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**Japanese Research Plan in the Bering Sea  
and the Gulf of Alaska**

**by**

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## **Japanese Research Plan in the Bering Sea and the Gulf of Alaska**

### **Introduction**

The somatic growth of Japanese chum salmon is affected by offshore environment in the North Pacific Ocean (Ishida et al. 1993). Growth reductions occurred from the 1970s to the 1990s may be due to density-dependence with increasing stock size (Kaeriyama 1998). While, in the 1990s, the body size of chum salmon adults is increasing in the Alaska, which might relate with a regime shift (Helle and Hoffman 1998). In Japan, the body size of chum salmon is also recovering in the recent several years (unpublished data). We must consider a carrying capacity of chum salmon in the North Pacific Ocean to manage Japanese chum salmon stock in a healthy state.

Environment in the Bering Sea may be a key to determine the somatic growth of Japanese chum salmon. The ocean growth rate of chum salmon is the highest in summer (Ishida et al. 1998). In summer, Japanese chum salmon are distributed in the Bering Sea (Urawa 2000). Thus, ocean growth of Japanese chum salmon may be affected by intraspecific competition, oceanographic condition, prey organisms, and/or interspecific competition.

From 1992, Japan continues to monitor summer salmon stocks and environments in the Bering Sea using research gillnets. However, data of the monitoring research is not sufficient to estimate abundances of salmon species, because of the limited survey area. Thus, to estimate precise abundance and ecosystem structure, we need intensive surveys in the whole areas of the Bering Sea using a trawl net.

### **Bering Sea surveys in summer of 2002**

1. Monitoring survey by R/V *Wakatake maru* (gillnets) June – July
2. Survey for salmon abundance by R/V *Kaiyo maru* (trawl) June – September

### **Individual survey plan**

#### **1. Monitoring survey**

- 1) Objective: Monitoring of salmon stocks and environments in the central North Pacific and the Bering Sea
- 2) Research vessel: *Wakatake maru* (Hokkaido Board of Education), 666 tonne, 2,200 horse power
- 3) Tentative schedule: Early June – Late July 2002, 47 days
- 4) Survey area: Central North Pacific (180° longitude line), Central Bering Sea (Figure 1)
- 5) Scientific party  
Japanese Scientists (Fisheries Research Agency): 2 peoples  
U.S Scientist: 1 people
- 6) Contents
  - Physical and chemical oceanography, and primary production

- oceanographic observation (CTD), surface water chlorophyll a concentration
- Zooplankton collections
  - NORPAC net (vertical tow), ORI net (0.67 mm mesh, surface tow)
- Gillnet fishing
  - high Seas 19 stations (CNP 8 stations, BS 11 stations)
  - 10 mesh research gillnets
  - biological measurement of salmonids and other fishes, stomach contents, stock identification
- Longline fishing
  - high Seas 19 stations and U.S. EEZ 7 stations
  - disk tagging

## 2. Survey for salmon abundance

- 1) Objective: Abundance estimation and spatial distribution of salmon by stocks and ecosystem structure in the Bering Sea and the Gulf of Alaska  
Specific objectives in 2002 are spatial distribution of salmonids, fishing efficiencies of trawl and gillnets, and construction of research plan for abundance estimation of chum salmon.
- 2) Research vessel: *Kaiyo maru* (Fisheries Agency of Japan) 2,630 tonne, 3,500 horse power × 2
- 3) Tentative schedule: June 3 – September 14, 2002, 103 days
- 4) Survey area: the Bering Sea, Gulf of Alaska (Figure 1)
- 5) Scientific party
  - Fisheries Research Agency: 4 persons
  - National Salmon Resources Center
  - Foreign Scientists
  - Others
- 6) Contents
  - Physical and chemical oceanography, and primary production
    - oceanographic observation (CTD), nutrients concentrations, chlorophyll a concentration, flow direction and speed
  - Zooplankton collections
    - NORPAC net (vertical tow), ORI net (0.67 mm mesh, surface tow), MOCKNESS net
  - Trawl fishing
    - 106 stations (BS 91 stations, GOA 15 stations)

biological measurement of salmonids and other fishes, stomach contents, stock identification

- Acoustic survey  
Bering Sea, daytime
- Archival tagging  
longline or hook-and-line, Bering Sea, sunset or sunrise, 30 tags

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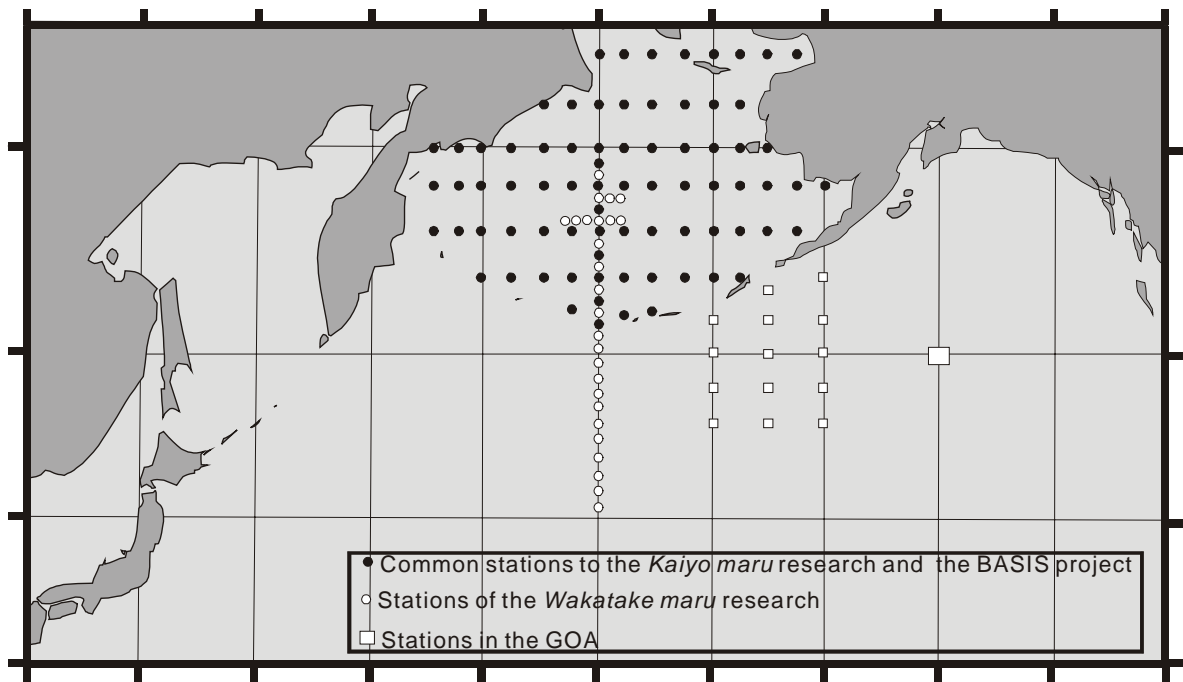


Figure 1. Research stations in the Bering Sea, the central North Pacific, and the Gulf of Alaska by the R/V *Kaiyo maru* and the R/V *Wakatake maru* in 2002. The R/V *Kaiyo maru* may conduct at stations in the Bering Sea and the Gulf of Alaska, and the R/V *Wakatake maru* may conduct at stations along 180° longitude transect and in the Bering Sea.