

NPAFC  
Doc. 1457  
Rev. \_\_\_\_\_

**Trawl Survey Plans for Pacific Salmon Marine Life Period Studies in the Far  
Eastern Seas in summer and fall 2013 by Russia**

by

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Submitted to the

**NORTH PACIFIC ANADROMOUS FISH COMMISSION**

by

Russia

March 2013

**THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:**

Temnykh O.S., Starovoytov A.N., and Zavolokin A.V. 2013. Trawl Survey Plans for Pacific Salmon Marine Life Period Studies in the Far Eastern Seas in summer and fall 2013 by Russia. NPAFC Doc. 1457. 6 pp. (Available at <http://www.npafc.org>).

# **Trawl Survey Plans for Pacific Salmon Marine Life Period Studies in the Far Eastern Seas in summer and fall 2013 by Russia**

## **ABSTRACT**

The document summarizes trawl survey plans for Pacific salmon marine life period studies in the Far Eastern Seas in summer and fall 2013 by Russia (TINRO-Center). The outline of materials, methods, surveys timing and theoretical background are provided.

## **INTRODUCTION**

Pacific salmon marine life period studies are planned in accordance with “Russian Pacific Salmon Research Program for 2010-2014 Period” (NPAFC Doc 1231). Surveys plan for Pacific salmon research in 2013 is a logical continuation of previous studies on salmon marine ecology. It is based on proven methods and approaches for assessment of salmon abundance, biological condition, spatial distribution patterns, size and age composition and others (NPAFC Doc 645, 682, 901, 985 and others).

In last years the abundance of many Russian salmon stocks (especially some stocks of pink and chum salmon) has increased. In 2005-2012, the total catch of Pacific salmon by Russia was at 260-542 th. ton. In this year salmon abundance is expected to be also high. Continuation of salmon studies in main areas of their habitat will let us to estimate the dynamic of their distribution, abundance, body size, feeding habits, and other features and to improve our knowledge of salmon ecology.

In 2013 Russia will continue monitoring of the state of the Bering Sea, Okhotsk Sea, and Pacific waters off Kuril and Commander Islands ecosystems. The studies on salmon distribution, food habits, dependence of salmon feeding on biomass and composition of plankton and nekton communities, changes of biological condition of fishes during the foraging, salmon spatial differentiation, structure of stocks contributing to the mixture and the influence of abiotic environment upon the salmon quantitative allocation and migrations are planned. One of the goals of these studies is the estimation of Pacific salmon survival/mortality at the different stages of marine life period.

## **METHODOLOGY OF STUDIES**

Surveys will be conducted by vessels of TINRO-Center (“TINRO” and “Professor Kaganovsky”) using uniform methods and approaches. Trawlings of R/V “TINRO” and “Professor Kaganovsky” are carried out by the standard midwater trawl, model RT/TM 80/396 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 using the Jeday net. 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. 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 and 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.

### **I. CRUISE PLAN FOR PACIFIC SALMON MARINE PERIOD OF LIFE RESEARCH DURING THEIR ANADROMOUS MIGRATIONS**

#### **SURVEYS OBJECTIVES AND TASKS**

Studies during Pacific salmon anadromous migrations are planned in the Pacific waters off Kuril Islands as well as in the western Bering Sea and Pacific waters off eastern Kamchatka.

The major purpose of these studies is the estimation of anadromous Pacific salmon abundance and biomass for short-term forecasting of their returns and possible catch. The studies on salmon distribution, salmon food habits, dependence of salmon feeding on biomass and composition of plankton and nekton communities, changes of biological condition of salmon during the anadromous migrations and foraging, salmon spatial differentiation, structure of stocks contributing to the mixture and the influence of abiotic environment upon the salmon quantitative allocation and migrations are planned.

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 Pacific waters off Kuril Islands for estimation of mature and immature Pacific salmon and other nekton species abundance and biomass, assessment of their biological condition and spatial distribution patterns, size and age composition of stocks, sampling for feeding studies.

