CRUISE REPORT OF THE COMMON MINKE WHALE BIOPSY SAMPLING SURVEY IN THE OKHOTSK SEA, SUMMER 2009

HIDEYOSHI YOSHIDA[1)], YU KANAJI[1)], TOMIO MIYASHITA[1)], TOSHINORI UOYA[2)], AND HIROKO FURUKAWA[2)]

1) National Research Institute of Far Seas Fisheries
2-12-4 Fukuura, Kanazawa-ku, Yokohama, Kanagawa 236-8648, Japan
Contact e-mail: hideka@fra.affrc.go.jp
2) Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries
1-2-1 Kasumigaseki, Chiyoda-ku, Tokyo 100-8907, Japan

ABSTRACT

From 18 July to 31 August in 2009, the restricted closing mode sighting survey from a research vessel *Shonan-maru No. 2* was conducted in the Okhotsk Sea, to obtain biopsy samples and information on distribution, abundance, and cookiecutter shark scars of common minke whales. The research area was set in the Okhotsk Sea including the Russian EEZ, though part of the area was excluded due to no permission (e.g., the Russian territorial waters). During the searching of track lines of 1,662.6 n.miles, all the 39 schools (40 animals) of common minke whales were encountered, of which primary sightings were 30 schools (31 animals). The 18 schools (19 animals) of common minke whales were approached for biopsy sampling and a total of five biopsy samples were collected from five individual whales, after the 18 darts were launched at 9 animals using two Larsen guns. Observation of cookiecutter shark scars on common minke whales sighted was conducted using digital photographs. Examination of photographs of dorsal and lateral aspects of 22 individual common minke whales revealed that all the animals exhibited shark scars on their bodies. Other species of large cetaceans observed during the survey were fin, North Pacific Right, and sperm whales. Unfortunately, all the biopsy samples taken could not be brought out from the Russian waters because of discrepancies between Russia and Japan in domestic legal status of common minke whale related to CITES as well as in domestic legal systems related to international trade.

KEY WORD: COMMON MINKE WHALE, BIOPSY SAMPLING, SIGHTING SURVEY, COKKIECUTTER SHARK, OKHOTSK SEA

INTRODUCTION

For stock assessment of the Sea of Japan-Yellow Sea-East China Sea stock (J-stock) of common minke whales, a series of sighting surveys has been conducted in the related waters including the Okhotsk Sea (An et al., 2006, 2008, 2009; Iwasaki *et al*., 1995, 2000; Miyashita and Yoshida, 2003;

Miyashita, 2004, 2005, 2006, 2007, 2008; Kim et al., 1999, 2000, 2001, 2002, 2003, 2004, 2005; Sohn et al. 2001). In the Okhotsk Sea, it is known that animals not only of J-stock but also of O-stock (Okhotsk Sea-Western Pacific stock) migrate for feeding in spring and summer (e.g., Goto and Pastene, 1997). For stock assessment, abundance estimation should be conducted for each of the two stocks. To do that, their mixing ratio in the sea is needed.

Studies on stock identification at individual level have been conducted mainly from genetic analyses (e.g., Goto et al., 2000; Kanda et al., 2009); information from the studies can be used for mixing ratio estimation. In summer 2009, a sighting survey for common minke whales was conducted in the Okhotsk Sea, in which biopsy sampling was carried out for genetic analysis. This report is summary of the cruise. Since cookiecutter shark scars on common minke whale bodies have been reported as useful key for stock identification (Fujise et al. 2001; Goto et al. 2009), observation of the scars was also conducted during the survey.

SURVEY DESIGN AND METHODS

The research area was set north of 46°N in the Okhotsk Sea, where open sea and the Russian EEZ was included. However, the following areas were excluded due to no permission: north of 57°N, east of 152°E, and the Russian territorial waters (Fig. 1). Track lines were designed to cover the area widely under the zigzag form: all the 11 lines totaling 2219.9 nautical miles were predetermined.

