



CCAMLR

COMM CIRC 10/71
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Martes, 6 Julio 2010

Propuesta de investigación científica a realizarse en 2010/11 - Japón

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**A TODOS LOS MIEMBROS DE LA COMISIÓN
Y DEL COMITÉ CIENTÍFICO**

**COMM CIRC 10/71
SC CIRC 10/40**

Hobart, 6 de julio de 2010

Propuesta de investigación científica a realizarse en 2010/11 – Japón

De conformidad con la Medida de Conservación 24-01, se comunica a los miembros que Japón ha presentado una notificación (adjunta) para continuar sus investigaciones científicas en las Divisiones 58.4.4a y 58.4.4b en 2010/11. Se propone efectuar un estudio sobre el estado y las características biológicas del stock de *Dissostichus* spp., con un palangrero comercial. Se prevé una captura de *Dissostichus* spp. de 78 a 114 toneladas.

Esta notificación fue presentada por Japón a WG-SAM (WG-SAM-10/15) de acuerdo con el párrafo 3 de la Medida de Conservación 24-01, y el plan de investigación será considerado por el WG-SAM y el Comité Científico.

Andrew Wright
Secretario Ejecutivo

Adj.

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WG-SAM-10/15
2 July 2010
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Title **RESEARCH PLAN FOR TOOTHFISH IN DIVISION 58.4.4 A & B
BY SHINSEI MARU NO. 3 IN 2010/11**

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Published or accepted for publication elsewhere? Yes ☐ No ☒

If published, give details

ABSTRACT

In order to clarify the stock status and biological characteristics of *Dissostichus* spp. in Division 58.4.4 a & b, we submit this research plan for toothfish in the Division by *Shinsei Maru* No. 3 to be conducted in April-June 2011. This is the second year of the survey of the 3-5 years consecutive research focusing on tagging program, recommended by WG-SAM-09 in this Division, following the first survey conducted in 2009/10 season, when total sample size for *Dissostichus* spp. was allowed as 60,000 kg. The research hauls are allocated on 10-minute latitude x 20-minute longitude grid points, taking into account the need to deploy research hauls and tagging releases evenly throughout the survey area in the same manner as 2009/10 survey. A Trot line system will be employed for all hauls. To apply the mark-and-recapture studies, sufficient tagging rate of 5 fish / ton will be conducted in the same manner as the 2009/10 survey. We calculated the two values (78 and 114 tonnes) of total allowable sample size for the 2010/11 survey, taking into account the need for completion of the survey and impact on the fish stock, and will take advices for the method of estimations in the WG-SAM-10 meeting.

SUMMARY OF FINDINGS AS RELATED TO NOMINATED AGENDA ITEMS

Agenda Item	Findings
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3	N/A
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This paper is presented for consideration by CCAMLR and may contain unpublished data, analyses, and/or conclusions subject to change. Data in this paper shall not be cited or used for purposes other than the work of the CCAMLR Commission, Scientific Committee or their subsidiary bodies without the permission of the originators and/or owners of the data.

Research plan for toothfish in Division 58.4.4 a & b by Shinsei Maru No. 3 in 2010/11

Format 2

5

FORMAT FOR REPORTING PLANS FOR FINFISH SURVEYS IN ACCORDANCE WITH PARAGRAPH 3 OF CONSERVATION MEASURE 24-01

10 CCAMLR MEMBER _Japan

SURVEY DETAILS

A statement of the planned research objectives

15 In order to clarify the stock status and biological characteristics of *Dissostichus* spp.
in Division 58.4.4 a & b, we submit this research plan for toothfish in the Division by
Shinsei Maru No. 3 to be conducted in April-June 2011. This is the second year of the
survey of the 3-5 years consecutive research focusing on tagging program, recommended
by WG-SAM-09 in this Division, following the first survey conducted in 2009/10 season,
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fish/ton will be conducted in the same manner as the 2009/10 survey. We calculated
25 the two values (78 and 114 tonnes) of total allowable sample size for the 2010/11 survey,
taking into account the need for completion of the survey and impact on the fish stock,
and will take advices for the methods of estimations in the WG-SAM-10 meeting.