2) carrying out of trawl survey of epipelagic zone in the western Bering Sea and Pacific waters off eastern Kamchatka for estimation of mature Pacific salmon and other nekton species abundance and biomass, assessment of their biological condition and spatial distribution patterns, size and age composition of stocks, sampling for feeding studies.

3) 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.

4) carrying out of hydrological survey for evaluation of climate-oceanic conditions of the Pacific waters off Kuril Islands and in the western Bering Sea and Pacific waters off eastern Kamchatka.

Research vessels “TINRO” and “Professor Kaganovsky” are planned to study Pacific salmon anadromous migrations.

### **LOCATIONS AND PERIOD OF SURVEY**

The salmon studies of research vessels “TINRO” and “Professor Kaganovsky” will begin in the Pacific waters and in the western Bering Sea in summer – from June to early July (Figure 1, 2).

### **PARTICIPATING SCIENTISTS**

Scientific field party will include 17 persons on R/V “Professor Kaganovsky” (8 ichthyologists, 4 hydrobiologists, 3 hydrologists, 2 acousticians) and 16 persons on R/V “TINRO” (8 ichthyologists, 3 hydrobiologists, 3 hydrologists, 2 acousticians).

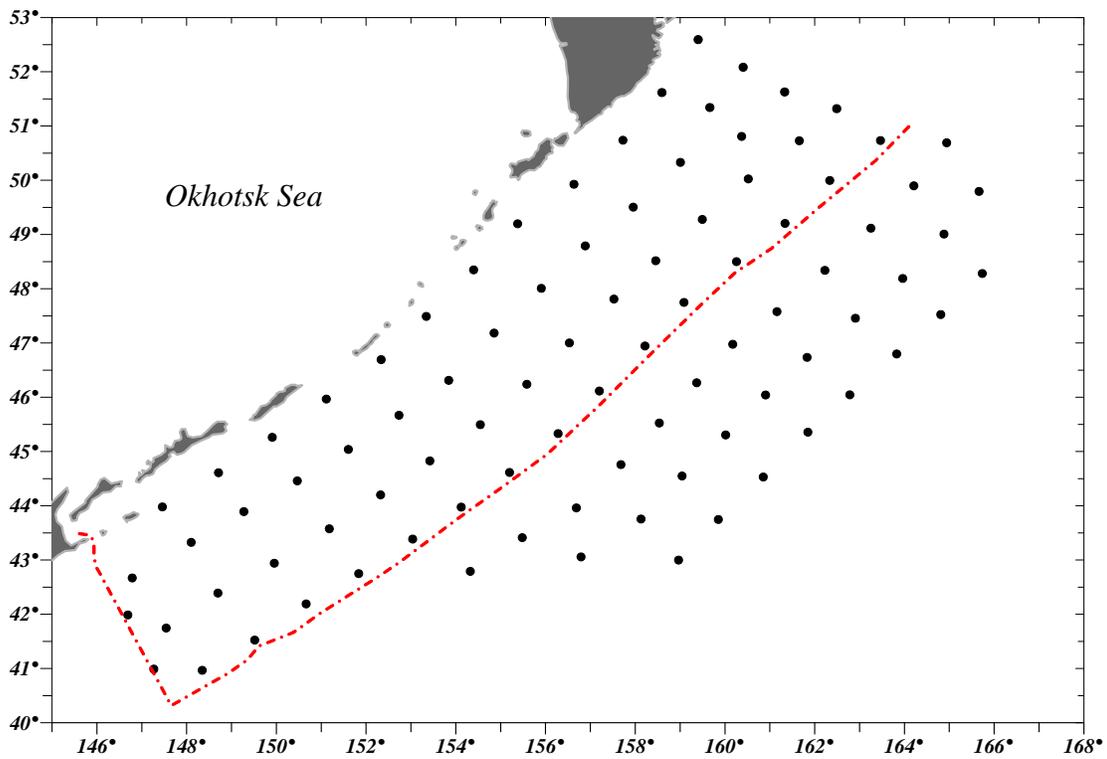


Figure 1. Station locations to be sampled by the standard comprehensive survey of the upper epipelagic layer of the Pacific waters off Kuril Islands by RV “TINRO” according to TINRO-Center plan for June-July, 2013. Red line is the border of Russian EEZ

