



**Northwest and  
Alaska Fisheries  
Center**

National Marine  
Fisheries Service

U.S. DEPARTMENT OF COMMERCE

**NWAFRC PROCESSED REPORT 87-02**

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Associated with Rock Sole  
in Bristol Bay**

January 1987

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in Bristol Bay

by

Jerry Reeves

Northwest and Alaska Fisheries Center  
National Marine Fisheries Service  
National Oceanic and Atmospheric Administration  
Resource Ecology and Fisheries Management Division  
7600 Sand Point Way NE  
Bin C15700; Building 4  
Seattle, WA 98115

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## Incidental Crab Catches Associated With Rock Sole in Bristol Bay

The potential development of a domestic fishery targeting on rock sole in the Bering Sea has raised questions concerning the nature of incidental crab catches which might occur. No data is available regarding discards from such a fishery. The intent of this report is to assemble current information on the location of the rock sole resource, and on crab bycatches experienced by foreign and joint-venture operations in major rock sole habitat, as a way of providing some background for the study of such questions.

### Areas of Rock Sole Abundance

Information on the relative abundance of rock sole on the southern Bering Sea shelf is available from two sources, the annual NMFS crab/groundfish research survey and the NMFS observer program. Survey trawl hauls taken systematically at approximate 20-nmi intervals provide data on catch rates, size structure and other parameters for rock sole. The NMFS observer program collects data on CPUE for rock sole caught during foreign and joint-venture fishing operations, as well as incidence rates and average weights for king and Tanner crab and other prohibited species.

Rock sole data from the two most recent surveys, 1985 and 1986, are presented in Figures 1-4. Relative abundance as indicated by the distribution of catch rates is given for 1985 in Figure 1 and for 1986 in Figure 3. The average size of rock sole caught at each station is shown in Figures 2 and 4 for each of the years. In Figures 1 and 3 areas of highest catch rates (>1000 lbs/hr) are outlined and indicate that a major area of high abundance exists within Bristol Bay east of approximately 164 W longitude. The extent of rock sole concentrations within this area is variable between years. In 1985, high catch rates occurred predominantly along the length of the Alaska Peninsula. In 1986, high concentrations were more widespread, occurring from the Peninsula up to Cape Newenham. The survey data further indicate that a secondary area of rock sole concentration exists directly to the east of the Pribilofs, with a few small local areas of concentration between there and Bristol Bay. The distribution of rock sole average size, shown in Figures 2 and 4, is more consistent between years. Areas of rock sole larger than 10 in. are located along the northern shore of Bristol Bay and along the slopeward areas of rock sole habitat. An area of larger rock sole occurred just off Port Moller in 1985 but was not obviously present in 1986.

Fisheries information on areas of high rock sole concentration is shown in Figures 5 and 6. Note that actual catch rates have been grouped and each group has an associated code (see figure legends), which has been plotted. The 1985 distribution of rock sole catch rates in joint-venture mothership operations in INPFC area I is given in Figure 5. Figure 6 shows comparable information from foreign small trawler and large freezer trawler operations. Values in these and subsequent charts appearing over land masses are simply artifacts of the conventions chosen for computer plotting. Areas of high concentrations are similar for joint-venture and foreign fisheries. A major area exists in Bristol Bay south of approximately 58 N latitude and east of

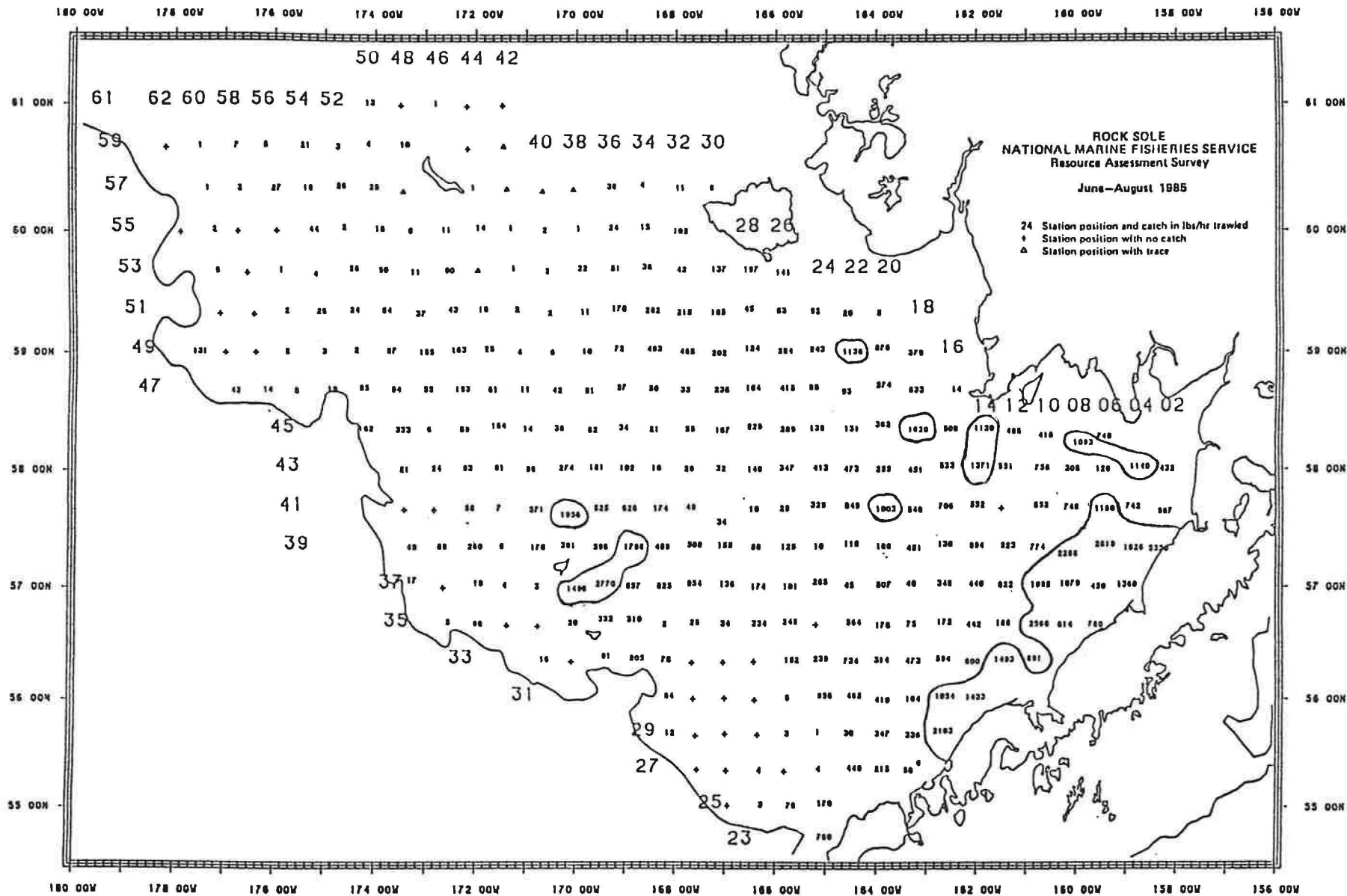


Figure 1.--Catches (lbs/hr) of rock sole during the 1985 NMFS survey (from Bohle, 1986).