Survey Area/Subarea/Division: Division 58.4.4a & 58.4.4b (Fig.1)

30

Geographical Boundaries:

SSRU A (Lat: 51°S - 54°S, Long: 40°E - 42°E)

SSRU B (Lat: 51°S - 54°S, Long: 42°E - 46°E)

SSRU C (Lat: 51°S - 54°S, Long: 46°E - 50°E)

35 SSRU D (Whole division excluding SSRUs A, B and C)

Is a map of area surveyed (preferably including bathymetry and positions of sampling stations/hauls) appended to the format? Yes, the map and positions of hauls are appended in Fig. 2

5 Proposed dates of survey: from 2011 April to June (1.5 - 2 months)

Name(s) and address of the chief scientist(s) responsible for planning and coordinating the research: Dr. Kenji Taki

Oceanic Resources Division

10 National Research Institute of Far Seas Fisheries

2-12-4 Fukuura, Kanazawa, Yokohama, Kanagawa 236-8648, JAPAN

TEL: +81-45-788-7500, E-mail: takisan@fra.affrc.go.jp

Number of scientists 2 and crew 30 to be aboard the vessel.

15

Is there opportunity for inviting scientists from other Members? No due to space limitation

If so, indicate a number of such scientists 0

20 DESCRIPTION OF VESSEL

Name of vessel: Shinsei Maru No.3

Name and address of vessel owner Name : TAIYO A&F CO.,LTD.

25 Address: 4-5, Toyomi-cho, Chuo-ku, Tokyo, Japan 104-0055

Vessel type (dedicated research or chartered commercial vessel): Voluntary commercial fishing vessel

Port of registration: Yaizu, Shizuoka Registration number: 128862

30 Radio call sign: JAAL Overall length: 47.2 (m)

Tonnage: 495 ton

Equipment used for determining position: GPS FURUNO GP500MK2

Fishing capacity (limited to scientific sampling activities only or commercial capacity):

35 10 (ton/day)

Fish processing capacity (if vessel type is commercial): 10 (ton/day)

Fish storage capacity (if vessel type is commercial): 553 (m3)

DESCRIPTION OF FISHING GEAR TO BE USED

5 Longline: Shinsei Maru Trot line system

Other sampling gear as plankton nets, CTD probes, water samplers, etc.
(specify): Compact temperature/depth recorders (down to a depth of 2000m)

10 DESCRIPTION OF ACOUSTIC GEAR TO BE USED

Type: JRC JFV-250 Frequency: 28kHz/50kHz

SURVEY DESIGN AND METHODS OF DATA ANALYSES

15

Survey design (random, semi-random): Grid design as detailed in the appended 'APPLICATION TO UNDERTAKE SCIENTIFIC RESEARCH IN CCAMLR DIVISION 58.4.4 IN THE 2010/11 SEASON'

20 Target species: Dissostichus spp. (Dissostichus eleginoides and D. mawsoni)

Stratification (if any) according to:

Depth zones (list) N/A:

Fish density (list) N/A

25 Other (specify) N/A

Duration of standard sampling stations/hauls (preferably 30 min): Soak time of not less than six hours

Proposed number of hauls: 113 hauls

30 Proposed sample size (total): undecided

Proposed methods of survey data analyses (i.e. swept area method, acoustic survey)
Swept area method and mark-and-recapture analysis

DATA TO BE COLLECTED

35 Haul-by-haul catch and effort data in accordance with CCAMLR Form C4 for reporting results of fishing for research purposes: Dissostichus spp.

Fine-scale biological data in accordance with CCAMLR Forms B1, B2 and B3:

B2 and Longline observer data: *Dissostichus spp.*

Other data (as applicable) (see application for more details)

- 5 (*Macrourus spp.*) : 30 fish/line for length and weight measurement
 (Other by-catch species): 10 fish/line for length and weight measurement
 Tagging of *Dissostichus spp.*: 5 fish/ton
 Dissostichus spp.: Otoliths for ageing
Vulnerable Marine Ecosystems: Information on benthos taken

10

APPLICATION TO UNDERTAKE SCIENTIFIC RESEARCH IN CCAMLR DIVISION 58.4.4 IN THE 2010/11 SEASON

CCAMLR MEMBER: JAPAN

5 Abstract

In order to clarify the stock status and biological characteristics of *Dissostichus* spp. in Division 58.4.4 a & b, we submit this research plan for toothfish in the Division by *Shinsei Maru No. 3* to be conducted in April-June 2011. This is the second year of the survey of the 3-5 years consecutive research focusing on tagging program, recommended
10 by WG-SAM-09 in this Division, following the first survey conducted in 2009/10 season, when total sample size for *Dissostichus* spp. was allowed as 60,000 kg. The research hauls are allocated on 10-minute latitude x 20-minute longitude grid points, taking into account the need to deploy research hauls and tagging releases evenly throughout the survey area in the same manner as 2009/10 survey. A Trot line system will be employed
15 for all hauls. To apply the mark-and-recapture studies, sufficient tagging rate of 5 fish / ton will be conducted in the same manner as the 2009/10 survey. We calculated the two values (78 and 114 tonnes) of total allowable sample size for the 2010/11 survey, taking into account the need for completion of the survey and impact on the fish stock, and will take advices for the method of estimations in the WG-SAM-10 meeting.

