
169	43	0	2	2	0	0	0	1	0	0	0	0	1	3
BEA	44	0	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix E.1. (page 2 of 4)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
BEB	45	6	1	7	7	3	1	2	1	0	0	1	14	21
BEC	47	26	9	35	4	47	21	4	0	2	0	2	78	113
BED	46	3	0	3	0	0	0	0	0	0	0	0	0	3
BEE	48	8	6	14	1	4	11	4	0	0	0	0	20	34
COB	30	16	0	16	22	0	0	0	0	0	0	0	22	38
COC	31	11	0	11	15	3	0	0	0	0	0	0	18	29
COE	32	25	1	26	15	13	12	5	1	1	0	2	47	73
COF	33	27	18	45	1	60	57	46	7	5	0	12	176	221
COG	34	2	0	2	0	1	4	15	9	5	7	21	41	43
COH	35	5	0	5	12	8	4	4	1	3	0	4	32	37
COJ	36	0	0	0	1	0	0	0	0	0	0	0	1	1
COL	37	0	0	0	0	0	0	0	0	0	0	0	0	0
COM	40	0	0	0	0	0	0	0	0	0	0	0	0	0
CON	41	10	77	87	4	4	6	9	8	3	0	11	34	121
COO	42	5	11	16	0	1	3	1	1	0	0	1	6	22
COP	38	2	0	2	1	0	0	0	0	0	0	0	1	3
COQ	39	0	0	0	1	0	0	0	0	0	0	0	1	1
Pop Est		263,424	311,506	574,930	133,813	222,565	234,339	220,235	88,143	32,649	8,520	129,312	940,264	1,515,195
Pavlof/Volcano Bays														
228	90	8	0	8	8	0	1	5	0	0	0	0	14	22
245	95	0	0	0	0	1	0	0	0	0	0	0	1	1
246	96	0	0	0	0	0	0	0	0	0	0	0	0	0
263	98	9	0	9	7	0	0	0	0	0	0	0	7	16
264	97	3	19	22	0	1	5	6	2	4	0	6	18	40
PAA	65	0	0	0	0	0	0	0	0	0	0	0	0	0
PAB	66	0	0	0	0	0	0	0	0	0	0	0	0	0
PAC	67	0	0	0	0	0	0	0	0	0	0	0	0	0
PAD	64	0	0	0	0	0	0	0	0	0	0	0	0	0
PAE	70	0	0	0	0	0	0	0	0	0	0	0	0	0
PAF	69	0	0	0	3	0	0	0	0	0	0	0	3	3
PAG	68	4	0	4	2	0	0	0	0	0	0	0	2	6
PAH	62	22	0	22	19	0	0	0	0	0	0	0	19	41
PAI	63	21	0	21	38	3	5	6	2	0	0	2	54	75
PAJ	71	3	0	3	10	1	0	0	0	0	0	0	11	14
PAL	72	8	0	8	7	2	3	0	1	1	0	2	14	22
PAM	82	43	0	43	59	6	2	1	0	0	0	0	68	111

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Appendix E.1. (page 3 of 4)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
PAN	83	20	0	20	21	0	0	0	0	0	0	0	21	41
PAO	73	30	1	31	22	11	5	4	2	1	3	6	48	79
PAP	85	4	1	5	6	0	2	2	0	0	0	0	10	15
PAR	74	9	9	18	6	6	24	22	6	0	2	8	66	84
PAS	81	16	35	51	5	27	177	136	56	21	23	100	445	496
PAT	76	0	0	0	3	0	0	0	0	0	0	0	3	3
PAU	75	16	1	17	5	15	17	12	7	0	3	10	59	76
PAV	80	1	2	3	1	1	1	3	0	1	3	4	10	13
PAW	86	2	0	2	3	0	0	1	1	0	0	1	5	7
VOA	77	11	1	12	8	1	2	1	5	0	1	6	18	30
VOB	78	4	39	43	2	5	13	13	15	3	7	25	58	101
VOC	79	6	218	224	3	8	6	42	20	7	8	35	94	318
VOD	87	12	1	13	7	4	3	0	2	0	0	2	16	29
VOE	88	0	0	0	0	0	0	0	0	0	0	0	0	0
VOF	57	10	2	12	8	6	13	11	3	0	2	5	43	55
VOG	58	46	295	341	3	68	87	45	15	20	2	37	240	581
VOH	59	4	20	24	3	7	27	31	25	1	7	33	101	125
VOI	60	9	5	14	4	4	19	14	9	3	6	18	59	73
VOJ	61	5	89	94	4	1	7	12	2	3	3	8	32	126
VOK	89	0	0	0	0	0	0	0	0	0	0	0	0	0
VOL	52	4	0	4	10	0	0	0	0	0	0	0	10	14
VOM	56	1	3	4	0	1	20	16	6	0	1	7	44	48
VON	55	5	84	89	2	5	30	24	12	8	4	24	85	174
VOO	50	53	4	57	54	12	20	9	2	0	1	3	98	155
VOQ	53	5	1	6	3	0	1	0	0	0	0	0	4	10
VOR	54	12	1	13	8	5	6	13	7	0	1	8	40	53
VOT	49	1	0	1	1	1	0	0	0	0	0	0	2	3
Pop Est		438,378	879,351	1,317,728	351,825	213,743	527,769	473,115	211,734	86,807	79,839	378,380	1,944,832	3,262,561
Beaver/Balboa Bays														
261	94	0	0	0	0	0	0	0	0	0	0	0	0	0
278	91	2	2	4	2	3	0	1	0	1	0	1	7	11
311	102	27	17	44	20	20	13	2	2	0	0	2	57	101
312	108	0	0	0	0	0	0	1	0	0	0	0	1	1
329	101	7	4	11	7	1	2	0	0	0	0	0	10	21
BAA	105	0	0	0	2	0	0	0	0	0	0	0	2	2
BAC	106	3	2	5	0	0	0	0	0	0	0	0	0	5