The survey was conducted from the research vessel, *Shonan-maru No. 2*, having a top barrel elevated 20 m above the sea surface. 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, though opportunistic closing was sometimes carried out. The survey was conducted when the weather conditions were acceptable for searching (Beaufort wind scale ≤4 and visibility ≥2 nmi). The daily survey began at 0600 (or 30 min after sunrise) and finished at 1800 (or 30 min before sunset). The vessel followed the predetermined line at 11.5 kts. Two topmen on the barrel of the vessel observed the sea surface by naked eyes. Species identification and school counting was conducted using binocular. On the upper-bridge, two scientists also searched for cetaceans and recorded sighting information.

CRUISE SUMMARY

Scientists and observer onboard

The following scientists and observer were onboard:

Scientists: Hideyoshi Yoshida (Chief scientist, NRIFSF; the first half of the survey)

Yu Kanaji (Chief scientist, NRIFSF; the second half)

Shigeru Noji (Scientist, NRIFSF; entire period)

Russian observer: Viacheslav A. Tatarnikov (VNIRO; entire period)

Narrative

18 July : The vessel left Shiogama port, Miyagi Prefecture.

19 July : The vessel conducted transit cruise to the Russian check point (E-5).

20 July : The vessel started passing mode survey on transit. At 12:56, the vessel entered in the Russian EEZ and passed the check point (E-5) at 18:55.

21 July : The vessel conducted the passing mode survey on transit to the way point of No. 1, but a dense fog often prevented the vessel from searching.

22 July : The vessel continued the passing mode survey under good weather condition.

23 July : The vessel arrived at the way point of No. 1 at 07:36 and started the restricted closing mode survey.

24-31 July : Sometimes a dense fog prevented the vessel from searching, but weather was generally good. Most of the track lines set in the northern coastal area (way points of No. 1-6) could be searched. During the period, all the five biopsy samples were collected. On 12:58 of 31st, the vessel arrived at the point of No. 6, and then started the searching of lines in the eastern offshore area (way points of No. 6-9).

1-4 August : A dense fog often prevented the vessel from searching.

5 August : From a heavy fog, the vessel conducted the survey only for 2 nm. At 18:00, the vessel finished the first half of the survey at 75 nm point from the way point of No. 7, and started the transit cruise to Abashiri.

6 August : On the way to Abashiri, passing mode survey was conducted. At 06:59, all the five biopsy samples taken from five individual common minke whales were discarded to the sea, under the observation of the captain, Russian observer, and scientists.

7 August : The vessel passed the Russian check point (E-5) in the early morning, went out of the Russian EEZ at 10:19, and anchored near the Abashiri port in the evening.

8 August : The vessel entered the Abashiri port in the morning.

9 August : Refueling at the Abashiri port. Chief scientists were replaced.

10 August : The vessel left the Abashiri port in the morning, and then passed the Russian check point (E-5) at night.

11 August : The vessel reached the way point of No. 9 at noon, but sighting survey could not be conducted by a dense fog in the whole day.

12 August : Sighting survey was restarted from the way point of No. 9 at 7:01, and ended at 17:48. During the day, the survey was briefly discontinued two times by the strong wind.

13 August : The wind was so strong most of the day. Sighting survey was conducted only in 6:00-8:42 and 12:08-12:23, when the wind was relatively moderate.

14 August : Sighting survey could not be conducted all the day due to the strong wind.

15 August : Sighting survey was started at 6:00, but suspended at 14:07 because of a strong wind.

16 August : Sighting survey was conducted from 6:54 to 18:00. It was sunny all the day.

17 August : Sighting survey was conducted from 6:00 to 17:26. It was sunny most of the day,

though there were three times of abeyance due to the rain. After the survey, the vessel headed to the way point of No. 10, since survey in the track line between the way points of No. 8 and 9 was finished.

18 August : The vessel reached the way point of No. 10 at 14:02, and then sighting survey was conducted until 16:37.

19 August : Sighting survey was conducted in 6:00–13:52 and 15:52–18:06. A two-hour abeyance from 13:52 to 15:52 was due to the strong wind.

20 August : Sighting survey was started at 6:02, but suspended at 14:18 because of the strong wind.

21-24 August : Sighting survey could not be conducted all the day due to the bad weather.