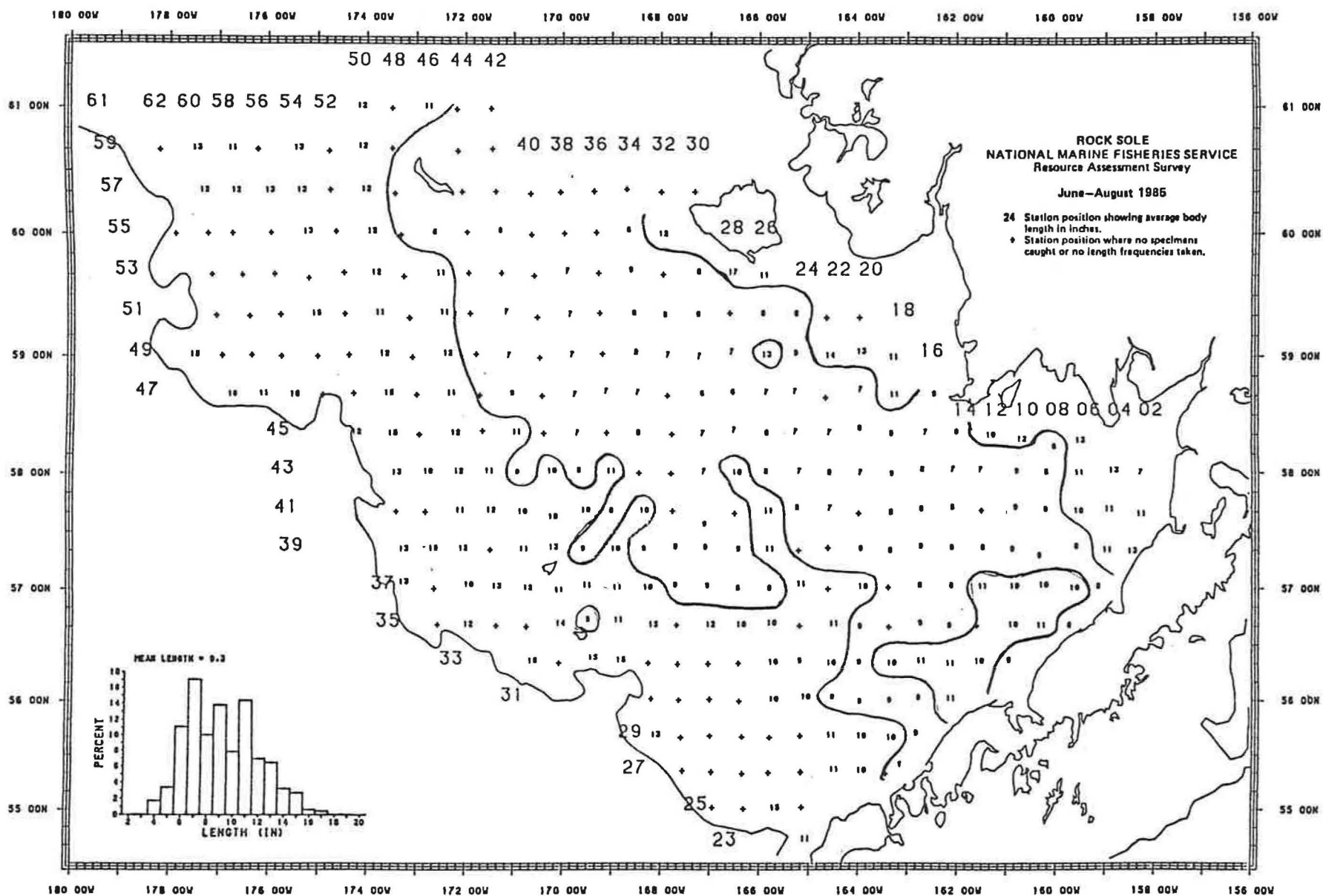


Figure 2.--Average lengths (in) of rock sole caught during the 1985 NMFS survey (from Bohle, 1986).

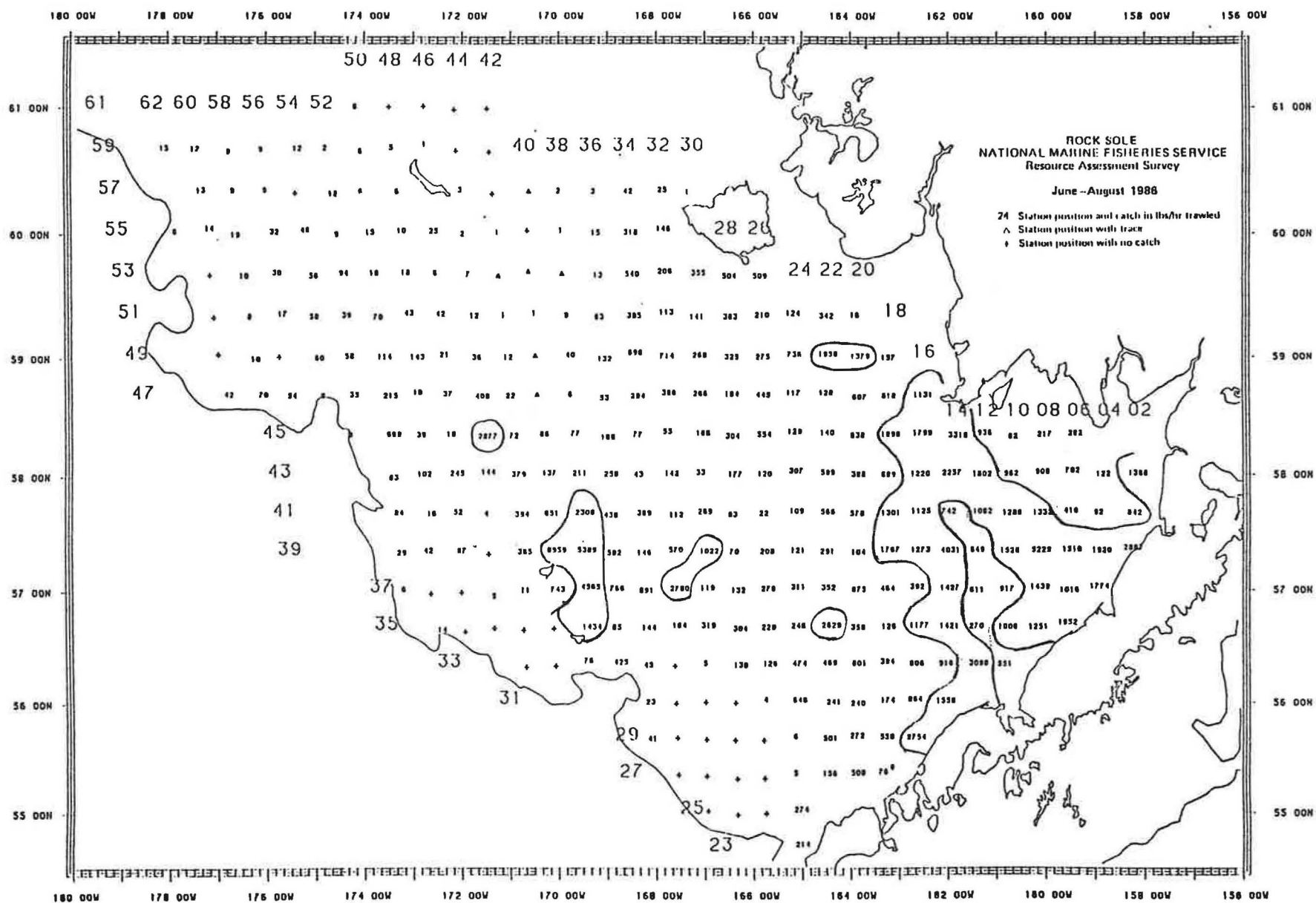


Figure 3.--Catches (lbs/hr) of rock sole during the 1986 NMFS survey (Bohle, pers. comm.).

