

SC/68B/ASI/14

Outline of the research plan for Japans
dedicated cetacean sighting surveys in the
western North Pacific Ocean in summer
2020

Takashi Hakamada, Megumi Takahashi, Koji
Matsuoka and Tomio Miyashita



INTERNATIONAL
WHALING COMMISSION

Outline of the research plan for Japan's dedicated cetacean sighting surveys in the western North Pacific Ocean in summer 2020

Takashi Hakamada¹, Megumi Takahashi¹, Koji Matsuoka¹ and Tomio Miyashita²

¹*Institute of Cetacean Research, Toyomi-cho 4-5, Chuo-ku Tokyo 104-0055, Japan*

²*National Research Institute of Far Seas Fisheries, Japan Fisheries Research and Education Agency, 5-7-1 Orido, Shimizu, Shizuoka, Shizuoka 424-8633 Japan*

Contact e-mail: hakamada@cetacean.jp

ABSTRACT

This document outlines the plan for a systematic vessel-based sighting survey in the North Pacific in 2020. The main objective of this survey is to estimate the abundance of large whale species in the western North Pacific Ocean for appropriate management and conservation of stocks. The survey will be conducted using the research vessels *Yushin-maru No. 1 (YS1)*, *Yushin-maru No. 3 (YS3)* and *Kaiyo-maru No. 7 (KY7)* in August-September 2020, and will cover the area comprised between 35°-48°N, 140°-170°E including the coast of Japan. For more precise abundance estimation of whales, distance and angle estimation experiments will be conducted. Furthermore, biopsy skin samples of large whale species will be collected on an opportunistic basis. Photo-identification experiments on blue, North Pacific right and humpback whales, and satellite tag experiment for fin and sei whales will be also conducted.

KEYWORDS: LARGE WHALES, SIGHTING SURVEY, NORTH PACIFIC

INTRODUCTION

In the western North Pacific dedicated cetacean sighting surveys have been conducted by the Institute of Cetacean Research (ICR) since 1995. The sighting surveys were based on the survey procedures of the International Whaling Commission/Southern Ocean Whale and Ecosystem Research (IWC/SOWER) and more recently International Whaling Commission/Pacific Ocean Whale and Ecosystem Research (IWC/POWER). Based on the collected data, the distribution pattern of large whales such as blue, fin, sei, Bryde's, common minke, humpback, right and sperm whales and abundance estimate of those whale species were investigated and reported to the IWC SC (IWC, 2001; 2010; 2016; Hakamada *et al.*, 2017; 2019). The National Research Institute of Far Seas Fisheries (NRIFSF) has also conducted dedicated sighting survey for cetaceans in the North Pacific since the 1980s (Buckland *et al.*, 1992; Miyashita and Kato, 2004; 2005).

Sighting surveys were conducted under the New Scientific Whale Research Program in the western North Pacific (NEWREP-NP) in 2018 and 2019 (Government of Japan, 2017; IWC, 2017).

As in the sighting surveys in 2018 and 2019, the surveys in 2020 are planned considering the following aspects:

- a) The use of the independent observer (IO) mode survey to estimate $g(0)$,
- b) The setting of the appropriate survey track order to avoid double-counting,
- c) The setting of temporal stratification based on information on the migration pattern of each target species/population.

As in previous surveys, the design, protocols and implementation of the 2020 surveys will follow the 'Requirements and Guidelines for Conducting Surveys and Analyzing Data within the Revised Management Scheme (RMS)' (IWC, 2012). Data collected in this survey will be used for abundance estimates, which is essential for appropriate conservation and management of large whales in the western North Pacific.

The objective of this paper is to outline the research plan for dedicated sighting surveys in the western North Pacific in summer 2020.

OUTLINE OF THE 2020 RESEARCH PLAN

Research vessels

The sighting surveys will be based on the research vessels *Yushin-maru No. 1 (YS1)*, *Yushin-maru No. 3 (YS3)* and *Kaiyo-maru No. 7 (KY7)* (Figure 1). These vessels are equipped with a top barrel platform (TOP),

independent observer platform (IOP) and upper bridge. The ICR research data collecting system is set on the vessels. Specifications of the vessels are shown in Table 1.

Research schedule

The sighting surveys will be conducted from August to September. The tentative survey itineraries for *YS1*, *YS3* and *KY7* are shown in Tables 2A, 2B and 2C, respectively. The planned numbers of research days are 56, 56 and 45 days for *YS1*, *YS3* and *KY7*, respectively.