25 August : Sighting survey was conducted from 6:00 to 18:00. It was sunny all the day. The vessel turned at the way point of No. 11 and headed to that of No. 10 at 10:53.

26 August : Sighting survey was conducted from 6:00 to 18:00. It was sunny most of the day.

27-29 August : Sighting survey could not be conducted all the day due to the bad weather.

30 August : Sighting survey could not be conducted all the day due to the bad weather. The latter half of the survey was ended. The vessel headed back to the Abashiri port. On the homeward voyage, the vessel passed the Russian check point (E-5) at 16:57.

Survey results

All the 1,662.6 n. miles of track lines was searched under the primary searching mode, which was 74.9% of the predetermined lines. Unfortunately, a predetermined track line between way points of No. 12 and 13 was not searched from bad weather condition. However, the vessel conducted searching of 68.6 n. miles on transit cruise to the Abashiri port on 6th August, where waters adjacent to the predetermined line were searched. Thus, results from the transit cruise were pooled, as information from the track line between way points of No. 12 and 13. From these, most of the predetermined track lines could be covered.

During the searching including additional transit cruise, all the 447 cetacean schools (1337 individuals) were encountered (Table 1). Common minke whales were sighted on 46 occasions mainly at shallow and coastal waters of around 200 m depth (Fig. 2). Of these, 30 schools (31 animals) were primary sightings obtained at the track lines. All the 18 common minke whale schools (19 individuals) sighted on the lines were targeted for biopsy sampling. Two Larsen guns were used. The 18 darts were launched at nine individuals, six darts hit five animals, and five biopsy samples were collected from the five individual whales. No apparent reaction of animals from hit was observed. The average time taken to sample an individual whale was 0.58 hours (Range = 0.07-1.3). Observation of cookiecutter shark scars on common minke whales was also conducted. Digital photographs were obtained of 22 individual whales, including 15 animals targeted for biopsy sampling. Examination of photographs revealed that all the 22 animals exhibited shark scars on their dorsal and/or lateral aspects of bodies, though two animals indicated only one scar and relatively smooth skin.

Other species of large cetaceans observed during the survey were fin, North Pacific right, and sperm whales (Table 1). There were 73 sightings of fin whales (comprising 118 animals) at deeper and offshore waters than common minke whales (Fig. 3). A total of 17 North Pacific right

whale schools (29 animals) were detected at offshore waters >200m depth (Fig. 4). Of these, 16 schools were targeted for photo-id research and 22 animals of 15 schools were photographed. Examination of digital images of head (callosities and lip patches) of the 22 animals indicated no re-sightings. Sperm whales were encountered two times at deep waters near the Kuril Islands (Fig. 4).

Unfortunately, all the biopsy samples taken could not be brought out from the Russian waters because of discrepancies between Russia and Japan in domestic legal status of common minke whale related to CITES as well as in domestic legal systems related to international trade, as described in the following.

1) Common minke whale is a species included in Appendix I of CITES. Accordingly, both export and import permits are required for international trade of its biopsy samples in Russia. On the other hand, Japan has made a reservation with respect to listing of the species in Appendix I of CITES. Therefore, common mike whale is treated as if it were included in Appendix II of CITES in Japan, in accordance with Conf. 4. 25 of CITES. That means that CITES import permit is not required for international trade of biopsy samples of common minke whales in Japan.

2) Under Japanese domestic legal systems related to international trade, it is not regarded as "import" to bring biopsy samples taken by a Japan-flagged vessel in other State's EEZ back to Japan. In other words, there is no domestic legal basis to issue a CITES import permit for such an action. On the other hand, that is not the case with Russia.

3) Consequently, CITES Management Authority of the Russian Government needed to be satisfied that an import permit, issued by CITES Management Authority of the Japanese Government, had been granted for the biopsy samples taken in the survey, in order to issue an export permit for them, in accordance with Article III, 2(d) of CITES. However, CITES Management Authority of the Japanese Government could not issue an import permit for the samples.