20

Introduction

Longline fishery in 58.4.4 a & b started in 1997/98 season by South Africa and Ukraine. In 2002/03 season, the direct fishing of *Dissostichus* spp. was prohibited in this Division, based on concern that this area is believed to have been subject to high
25 levels of IUU fishing and that more information is needed about the states of *D. eleginoides* stocks in this area before any further fishing is allowed (SC-CCAMLR-XXI, paragraph 4.106). Since the catch prohibition in 2002/03 season, one survey was undertaken by *Shinsei Maru No. 3* in 2007/08 season in this Division.

The WG-SAM-09 recommended the consecutive research focusing on tagging program
30 for a period of 3-5 years to estimate current stock size accurately in this Division (SAM report paragraph 2.3.20). According to the decision in the 28 CCAMLR Meeting of the Commission (28 CCAMLR report paragraph 4.43), the first survey by *Shinsei Maru No.3* was conducted in April-June 2010. We propose this plan on the second year of the consecutive research for 3-5 years in the Division by *Shinsei Maru No. 3* in April-June
35 in 2011.

Research proposal

1) Objectives

The primary objective of this research is to clarify the current stock status of *Dissostichus* spp. in Division 58.4.4 a & b, and to collect various biological information such as distribution, migration and population structure of these species over their whole habitats in the Division. To this end, the grid-based survey including concentrated tagging activities will be conducted. Secondly, to evaluate the habitat for *Dissostichus* spp. in the Division 58.4.4 a & b, bottom topography will be examined over the grid points.

2) Methods

2-1) Allocated points and proposed sample size

The research will be conducted using a commercial fishing vessel, *Shinsei Maru No. 3* from April to June, 2011 (1.5 – 2 months). The proposed survey covers all of the four SSRUs rather than concentrating the research / sampling efforts on a subset of the Division during 3-5 year consecutive surveys to obtain reliable stock estimate in the whole Division. Another reason is to avoid predation and loss of tagged fish caused by predators such as sperm whales and killer whales. If these predators occur around the vessel (*Shinsei Maru No. 3*), the vessel has to move great distances to escape from them as we experienced in the 2007 / 08 and 2009 / 09 surveys. The small subset of the area is not large enough to avoid the predation and to implement proposed research successfully. Thus, to clarify the accurate stock status and collect biological information on toothfish, the proposed survey covers all of the four SSRUs, and a total of 113 research hauls are allocated on 10-minute latitude x 20-minute longitude grid points (spaced approximately 10 nautical miles apart; Fig. 1). Location of such 113 points is identical with the location of the points in 2009/10 survey, except that four grid points allocated on the outer margin of SSRU D in the research plan in 2009/10 season will be omitted in the 2010/11 survey. This is because these four points and adjacent areas are confirmed to be clearly deeper than 2,000 m where the vessel cannot operate safely. The Trot line system has a total of 200 vertical droppers with 25 hooks per dropper, thus 5,000 hooks in total will be used per line. Distance between droppers is 45 m, thus the length of longline will be 9,000 m. The line formation is equal to that in the 2009/10 survey. In each haul, the longline gear will be set so that the gear will pass through the allocated grid point at any of its portion.

We calculated the two values of total allowable sample size of *Dissostichus* spp. for the 2010/11 survey, taking into account following the three factors.

(1) Need for completion of the proposed survey plan (113 research hauls):

In the 2009/10 season, the survey was finished at the 94th allocated point in 20th June because the total catch amounted to nearly 60 tonnes. CPUE in terms of weight for 71 hauls where only Trot line system was adopted was 0.139 ± 0.099 kg / hook (mean \pm SD; or 0.695 ± 0.495 kg / haul) . If the survey is conducted for all fishable allocated 113 points using only Trot line system, total catch of 78 tonnes (0.695×113) will be expected.