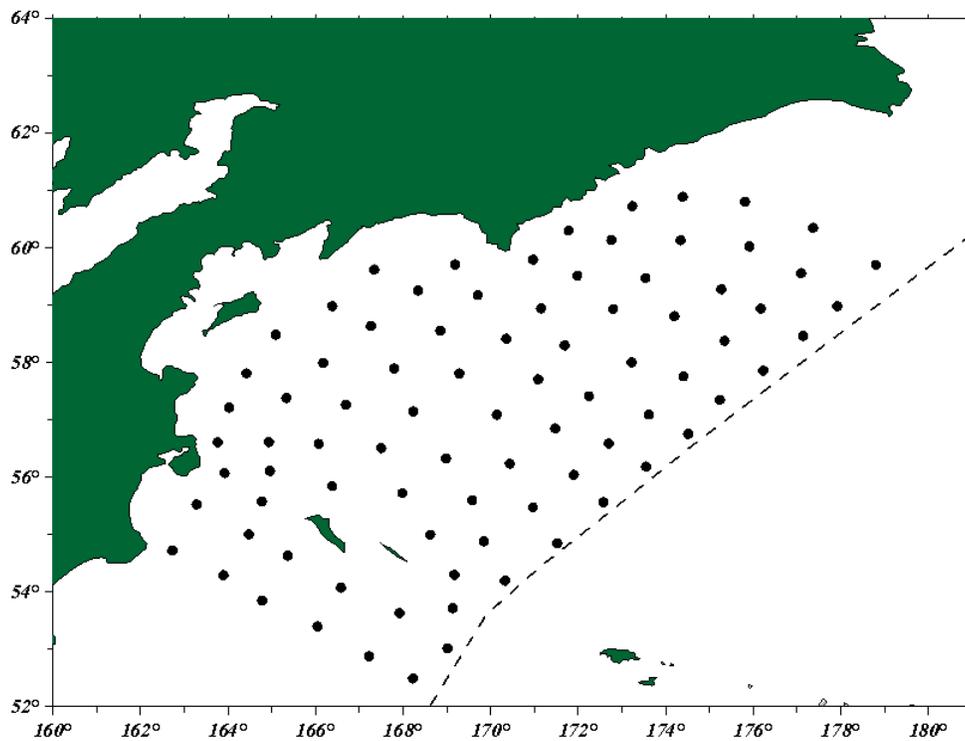


Figure 2. Station locations to be sampled by the standard comprehensive survey of the upper epipelagic layer of the Pacific waters and in the western Bering Sea in summer by RV “Professor Kaganovsky”

## **II. CRUISE PLAN FOR PACIFIC SALMON MARINE PERIOD OF LIFE RESEARCH DURING THEIR CATADROMOUS MIGRATIONS**

### **SURVEYS OBJECTIVES AND TASKS**

Studies during Pacific salmon catadromous migrations are planned in the Bering, Okhotsk Seas and adjacent waters. The major purpose of these studies is the estimation of catadromous Pacific salmon abundance and biomass for forecasting of their returns and possible catch in the next years. The studies on salmon distribution, salmon food habits, dependence of salmon feeding on biomass and composition of plankton and nekton communities, changes of biological condition of salmon during the catadromous migrations and foraging, salmon spatial differentiation, structure of stocks contributing to the mixture and the influence of abiotic environment upon the salmon quantitative allocation and migrations are planned.

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 Bering Sea, southern Okhotsk Sea and pacific waters off eastern Kamchatka for estimation of juvenile and immature Pacific salmon and other nekton species abundance and biomass, assessment of their biological condition and spatial distribution patterns, size and age composition of stocks, 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 of the western Bering Sea, southern Okhotsk Sea and pacific waters off eastern Kamchatka.

Studies of Pacific salmon during their catadromous migrations will be conducted by R/V “TINRO”.

### **LOCATIONS AND PERIOD OF SURVEY**

Studies during Pacific salmon catadromous migrations will begin in the western Bering Sea and pacific waters off eastern Kamchatka in September and continue in the southern and central parts of Okhotsk Sea in October and November (Figure 3).

