Cruise report of the sighting and biopsy sampling survey for common minke whales in the Okhotsk Sea, spring 2011

SHINGO MINAMIKAWA, TOSHIYA KISHIRO, AND TOMIO MIYASHITA

National Research Institute of Far Seas Fisheries,
2-12-4 Fukuura, Kanazawa-ku, Yokohama, Kanagawa 236-8648, Japan
Contact e-mail: sminami@affrc.go.jp

ABSTRACT

From 14 May to 26 June in 2011, the sighting and biopsy skin sampling survey for common minke whales was conducted in the Okhotsk Sea including the Russian EEZ, using a research vessel, *Kaiyo-maru No.8*. Main objective was to estimate the mixing rate of the J and O stocks of common minke whales in the Okhotsk Sea in spring season. During the survey, a total of 1,295.3 n. miles was searched with the restricted closing mode, and five schools/ ten individuals of common minke whales, 30 schools/ 37 individuals of fin whales, and one North Pacific right whale were sighted. Among them, three schools of common minke whales were targeted for biopsy skin sampling using Larsen gun, but no sample was obtained due to the difficulty in closing the animals. Few sightings of common minke whales suggested that the migration of the whales into the Okhotsk Sea was scarce when the survey conducted in this season. Bad weather conditions and a low ability of the vessel, *Kaiyo-maru No.8*, for chasing the whales also prevented to obtain the success of the biopsy sampling in this cruise.

KEYWORDS: COMMON MINKE WHALE, NORTH PACIFIC, BIOPSY SAMPLING, SIGHTING SURVEY, OKHOTSK SEA

INTRODUCTION

The mixing rate of the J and O stocks of common minke whales in the Okhotsk Sea (especially in sub-area 12) is one of the most important information required in considering the abundance estimation by stocks in the North Pacific common minke whales (IWC, 2009).

In 2009, Japanese biopsy sampling survey, using a research vessel, *Shonan-maru No.2*, for common minke whales was conducted in the Okhotsk Sea including the Russian EEZ, in summer season from 18 July to 31 August (Yoshida, et al., 2010). During this cruise, valuable data and samples including five biopsy skin samples and data on the body surface scars by the cookie-cutter sharks were collected for examine the mixing rate of J and O stocks of common minke whales (Miyashita, et al., 2010), but unfortunately, all the biopsy samples taken could not be brought out from the Russian waters because of discrepancies in domestic legal status of common minke whale related to CITES as well as in domestic legal systems regarding international trade, between Russia and Japan (Yoshida, et al., 2010).

In 2010, the survey was conducted again in the Okhotsk Sea including the Russian EEZ, in summer season from 13 July to 26 August (Kishiro, et al., 2010: Yoshida, et al., 2011), using a same research vessel, *Shonan-maru No.2*. During the survey, a total of 38 sightings (42 individuals) of common minke whales and the eight biopsy skin samples were obtained. Genetic analysis for stock identification from the skin samples were carried out on board within the Russian waters, using the RFLP analysis of the mitochondrial DNA control region. After the genetic analyses, biopsy samples, DNA extraction, and PCR products were left at the Russian waters (Yoshida, et al., 2011).

To investigate the seasonal difference of the J-O mixing rate in the Okhotsk Sea, we got again the permission from the Russian Federation to enter these waters and the sighting and biopsy sampling survey was planned to be conduct in spring season (Kishiro, et al., 2011). In 2011 survey, the research vessel was changed from *Shonan-maru No.2* to *Kaiyo-maru No.8*, because of the logistical reason such as the availability of the vessels in that season.

The present report is summary of the cruise in the Okhotsk Sea, conducted from 14 May to 26 June in 2011.

SURVEY DESIGN AND METHODS

Research area and track line

Research area was set in the Okhotsk Sea including the Russian EEZ, though some part of the area was excluded following the Russian permission (e.g., the Russian territorial waters). The pre-determined track line was determined as shown in Figs. 1. A total research distance was planned to be 1,923.3 n.miles. When the Sea ice was melted in the coastal waters off Sakhalin, the sighting surveys was also planned to be conducted from the way points 1, 3, 5, 11, 13, and 15 and the pack ice area (or coastal area of Sakhalin if there are no pack ice). In addition, the pre-determined track line was set in the coastal waters off northern Hokkaido, during the return cruise from the research area to the Hakodate port (Figure 2). A total research distance planned in the coastal waters off northern Hokkaido during the return cruise was 217.7n.mile.

