

JAPANESE MOTHERSHIP SALMON FISHERY MEANS RESEARCH FOR NMFS

A mothership fleet that has sailed each spring for nearly 20 years from Hakodate, Japan, to fish Pacific salmon has affected significantly the research program of the NMFS Northwest Fisheries Center, Seattle, Wash. So, too, has the International North Pacific Fisheries Convention. Scientists at the Center and from other groups have worked with their Canadian and Japanese counterparts to conduct research related to salmon stocks in the vast mothership fishing area and to important convention provisions. Convention members are Japan, Canada, and the U.S.

During the 1930s and early 1940s, a fleet of up to 19 motherships and 305 catcher-boats fished salmon just outside territorial waters off Kamchatka's east and west coasts. Maximum annual catches were near 12 million salmon--mostly sockeye (39%), chums (32%), and pinks (27%).

In 1936 and 1937, Japanese vessels sought and caught salmon off Alaska in the eastern Bering Sea, not far from the mouth of Bristol Bay. This Bay is the major producer of North American sockeye salmon. The U.S. protested strongly and the Japanese ended those exploratory operations. When World War II began, Japan suspended all high-seas salmon fishing; it resumed in 1952.

Fishing Areas

For a few years, fishing was limited to the western North Pacific Ocean, between 155° E and 175° E. Then it expanded westward to the Okhotsk Sea, 1955-58, and, in 1956, eastward in the North Pacific Ocean and Bering Sea to 175° W. Since 1959, the fleet has fished this area: 160° E on the west, 46° N on the south, 60° to 62° N on the north, and 175° W on the east.

Size, Fishing Gear, & Operation

Since 1962, the mothership fleet has remained 11 motherships and 369 catcher-boats; in 1952, it was 3 motherships and 57 catcher-boats; the peak was in 1956-59: 16 motherships and 460 to 500 catcher-boats.

The motherships are owned by large companies. The vessels range from 7,000 to

12,000 tons, are capable of canning 100 to 200 tons of salmon a day, and freezing another 40 to 160 tons. (Freezing capacity varies inversely with canning capability.) They carry about 400 persons, including 2 inspectors from the Fisheries Agency of Japan, a company biologist, and a Russian-speaking interpreter. Each mothership is accompanied by 30 to 35 catcher-boats. The latter, generally owned independently, are in the 80-ton class, usually of steel, and carry crews of about 20. Motherships and catcher-boats also fish other species when not catching salmon.

3,000-3,800 Miles of Gillnet

West of 170° E in the mothership fishing area, each catcher-boat may fish 264 tans (8.2 miles) of gillnet each day. East of 170° E, the maximum gillnet length is 330 tans (10.2 miles). So, when it is desired, the fleet of 369 catcher-boats can fish 3,000 to 3,800 miles of gillnet. "Two sizes of mesh are used in the gillnets: 121 mm (4.8 inches) and 130 mm (5.2 inches), stretched measure. Up to 40% of a string of net can be of the smaller mesh west of 170° E, and up to 60% east of 170° E."

Fishing Season

The fishing season usually begins around May 20 and ends between July 15 and August 10. The closing date depends on when the fleet has caught the quota agreed upon during annual meetings of the Japanese-Soviet Commission for Fisheries of the Northwestern Pacific Ocean. On any one day during the season, only 1 mothership with its 30 to 35 catcher-boats (or equivalent) can fish in any one of 169 subareas designated by the Japanese Fisheries Agency for controlling fishing. Average size of subareas is about 5,600 square miles (70 miles north to south by 80 miles east to west).

INPFC-RELATED RESEARCH

The eastern boundary of the fishing area is the provisional line established by the Protocol to the International North Pacific Fisheries Convention (INPFC). This implements the Convention's abstention provisions concerning salmon. The salmon-abstention

provisions have been in effect since the Convention was implemented in 1953. Under them, Japan abstains from fishing salmon east of 175° W in the North Pacific Ocean and Bering Sea; Canada abstains east of 175° W in the Bering Sea. And Canada and the U.S. must provide evidence that their salmon stocks are being fully utilized, scientifically managed, and under extensive research to determine the conditions necessary to achieve and maintain maximum sustained productivity.

Also, the Convention Protocol requires the three members to conduct research to determine areas and extent of intermingling of Asian and North American salmon. Such information is needed to decide whether a longitudinal line or lines other than the provisional line at 175° W would divide salmon of the two continents more equitably.

Large-Scale Research

In the mid-1950s, Canada, Japan, and the U.S. began large-scale research related to the Protocol problem. The prevailing hypothesis in the U.S. prior to the early 1950s was that salmon in their marine life were confined essentially to continental shelf areas. Research by the NMFS Northwest Center and its contractors has proved that the 5 principal species of North American salmon typically inhabit the high-seas waters of the subarctic North Pacific Ocean. Now it is common knowledge that salmon originating in Asian streams migrate as far eastward as western Gulf of Alaska; also, that North American salmon migrate as far west as Attu or the Komandorskie Islands.

The studies have provided a reasonably complete picture of the intermingling of most major stocks of Asian and North American salmon. The scientists now are able to make fairly accurate estimates of the numbers of North American salmon caught by the mother-ship fishery.

Salmon-Stock Abstention

Also, U.S. scientists have collected and analyzed much data on the qualification of U.S. salmon stocks for abstention. Demonstrating the qualifications of U.S. salmon stocks for abstention is important. Removing a stock from the Convention's abstention list would remove the protection given it by the abstention line at 175° W. Even with the

abstention line, many salmon of western Alaska origin--mostly Bristol Bay sockeye--are caught by the Japanese. However, the abstention line generally provides much protection for North American salmon--practically 100% for all stocks other than those originating in western Alaska. During 1954-70, 1,337 billion North American salmon were caught; the estimated Japanese catch was about 44 million fish, 3% of total.

Bristol Bay Sockeye

Research on the Protocol problem was completed in the early 1960s. Then research of the Center and its contractor, the Fisheries Research Institute, focused on forecasting the strength of Bristol Bay sockeye salmon runs through high-seas research. The scientists also examined the relation between Bristol Bay sockeye salmon abundance and the dynamics of the ocean current systems in the subarctic region. The latter yielded a detailed description of seasonal changes in transport and flow between North Pacific Ocean and Bering Sea. And this information has provided provisional hypotheses about the spawning migration patterns of Bristol Bay sockeye.

Center Researchers

Dr. Francis Fukuhara is scientific coordinator of U.S. Section of INPFC and director of Center's Division of Marine Fish and Shellfish. His division has three major teams that conduct salmon research for U.S. Section:

1. Dr. Felix Favorite heads an oceanography group. It surveys North Pacific Ocean and Bering Sea.
2. Robert French heads a team that surveys distribution of salmon on high seas. The two teams collaborate to study influence of oceanic features on distribution and migration of salmon at sea.
3. The third team is a scale unit headed by Richard Major. It uses scales from the fish body to study age, and it uses scales to determine the natal origins of salmon taken on the high seas.

Personnel of the Division of Fisheries Data and Management Systems, directed by R. A. Fredin, study catch statistics of the Japanese catch of U.S. salmon.