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## Report and highlights of the Japanese dedicated sighting surveys in the North Pacific in 2024

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### ABSTRACT

This paper presents the results of vessel-based sighting surveys conducted in 2024 by the Institute of Cetacean Research in the North Pacific. The research area was set between 39°N–46°N and 136°E–147°E for the spring survey, 35°N–51.5°N and 153°E–170°E for the summer survey, and around Hachijojima Island (33°N, 139°E) for the winter survey. The surveys were conducted between April 2024 and March 2025 involving three seasons. The research vessels *Yushin-Maru* and *Yushin-Maru* No.2 were engaged in the spring survey, *Yushin-Maru* and *Kaiyo-Maru* No.7 in the summer survey, and *Aki-Maru* in the winter survey. A total of 7,272.1 n.miles was searched in the North Pacific with an additional 106.0 n.miles around Hachijojima Island. Coverage of the searching efforts on the planned cruise track line was 77.9%. In total, seven large whale species, including blue (22 schools/23 individuals), fin (72/102), sei (80/96), Bryde's (63/84), common minke (41/47), humpback (47/65 and 279/428 at Hachijojima island) and sperm (130/290) whales were sighted during the surveys. Photo-ID images were collected from 159 individuals across all seasons. Biopsy skin samples were collected from 21 individuals (common minke n=10, fin n=11). Satellite tags were attached to 17 whales (common minke n=13, fin n=4). The first record of a North Pacific right whale was made at Hachijojima Island. Data collected during these surveys will be used in studies on abundance, distribution, movement and stock structure of several whale species.

### INTRODUCTION

Dedicated cetacean sighting surveys in the western North Pacific were conducted in the late summer season since 1995 as a part of the Japanese Whale Research Program under Special Permit in the western North Pacific (JARPN/JARPNII) and the New Scientific Whale Research Program in the western North Pacific (NEWREP-NP) based on the survey procedures of the International Whaling Commission/Southern Ocean Whale and Ecosystem Research (IWC/SOWER) (IWC, 2008). Based on the collected data, the distribution patterns of large whales such as blue, fin, sei, Bryde's, common minke, humpback, North Pacific right and sperm whales, and abundance estimates of common minke, sei and Bryde's whales were investigated and reported to the IWC SC (IWC, 2001; 2010; 2016; Hakamada *et al.*, 2009; Murase *et al.*, 2009; Pastene *et al.*, 2009; Matsuoka *et al.*, 2014; 2015).

The Fisheries Resources Institute (FRI) has also conducted dedicated sighting surveys for cetaceans in the North Pacific since the 1980s (Buckland *et al.*, 1992;

Miyashita *et al.*, 1995; Miyashita and Kato, 2004; 2005; Shimada, 2004; Kanaji *et al.*, 2012). In 2019 the Government of Japan decided to continue the sighting surveys in the North Pacific (IWC, 2019) under the rational that the collection of sighting data to estimate abundance and biopsy/photo-identification data to examine stock structure have contributed in the past to the work on management and conservation of large whales by the IWC SC (IWC, 2016).

In 2024, the Institute of Cetacean Research (ICR) conducted sighting surveys with three seasonal components: spring surveys focusing on common minke whale migration and stock structure in the western North Pacific, summer surveys for abundance estimation across a broader scale, and a new winter survey component focusing on photo-identification of humpback whales around Hachijojima Island. The winter survey represents an important expansion, as humpback whales have been migrating to Hachijojima Island waters since 2015 (Katsumata *et al.*, 2021), providing a unique opportunity to monitor this species during their breeding season.

This paper reports the results of the Japanese dedicated sighting surveys conducted during April–October 2024 in the North Pacific and December 2024–March 2025 around Hachijojima Island, involving three seasons: spring, summer and winter.

## SURVEY DESIGN

### Spring and summer surveys

#### Research period and area

The spring survey (April–May) focused on common minke whales as the primary target species, with objectives to collect information on whale migration, movement patterns and stock structure, as well as abundance estimation. The summer survey (August–September) aimed

to estimate abundance of large whales and study their distribution, migration and stock structure through various experiments. Figure 1 illustrates the research areas covered in the North Pacific.