Researchers on board and oversight person

Experienced researchers on line transect whale sighting surveys, biopsy sampling, photo-id and satellite tag experiments will be selected in each vessel. Koji Matsuoka (ICR) will be the responsible person for these surveys.

Research area and track line design

The research area will be covered by three survey blocks (south pelagic, north pelagic, and offshore including the coast of Japan) (Figure 2). The three blocks will cover the area comprised between 35°-48°N, 140°-170°E, avoiding foreign countries waters.

Table 3 shows the waypoints (WP) of each survey block. The *YS1* will start the survey at WP601 and will end at WP608 in the south pelagic block. The *YS3* will start the survey at WP701 and will end at WP709 in the north pelagic block, and *KY7* will start the survey at WP801 and will end at WP810 in the offshore block. All vessels will survey in ascending order of WP number.

The planned searching distances in each survey block are 1986.8, 1928.6 and 1981.8 n.miles in the south pelagic, north pelagic and offshore blocks, respectively. The start points of the track lines will be decided at random using the Distance program ver. 7.0 (Thomas *et al.*, 2010), and the number of lines (width in the longitude) is decided by the research schedule based on the IWC survey guideline (IWC, 2012).

Survey modes

Sighting activities will be classified into two principal types: ‘On-effort’ and ‘Off-effort’. On-effort means sightings activities executed under weather and sea state conditions considered acceptable. Off-effort means all activities that are not On-effort. All sightings to be recorded On-effort will be classified as ‘Primary sightings’. All other sightings will be classified as ‘Secondary sightings’. Sighting effort will be conducted by the boatswain and topmen from the top barrel (there will be always two primary observers on the top barrel) and the upper bridge where the helmsman, captain or officer on-watch, researchers, and the chief engineer (or second engineer) will be also present (always two primary observers and four secondary observers).

The sighting survey will be conducted using (1) Passing with abeam closing mode (NSP) and (2) Passing with Independent Observer mode (IO) in order to estimate whale abundance considering estimated $g(0)$. Both survey modes follow the protocol endorsed for the IWC/SOWER surveys (e.g. Matsuoka *et al.*, 2003; IWC, 2008).

Under NSP mode, there will be two primary observers on the TOP. These observers will search for cetaceans by using angle board and binoculars (7x), which include the distance estimate scales. Members of two observer teams on TOP will be fixed and will operate in one or two hours-shifts. There will be open communication between the upper bridge and the TOP. These observers report sighting information to researchers and other observers on the upper bridge for data recording.

Under IO mode, there will be two primary observers on the TOP and one primary observer on the IOP. These observers on TOP and IOP platforms will conduct searching for cetaceans by using angle board and binoculars (7x). Members of the two observer teams on TOP will be fixed and will operate in one or two hours-shifts. There will be no open communication between the IOP and the TOP. The observers on the upper bridge will communicate to the TOP (or IOP) independently, with the topmen required only to clarify information without distracting them from their normal search procedure. These observers report sighting-information to researchers and other observers on the upper bridge for data recording.

Experiments

Distance and angle measurement experiment consists of the following two steps. Distance and angle measurement training will be conducted at the first stage of the survey. The experiment to evaluate measurement error will be conducted at the last stage of the survey following the protocols for the IWC/SOWER cruise (IWC,

2008).

When large cetaceans such as blue, North Pacific right and humpback whales are found, photographs will be taken for photo-identification studies. Biopsy skin sampling of baleen whales will be collected on an opportunistic basis using Larsen system for investigating stock structure. Protocols for photo-id and biopsy sampling are similar to those used in the IWC-POWER surveys.

Satellite tag experiment will be conducted by all vessels. Target species will be the fin and sei whales.

DATA STORAGE

The researcher will input data collected (weather, effort, sighting and from experiments data) to the computer on board during the survey as was done for the previous surveys conducted by ICR (*e.g.* IWC-SOWER, JARPAII/JARPANII). These data will be stored at the ICR and provided to the IWC secretariat by Japan as an observer nation.

Scientists at the ICR will analyze the sighting data collected using the methods developed and modified by Hakamada *et al.* (2009), Matsuoka *et al.* (2011) and Okamura and Kitakado (2004). Collaboration work with NRIFS will be conducted for abundance estimation of cetaceans in the surveyed area.

