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**Trawl Survey Plan for Pacific Salmon Marine Life Period Studies in North
Pacific Subarctic Frontal Zone in Winter-Spring 2011**

by

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Subarctic Frontal Zone in Winter-Spring 2011**

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ABSTRACT

The trawl survey plan of R/V “TINRO” (TINRO-Centre) for Pacific salmon marine life period studies in North Pacific Subarctic Frontal Zone during February, 15 - April, 15 2011 is presented. The major objectives of the survey are: 1) determination of the current state of Pacific salmon in the pelagic ecosystems of the Pacific waters; 2) elucidation of Pacific salmon position and role in the trophic structure of the epipelagic zone; 3) evaluation of pelagic ecosystems status, as well as oceanic and overall ecological conditions in the Pacific waters in winter-spring of 2011, 4) estimation of salmon mortality during fall-winter period.

The outline of materials, methods, surveys timing and theoretical background are provided.

INTRODUCTION

The researches in winter-spring period in the North Pacific Ocean are allowed to estimate abundance of Pacific salmon juveniles (considered in autumn cruises), to define their oceanic mortality, to determine salmon spatial differentiation, to study conditions of winter dwelling of fishes. Such researches have been conducted in the western part of Subarctic front on the R/V “TINRO” in winter-spring 2009 and 2010. The researches in winter-spring period of 2011 are a logical continuation of previous studies.

METHODOLOGY OF STUDIES

All surveys will be conducted by TINRO-Centre’ vessels using uniform methods and approaches. Trawlings are carried out by the standard midwater trawl, model RT/TM 80/376 m fished with four 120 m bridles. Heavy orbicular midwater trawl doors, each one of 6 sq.m, are used. Depending on towing speed the vertical spread of the trawl is 32-42 m and horizontal spread is 30-34 m. At each station the net is towed for 1 hour. The net is towed at about 4.5-5.0 kts with the headrope located at the surface (fixed layer - 0 m), particularly at night. The length of warps is 250-310 m.

Each trawling is accompanied (before or after) by the collection of plankton samples.

Samples for fish and squid diet studies are taken from the catch of every trawling and these samples undergo on-board processing. The processing of all samples is carried out by means of express methods of analysis that were developed by TINRO-Center. Intensification of research on caloric content of food items and their isotope composition will provide further insights into understanding of Pacific salmon biological environment.

Hydrological studies are conducted during the whole period of the survey by means of hydrological probe Neil-Brown or by ICTD. The data is recorded for the fixed layer 0-1000 meters and for the areas with the depth less than 1000 meters – down to the bottom.

SURVEYS OBJECTIVES AND TASKS

Pacific salmon studies in the wintering area (Subarctic frontal zone of North Pacific) were planned in accordance with comprehensive ecosystem research plans of Russia. The major purpose of these studies is the determination of environment conditions and state of Pacific salmon during the less favorable period of their marine life cycle. In 2011 the studies on salmon distribution, salmon food selectivity, dependence of salmon feeding on biomass and composition of plankton and nekton communities, changes of biological condition of salmon during winter, salmon spatial distribution, population structure of stocks contributing to the mixture and the influence of abiotic environment upon the salmon quantitative allocation and migrations are planned.

The major objectives of the survey are: 1) determination of the current state of Pacific salmon in the pelagic ecosystems of the Pacific waters; 2) elucidation of Pacific salmon position and role in the trophic structure of the epipelagic zone; 3) evaluation of pelagic ecosystems status, as well as oceanic and overall ecological conditions in the Pacific waters in winter-spring of 2011, 4) estimation of salmon mortality during fall-winter period.

Achievement of these objectives will be accomplished through the fulfillment of the following tasks:

1) carrying out of trawl survey of epipelagic zone in the western area of the Subarctic frontal zone for estimation of Pacific salmon and other nekton species abundance and biomass. Assessment of their biological condition and spatial distribution patterns, size and age composition of stocks and their mixtures. Sampling for feeding studies.

2) carrying out of plankton survey of epipelagic zone for collection of data on plankton communities composition and structure, salmon and mass nekton species feeding environment; description and development of nektonic communities trophic structure models.