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Appendix E.1. (page 4 of 4)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males <70	Sublegal Males 70-91	Sublegal Males 92-114	Sublegal Males >114	Recruit	Postrecruit <165	Postrecruit >164	Total Legal	Total Male	Total Crab
BAD	104	2	0	2	1	0	0	0	0	0	0	0	1	3
BAE	107	1	5	6	0	0	9	24	1	15	0	16	49	55
BAF	103	0	1	1	0	0	0	0	0	0	0	0	0	1
BVA	93	0	0	0	0	0	0	0	0	0	0	0	0	0
BVB	100	2	0	2	0	0	1	0	0	0	0	0	1	3
BVC	92	1	0	1	3	0	0	0	0	0	0	0	3	4
BVD	99	2	0	2	3	1	1	0	0	0	0	0	5	7
Pop Est		123,769	76,533	200,302	106,816	66,274	50,497	22,020	5,399	10,364	0	15,763	261,370	461,672
Grand Total		1,298,713	1,660,851	2,959,564	849,107	789,880	1,058,067	937,258	402,055	160,668	105,378	668,101	4,302,413	7,261,977

Appendix F.1. Population estimates for king crab, Paralithodes camtschatica, from the 1988 trawl survey, South Peninsula.

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
Ikatan/Morzhovoi													
87	3	0	0	0	0	0	0	0	0	0	0	0	0
97	5	0	0	0	0	0	0	0	0	0	0	0	0
98	4	0	0	0	0	0	0	0	0	0	0	0	0
MOA	20	0	0	0	0	0	0	0	0	0	0	0	0
MOB	21	0	0	0	0	0	0	0	0	0	0	0	0
MOC	19	0	0	0	0	0	0	0	0	0	0	0	0
MOD	22	0	1	1	0	0	0	0	0	0	0	0	1
MOE	23	0	0	0	0	0	0	0	0	0	0	0	0
MOF	24	0	0	0	0	0	0	0	0	0	0	0	0
MOG	18	0	0	0	0	0	0	0	0	0	0	0	0
MOH	25	0	0	0	0	0	0	0	0	0	0	0	0
MOI	17	0	0	0	0	0	0	0	0	2	2	2	2
MOJ	14	0	0	0	0	0	0	0	0	0	0	0	0
MOK	15	0	0	0	0	0	0	0	0	0	0	0	0
MOL	16	0	0	0	0	0	0	0	0	0	0	0	0
MOM	12	0	0	0	0	0	0	0	0	0	0	0	0
MON	13	0	0	0	0	0	0	0	0	0	0	0	0
MOO	7	0	0	0	0	0	0	0	0	0	0	0	0
MOP	6	0	0	0	0	0	0	0	0	0	0	0	0
MOR	9	0	0	0	0	0	0	0	0	0	0	0	0
MOS	8	0	0	0	0	0	0	0	0	0	0	0	0
MOT	10	0	0	0	0	0	0	0	0	0	0	0	0
MOU	11	0	0	0	0	0	0	0	0	0	0	0	0
MOV	1	0	0	0	0	0	0	0	0	0	0	0	0
MOW	2	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		0	949	949	0	0	0	0	0	1,665	1,665	1,665	2,614
Cold Bay/Belkofski													
144	26	0	0	0	0	0	0	0	0	0	0	0	0
145	29	0	0	0	0	0	0	0	0	0	0	0	0
156	27	0	0	0	0	0	0	0	0	0	0	0	0
157	28	0	0	0	0	0	0	0	0	0	0	0	0
169	43	0	0	0	0	0	0	0	0	0	0	0	0
BEA	44	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix F.1. (page 2 of 4)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
BEB	45	2	0	2	0	0	1	1	0	0	0	2	4
BEC	47	1	0	1	0	0	0	0	0	0	0	0	1
BED	46	0	0	0	0	0	0	0	0	0	0	0	0
BEE	48	0	0	0	0	0	0	0	0	0	0	0	0
COB	30	0	0	0	0	1	0	0	0	0	0	1	1
COC	31	0	0	0	0	0	0	0	0	0	0	0	0