In the spring, the research area was set up between 39°N–46°N and 136°E–147°E, excluding foreign Exclusive Economic Zones (EEZs); in the summer, between 35°N–51°30'N and 153°E–170°E for the main survey area, with an additional transit survey area between 35°N–43°N and 140°E–153°E, excluding foreign EEZs.

#### Research vessels

The sighting surveys in spring and summer seasons 2024 were conducted by research vessels *Yushin-Maru* (YS1),

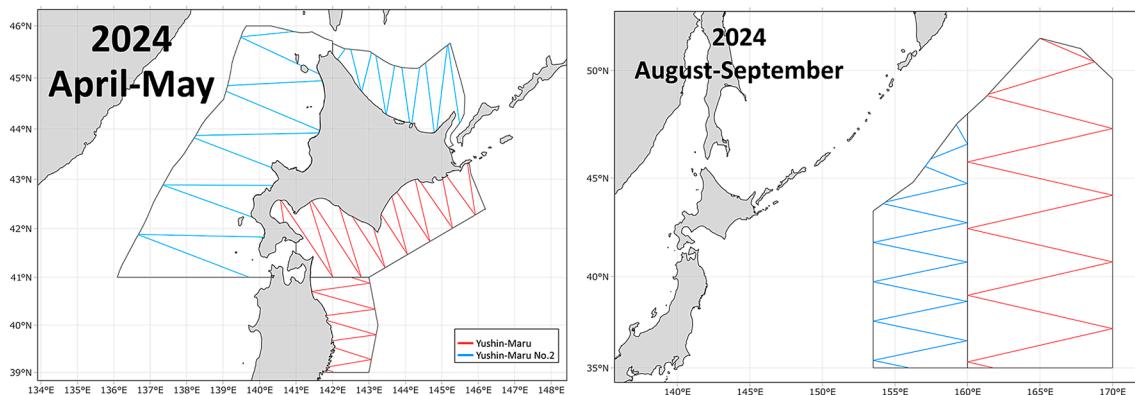


Figure 1. Research areas covered by the 2024 dedicated sighting surveys in each season. Left: spring survey. *Yushin-Maru* (YS1) surveyed blue line, and *Yushin-Maru* No.2 (YS2) covered red line. Right: summer survey. *Yushin-Maru* (YS1) covered the red line. *Kaiyo-Maru* No.7 (YS7) surveyed blue line.



Figure 2. Research vessels participating in the 2024 dedicated sighting surveys: *Yushin-Maru* (YS1) (upper left), *Yushin-Maru* No.2 (YS2) (upper right) and *Kaiyo-Maru* No.7 (YS7) (lower left).

*Yushin-Maru* No.2 (YS2) and *Kaiyo-Maru* No.7 (KY7). The vessels were equipped with a top barrel platform (TOP), IO barrel platform (IOP) and upper bridge.

#### Track line design

The pre-determined track lines in the spring and summer surveys are shown in Figure 1. The start points of the track lines were decided randomly using the 'Distance program ver. 7.3' (Thomas *et al.*, 2010) and the R package 'dssd' (Marshall, 2023), and the number of the line (width in the longitude) was decided by the research schedule based on the IWC survey guidelines (IWC, 2012).

#### Sighting procedure

The sighting surveys were conducted using (1) Normal Passing mode (NSP), (2) Normal Closing mode (ASP) and (3) Passing with Independent Observer mode (IO). The latter mode was conducted in the summer survey to estimate whale abundance considering estimated  $g(0)$ . The survey modes adopted for each survey are shown in Table 1.

For spring surveys, the searching conditions followed traditional minke whale survey protocols (visibility  $\geq 2.0$  n. miles, wind speed  $< 17$  knots) with a searching speed of 8.5 knots. For summer surveys, different protocols were applied based on latitude: north of 43°N followed minke whale protocols, while south of 43°N used standard line transect protocols (visibility  $\geq 2.0$  n.miles, wind speed  $< 21$  knots) with searching speeds of 11.5 knots for YS1 and 10.5 knots for KY7.

For NSP and ASP mode, there were two primary observers in the top barrel (TOP) and two in the upper

bridge (captain and helmsman). All primary observers conducted searching for cetaceans by using angle board and scaled binoculars (7x).