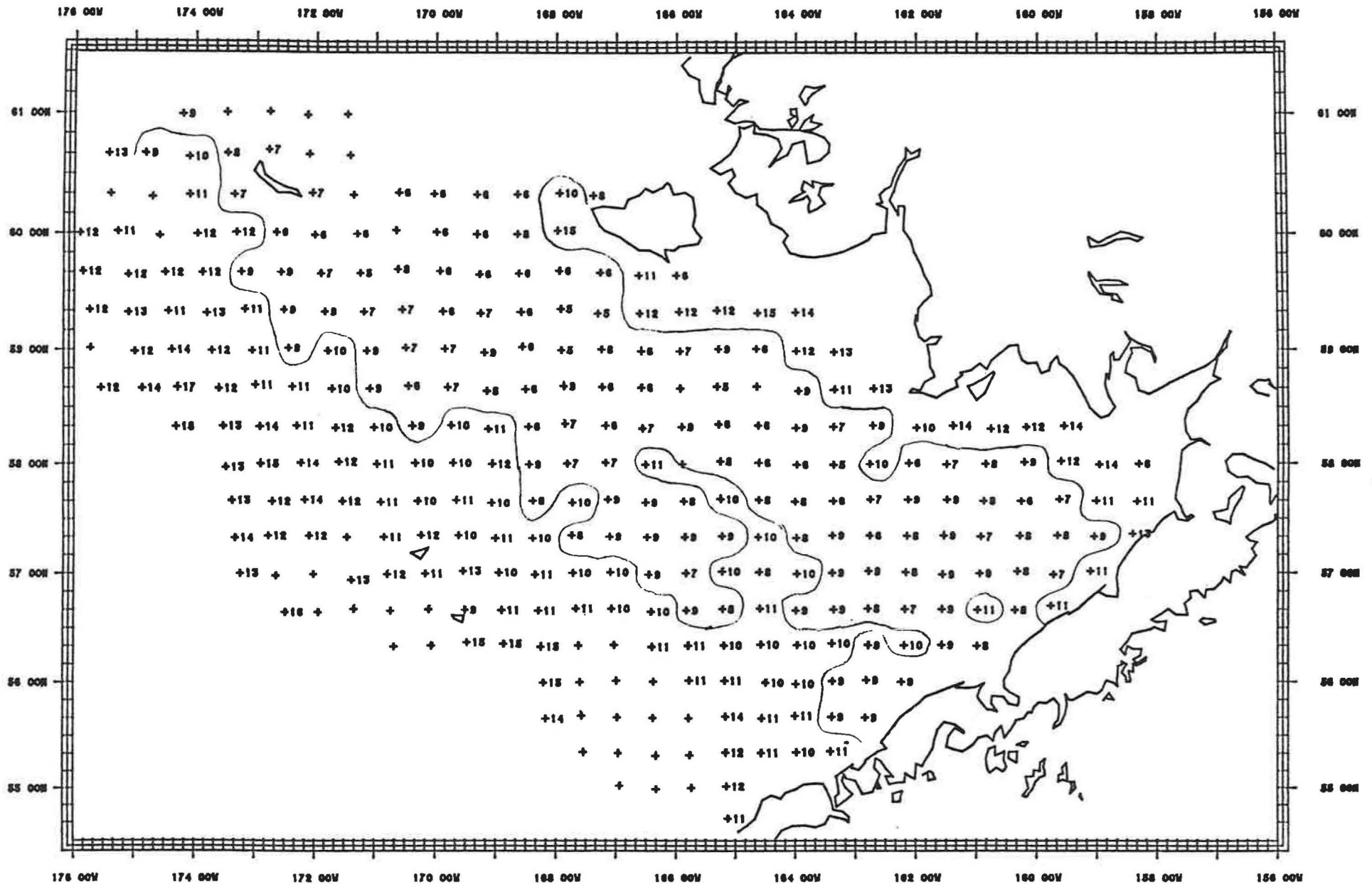


Figure 4.--Average lengths (in) of rock sole caught during the 1986 NMFS survey (Bohle, pers. comm.).



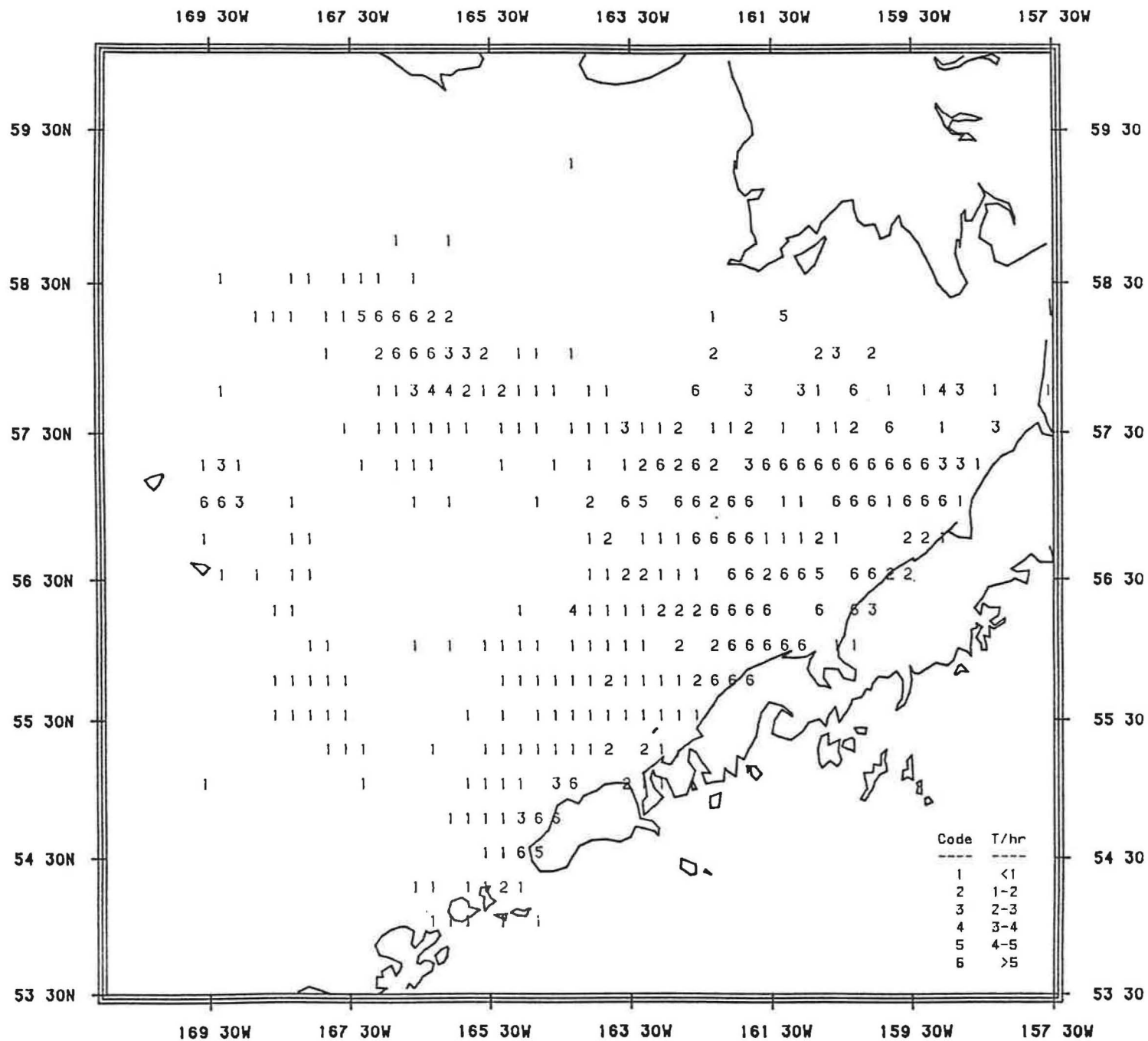


Figure 5.--Catches (T/hr) of rock sole during 1985 joint-venture fishing operations, estimated by the NMFS observer program.