Research vessel

The research vessel was *Kaiyo-maru No.8* (404GT, 1,600HP). Vessel was equipped with a top barrel. Number of crew on vessel was 13. The vessel was chartered by the Fisheries Research Agency.

Sighting methods

The restricted closing mode survey was carried out, in which closing was made only for the targeted cetacean species including common minke whales and North Pacific right whales. Two observers on the top barrel of the vessel conducted searching by naked eyes. Species identification was conducted using binocular. At least one researcher on the upper-bridge also searched for cetaceans and recorded sighting information. The survey was to be conducted from 6:00 a.m. to 6:00 p.m. basically when the weather conditions were suitable for observations: visibility better than 1.5 n.miles and the wind speed less than 7.5m/s. The vessel speed was planned to be 11.5 knots with slight adjustment to avoid vibration of vessel.

Biopsy sampling methods

Vessel tried skin sampling from all common minke whales sighted during the survey, using Larsen gun with the Russian permission. Genetic analysis using the collected skin samples was planned to be completed on board using the similar methods such as the RFLP analysis of the mitochondrial DNA control region conducted in 2010 cruise (Yoshida et al. 2011). Those samples will not be retained on board until the research vessel leave the Russian waters so that the samples will not be brought out of there, to avoid confliction with Russian domestic laws and regulations related to CITES.

Other experiments

When large cetaceans such as gray or North Pacific right whales were found, taking the photographs was planned for the photo-identification.

CRUISE SUMMARY

Scientists and observer onboard

Scientists: Shingo Minamikawa (Senior scientist, NRIFSF, first half of the survey)

Shigeru Noji (Senior scientist, NRIFSF, second half of the survey)

Aoi Nozawa (Scientist, NRIFSF, entire period)

Russian observer: K. Zharikov (VNIRO, entire period).

Additional track line to the pack ice area
Track lines from the way points 1, 3, 5, 11, 13, and 15 set during the cruise were shown in Fig. 3. There were no pack ices around the point A, D, E and F. The distances from both B and C to the pack ices were 3 n. miles.

Narrative
14 May: The vessel left Hakodate port.

16 May: The vessel passed the Russian checkpoint (E-5)

18 May: Training for shooting of Larsen guns was conducted.

19 May: The vessel started the restricted closing mode survey from the way point A. The vessel passed the way point of No. 2.

20 -26 May: The vessel surveyed the track lines till the way point 5 including additional line to the way point B and C.

27 May: The vessel started the survey from the way point of No. 7.

28 May: The survey was interrupted for about 5 hours by the inspection of Russian Coast Guard.

30 May: Collecting biopsy sample was attempted, but there were no chance to fire the gun. The vessel started the transit cruise to Abashiri.

1 June: The vessel continued transit cruise and passed the Russian checkpoint (E-5).

2 June: The vessel entered the Abashiri port. Refueling at the port.

4 June: The vessel left Abashiri port and passed the checkpoint (E-5).

5 June: The vessel conducted transit cruise to the way point D.

6 June: Training for shooting of Larsen guns was conducted.

7 June: The vessel started the survey from the way point D

9 June: Collecting biopsy sample was attempted, but there were no chance to fire the gun.

14 June: The vessel conducted the survey from the way E.

15 June: The vessel conducted transit cruise to the way point of No. 16.

17 June: The vessel started the survey from the way point of No. 16.

19 June: After vessel passed the way point of No.19, conducted transit cruise to the Russian checkpoint (E-5).

20 June: The vessel conducted the survey intermittently during the transit cruise.

21 June: The vessel passed the Russian checkpoint (E-5) and went out of the Russian EEZ.

22 June: The vessel started the survey from the way point of No. O1. Collecting biopsy sample was attempted, but there were no chance to fire the gun.

24 June: The vessel started transit cruise to Hakodate port.

26 June: The vessel arrived at Hakodate port at 09:00.

SURVEY RESULTS
A total distance of 1,167.6 n. miles was searched under the primary searching mode within research area. The coverage was 60.7% of the predetermined lines. Unfortunately, most of predetermined lines set south of 51ºN were not surveyed from bad weather conditions and a dense fog. During the return cruise, 127.7 n. miles was searched in the coastal waters off northern Hokkaido (see, Fig. 4).