(2) Impacts on the stock status

An approximate spawning stock biomass level of *Dissostichus* spp. in the Division 58.4.4 a & b was estimated using the R-code program on comparative CPUE analysis (Agnew et al. Pers. Comm. 2009). According to the program, the current biomass (B_x) in target area x (Division 58.4.4) can be expressed: $B_x = I_x A_x B_R / q_{Rx} I_R A_R$, where I is the CPUE index, A is the toothfish-habitable seabed area, q_{Rx} is the relative efficiency of the gear in the target area x (Division 58.4.4) relative to the reference area R (Division 48.4), and B_R is the reference area biomass estimate. According to the sub-area 48.4 information in Roberts and Agnew (2009; WG-FSA-09-18) and Agnew pers. comm., B_R , I_R and A_R are 974 ton, 0.13 kg / hook ($CV=35\%$ based on WG-FSA-09-17) and 2,955 mi², respectively. I_x is 0.139 kg / hook, $SD=0.099$ kg / hook; $SE=0.012$ kg / hook; $CV=8.4\%$, which was estimated for 2009/10 season. A_x is 14,909 mi² corresponding to area < 2,000 m within the Division 58.4.4 (Table 1). q_{Rx} is 1.85, which corresponds to mean CPUE ratio in weight of Trot line system to Spanish line system (Taki et al. 2010).

As a result, the estimated spawning stock biomass in the Division 58.4.4 are calculated as follows: $B_x = (0.139 \text{ kg / hook} \times 14,909 \text{ mi}^2 \times 974 \text{ ton}) / (1.85 \times 0.13 \text{ kg / hook} \times 2,955 \text{ mi}^2) = 2,838 \text{ ton}$

We assume that the current spawning stock biomass is < 40 % of SSB_0 , referring to an Australian researcher's viewpoint in the SC-CAMLR meeting in 2009. Thus, SSB_0 is estimated to be > 7,096 ton ($2,838 \text{ ton} \times 100\% / 40\%$). When the exploitation rate is 1.6 % which an Australian researcher proposed in the SC-CAMLR meeting in 2009 is applied, sample size is calculated to be > 114 ton ($7,096 \text{ ton} \times 1.6\%$).

(3) Expected no. of recapture and CV of population estimate between the three sample sizes (tagging rate: 5 fish /ton)

When sample size is 60 ton (same as total allowable catch in the 2009/10 season) with tagging rate of 5 fish /ton in the 2010/11 season onward, expected number of

recapture of tagged fish in the previous year will be 5.0 individuals (60 ton x 5 fish / ton x $\text{Exp}(-0.13(M-1)(\text{Tag}M))$ x 2.1 % (exploration rate: 60 ton / 2,838 ton)). When over-dispersion value is applied to be 2, *CV* will be 0.53 in case sample size is 60 ton (Hillary, 2008; Table 1).

When sample size is 78 ton with tagging rate of 5 fish /ton in the 2010/11 season onward, expected number of recapture of tagged fish in the previous year will be 8.5 individuals (78 ton x 5 fish / ton x $\text{Exp}(-0.13(M-1)(\text{Tag}M))$ x 2.7 % (78 ton / 2,838 ton)). When over-dispersion value is applied to be 2, *CV* will be 0.43 in case sample size is 78 ton (Table 1).

When sample size is 114 ton with tagging rate of 5 fish /ton in the 2010/11 season onward, expected number of recapture of tagged fish in the previous year will be 18.0 individuals (114 ton x 5 fish / ton x $\text{Exp}(-0.13(M-1)(\text{Tag}M))$ x 4.0 % (114 ton / 2,838 ton)). When over-dispersion value is applied to be 2, *CV* will be 0.31 in case sample size is 114 ton (Table 1). Hillary (pers comm) indicated that values of dispersion around the level of 2 are expected for toothfish and recommended that the expected *CV* should not approach 0.5 when the level of dispersion equals to 2. Therefore, adoption of this case is thought to be more appropriate for the biomass estimate

In conclusion, total allowable catch of 78 tonnes are needed to complete the proposed survey plan. However, that of 114 tonnes are thought to be precautionary value taking into account the impact on the stock, and more appropriate value taking into account the mark and recapture analyses, compared to the smaller catches.

2-2) Collection of Data and Specimen

[Biological measurement (toothfish: species, length, weight, sexual maturity, stomach contents, otolith, etc.)]

For all individuals of *Dissostichus* spp. caught, species and sex will be identified and body length will be measured and recorded along with the sampled depths and gear types. The weight, stomach content and otolith of 30 fish will also be recorded for each haul. The 30 sample fish will be carefully selected in terms of their size, so that this 30 sample would accurately represent the whole fish caught in a haul. The age and growth study with otoliths is expected to explain the peculiar sex ratio found in the previous survey.

[Environmental data]

The detailed bottom configuration will be recorded with the marine navigation

software (MaxSea). As the information is essential for abundance estimation, the whole area, especially those areas unsurveyed in previous surveys, will be covered. The compact temperature/depth recorder (maximum depth: 2,000m) will be attached to the gear.

5

[By-catch species]

1) Measurements will be the same as in the first survey.