COE	32	1	0	1	0	0	0	0	0	0	0	0	1
COF	33	0	0	0	0	0	0	0	0	0	0	0	0
COG	34	0	0	0	0	0	0	0	0	2	2	2	2
COH	35	0	0	0	0	0	0	0	0	0	0	0	0
COJ	36	0	0	0	0	0	0	0	0	0	0	0	0
COL	37	0	0	0	0	0	0	0	0	0	0	0	0
COM	40	0	0	0	0	0	0	0	0	0	0	0	0
CON	41	0	0	0	0	0	0	0	0	0	0	0	0
COO	42	0	0	0	0	0	0	0	0	0	0	0	0
COP	38	0	0	0	0	0	0	0	0	0	0	0	0
COQ	39	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		2,274	0	2,274	0	936	489	489	0	1,325	1,325	3,239	5,512
Pavlof/Volcano Bays													
228	90	0	0	0	0	0	0	0	0	0	0	0	0
245	95	0	0	0	0	0	0	0	0	0	0	0	0
246	96	0	0	0	0	0	0	0	0	0	0	0	0
263	98	0	0	0	0	0	0	0	0	0	0	0	0
264	97	0	0	0	0	0	0	0	0	0	0	0	0
PAA	65	0	0	0	0	0	0	0	0	0	0	0	0
PAB	66	0	0	0	0	0	0	0	0	0	0	0	0
PAC	67	0	0	0	0	0	0	0	0	0	0	0	0
PAD	64	0	0	0	0	0	0	0	0	0	0	0	0
PAE	70	0	0	0	0	0	0	0	0	0	0	0	0
PAF	69	0	0	0	0	0	0	0	0	0	0	0	0
PAG	68	0	0	0	0	0	0	0	0	0	0	0	0
PAH	62	1	0	1	0	0	0	0	0	0	0	0	1
PAI	63	0	4	4	1	0	0	0	0	0	0	1	5
PAJ	71	0	0	0	0	0	0	0	0	0	0	0	0
PAL	72	0	2	2	0	0	0	0	1	3	4	4	6
PAM	82	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix F.1. (page 3 of 4)

Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
PAN	83	36	0	36	21	1	0	0	0	0	0	22	58
PAO	73	0	0	0	0	0	0	1	10	16	26	27	27
PAP	85	0	0	0	0	0	0	0	1	0	1	1	1
PAR	74	0	0	0	0	0	0	0	0	1	1	1	1
PAS	81	0	0	0	0	0	0	0	0	0	0	0	0
PAT	76	0	0	0	0	0	0	0	0	0	0	0	0
PAU	75	0	0	0	0	0	0	0	0	0	0	0	0
PAV	80	0	0	0	0	0	0	0	0	0	0	0	0
PAW	86	0	0	0	0	0	0	0	0	0	0	0	0
VOA	77	0	0	0	0	0	0	0	0	0	0	0	0
VOB	78	0	0	0	0	0	0	0	0	2	2	2	2
VOC	79	0	0	0	0	0	0	0	0	0	0	0	0
VOD	87	0	0	0	0	0	0	0	0	0	0	0	0
VOE	88	0	0	0	0	0	0	0	0	0	0	0	0
VOF	57	0	0	0	0	0	0	0	0	3	3	3	3
VOG	58	0	0	0	0	0	0	0	0	2	2	2	2
VOH	59	0	0	0	0	0	0	0	0	0	0	0	0
VOI	60	0	0	0	0	0	0	0	0	0	0	0	0
VOJ	61	0	0	0	0	0	0	0	0	0	0	0	0
VOK	89	0	0	0	0	0	0	0	0	0	0	0	0
VOL	52	0	2	2	0	0	0	0	0	0	0	0	2
VOM	56	0	0	0	0	0	0	0	0	2	2	2	2
VON	55	0	0	0	0	0	0	0	0	0	0	0	0
VOO	50	0	0	0	0	0	0	0	0	0	0	0	0
VOQ	53	0	0	0	0	0	0	0	0	0	0	0	0
VOR	54	0	0	0	0	0	0	0	0	0	0	0	0
VOT	49	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		15,062	6,712	21,775	9,349	400	0	1,252	14,492	33,447	47,939	58,940	80,715
Beaver/Balboa Bays													
261	94	0	0	0	0	0	0	0	0	0	0	0	0
278	91	0	0	0	0	0	0	0	0	0	0	0	0
311	102	0	0	0	0	0	0	0	0	0	0	0	0
312	108	0	0	0	0	0	0	0	0	0	0	0	0
329	101	0	0	0	0	0	0	0	0	0	0	0	0
BAA	105	0	0	0	0	0	0	0	0	0	0	0	0
BAC	106	0	0	0	0	0	0	0	0	0	0	0	0