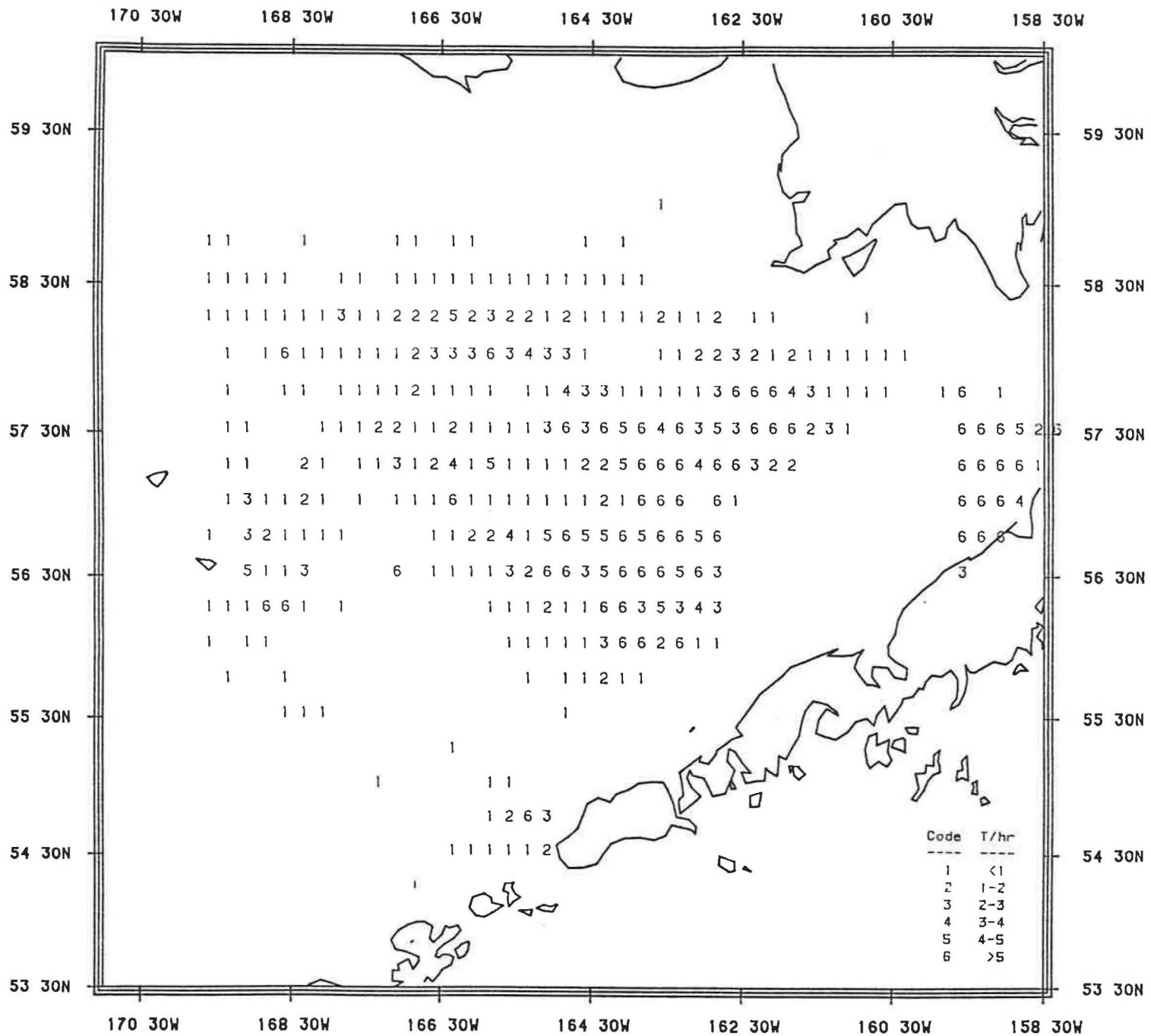


Figure 6.--Catches (T/hr) of rock sole during 1985 foreign fishing operations, estimated by the NMFS observer program.

approximately 164 W according to the joint-venture data and east of approximately 165 W according to the foreign data. Smaller areas of concentration are located at the Pribilofs, off Cape Serichef on Unimak Island, and halfway between the Pribilofs and Cape Newenham. In general, this information agrees with the survey data. However, the fishery data show a closer correspondence with the 1986 survey data. Nevertheless, it is concluded from both data sources that the major area of rock sole concentration is in Bristol Bay.

#### Associated Incidental Crab Catches

Information on incidental catches of king and Tanner crabs in joint-venture and foreign small trawler and large freezer trawler fisheries in 1985 in INPFC area I is given in Figures 7-14. Figures 7-10 show king crab incidence rates and average weights for joint-venture and foreign operations. Figures 11-14 show the same information for Tanner crabs. The values shown are codes representing groups of the actual values, as indicated by the figure legends. Outlined areas correspond to major rock sole areas described previously for each fishery. Dash-lines indicate the region within the rock sole area currently closed to trawling. The following discussion of crab catches focuses on these outlined areas, and assumes that within these areas the predominate crab species are red king crab and C. bairdi.

Figures 7 and 8 show the distribution of coded king crab catch incidence rates in the joint-venture and foreign fisheries in 1985. Figures 9 and 10 show the distribution of coded average weight data. These data are summarized in Table 1.

Table 1.--King crab average incidental catch rates and average weight/crab (coded).

	Entire area		Excluding closed area	
	Coded nos/T	Coded lbs/crab	Coded nos/T	Coded lbs/crab
JV	3.4	2.2	2.7	2.3
Foreign	2.4	1.4	2.2	1.3

Incidence rates for king crab in the joint-venture fisheries are generally in the 2-3 crabs/T category with slightly lower rates outside the closed area. The highest rates occur primarily in the closed area. Incidence rates in the foreign fisheries are generally in the 1-2 crabs/T category, with only a small amount of data available for the closed area. Average size of crab is generally in the 1-2 lb category for joint ventures and less than 1 lb for foreign fisheries.