10 *Macrourus* spp were the major by-catch species in the first survey. Up to 30 fish will be measured for each haul. The coordinates and depth of the center of the line will be recorded.

For the other by-catch species, up to 10 fish will be measured for each haul. The coordinates and depth of the center of the line will be recorded.

15 For benthos, species identification (Scleractinia, Alcyocea, Phylum Porifera, Class Holothuroidea, Asteroidea, Ophiuroidea, Bryozoa), volume, coordinates, and depth will be recorded and photographic image will be taken as many as possible.

2) Effects on seabirds

Every effort will be taken during the survey to reduce any negative effect on seabirds and marine mammals in the survey area.

20

3) Reports and analysis

Various biological data as well as set-by-set catch and effort data (C4) will be provided to CCAMLR for evaluation of toothfish resources. The summary cruise report and the final report will also be presented to the CCAMLR SC 2011.

25

Reference

Hillary R. M. (2008) Defining tag rates and TACs to obtain suitably precise abundance estimates for new and exploratory fisheries in the CCAMLR Convention Area. WG-SAM/08/06.

30 SC-CAMLR-XXIII, 2009. REPORT OF THE WORKING GROUP ON FISH STOCK ASSESSMENT.

Taki K, Kiyota M and Ichii T. (2010) Preliminary reports on abundance and biological information on toothfish in the eastern area of Division 58.4.4 a & b by *Shinsei maru No. 3* in 2009/10 season. WG-SAM/10.

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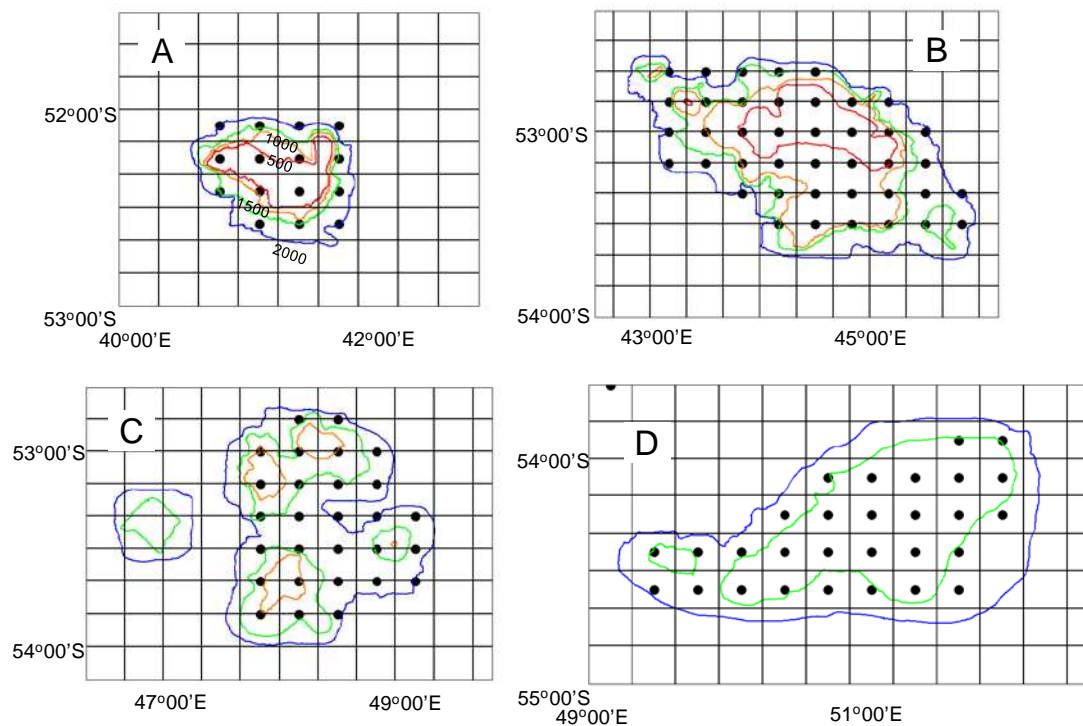


Fig. 1. Allocated locations (*113* grid points) for longline survey in SSRUs A-D in 58.4.4 a & b in 2010/11 season.

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Table 1. Expected number of recapture and *CV* of population estimate in the 2010/11 season and onward between the three sample sizes (tagging rate: 5 fish /ton)

	114 ton	78 ton	60 ton
Expected no. of recapture of tagged fish in the previous year	18.0 indiv.	8.5 indiv.	5.0 indiv.
<i>CV</i> of population estimate at over-dispersion value of 2	0.31	0.43	0.53

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