Japanese Research Plan in 2000/2001

by

Fisheries Agency of Japan

Ministry of Agriculture, Forestry and Fisheries
1-2-1 Kasumigaseki, Chiyoda-ku, Tokyo 100
Japan

Submitted to the
NORTH PACIFIC ANADROMOUS FISH COMMISSION
by
Japan

October 1999

Japanese Research Plan in 2000/2001

1. SALMON POPULATION DYNAMICS

1-1 Coastal environment
Northern Japan is located in the southern limit of anadromous salmonid distribution, and the coastal environments occupy a significant impact on the survival of juvenile salmon. Salmon habitat environments will be monitored at 14 stations along the coasts of Hokkaido, where juvenile salmon migrate in spring season. This monitoring program includes surface water temperature, salinity, and zooplankton biomass.

1-2 Offshore environment
In relation to climate changes such as global warming, oceanographic conditions for salmon habitat including physical and chemical conditions, and phytoplankton and zooplankton biomass will be monitored in the western and central North Pacific, the Bering Sea, and the Gulf of Alaska in summer.

1-3 Biological monitoring of salmon in the North Pacific Ocean
Independently of coastal catch and escapement data, salmon abundance and fish size will be monitored on board the salmon research vessels in the western and central North Pacific, the Bering Sea, and the Gulf of Alaska in summer.

1-4 Biological monitoring of adult salmon
This long-term monitoring research will focus on evaluating salmon stock conditions affected by various factors. Body size, fecundity, and egg size will be examined in adult chum salmon returning to major spawning rivers in Japan. The age structure will be determined in each local salmon population. Genetic variations will be monitored in hatchery populations of chum and pink salmon. Health status will be evaluated for wild and hatchery salmon.

1-5 Survival and growth of salmon
To clarify the survival process and growth history of salmon, the survival and growth rate at each life stage are estimated using mark-recapture experiments, calcified-tissue analyses, and population monitoring of high-seas salmon and returning adults.

2. SALMON LIFE HISTORY

2-1 Coastal life history of juvenile salmon
Major mortality of chum and pink salmon may occur during the initial coastal life. Thus the coastal life history studies are important to understand the survival mechanism of salmon. Feeding, growth and survival of juvenile chum and pink salmon will be surveyed in the Nemuro Strait, eastern Hokkaido. The migration route of thermally-marked chum salmon juveniles will be surveyed along the coasts of Hokkaido.

2-2 Offshore migration and distribution of salmon
To visualize offshore migration and distribution of salmon, abundance and biological data (species, age compositions, and maturity) collected by the salmon research vessels will be analyzed retrospectively. Tagging experiments using archival and disc tags will be conducted in the Bering Sea to investigate Japanese chum salmon migration route and relationship between salmon migration and ocean conditions.

2-3 Feeding and growth of high seas salmon
To clarify ocean life history of Pacific salmon, variation of growth, maturity, and feeding ecology of salmon in the ocean will be analyzed using the data collected by the salmon research vessels.

2-4 High seas interaction
To clarify species interaction such as between chum and pink salmon and to investigate stocks interaction such as between Japanese and other chum salmon stocks, salmon abundance, distribution, prey organisms, and somatic growth obtained from high-seas surveys will be analyzed retrospectively.

2-5 Homing migration and maturing mechanism
To determine the maturing mechanism, endocrinological surveys will be conducted for chum salmon during their feeding and homing migrations. Archival tags will be used for adult chum salmon migrating in the coastal waters to elucidate how they find out the natal river.

3. SALMON STOCK IDENTIFICATION

3-1 Genetic stock identification
The genetic population structure and distribution of chum salmon will be determined by genetic stock identification (GSI). The GSI samples will be collected in the eastern, central and western waters of the North Pacific Ocean, and the central Bering Sea by Japanese research vessels.

3-2 Thermal otolith marking
Approximately 14 million chum and pink salmon fry will be released from 5 hatcheries on Hokkaido after thermal otolith markings. Thermal marking techniques and facilities will be developed for further mass markings at national hatcheries. Thermally-marked chum and pink salmon will be monitored in the North Pacific Ocean, Bering Sea, and adjacent seas.

3-3 Stock identification by scale pattern
To clarify stock composition in the North Pacific Ocean, chum salmon stock identification will be conducted using scale pattern. Cooperative sockeye salmon stock identification using scale pattern will be conducted with scientists of member countries, if possible.

3-4 Stock identification by high seas tagging
To confirm stock distribution in the limited survey area such as in the central Bering Sea and the Gulf of Alaska, tagging experiments will be conducted on board the salmon research vessels.

4. SALMON STOCK ASSESSMENT

4-1 Modeling of salmon population and ecosystem dynamics
Using numerical models, dynamics of salmon population will be simulated and the effects of density dependence, environmental factors, carrying capacity, interaction with other populations, and harvest strategy will be examined and possible future survey will be proposed.

4-2 Salmon stock assessment and forecast
To manage salmon stocks, numbers and conditions of stocks will be assessed and forecasted using monitoring of conditions of released juveniles, survival, growth, environmental factors during freshwater, coastal, and oceanic lives, and population structure of returning adults.