That was just an unfortunate situation, and neither side can be blamed for that. Because of the importance of obtaining information on the mixing rate of 'J'/'O' stock minke whales in this area, we will seek some solutions for this circumstance. It is recognized that this kind of problem may not be limited to the situation between Russia and Japan and can happen among any other countries. In this regard, certain solutions should be found as soon as possible to promote genetic study on whale resources using biopsy samples.

ACKNOWLEDGMENTS

We express our sincere thanks to the captain and crew of *Shonan-maru No. 2* for their hard work and providing an excellent survey platform during the cruise. We also express our sincere appreciation to the Russian Government for issuing the permission for this survey in the Russian waters.

REFERENCES

An, Y.R., Kim, Z.G. and Choi, S.G. 2006. Cruise report of the Korean cetacean sighting survey in the East Sea, April-May 2006. Paper SC/58/NPM7 presented to the IWC Scientific Committee. 4pp.

An, Y.R., Choi, S.G., Kim, H.W. and Kim, Z.G. 2008. Cruise report of the Korean sighting survey in the East Sea in 2007. Paper SC/60/NPM1 presented to the IWC Scientific Committee.

An, Y.R. Choi, S.G., Kim, Z.G., and Kim H.W. 2009. Cruise report of the Korean cetacean sighting survey in the Yellow Sea, April-May 2008. SC/61/NPM1 presented to the IWC Scientific Committee. 4pp.

Fujise, Y., Zenitani, R. and Goto, M. 2001. Utility of non-genetic information for stock identification -The case of the western North Pacific minke whale-. Paper SC/53/SD5 presented to the IWC scientific committee. 9pp.

Goto, M. and Pastene, L. A. 1997. Population structure of the western North Pacific minke whale based on an RFLP analysis of the mtDNA control region. *Rep.int.Whal.Commn*. 47:531-537.

Goto, M., Kim, Z.G., Abe, H. and Pastene, L.A. 2000. A note on the possibility of identifying individual J stock animals from a mixed assemblage based on mitochondrial DNA analysis. Paper SC/F2K/J28 presented to the Workshop to Review the Japanese Whale Research Programme under Special Permit for North Pacific Minke Whales (JARPN), February 2000. 9pp.

Goto, M., Kanda, N., Pastene, L.A., Bando, T. and Hatanaka, H. 2009. Differences in cookie cutter shark-induced body scar marks between J and O stocks of common minke whales in the western North Pacific. Paper SC/J09/JR28 presented to the JARPNII review meeting, Yokohama, January 2009. 7pp.

Iwasaki, T., Hwang, H. and Nishiwaki, S. 1995. Report of whale sighting surveys in waters off Korean Peninsula and adjacent waters in 1994. Document SC/47/NP18 presented to the IWC Scientific Committee. 15pp.

Iwasaki, T., Shimada, H., Kim S.T. 2000. Cruise report of Japanese pilot sighting survey conducted under the joint research program between Japan and Republic of Korea in 1999 summer. Paper SC/52/RMP11 presented to the IWC Scientific Committee. 9pp.

Kanda, N., Goto, M., Kishiro, T., Yoshida, H., Kato, H., and Pastene, L.A. 2009. Update of the analyses on individual identification and mixing of J and O stocks of common minke whale around Japanese waters examined by microsatellite analysis. Paper SC/61/JR5 presented to the IWC scientific committee. 14pp.

Kim, Z.G., Miyashita, T., Baik, C.I., Sohn, H. AND Choi, K.H. 2000. Report of Korean whale sighting survey conducted under Korea and Japan joint pilot research plan in summer 1999. Paper SC/52/RMP21 presented to the IWC Scientific Committee. 9pp.

Kim, Z.G., Sohn, H., Yoshida, H. AND Baik, C.I. 2000. Preliminary report of Korean whale sighting survey conducted under Korea-Japan joint Pilot Research Plan in summer 2000 Paper SC/52/RMP22 presented to the IWC Scientific Committee. 7pp.