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Station	Tow #	Females Juv	Females Adult	Females Total	Sublegal Males Four	Sublegal Males Three	Sublegal Males Two	Sublegal Males One	Recruit	Post recruit	Total Legal	Total Male	Total Crab
BAD	104	0	0	0	0	0	0	0	0	0	0	0	0
BAE	107	0	0	0	0	0	0	0	0	0	0	0	0
BAF	103	0	0	0	0	0	0	0	0	0	0	0	0
BVA	93	0	0	0	0	0	0	0	0	0	0	0	0
BVB	100	0	0	0	0	0	0	0	0	0	0	0	0
BVC	92	0	0	0	0	0	0	0	0	0	0	0	0
BVD	99	0	0	0	0	0	0	0	0	0	0	0	0
Pop Est		0	0	0	0	0	0	0	0	0	0	0	0
Grand Total		17,336	7,662	24,998	9,349	1,336	489	1,741	14,492	36,437	50,929	63,844	88,842

Appendix G.1. Estimator and population estimates for Kodiak and South Peninsula Tanner crab, Chionoecetes bairdi.

The estimator used to compute the population estimates:

$$(1) \qquad \hat{T}_{r,g} = 151.9 * \sum_{i=1}^{n(r)} A_i * C_{i,g},$$

where $\hat{T}_{r,g}$ is the estimated total number of crabs of sex-age class g in region r, A_i is the area of station i, $C_{i,g}$ is the catch per tow-mile of crabs of sex-age class g in the tow for station i, n(r) is the number of stations in region r, and 151.9 is a factor to convert catch-per-mile of a tow to catch per square mile (a one mile tow sweeps 1/151.9 square miles). The estimator simply expands the catch within the area of a tow for a station to the area of the entire station and sums these expanded values over all the stations within a region. The region, r, that a population total is estimated for may be an entire management district, a section within a management district, or an individual station. The sex-age class, g, may be all crabs or a subdivision based on any combination of sex, size, or ovigerity.

Implicit in the use of this estimator is the assumption that $C_{i,g}$ is the best single estimate of the density of crabs of sex-age class g in station i; that is, that variation in catch per tow-mile within a station is low relative to variation among stations. This assumption may be true and the estimator, $\hat{T}_{r,g}$, has an appealing simplicity, but an unbiased estimate of the variance of $\hat{T}_{r,g}$, $Var(\hat{T}_{r,g})$, cannot be derived from the data. An estimate of $Var(\hat{T}_{r,g})$ requires estimation of the within-station variance in catch per tow-mile for sex-age class g in each station. With only one tow per station, however, that variance estimate cannot be obtained. Hence, there is no way to judge the precision of the population estimates computed from this estimator.

To obtain population estimates with associated estimates of error variance for the Tanner crab sex-age classes of greatest interest, population estimates were recomputed for sublegal male Tanner crab greater than 114 mm in carapace length, for recruit Tanner crab, and for legal Tanner crab by using a stratification method that allows for estimation of error variance. Within management district sections, strata were defined by lumping bay stations from the same bay and lumping spatially clustered ocean stations. Strata definitions are given in this appendix. Population estimates and estimates of error variance were computed for the Kodiak and South Peninsula Management Districts and for sections within these districts using the stratified sampling model (e.g., Cochran, 1977). The variance of catch per tow-mile within strata was computed using the within-strata sample variance; i.e., the

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within-strata variances were computed as the observed catches per tow-mile for a stratum were observations from a simple random sample drawn from an infinite population. For strata in which the computed within-strata population and variance estimates were zero (due to a complete absence of a sex-age class in that strata) the within-strata variance in catch per tow-mile was set at .064 for strata in the Kodiak Management District and at .210 for strata in the South Peninsula Management District. These adjustments to the within-strata variance are based on the observed near-linear relationship between the within-strata means and variances for catch per tow-mile in the trawl survey data.