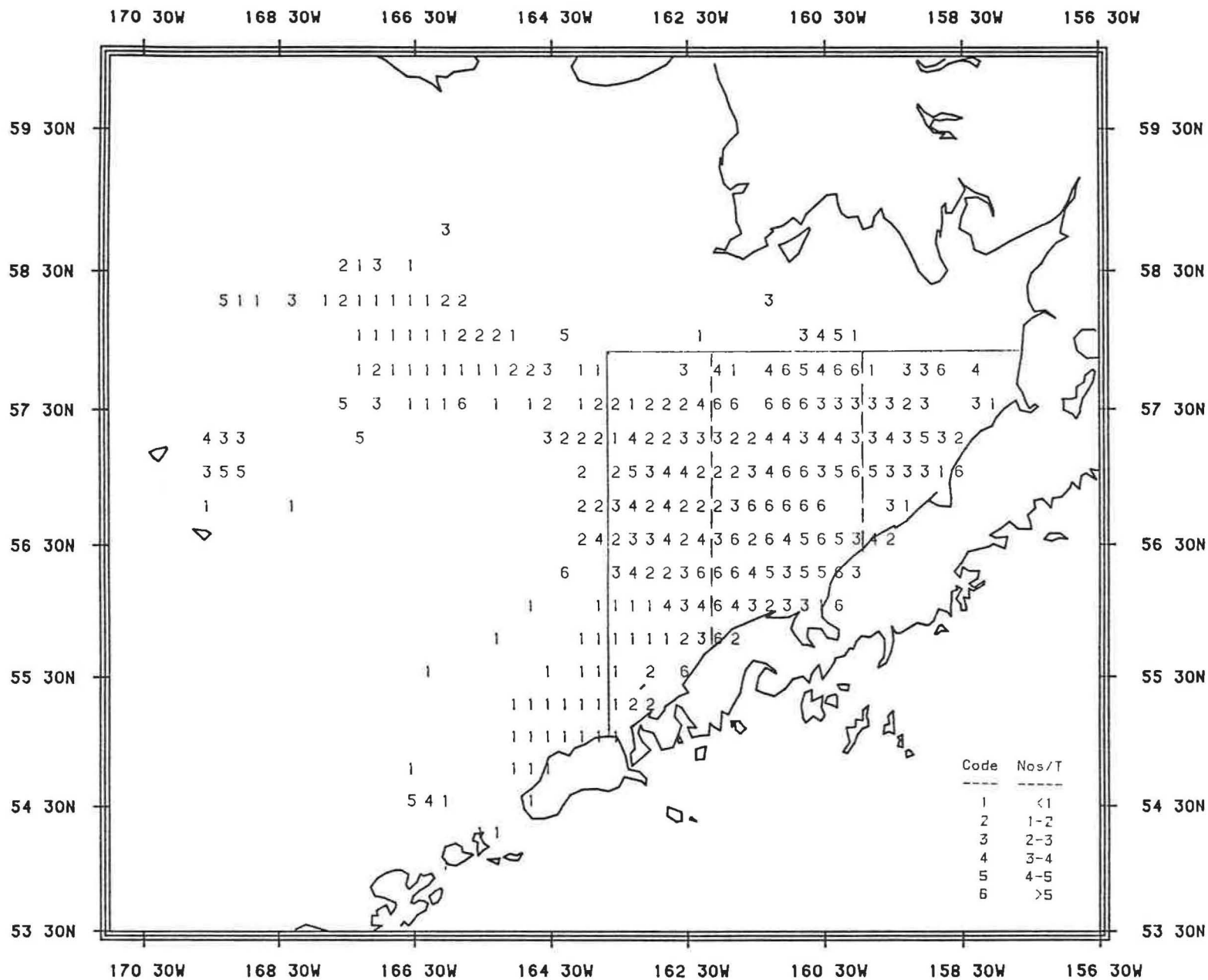


Figure 7.--Incidental catches (numbers/T) of king crab during 1985 joint-venture fishing operations, estimated by the NMFS observer program.

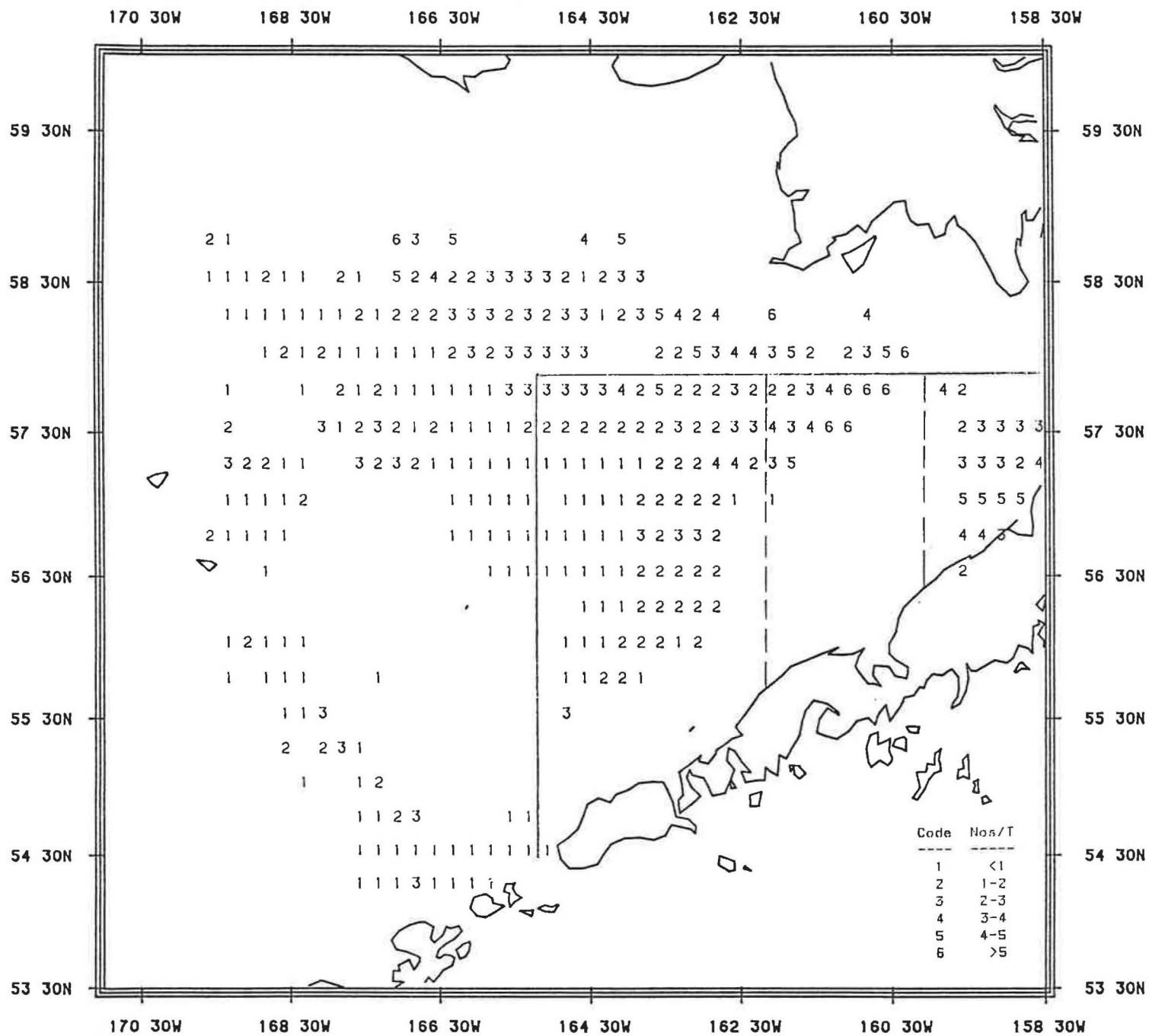


Figure 8.--Incidental catches (numbers/T) of king crab during 1985 foreign fishing operations, estimated by the NMFS observer program.