ACKNOWLEDGEMENTS

We thank the Fisheries Agency of Japan (FAJ) for their support and funding of the sighting surveys in the North Pacific. Several colleagues from the ICR, NRIFS and FAJ assisted with technical suggestions during the preparation of the sighting survey outlined in this document. We also thank Luis A. Pastene for his assistance in preparing this report.

REFERENCES

- Buckland, S.T., Cattanach, K.L. and Miyashita, T. 1992. Minke whale abundance in the northwest Pacific and the Okhotsk Sea, estimated from 1989 and 1990 sighting surveys. *Rep. int. Whal. Commn* 42: 387-92.
- Government of Japan. 2017. Proposed Research Plan for New Scientific Whale Research Program in the western North Pacific (NEWREP-NP). Paper SC/J17/JR01 presented to the Expert Panel Workshop on the Proposed Research Plan for New Scientific Whale Research Program in the western North Pacific (NEWREP-NP). (unpublished) 162pp.
- Hakamada, T., Matsuoka, K. and Miyashita, T., 2009. Distribution and the number of western North Pacific common minke, Bryde's, sei and sperm whales distributed in JARPANII Offshore component survey area. Paper SC/J09/JR15 presented to the JARPANII Review Workshop, January 2009 (unpublished). 18pp. [Paper available at the IWC Office].
- Hakamada, T., Takahashi, M., Matsuoka, K. and Miyashita, T., 2017. Abundance estimate for western North Pacific Bryde's whale by sub-areas based on IWC-POWER and JARPANII sighting surveys. Paper SC/M17/RMP02 presented to the Workshop on the Implementation Review of western Pacific Bryde's whales, March 2017 (unpublished). 11pp. [Paper available at the IWC Office].
- Hakamada, T., Katsumata, T., Takahashi, M. and Matsuoka, K. 2019. Common minke whale abundance estimates based on dedicated sighting surveys during 2013-2018. Paper SC/68A/ASI/14rev1 submitted to IWC Scientific Committee, May 2019 (unpublished). 9pp. [Paper available at the IWC Office].
- International Whaling Commission, 2001. Report of the Workshop to Review the Japanese Whale Research Program under special permit for North Pacific minke whales (JARPAN). *J. Cetacean Res. Manage.* (Suppl.) 3: 375-413.
- International Whaling Commission, 2008. IWC SOWER Cruise 2008/09, Information for Researchers. <https://iwc.int/private/downloads/-m4RVc06JhBVw3ymd3oPcw/Guide%20%20for%20Researchers%202008-09.pdf> [Paper available at the IWC Office].
- International Whaling Commission, 2010. The Report of the Expert Workshop to review the ongoing JARPAN II programme. *J. Cetacean Res. Manage.* (Suppl.) 11: 405-49.
- International Whaling Commission. 2012. Requirements and Guidelines for Conducting Surveys and Analysing Data within the Revised Management Scheme. *J. Cetacean Res. Manage.* (Suppl.) 13:507-18.
- International Whaling Commission. 2016. Report of the Expert Panel of the final review on the western North Pacific Japanese special permit programme (JARPAN II), 22-26 February 2016, Tokyo, Japan. Paper SC/66b/Rep6 submitted to this meeting. 96pp. [Paper available at the IWC Office].
- International Whaling Commission. 2017. Report of the Expert Panel Workshop on the Proposed Research Plan for New Scientific Whale Research Programme in the western North Pacific (NEWREP-NP). Paper

- SC/67a/Rep01 presented to IWC Scientific Committee, May 2017 (unpublished) 80pp.
- Matsuoka, K., Ensor, P., Hakamada, T., Shimada, H., Nishiwaki, S., Kasamatsu, F. and Kato, H. 2003. Overview of minke whale sightings surveys conducted on IWC/IDCR and SOWER Antarctic cruises from 1978/79 to 2000/01. *J. Cetacean. Res. Manage.* 5:173-201.
- Matsuoka, K., Hakamada, T., Kiwada, H., Murase H. and Nishiwaki, S. 2011. Abundance estimates and trends for humpback whales (*Megaptera novaeangliae*) in Antarctic Areas IV and V based on JARPA sighting data. *J. Cetacean Res. Manage.* (special issue) 3: 75-94.
- Miyashita, T. and Kato H. 2004. Plan for the North Pacific minke whale sighting surveys in 2004. Paper SC/56/RMP3 submitted to IWC Scientific Committee, May 2014 (unpublished). 3pp. [Paper available at the IWC Office].
- Miyashita, T. and Kato H. 2005. Plan for the minke whale sighting surveys in the North Pacific in 2005. Paper SC/57/NPM2 submitted to IWC Scientific Committee, June 2015 (unpublished). 5pp. [Paper available at the IWC Office].
- Okamura, H. and Kitakado, T. 2004. Advance in an abundance estimation model of Antarctic minke whales. Paper SC/56/IA9 submitted to IWC Scientific Committee, May 2014 (unpublished). 12pp. [Paper available at the IWC Office].
- Thomas, L., S.T. Buckland, E.A. Rexstad, J.L. Laake, S. Strindberg, S.L. Hedley, J.R.B. Bishop, T.A. Marques, and K.P. Burnham. 2010. Distance software: design and analysis of distance sampling surveys for estimating population size. *J. Appl. Ecol.* 47: 5-14.