For IO mode, there were two primary observers on the TOP and two in the independent observer platform (IOP). These observers conducted searching for cetaceans by using angle board and scaled binoculars (7x). There was no open communication between the IOP and the TOP. The observers and researchers on the upper bridge communicated to the TOP (or IOP) independently, only to clarify information and did not distract the top-men from their normal searching procedure. These primary observers report sighting-information to researchers and other observers on the upper bridge for data recording.

The survey effort began 60 minutes after sunrise and ended 60 minutes before sunset, with a maximum of 12 hours per day (maximum 06:00–19:00, including 30 minutes for mealtime for lunch and supper, when surveying in IO mode) when the weather conditions were acceptable for observations. Detailed search conditions for each survey are shown in Table 1.

#### Experiments

Table 2 describes the details of the planned experiments for each survey. Distance and angle experiments were conducted in the middle of the survey period. The experiment was conducted to evaluate measurement error and followed the protocol of the IWC/SOWER and IWC-POWER surveys (IWC, 2012).

When large cetaceans such as blue and humpback whales were found, photo-ID images were obtained using Canon EOS R6 Mark II (with 100–500 mm lens) from the

Table 1

Summary of the survey modes and searching conditions by each seasonal survey during the 2024 dedicated sighting surveys.

Season	Vessel	Survey mode	Searching conditions		
			Visibility (n.miles)	Wind speed (kt)	Searching speed (kt)
Spring	YS1, YS2	Normal Passing mode	$\geq 2.0$	$< 17.0$	8.5
Summer	KY7, YS1	Normal Passing mode	$\geq 2.0$	$< 21.0$	10.5–11.5
		Passing with Independent Observer mode			

Table 2

Experiments planned in each seasonal survey during the 2024 dedicated sighting surveys.

Season	Vessel	Planned experiments
Spring	YS1, YS2	Photo-ID, biopsy, satellite tagging, acoustic tagging, distance and angle experiments
Summer	KY7, YS1	Photo-ID, biopsy, satellite tagging, MINTAG, distance and angle experiments

bow or upper deck. Further, biopsy skin sampling using the Larsen system (Larsen, 1998) was conducted when blue, fin, sei and common minke whales were sighted. The satellite tagging experiment using the Air Rocket Transmitter System (LK-ARTS) was also conducted for fin and common minke whales.

### Hachijojima Island Survey

#### Research area and period

A new winter survey was conducted around Hachijojima Island (Figure 3) from December 2024 to March 2025. The primary objective was to collect photo-identification data of humpback whales in their breeding area for abundance estimation based on mark-recapture methods. The survey area primarily covered waters shallower than 200 m on the southeastern and southwestern sides of the island, located approximately 287 km south of Tokyo.

#### Research vessels and methodology

The survey employed a combination of dedicated systematic surveys using a chartered vessel *Aki-Maru* (12GT) (Figure 4) for 14 days, and opportunistic surveys using a commercial whale watching vessel for 15 days.

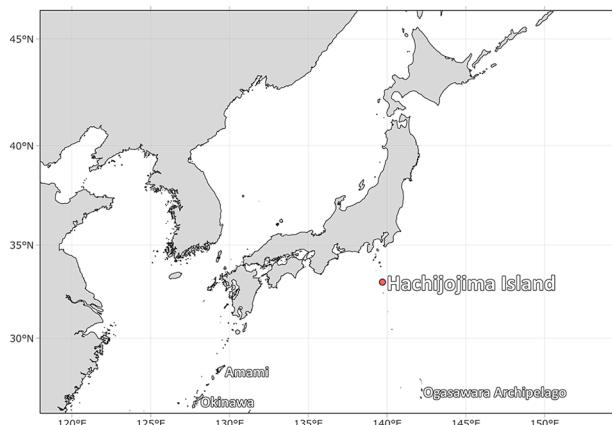


Figure 3. Location of Hachijojima island.



Figure 4. Research vessel *Aki-maru*.

#### Data collection

The primary focus was on collecting photo-identification images of humpback whale flukes using Canon EOS R6 Mark II cameras. A total of 29 survey days (14 dedicated +15 opportunistic) were conducted, though weather conditions reduced the dedicated survey effort to 58% of the planned schedule.

Additionally, photo-identification images were provided by Nature Kikaku Co. from whale watching operations conducted outside of the scheduled survey periods.