Kim, Z.G. and Sohn, H. 2001. Cruise report of whale sighting survey in the East Sea of Korea, September – October 2000. Paper SC/53/RMP23 presented to the IWC Scientific Committee. 4pp.

Kim, Z.G., Sohn, H. and Miyashita, T. 2002. Cruise report of the Korean whale sighting survey in the Yellow Sea, September 2001. Paper SC/54/RMP20 presented to the IWC Scientific Committee. 7pp.

Kim, Z.G., Sohn, H., Miyashita, T., and An, Y.R. 2003. Cruise report of the Korean whale sighting survey in the East Sea, May-June 2002. Paper SC/55/RMP 13 presented to the IWC Scientific

Committee. 5pp.
Kim, Z.G., Sohn, H., Miyashita, T., and An, Y.R. 2003.Cruise report of the Korean whale sighting survey in the Yellow Sea, August-September 2002. Paper SC/55/RMP14 presented to the IWC Scientific Committee. 4pp.
Kim, Z.G., Sohn, H., An, Y.R., and Miyashia, T. 2003. Cruise report of the Korean pilot whale sighting survey in the East Sea, April-May 2003. Paper SC/55/RMP15 presented to the IWC Scientific Committee. 4pp.
Kim, Z.G., Sohn, H., and An, Y.R. 2004. Cruise report of the Korean whale sighting survey in the Yellow Sea, April-May 2004. Paper SC/56/NPM2 presented to the IWC Scientific Committee. 6pp.
Kim, Z.G., Sohn, H., and An, Y.R. 2005. Cruise report of the Korean minke whale sighting survey in the East Sea, April-May 2005. Paper SC/57/NPM9 presented to the IWC Scientific Committee. 7pp.
Kim,Z.G., Miyashita, T., Baik,C.I., Sohn, H. and Choi, K.H. 2000. Report of Korean whale sighting survey conducted under Korea and Japan joint pilot research plan in summer 1999. Paper SC/52/RMP21 presented to the IWC Scientific Committee. 8pp.
Miyashita, T. 2001. Cruise report of the Japanese sighting survey under the joint research program, between Japan and Korea in 2000 and 2001. Paper SC/53/RMP6 presented to the IWC Scientific Committee. 6pp.
Miyashita, T. and Fujise, Y. 1997. Abundance estimate of the western North Pacific minke whale in Sub-Area 9 with notes on the results of dedicated sighting surveys. *Rep.int.Whal.Commn* 47:543-551.
Miyashita, T. 2002. Cruise report of the Japanese sighting survey under the joint research program between Japan and Korea in 2000 and 2001. Paper SC/53/RMP6 presented to the IWC Scientific Committee. 5pp.
Miyashita, T. 2004. Cruise report of the Japanese sighting survey under the Japan/Korea joint project in 2003. Paper SC/56/RMP2 presented to the IWC Scientific Committee. 8pp.
Miyashita, T. and Yoshida, H. 2003. Report of the Japanese sighting survey the Japan/Korea joint project in 2002. Paper SC/55/RMP5 presented to the IWC Scientific Committee. 7pp.
Miyashita, T. 2004. Report of the Japanese sighting survey under the Japan/Korea joint project in 2003. Paper SC/56/RMP2 presented to the IWC Scientific Committee. 8pp.
Miyashita, T. 2005. Cruise report of the minke whale sighting survey in the Sea of Japan in 2004. Paper SC/57/NPM1 presented to the IWC Scientific Committee. 5pp.
Miyashita, T. 2006. Cruise repost of the IO sighting survey in the northern Sea of Japan in 2005 with special reference to g(0). Paper SC/58/NP4 presented to the IWC Scientific Committee. 5pp.
Miyashita, T. 2007. Cruise report of the IO sighting survey in the Northern Sea of Japan in 2006. Paper SC/59/NPM3 presented to the IWC Scientific Committee. 7pp
Miyashita, T. 2008. Cruise report of the minke whale sighting survey in the Japan and the Okhotsk Sea off the northern Hokkaido in 2007. Paper SC/60/NPM4 presented to the IWC Scientific Committee.
Sohn, H., Kim, Z.G.., Miyashita, T. and Park, K.J. 2001.Cruise report of Korean whale sighting survey in the Yellow Sea, April-May, 2001. Paper SC/53/RMP22 presented to the IWC presented to the IWC Scientific Committee. 6pp.