During the searching including additional transit cruise, all the 142 cetacean schools (415 individuals) were encountered. These include five schools (ten animals) of common minke whales, 30 (37) of fin whales and one

of North Pacific right whale (Table 1). Common minke whales were sighted mainly at deeper and offshore waters than the past surveys conducted in summer 2010 and 2011. In the past surveys, they were sighted mainly in shallow and coastal waters of around 200 m depth (Yoshida et al. 2010a, Yoshida et al. 2011). Most of fin whales were detected at offshore waters deeper than 200 m as in the past survey (Fig. 5).

North Pacific right whales were encountered on only one occasion on 19 June (Fig. 6). The animal was targeted for photo-id research and succeeded in obtaining the photograph.

The three common minke whale schools (6 individuals) primarily sighted were targeted for biopsy sampling. However, we lost all of them after 44.6-74 minutes chasing, and there was no chance to fire the gun at the whale. The closed distances to the whales were from 0.02 to 0.1 n. miles. Summary of the biopsy skin sampling activity for common minke whales are indicated in table 2.

DISCUSSION

Biopsy samples of common minke whales could not be obtained in this cruise. Some plausible reason was as follows. Firstly, the encounter of common minke whales was fewer than that of the previous cruise conducted in summer. Although a large proportion of the track line was successfully surveyed in the northern area of the Okhotsk Sea, the number of the sightings was only three in those areas. This result suggested that most common minke whales probably had not yet migrated to this area when the survey conducted, and the density of common minke whales was sparse. In the southern area of the Okhotsk Sea, the survey was very often disturbed by bad weather condition, mainly dense fog. These resulted in few sighting of common minke whales in this area. As a result, total number of sightings of common minke whale schools in spring 2011 was only five whereas 38 in summer 2011.

Secondly, there were some problems in the research vessel. The full speed of *Kaiyo-maru No.8* was lower (at most, 11 knot) than *Shonan-maru No.2* and the vessel could not turn quickly because the balance was rather precarious due to the top barrel retrofitted. These caused the lost of sightings of common minke whales during chasing.

ACKNOWLEDGMENTS

We express our sincere thanks to the captain and crew of *Kaiyo-maru No.8* for their hard work and providing a survey platform during the cruise. We especially thank Shigeru Noji and Aoi Nozawa for their excellent work onboard. We also express our sincere appreciation to the Russian Government for issuing the permission for the present survey in the Russian waters. We gratefully thank to Toshinori Uoya of the Fisheries Agency of Ministry of Agriculture, Forestry and Fisheries, Japan, and Dr. Zharikov, Russian observer from VNIRO for their help and arrangement for the cruise.

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Table 1. Sightings by *Kaiyo-maru No.8* in the common minke whale biopsy sampling survey in the Okhotsk Sea, spring 2011

	First half				Second Half				Total			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Species	Sch.	Animal	Sch.	Animal	Sch.	Animal	Sch.	Animal	Sch.	Animal	Sch.	Animal
Common minke whale	1	3	2	4	2	3	0	0	3	6	2	4
Fin whale	7	7	1	1	17	23	5	6	24	30	6	7
North Pacific right whale	0	0	0	0	1	1	0	0	1	1	0	0
Unidentified Large cetacean	0	0	0	0	2	2	2	2	2	2	2	2

Table 2. Results of the biopsy skin sampling activity for common minke whales by *Kaiyo-maru No.8* in the Okhotsk Sea in the spring 2011survey.

Date	Sighting ID	Time at sighting	Sea state*	Visibility (n.miles)	School size	Chasing time(minute)	Closed distance (n.miles)	Remarks
30 May	001	6:35	4	5.5	3	44.6	0.1	No chance to fire the gun at the whale
9 June	029	15:55	2	3	2	74.0	0.02	No chance to fire the gun at the whale
22 June	007	13:19	3	3	1	59.0	0.02	No chance to fire the gun at the whale