## RESULTS

#### Brief narrative of the surveys

##### Spring survey (April–June)

YS1 departed Shimonoseki, Yamaguchi, Japan on 20 April, and started the survey in the research area on 24 April. The survey was completed on 31 May. YS1 arrived in Shiogama, Miyagi, Japan on 6 June.

YS2 departed Shiogama, Miyagi, Japan on 12 April, and started the survey in the research area on 15 April. The survey was completed on 25 May. YS2 arrived in Shiogama on 29 May.

##### Summer survey (July–October)

KY7 departed Otaru, Hokkaido, Japan on 26 July and started the survey in the research area on 6 August. KY7 suspended the survey on 4 September and entered Kushiro for port call on 7 September. KY7 departed Kushiro on 8 September and resumed the survey in the research area on 10 September. The survey was completed on 4 October and KY7 arrived in Shiogama on 11 October.

YS1 departed Shiogama on 2 August and started the survey on 8 August. YS1 completed it on 25 September. YS1 arrived in Hachinohe, Aomori, Japan on 30 September.

Although the survey was originally planned to cover waters down to 35°N, rough weather conditions caused delays in progress, and the survey area was limited to 38°N. The remaining area will be surveyed during the same period in 2025.

#### Winter survey (December–March, Hachijojima island)

*Aki-Maru* conducted dedicated surveys around Hachijojima Island in six periods between December 2024 and March 2025. In this study, daily surveys were conducted during each 4-day survey period, with the research vessel departing from either Yaene Port or Borawazawa fishery port or Kaminato port at 09:00 and returning at 15:00. Due to meteorological conditions, 14 out of 24 planned survey days were completed. Surveys were conducted on 6 January, 20–23 January, 3–4 and 17–20 February, 6 and

10–12 March 2025.

In addition, opportunistic surveys were conducted aboard commercial whale watching vessels operated by Nature Kikaku Co. Ltd. between December 2024 and March 2025, completing 15 survey days. These supplemented the dedicated surveys to maintain continuous monitoring throughout the winter season.

### Searching effort

A summary of searching effort and coverage in each seasonal survey is shown in Table 3. A total of 10,778.7 n.miles

(19,962.2 km) were searched in all seasonal surveys.

### Sightings

#### Spring

Tables 4 shows the total sightings for large and small cetacean species, made in the spring season. The sighting locations of each species are shown in Figure 5.

#### Fin whale

A total of 33 schools (53 individuals) were sighted (Figure 5). No mother and calf pairs were observed. The mean school size was 1.61. SST at sighting positions

Table 3  
Summary of the survey periods and searching effort by each seasonal survey in the 2024 dedicated sighting surveys.

Season	Vessel	Research period	Planned cruise track (n.miles)	Searching effort NSP (n.miles)	Searching effort IO (n.miles)	Searching effort Total (n.miles)	Coverage of effort
Spring	YS1	2024/04/24–05/31	1,585.4	1,466.7	—	1,466.7	92.5%
	YS2	2024/04/15–05/25	1,837.0	1,062.3	—	1,062.3	57.8%
	Sub total	—	3,422.4	2,529.0	—	2,529.0	73.9%
Summer	KY7	2024/08/17–09/04, 09/10–10/04	7,190.0*	2,377.6	2,365.6	4,743.2**	66.0%
	YS1	2024/08/08–09/25	—	—	—	—	—
	Total	—	10,612.4	4,906.6	2,365.6	7,272.2	68.5%

\* Planned distance up to 35°N

\*\* Actual surveyed distance up to 38°N

Table 4  
Total number of sightings of large and small cetacean species made in the spring season 2024, by research vessel and species.