Table 1. Sightings by *Shonan-maru No. 2* in the common minke whale biopsy sampling survey in the Okhotsk Sea, summer 2009.

Species	On the track lines				Transit				Total			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
	Sch.	Animal	Sch.	Animal	Sch.	Animal	Sch.	Animal	Sch.	Animal	Sch.	Animal
Common minke whale	30	31	9	9	5	5	2	3	35	36	11	12
Fin whale	57	97	15	20	0	0	1	1	57	97	16	21
North Pacific right whale	12	19	5	10	0	0	0	0	12	19	5	10
Sperm whale	2	3	0	0	0	0	0	0	2	3	0	0
Others	254	859	37	122	14	146	4	12	268	1005	41	134
Total	355	1009	66	161	19	151	7	16	374	1160	73	177

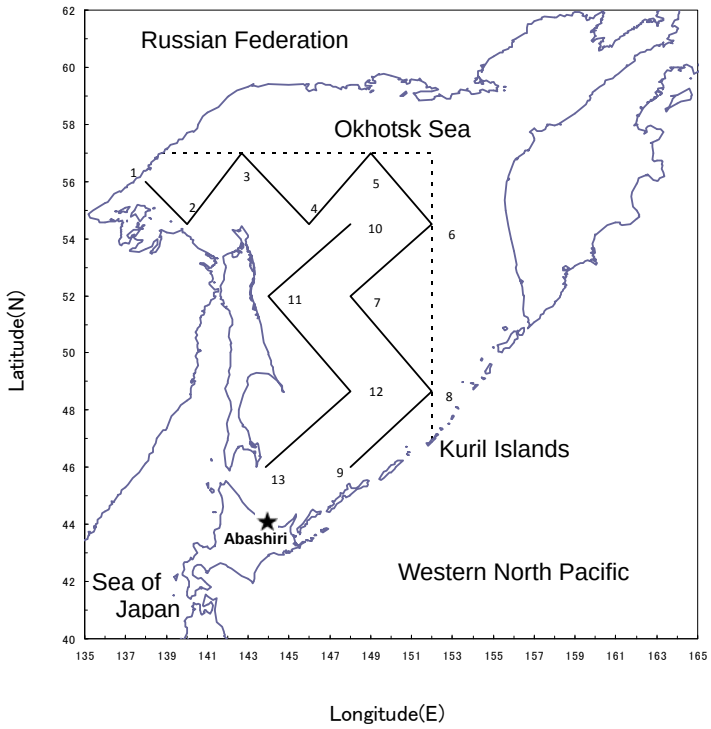

Figure 1. Predetermined track lines and way points set in research area.

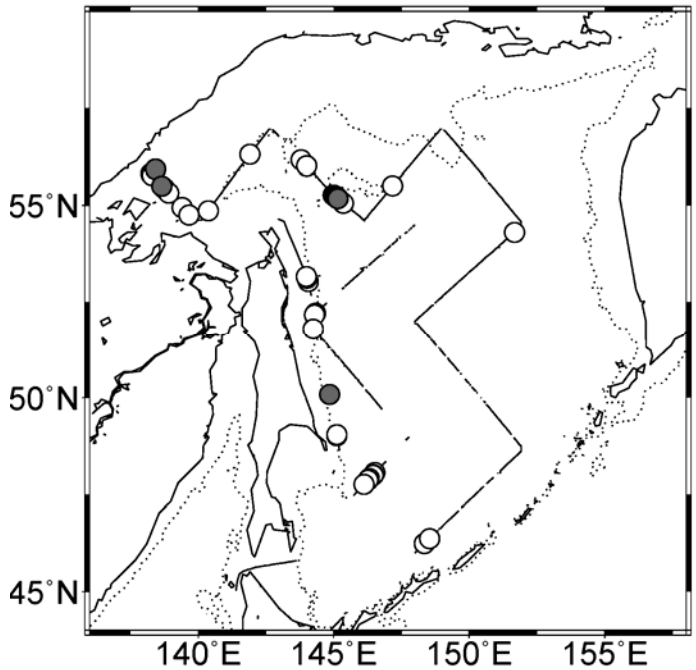

Figure 2. Survey tracks and sighting positions of common minke whales (white circle: primary sighting; gray circle: secondary sighting) made during the survey. Isobath is at 200 m depth.