- 3) carrying out of hydrological survey for evaluation of climate-oceanic conditions.
- 4) carrying out of acoustic survey for estimation of Pacific salmon abundance, biomass and vertical distribution.

LOCATIONS AND PERIOD OF SURVEYS

The cruise of research vessel "TINRO" begins in port of Vladivostok in February 15. In February-April, R/V "TINRO" will be conducted studies in the western area of the North Pacific waters (Fig. 1). Two daily stations including trawlings, fish diet analysis, plankton samplings and hydrological studies in each 40-m layer down to 1000 m are planned.

PARTICIPATING SCIENTISTS

Scientific field party will include 14 persons: 7 ichthyologists, 4 hydrobiologists, 2 hydrologists and 1 acoustician.

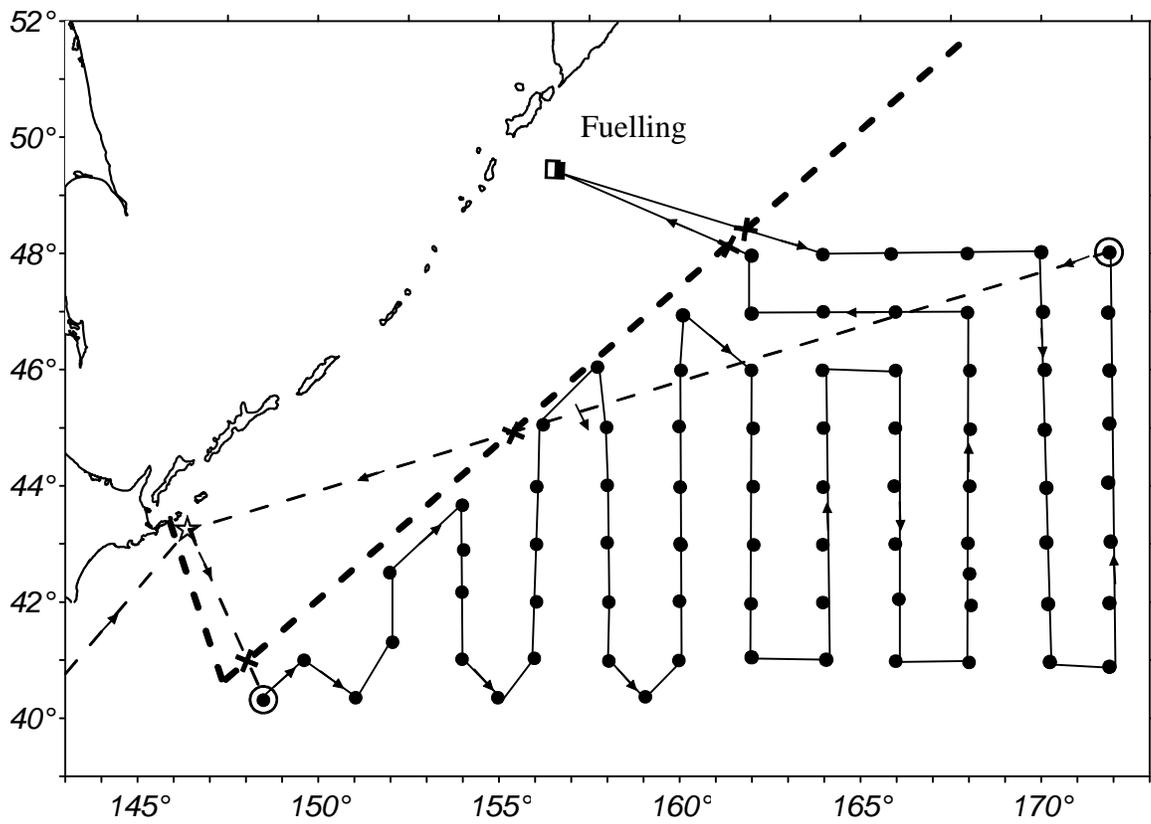


Figure 1. Proposed trawl survey stations for the research cruise in the western Subarctic frontal zone on board the R/V *TINRO*, February, 15 -April,15, 2011.