Table 1. Specification of the research vessels participating in the 2020 sighting surveys.

	<i>Yushin-Maru</i>	<i>Yushin-Maru No.3</i>	<i>Kaiyo-Maru No.7</i>
Call sign	JLZS	7JCH	JECL
Length overall [m]	69.61	69.61	60.02
Molded breadth [m]	10.4	10.8	10.6
Gross tonnage [GT]	724	742	649
Top barrel height [m]	19.5	19.5	17.5
IO platform height [m]	13.5	13.5	12.7
Upper bridge height [m]	11.5	11.5	9.6
Bow height [m]	6.5	6.5	4.5
Engine power [PS/kW]	5,280/3,900	5,280/3,900	2,100/1,544

Table 2A. Tentative itinerary of the *YSI* in the 2020 sighting survey.

Date	Event
31-July	<i>YSI</i> depart Shiogama, Japan
5-August	<i>YSI</i> arrive at the starting point in the research area (south pelagic block)
21-September	<i>YSI</i> complete survey block and move to Shiogama
24-September	<i>YSI</i> arrive Shiogama, Japan

Table 2B. Tentative itinerary of the *YS3* in the 2020 sighting survey.

Date	Event
31-July	<i>YS3</i> depart Shiogama, Japan
4-August	<i>YS3</i> arrive at the starting point in the research area (north pelagic block)
21-September	<i>YS3</i> complete survey block and move to Shiogama
24-September	<i>YS3</i> arrive Shiogama, Japan

Table 2C. Tentative itinerary of the *KY7* in the 2020 sighting survey.

Date	Event
5-August	<i>KY7</i> depart Shiogama, Japan
7-August	<i>KY7</i> arrive at the starting point in the research area (offshore block)
16-September	<i>KY7</i> complete survey block and move to Shiogama
18-September	<i>KY7</i> arrive Shiogama, Japan

Table 3. Waypoint (WP) in each survey block during the sighting survey in 2020. Asterisks (*) indicate that sighting survey will not be conducted between the WP and next WP.

Brock and vessel	WP	Lat				Lon			
Pelagic block (south) <i>YS1</i>	601	36°	-	59.5	N	170°	-	0.0	E
	602	35°	-	0.0	N	168°	-	39.3	E
	603	40°	-	0.0	N	165°	-	12.7	E
	604	35°	-	0.0	N	161°	-	46.0	E
	605	40°	-	0.0	N	158°	-	19.4	E
	606	35°	-	0.0	N	154°	-	52.7	E
	607	40°	-	0.0	N	151°	-	26.1	E
	608	37°	-	57.5	N	150°	-	0.0	E
Pelagic block (north) <i>YS3</i>	701	46°	-	10.6	N	160°	-	0.0	E
	702	47°	-	51.1	N	159°	-	40.8	E
	703	40°	-	0.0	N	158°	-	15.5	E
	704	45°	-	28.3	N	156°	-	58.2	E
	705	40°	-	0.0	N	155°	-	24.8	E
	706	43°	-	42.4	N	154°	-	7.8	E
	707	40°	-	0.0	N	152°	-	34.2	E
	708	42°	-	6.9	N	151°	-	8.9	E
	709	40°	-	24.8	N	150°	-	0.0	E
Offshore <i>KY7</i>	801	42°	-	34.6	N	146°	-	6.5	E
	802	42°	-	56.8	N	144°	-	4.9	E *
	803	41°	-	55.0	N	146°	-	27.9	E
	804	40°	-	58.7	N	141°	-	23.6	E *
	805	40°	-	34.0	N	141°	-	29.4	E
	806	39°	-	16.3	N	150°	-	0.0	E
	807	37°	-	53.0	N	140°	-	56.3	E *
	808	37°	-	36.4	N	141°	-	1.7	E
	809	36°	-	12.0	N	150°	-	0.0	E
	810	35°	-	0.0	N	142°	-	25.9	E