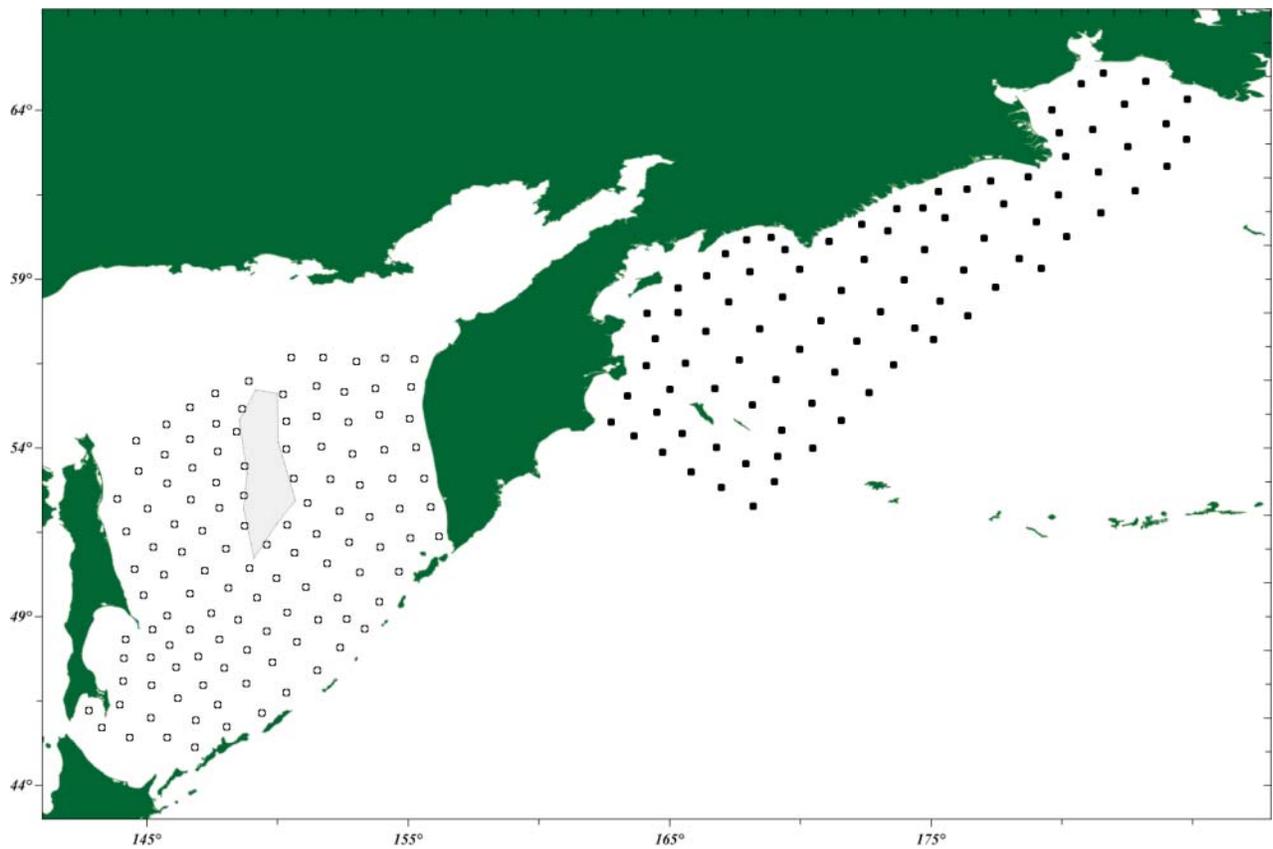


Figure 3. Station locations to be sampled by the standard comprehensive survey of the upper epipelagic layer of the western Bering Sea (September and October ) and in the southern Okhotsk Sea (October and November )by RV “TINRO”.

### **PARTICIPATING SCIENTISTS**

Scientific field party will include 17: 8 ichthyologists, 4 hydrobiologists, 3 hydrologists and 2 acousticians (preliminary).