



Winter research gillnetting results shown on this chart reveal catches of Red Salmon surprisingly far north for the first quarter of the year. Figures in parenthesis show the numbers of Red salmon caught at the fishing stations marked by dots and identified by plain numbers.

## North Pacific and Bering Sea Winter Gillnetting

By

CHARLES HUNTER and HERBERT LARKINS

● Last year the U. S. Bureau of Commercial Fisheries established a mile post by locating immature salmon during the winter in the North Pacific Ocean (*Pacific Fisherman*, June 1962). This past winter another first was marked by finding salmon in the Bering Sea. Fishing operations also took place in the eastern and central North Pacific Ocean (see chart).

From late January to early March the charter vessel *Bertha Ann* with Captain Mel Leonard as master, fished in the western Bering Sea and central North Pacific Ocean and the Bureau owned vessel *George B. Kelez* with Captain Trygve Mathisen, master, fished the eastern North Pacific. These research cruises are a part of the high seas research program conducted by the Bureau of Commercial Fisheries for the U. S. Section of the International North Pacific Fisheries Commission. Scientific personnel on these cruises were: Charles Hunter, biologist in charge of the *Bertha Ann*; Herbert Larkins, biologist in charge of the *Kelez*; James Ingraham, oceanographer; Wendell Peterson, Rolf Ha-

ance of salmon during the winter and to investigate the marine environment in the areas populated with salmon. Study of the salmon in its ocean environment during the entire year is important to the forecasting of spawning runs, the determination of ocean growth and mortality, and the knowledge of migration routes and feeding areas. All of the above factors are necessary for the management of the North American salmon resource.

● Sixteen hundred fathoms of surface gill net, 4 fathoms deep, was set each evening, weather permitting, and hauled in the morning after about 10 hours of fishing time. Four mesh sizes, 2½, 3¼, 4½, and 5¼" stretched measure, were used to assure the capture of most sizes of salmon.

The area north and west of Adak Island was of particular interest because it was believed that salmon were not present in the Bering Sea during winter. However, Red salmon were caught at every fishing location (see chart), and at set Number 10 at 53° 20'N, and 175°E, two Chum salmon

out this area, although the ocean-age composition of the catches varied. Red salmon in their second-winter at sea and about 20" in length, predominated at the southern stations and larger, three-winter at sea fish averaging 23", were dominant in the north. Most 3-winter at sea and some 2-winter at sea Red salmon will spawn this summer. Small salmon, about 11" in length, and in their first-winter at sea, were found only near the Aleutian chain south of 54° 30'N.

A total of 308 Red salmon was taken in the Bering Sea stations with the largest catch of 78 at Station 6. These Red salmon were fat and in very good condition, although for the most part their stomachs were empty when they were taken aboard. The food found in a few stomachs consisted of lantern fish, parts of squid, and various types of plankton. Plankton tows were not made on this cruise but there was little evidence that large quantities of plankton existed. Water temperatures ranged from 39°F. near the Aleutian Islands to 36°F. at the

tude, was interesting in that most of the Red salmon caught near the island chain were large, about 23" in length, but fish averaging 20" became dominant at the southern stations. The majority of the smaller, first-winter at sea Reds, about 11" long, were captured in the northern four stations along with the larger fish. Red salmon were caught at every central North Pacific station except the southernmost, with total catches decreasing from north to south. Total catches for the western series of stations in the North Pacific (sets 11-17) were 144 Reds, 62 Chums, 4 Pinks, 1 King, and 2 Silvers. The number of Chums approached that of the Reds in the catches of the southern five stations. Due to the decreasing catches and the zero catch of the *Kelez* at the same latitude, it is not believed that salmon would be found much farther to the south. In general, Red salmon catches south of Adak were at the same level as in the winter of 1962. Water temperatures here were considerably higher than in the Bering Sea and ranged from 38°F. in the north to 45°F. at the southernmost station.

● The cruise plan for the eastern North Pacific called for stations spaced 60 miles apart on 165°W., 155°W., and diagonally across the Gulf of Alaska to the Strait of Juan de Fuca. However, a combination of factors, primarily the almost continuously unfishable weather, forced a termination of the *Kelez*' cruise shortly after completion of the stations on 165°W.

Using the same gear make-up as the *Bertha Ann*, salmon catches at the eight successful *Kelez* stations on 165°W. were very low compared to catches of a year ago on 150°W. However, these catches were similar to those of the *Bertha Ann* farther to the west in 1963. Large Red salmon, 20 to 25" in length, dominated the five stations north of 49°N., but were absent from catches further south. Smaller, immature Reds, in their first-winter at sea, appeared in the next set at 47° 30'N. which was also the southern limit of Red salmon catches in the western Gulf. Small numbers of maturing Pink and Silver salmon were taken between 48° 30'N. and 46°N. No Chum or King salmon were taken in this area. The last set at 44° 30'N. was a blank haul, indicating the southern limit of salmon in February at this longitude to be about 45°N. Total catches for this cruise were 66 Reds, 13 Pinks, and 9 Silvers. Water tem-

lack of aquatic life was observed in comparison with summer cruises. Whales, porpoises, and sea lions were totally absent and only three fur seals were seen in the Bering Sea and North Pacific. Herring gulls and, at the southernmost stations, albatross were the only birds commonly sighted. Also, incidental fish species such as Atka mackerel, pomfret, and Pacific mackerel, often taken in large numbers during the summer season, were not recorded; however, several large mackerel sharks were caught. In the Ber-

ing Sea large quantities of a clear, round, disc-like jelly fish, up to 10" in diameter, often fouled the nets. These jelly fish were also present but in much smaller numbers in the Pacific and Gulf.

Although weather conditions during the winter months are more severe and the proportion of fishable days is much lower than during the summer, these winter cruises have proven that high seas salmon data can be collected throughout the year in all of the important sampling areas.



**George B. Kelez and Bertha Ann**, which conducted mid-winter gill-net researches for the U. S. Bureau of Commercial Fisheries west to 175° East Longitude and far north into Bering Sea.