*Beaufort scale

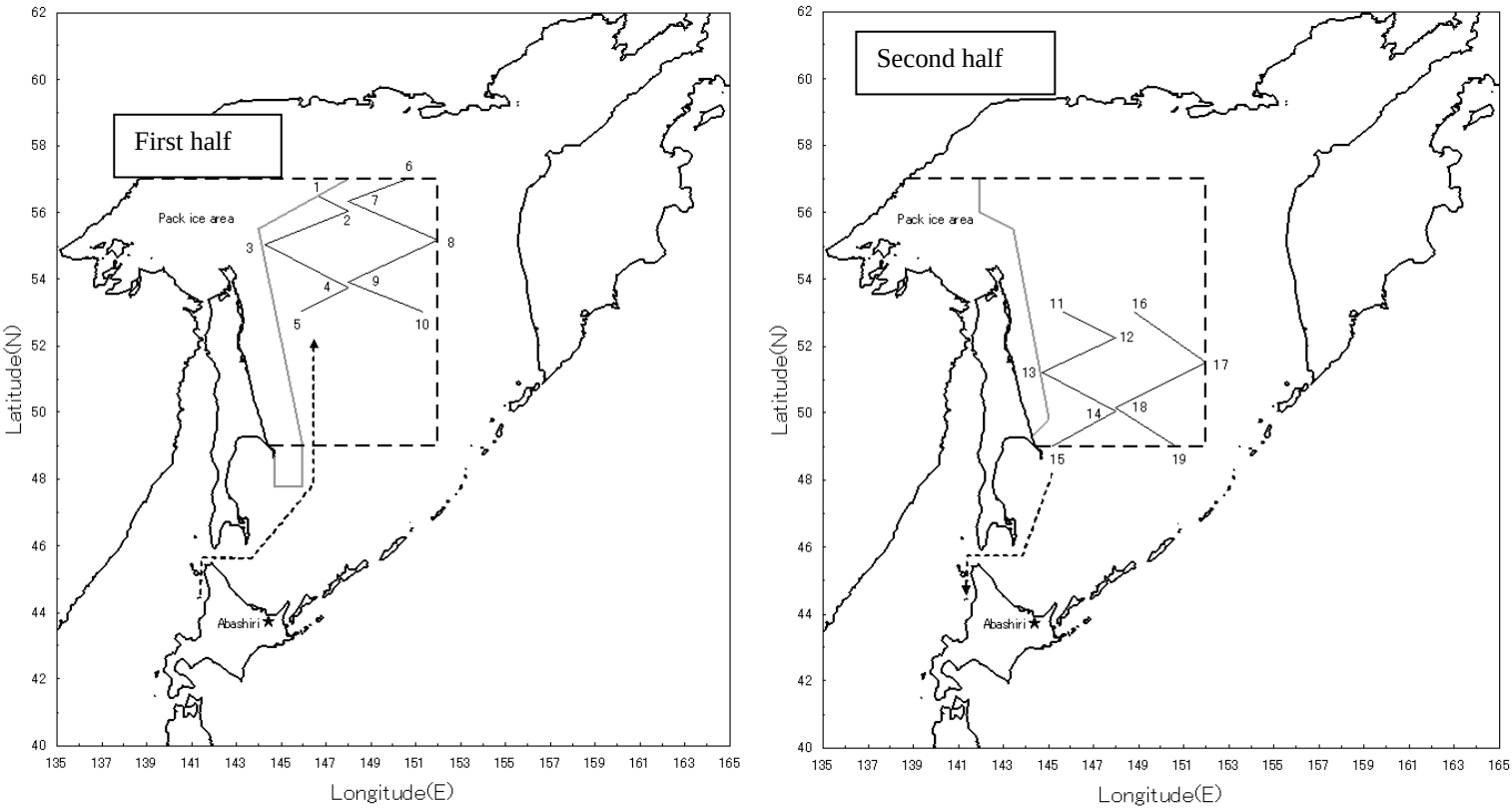

Fig. 1.Research area (dotted line) and pre-determined track line for *Kaiyo-maru No.8* in 2011. Gray line shows the assumed range of pack ice area, dotted arrows shows the track from the port to the research area.