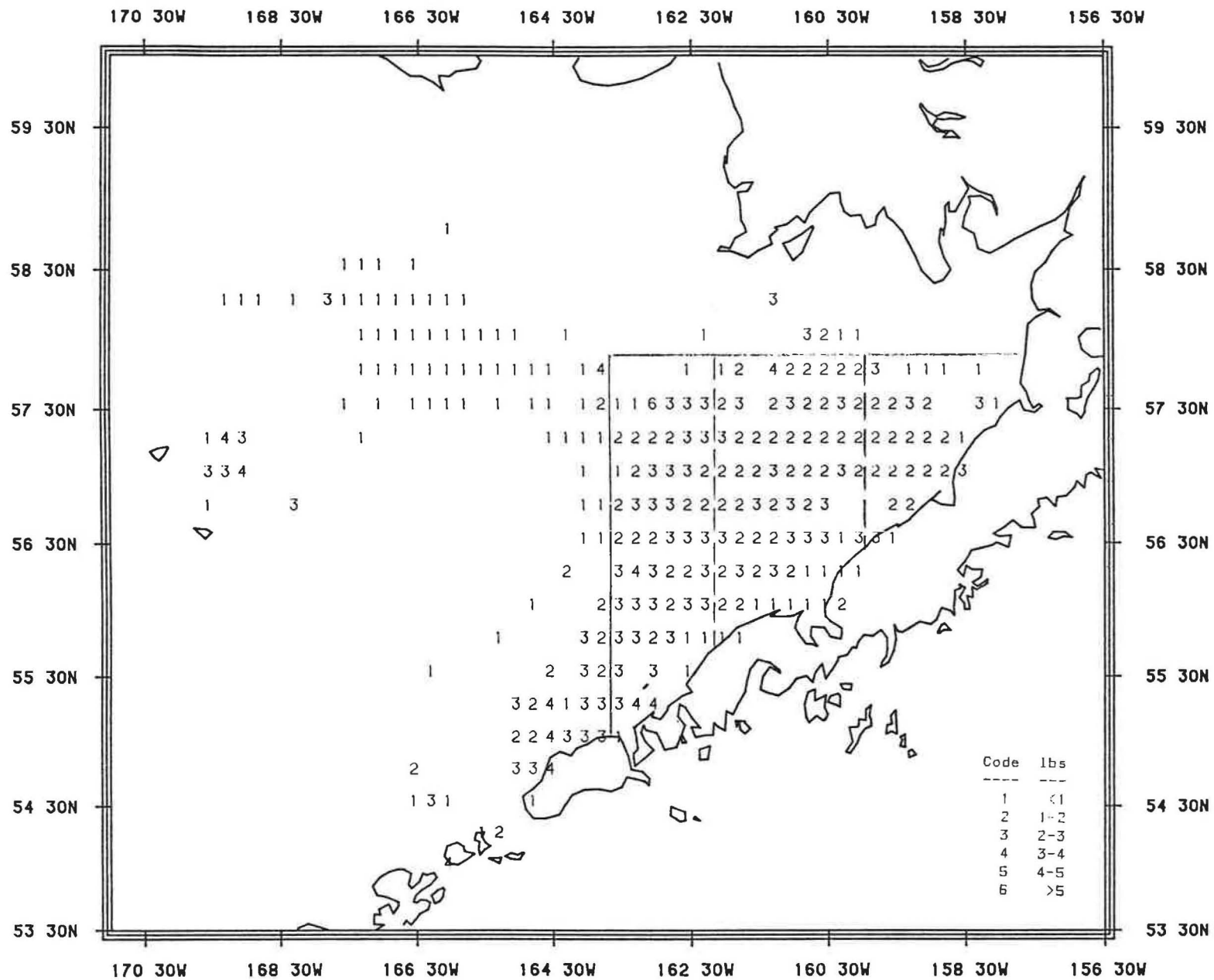


Figure 9.--Average sizes (lbs) of king crab caught during 1985 joint-venture fishing operations, estimated by the NMFS observer program.

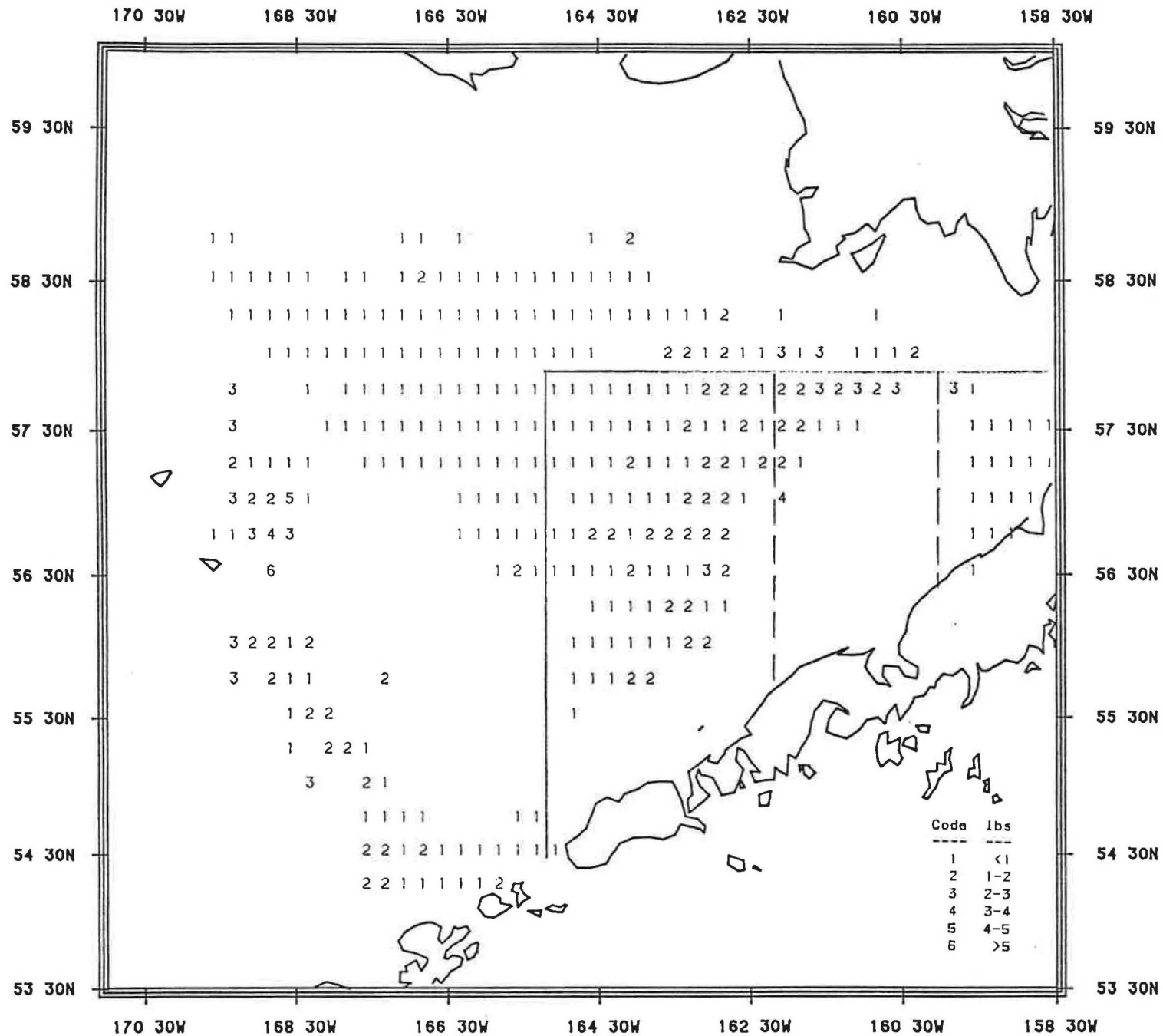


Figure 10.--Average sizes (lbs) of king crab caught during 1985 foreign fishing operations, estimated by the NMFS observer program.