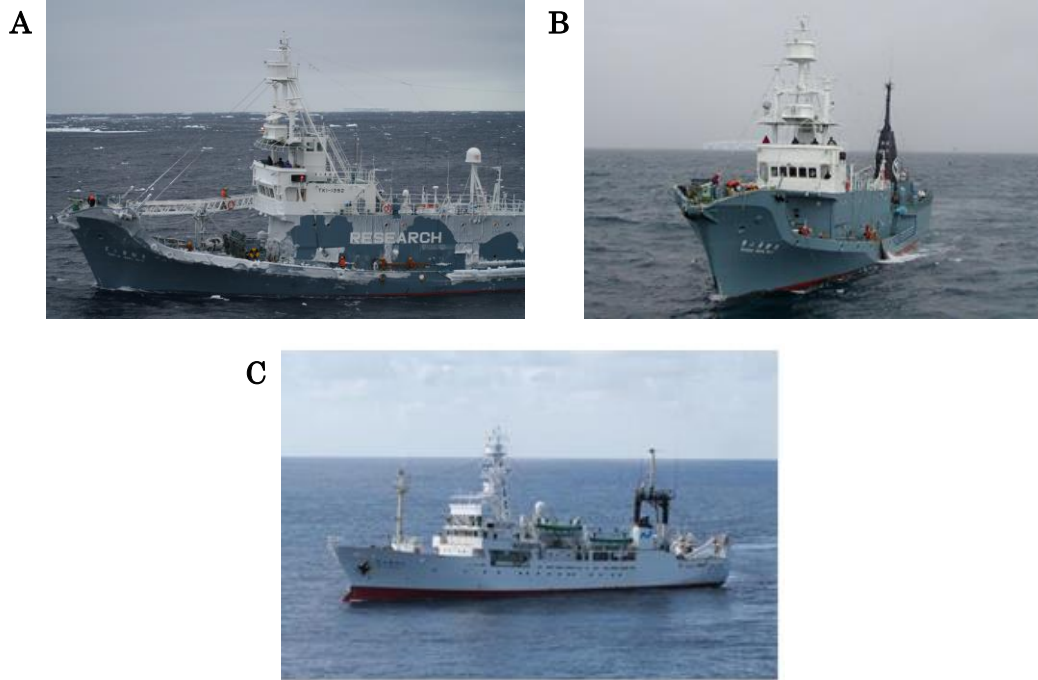


Figure 1. Research vessels participating in the dedicated sighting surveys in 2020: A) *Yushin Maru No. 1*, B) *Yushin Maru No. 3* and C) *Kaiyo Maru No. 7*.

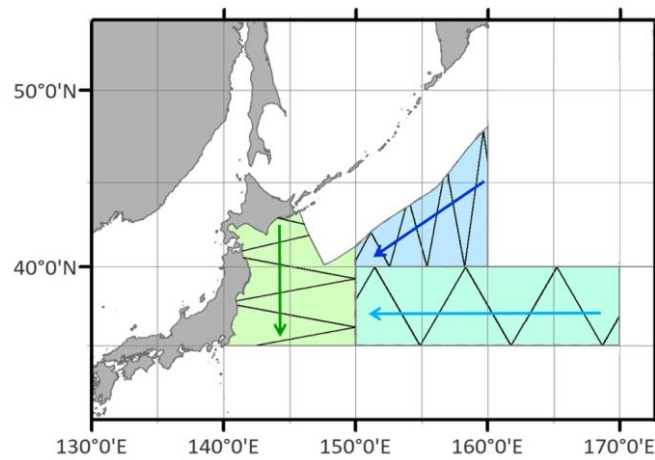


Figure 2. Research areas (blue: north pelagic block covered mainly by *YS3*, light-blue: south pelagic block covered mainly by *YS1*, green: offshore block covered mainly by *KY7*), and pre-determined track lines (black zigzag lines) of the 2020 sighting survey from August to September. Blue, light-blue and green arrows show survey order of the planned cruise tracks for, *YS3*, *YS1* and *KY7*, respectively.