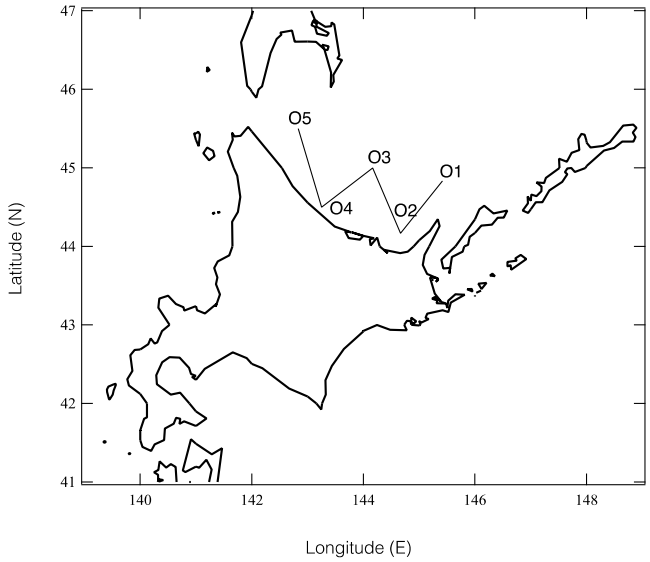

Fig. 2 The pre-determined track line set in the coastal waters off northern Hokkaido, during the return cruise from the research area to the Hakodate port.

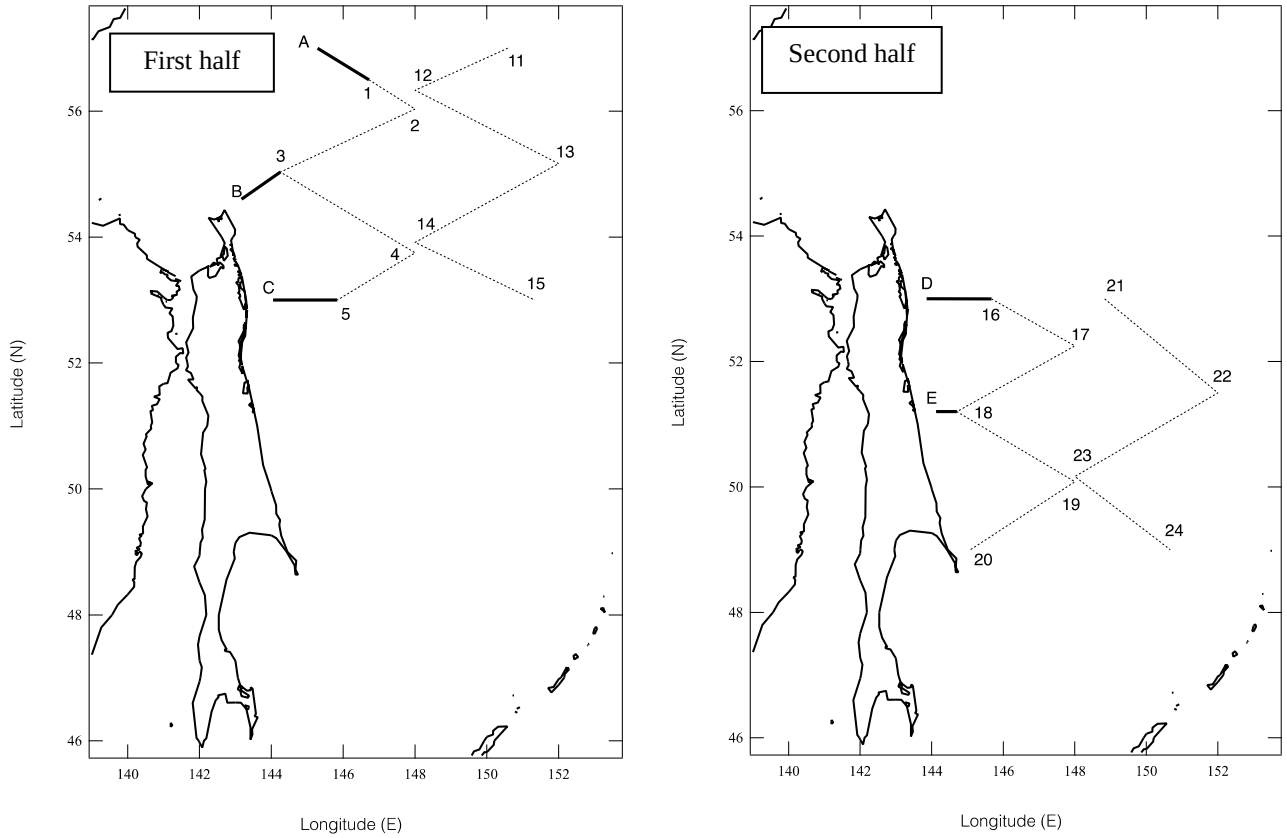

Fig. 3 Track lines from the way points 1, 3, 5, 11, 13, and 15 set during the cruise (Thick line). Broken lines indicate pre-determined track line.