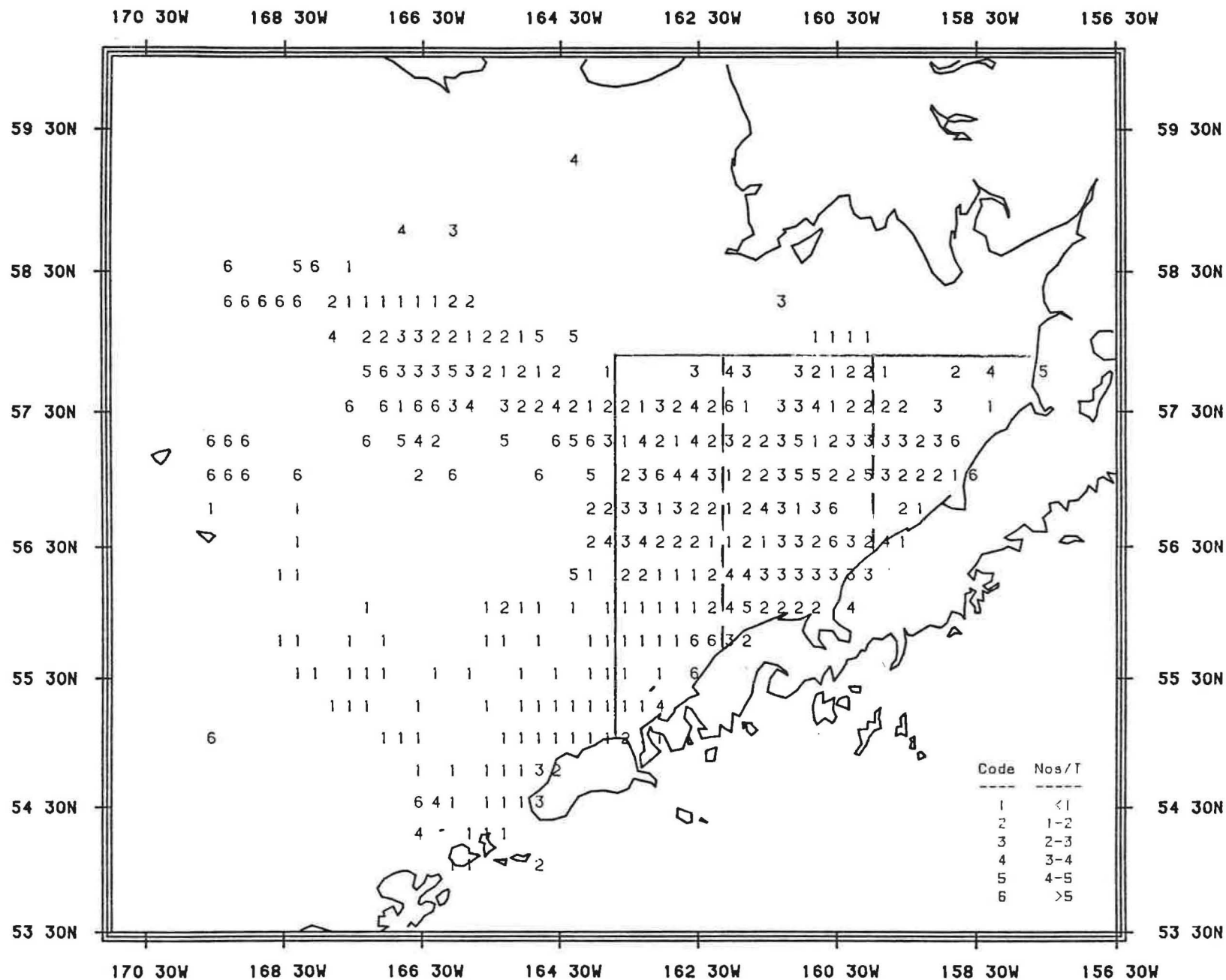


Figure 11.--Incidental catches (numbers/T) of Tanner crab during 1985 joint-venture fishing operations, estimated by the NMFS observer program.



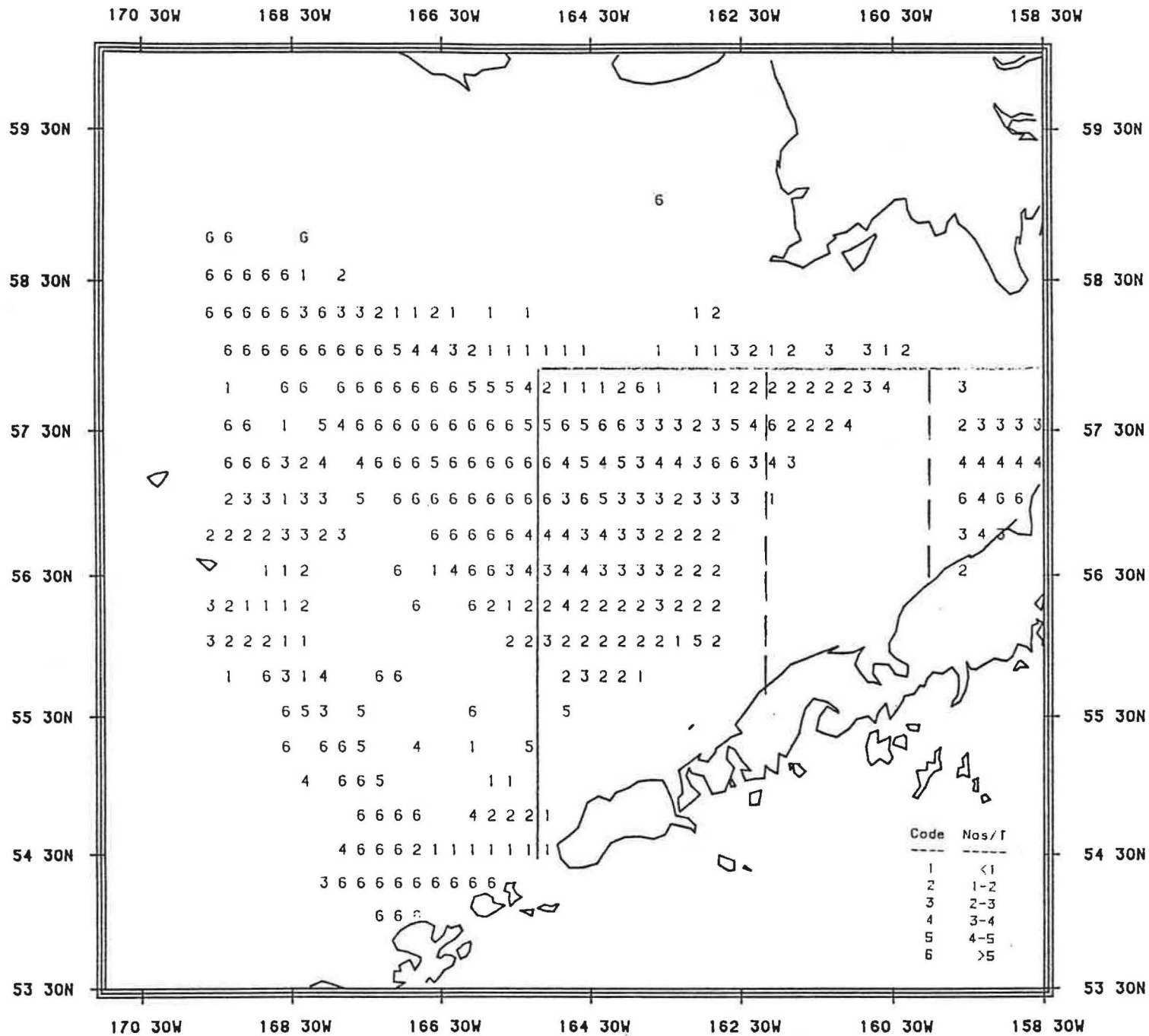


Figure 12.--Incidental catches (numbers/T) of Tanner crab during 1985 foreign fishing operations, estimated by the NMFS observer program.

