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**A Salmon Research Plan in the North Pacific Ocean
by the Fisheries Agency of Japan**

by

Fisheries Agency of Japan

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A Salmon Research Plan in the North Pacific Ocean by the Fisheries Agency of Japan

Introduction

Japan submitted two documents about the conception of scientific research and the research plan for salmon stock assessment to the first and second annual meetings of the North Pacific Anadromous Fish Commission (Fisheries Agency of Japan 1993, 1994). Based on these two documents, the present document describes the outline of salmon research which will be conducted by the Fisheries Agency of Japan.

1. Life Histories of Salmonids in the North Pacific Ocean

Purpose: To clarify life history of salmonids related to population dynamics for stock assessments.

1-1: Distribution of Salmonids

Investigate the distribution of salmonids, by ocean age and maturity, based on data accumulated by research vessels in the North Pacific Ocean. Identify factors affecting salmonid distributions, such as ocean temperature and interactions with other species.

1-2: Growth Variations of Salmonids

Investigate growth variations of salmonids, based on age and body size of adult salmonids returning to spawning rivers and biological data of salmonids collected by research vessels in the North Pacific Ocean. Examine formation of hard tissues, such as otolith and scales, in order to clarify the growth mechanisms. Conduct experiments in order to clarify external (water temperature and feeding conditions) and internal (fish density) factors which cause growth variations of salmonids.

1-3: Feeding Ecology and Nutritional Condition of Salmonids

Investigate the feeding ecology of salmonids in the North Pacific Ocean. Establish methods to assess the nutritional conditions of salmonids. Identify mechanisms of variations in feeding ecology and nutritional condition.

2. Population Dynamics of Salmonids in the North Pacific Ocean

Purpose: To clarify mechanisms of population dynamics of salmonids, and to contribute to the long-term forecast of salmonid abundance.

2-1: Mechanisms of Mortality of Salmonids

Estimate the survival rates of salmonids from changes in salmonid abundance by age group and by year, based on data collected by research vessels. Investigate the occurrence of salmonids affected by diseases or predators, and distribution of predators. Investigate factors affecting the survival, such as

predation, starvation, and diseases, by experimental methods.

2-2: Relationship between Ocean Environments and Carrying Capacity of Salmonid Populations

Establish methods to assess the carrying capacity of salmonid populations based on accumulated meteorological and oceanographic data (including plankton data) and biological data of salmonids, and examine the relationships between meteorological and oceanographic factors and salmonid carrying capacity.

2-3: Population Dynamics of Salmonids in the Wintering Season

Investigate the salmonid ecology in winter using a large research vessel, clarify the southern limit of salmonid distribution in winter, examine the so called "reverse migration hypothesis" in that salmonids migrate northwards to minimize metabolic demands and maximize utilization of food in winter, and elucidate the relationship between wintering ecology and population dynamics of salmonids.

3. Stock Assessments of Salmonids in the North Pacific Ocean

Purpose: To develop methods for accurate stock identification, to assess the abundance of each stock, and to contribute to the management for stock conservation and sustainable use of salmonids.

3-1: Stock and Local Population Identification of Salmonids

Develop methods for stock identification of salmonids including juveniles: (1) scale and otolith pattern analysis, (2) genetic analysis, and (3) artificial and biological tagging.

3-2: Biological Monitoring of Salmonids

Continue salmon research vessel surveys in summer, and establish methods to assess salmonid abundance and biological characters by species and stock. Establish methods of estimating abundance and survival of juvenile salmonids before wintering. Monitor genetic and reproductive characters, population structure of mature salmonids returning to their natal rivers. Improve biological monitoring methods for primary and secondary producers, competitors and predators of salmonids in the North Pacific Ocean.

References

- Fisheries Agency of Japan. 1993. A Japan's view on conception of scientific research for the Committee on Scientific Research and Statistics. (NPAFC Doc.28). Fisheries Agency of Japan, Tokyo 100, Japan. 11p.
- Fisheries Agency of Japan. 1994. A Japanese research plan for salmon stock assessment in the North Pacific Ocean. (NPAFC Doc.81). Fisheries Agency of Japan, Tokyo 100, Japan. 3p.