Species	YS1				YS2				Total			
	Prim.		Sec.		Prim.		Sec.		Prim.		Sec.	
	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.
Fin whale	6	6	0	0	19	29	8	18	25	35	8	18
Common minke whale	12	13	0	0	17	21	6	7	29	34	6	7
Bryde's whale	8	9	0	0	0	0	0	0	8	9	0	0
Humpback whale	36	50	7	10	0	0	0	0	36	50	7	10
Sperm whale	15	46	1	1	0	0	0	0	15	46	1	1
Like minke	0	0	1	1	1	1	1	1	1	1	2	2
Like fin	0	0	0	0	1	1	4	5	1	1	4	5
Unidentified large baleen whale	0	0	1	1	0	0	0	0	0	0	1	1
Unidentified large cetacean	1	1	0	0	3	3	0	0	4	4	0	0
Killer whale	6	30	0	0	8	40	0	0	14	70	0	0
Pacific white-sided dolphin	13	226	0	0	2	22	0	0	15	248	0	0
Striped dolphin	1	48	0	0	0	0	0	0	1	48	0	0
Risso's dolphin	6	42	0	0	0	0	0	0	6	42	0	0
Northern form short-finned pilot whale	1	14	0	0	0	0	0	0	1	14	0	0
Harbour porpoise	1	3	0	0	1	2	0	0	2	5	0	0
Dall's porpoise	44	344	0	0	48	150	0	0	92	494	0	0
Ziphiidae	2	4	0	0	5	13	0	0	7	17	0	0

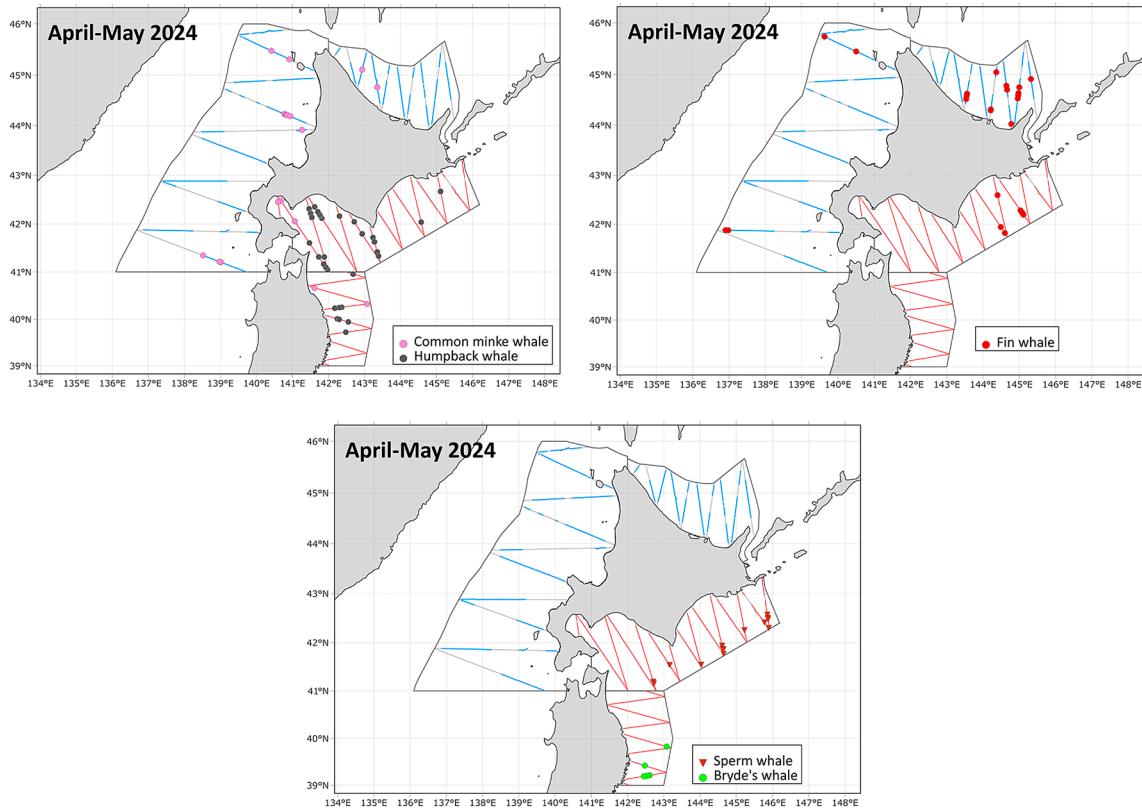


Figure 5. The locations of large cetaceans sighted by YS1 (blue track lines) and YS2 (red track lines) during the spring 2024. Upper left: Common minke whale (pink circles) and humpback whale (black circles) sightings. Upper right: Fin whale sightings (red circles). Lower: Sperm whale (purple triangles) and Bryde's whale (green circles) sightings.

ranged from 10.8°C–12.3°C (mean 11.6°C) for YS1 and 4.8°C–10.8°C (mean 7.5°C) for YS2. A total of 5 biopsy samples were collected (1 by YS1, 4 by YS2) and 2 acoustic tags were attached to fin whales by YS2 in the Okhotsk Sea.