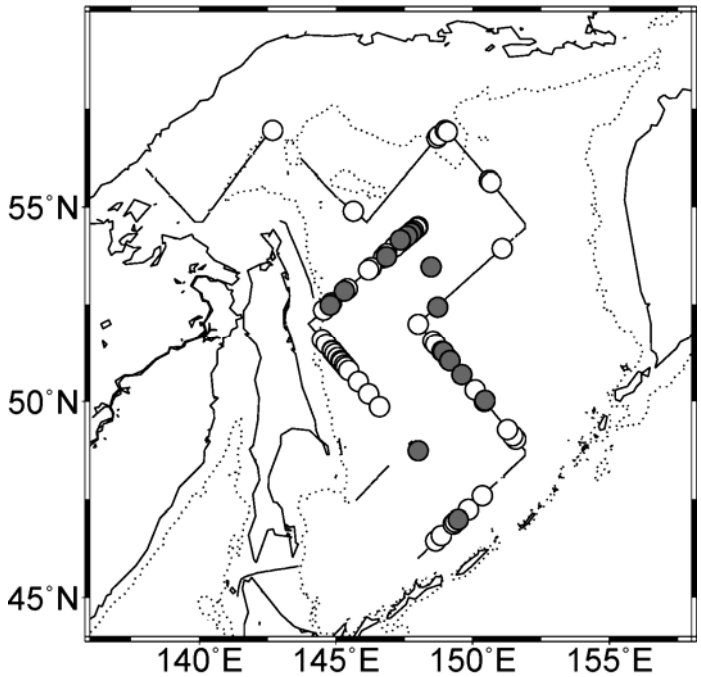

Figure 3. Survey tracks and sighting positions of fin whales (white circle: primary sighting; gray circle: secondary sighting) made during the survey. Isobath is at 200 m depth.

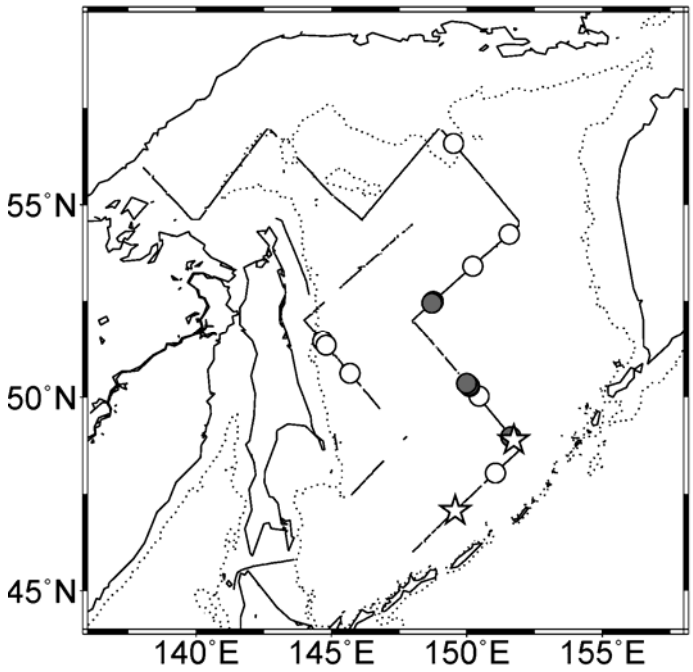

Figure 4. Survey tracks and sighting positions of North Pacific right whales (white circle: primary sighting; gray circle: secondary sighting) and sperm whales (white star: primary sighting) made during the survey. Isobath is at 200 m depth.