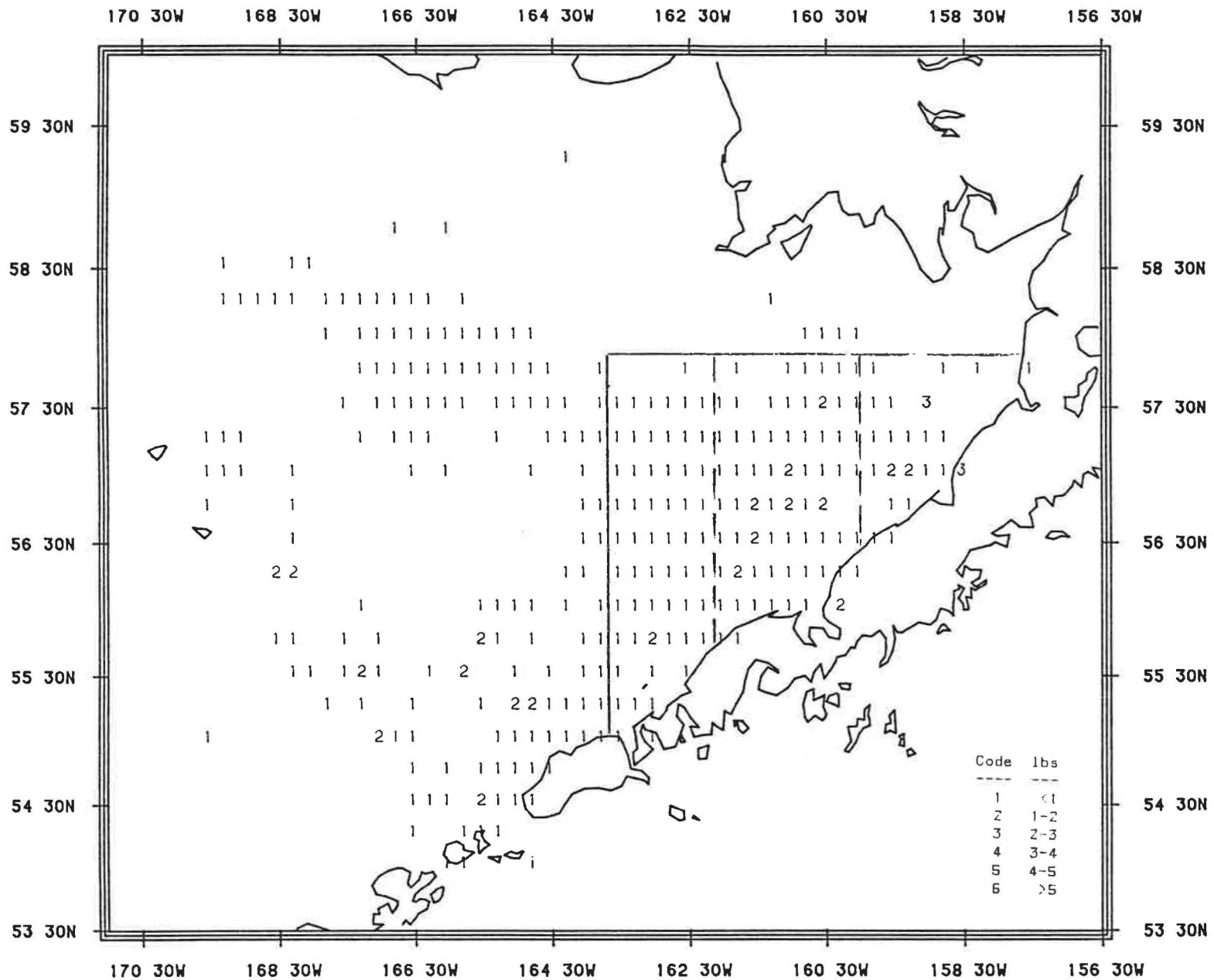


Figure 13.--Average sizes (lbs) of Tanner crab caught during 1985 joint-venture fishing operations, estimated by the NMFS observer program.

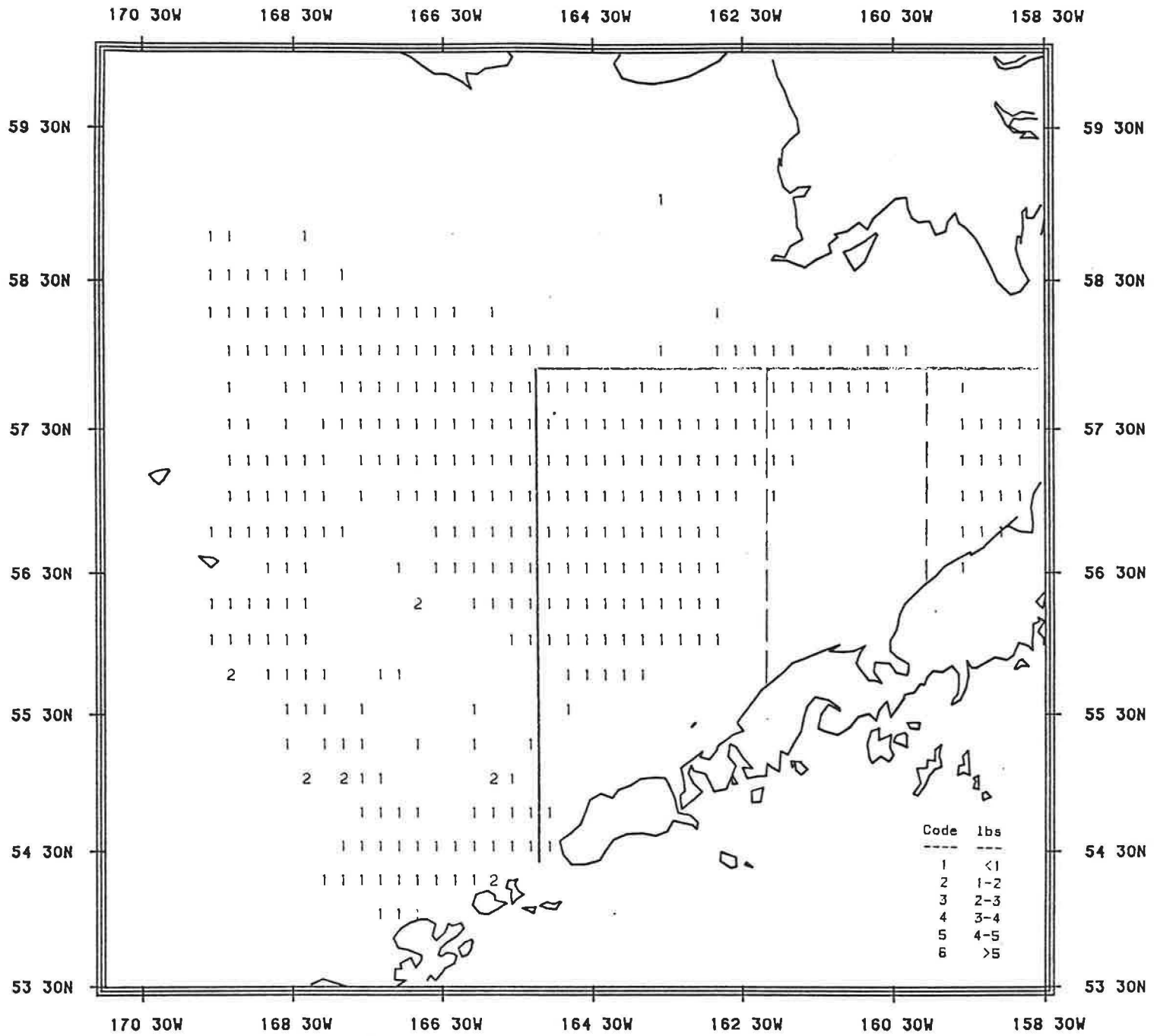


Figure 14.--Average sizes (lbs) of Tanner crab caught during 1985 foreign fishing operations, estimated by the NMFS observer program.

Figures 11 and 12 show the distribution of coded Tanner crab catch incidence rates in the joint-venture and foreign fisheries in 1985. Figures 13 and 14 show the distribution of coded average weight data. These data are summarized in Table 2.

Table 2.--Tanner crab average incidental catch rates average weight/crab (coded).

	Entire area		Excluding closed area	
	Coded nos/T	Coded lbs/crab	Coded nos/T	Coded lbs/crab
JV	2.6	1.1	2.4	1.1
Foreign	3.1	1.0	3.2	1.0

Incidence rates for Tanner crabs in joint-venture fisheries fall into the 1-2 crabs/T category. Rates in the foreign fisheries are in the 2-3 crabs/T category. The average size of Tanner crabs caught incidentally is relatively uniform at less than one pound per crab.

It should be noted that incidence rates estimated for Tanner crabs for 1985 may not be applicable to the current situation. The 1986 NMFS survey indicates that the total population of C. bairdi susceptible to trawl capture more than doubled between 1985 and 1986. The 1985 estimate of approximately 85 million crabs increased to approximately 208 million in 1986, due primarily to significant increases in smaller crabs. On the other hand, estimates of abundance of the total stock of red king crabs remained essentially unchanged from 1985 to 1986.

#### Reference

Bohle, M. S. 1986. Report to industry on the 1985 eastern Bering Sea groundfish survey. NWAFC Proc. Rep. 86-05, 51 p.