#### Bryde's whale

A total of 8 schools (9 individuals) were sighted by YS1 in the Pacific coastal waters south of 40°N (Figure 5). No mother and calf pairs were observed. The range of SST at sighting positions was 17.3°C–20.1°C (mean SST 18.7°C), and the mean school size was 1.13.

#### Common minke whale

A total of 35 schools (41 individuals including 1 mother and calf pair) were sighted (Figure 5). The mean school size was 1.17. SST at sighting positions ranged from 11.0°C–16.7°C (mean 14.2°C) for YS1 in the Pacific side and 4.8°C–13.5°C (mean 9.8°C) for YS2 in the Okhotsk Sea and Sea of Japan. A total of 10 biopsy samples were collected (4 by YS1, 6 by YS2) and 13 satellite tags were attached (6 by YS1, 7 by YS2).

#### Humpback whale

A total of 43 schools (60 individuals including 2 mother and calf pairs) were sighted by YS1 only (Figure 5). The

range of SST at sighting positions was 10.5°C–18.3°C (mean SST 15.2°C), and the mean school size was 1.40. Photo-ID images were collected from 5 individuals.

#### Sperm whale

A total of 16 schools (47 individuals) were sighted by YS1 (Figure 5). The range of SST at sighting positions was 11.0°C–17.3°C (mean SST 14.8°C). The mean school size was 2.94.

#### Summer

Tables 5 shows the total sightings for large and small cetacean species, made in the summer season. The sighting locations of large cetacean species are shown in Figure 6.

#### Blue whale

A total of 22 schools (23 individuals) were sighted primarily by YS1, concentrated north of 50°N. No mother and calf pairs were observed. The range of SST at sighting positions was 9.5°C–14.8°C (mean 11.2°C), and the mean school size was 1.05. Photo-ID images were collected from 1 individual by KY7.

#### Fin whale

A total of 39 schools (49 individuals) were sighted, with 36 schools by YS1 in the east of 160°E. No mother and

Table 5  
Total number of sightings of large whales made in the summer season 2024, by research vessel and species.

Species	KY7				YS1				Total			
	Prim.		Sec.		Prim.		Sec.		Prim.		Sec.	
	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.	Sch.	Ind.
Blue whale	3	3	0	0	19	20	1	2	22	23	1	2
Fin whale	3	3	0	0	36	46	0	0	39	49	0	0
Sei whale	15	17	0	0	65	79	2	2	80	96	2	2
Common minke whale	3	3	0	0	3	3	0	0	6	6	0	0
Bryde's whale	35	55	0	0	20	20	1	1	55	75	1	1
Humpback whale	0	0	0	0	4	5	2	2	4	5	2	2
Sperm whale	63	161	0	0	51	82	0	0	114	243	0	0
Like fin	7	8	0	0	11	12	0	0	18	20	0	0
Like minke	0	0	0	0	0	0	0	0	0	0	0	0
Unidentified large baleen whale	1	1	0	0	3	3	0	0	4	4	0	0
Baird's beaked whale	2	6	0	0	0	0	0	0	2	6	0	0
Killer whale	6	31	0	0	11	73	0	0	17	104	0	0
Common dolphin	8	188	0	0	2	41	0	0	10	229	0	0
Pacific white-sided dolphin	3	119	0	0	0	0	0	0	3	119	0	0
Northern right whale dolphin	0	0	0	0	1	26	0	0	1	26	0	0
Striped dolphin	1	12	0	0	1	23	0	0	2	35	0	0
Risso's dolphin	1	6	0	0	5	114	0	0	6	120	0	0
Southern form short-finned pilot whale	1	24	0	0	0	0	0	0	1	24	0	0
Dall's porpoise	3	14	0	0	7	44	0	0	10	58	0	0
Ziphiidae	7	16	0	0	7	10	0	0	14	26	0	0
Mesoplodon spp.	1	1	0	0	0	0	0	0	1	1	0	0