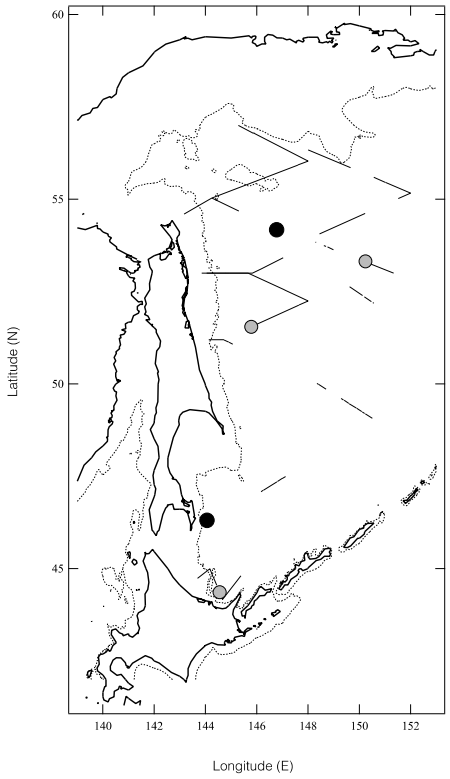

Fig. 4. Survey tracks and sighting positions of common minke whale schools made during the survey (gray circle: primary sighting; black circle: secondary sighting). Broken line is 200 m depth isobath.

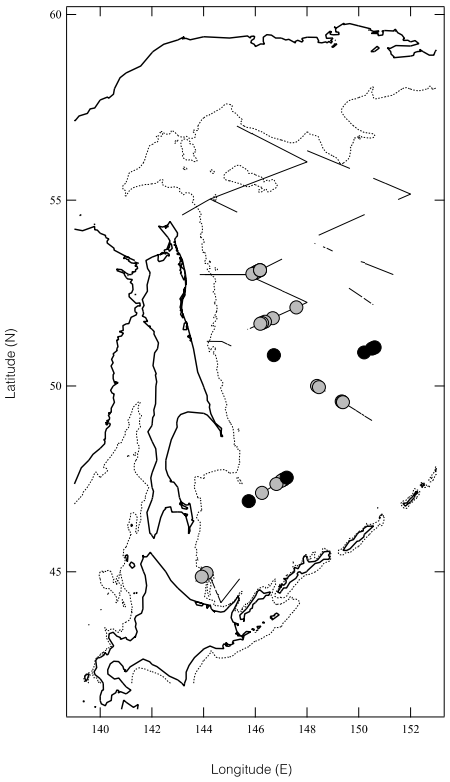

Fig. 5. Survey tracks and sighting positions of fin whale schools made during the survey (gray circle: primary sighting; black circle: secondary sighting). Broken line is 200 m depth isobath.

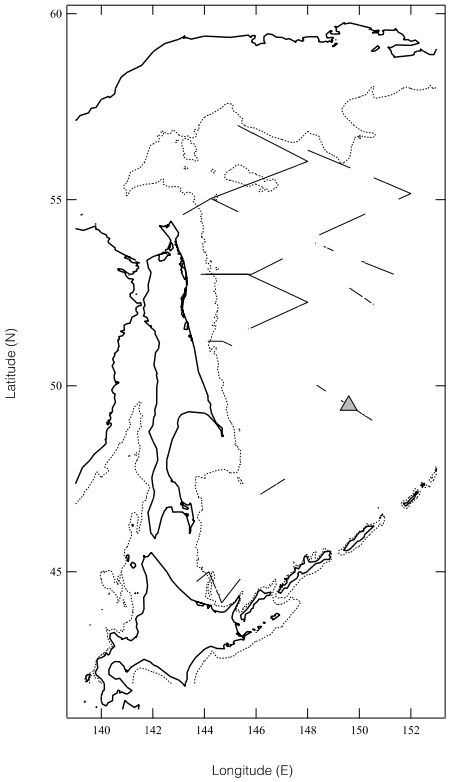

Fig. 6. Survey tracks and sighting positions of a North Pacific right whale (gray triangle). Broken line is 200 m depth isobath.