The population estimates for the three male Tanner crab classes that were computed using the stratified sampling model are given in this appendix. The standard errors (the square root of the population estimate error variance), and the "% error" (the standard error of an estimate divided by the estimate and then multiplied by 100) that accompany these population estimates indicate the precision of the population estimates using the stratified sampling model.

Appendix G.2. Strata definitions used in stratified sampling model population estimates.

Management District	Section	Strata	Stations
Kodiak			
	North East	(NE,1)	255-257, 283-284
		(NE,2)	369X, 395, 420-444
		(NE,3)	cha-chl
		(NE,4)	KZA-KZJ
		(NE,5)	MOGX-MOXX
	East Side	(ES,1)	486, 510-511, 533-535, 558-561, 587-589, 619-621, 655-656
		(ES,2)	KLA-KLL
		(ES,3)	UGA-UGM
	South East	(SE,1)	614-615, 650, 688, 725-729, 759-761, 794
		(SE,2)	858-859, 891-892
		(SE,3)	946-947, 973, 1000, 1022, 1045-1046
		(SE,4)	THA-THN
	South West	(SW,1)	645, 646a-646d, 682b, 682d, 683a-683d, 684a-684d
		(SW,2)	608x, 676x-678x, 712x, 748x, 750x, 781x, 815x-816x
		(SW,3)	ala-alq
	West Side	(WS,1)	121, 200
		(WS,2)	KUD-KUY
		(WS,3)	MAA, PAA, RAA
		(WS,4)	UYEX-UYSX
	North Mainland	(NM,1)	all North Mainland stations
South Peninsula			
	Ikatan/Morshovoi	(IM,1)	87, 97-98
		(IM,2)	MOA-MOW
	Cold Bay/Belkofski	(CB,1)	144-145, 156-157, 169
		(CB,2)	BEA-BEE
		(CB,3)	COB-COQ
	Pavlof/Volcano Bays	(PV,1)	228, 245-246, 263-264
		(PV,2)	PAA-PAW
		(PV,3)	VOA-VOT
	Beaver/Balboa Bays	(BB,1)	261, 278, 311-312, 329
		(BB,2)	BAA-BAF
		(BB,3)	BVA-BVD

Appendix G.3. Population estimates using a stratified sampling model for male Tanner craab, Chionoecetes bairdi, from the 1988 Kodiak trawl survey.

	Sublegal Males >144	Recruits	Total Legal
North East			
Pop est	802,755	471,638	535,615
Standard error	355,981	236,824	247,206
% error	44.3	50.2	46.2
East Side			
Pop est	713,019	300,909	401,142
Standard error	346,870	108,879	130,968
% error	48.6	36.2	32.6
South East			
Pop est	1,406,431	763,406	963,661
Standard error	540,372	215,510	259,084
% error	38.4	28.2	26.9
South West			
Pop est	582,863	1339784	1,473,562
Standard error	185,517	324,347	360,969
% error	31.8	24.2	24.5
West Side			
Pop est	614,446	274,536	347,030
Standard error	109,775	85,691	102,431
% error	17.9	31.2	29.5
North Mainland			
Pop est	1,328,006	1,079,710	1,207,620
Standard error	272,579	396,049	422,790
% error	20.5	36.7	35.0
Grand Total			
Pop est	5,447,520	4,229,984	4,928,630
Standard error	812,286	619,503	681,858
% error	14.9	14.6	13.8

Appendix G.4. Population estimates using a stratified sampling model for male Tanner crab, Chionoecetes bairdi, from the 1988 South Peninsula trawl survey.

	Sublegal Males >144	Recruits	Total Legal
Ikatan/Morshovoi			
Pop est	182,841	74,557	115,385
Standard error	81,822	38,694	50,669
% error	44.8	51.9	43.9
Cold Bay/Belkofski			
Pop est	188,889	74,363	111,998
Standard error	87,750	37,767	54,379
% error	46.5	50.8	48.6
Pavlof/Volcano Bays			
Pop est	406,020	181,778	323,648
Standard error	121,848	53,184	95,720
% error	30.0	29.3	29.6
Beaver/Balboa Bays			
Pop est	25,181	6,060	16,919
Standard error	14,078	5,602	10,281
% error	55.9	92.4	60.8
Grand Total	802,931	336,758	567,950
	171,581	76,050	121,624
	21.4	22.6	21.4

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