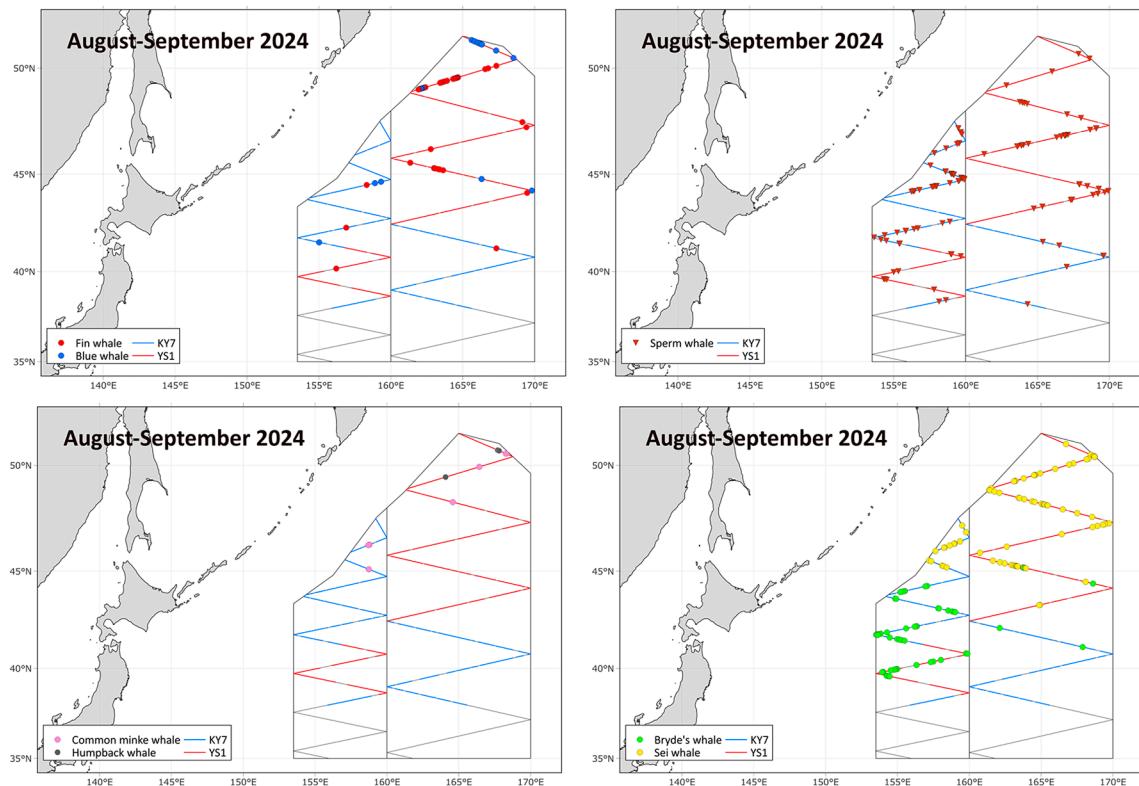


Figure 6. Sighting locations of large cetaceans by KY7 (blue track lines) and YS1 (red track lines) during the summer 2024. Upper left: fin whale (red circles) and blue whale (blue circles). Upper right: sperm whale (brown circles). Lower left: common minke whale (pink circles) and humpback whale (black circles). Lower right: Bryde's whale (green circles) and sei whale (yellow circles).

calf pairs were observed. The range of SST at sighting positions was 9.5°C–15.3°C (mean 11.8°C), and the mean school size was 1.26. A total of 6 biopsy samples were collected and 4 satellite tags and 1 MINTAG were deployed by YS1.

#### Sei whale

The most abundant baleen whale with 80 schools (96 individuals) sighted. No mother and calf pairs were observed. The range of SST at sighting positions was 9.5°C–16.8°C (mean 12.1°C), and the mean school size was 1.20.

#### Bryde's whale

A total of 55 schools (75 individuals) were sighted, primarily in the west of 160°E. No mother and calf pairs were observed. The range of SST at sighting positions was 19.3°C–24.5°C (mean 21.8°C), and the mean school size was 1.36.

#### Common minke whale

Only 6 schools (6 individuals) were sighted, 3 each by KY7 and YS1. The range of SST was 11.5°C–21.8°C (mean 17.6°C), and the mean school size was 1.00.

#### Humpback whale

A total of 4 schools (5 individuals) were sighted by YS1 around 50°N. The range of SST was 10.3°C–11.8°C (mean 11.0°C). Photo-ID images were collected from 1 individual.

#### Sperm whale

This species was the most abundant with 114 schools (243 individuals) distributed throughout the research area. The mean school size was 2.13. The range of SST was 11.5°C–24.3°C (mean 18.2°C).

Table 6

Total number of humpback whale sightings during the Hachijojima Island survey 2024/25 season.

Survey type	Survey days	Sch.	Ind.	Photo-ID (individuals)
Dedicated survey	14	170	270	89
Opportunistic survey	15	109	158	56
Data provision	—	—	—	73
Total	29	279	428	218

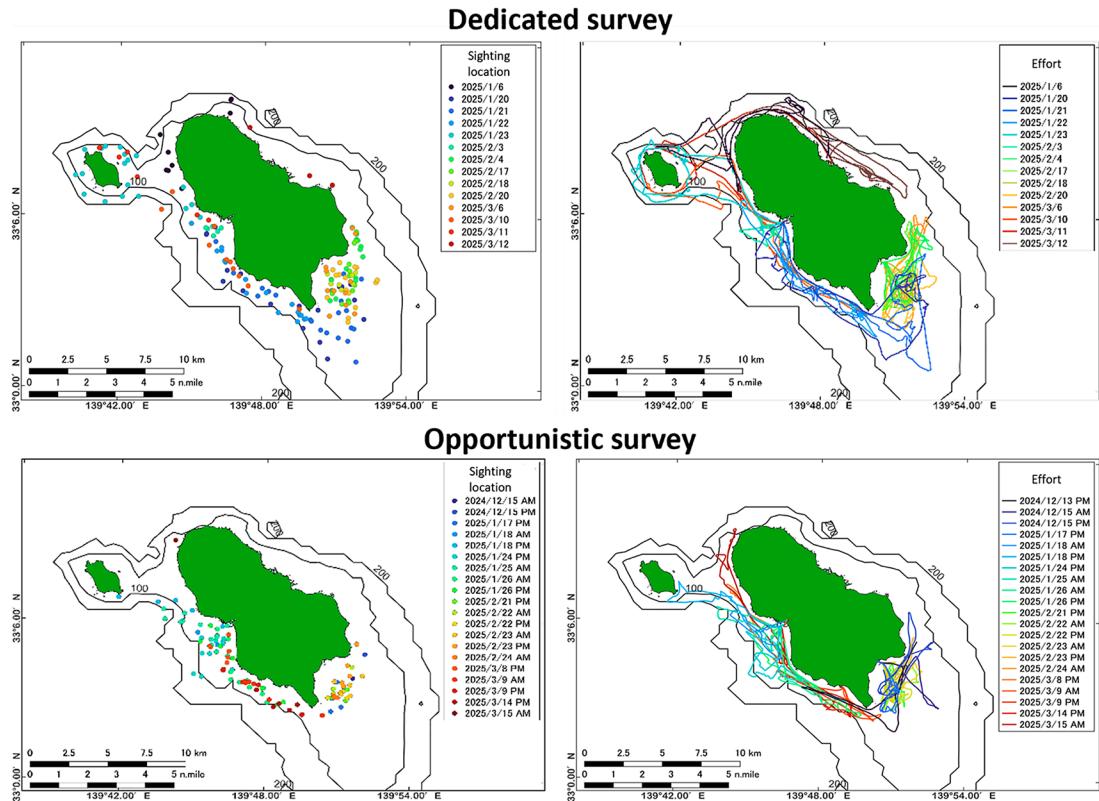


Figure 7. Sighting locations of humpback whales and survey tracks during the Hachijojima Island in 2024/25 season. Upper panels show dedicated survey results (left: sighting locations by date, right: survey effort tracks). Lower panels show opportunistic survey results aboard commercial whale watching vessels (left: sighting locations by date, right: survey tracks). Depth contours show 100 m and 200 m isobaths. Humpback whales were concentrated in waters shallower than 200 m around the southeastern and southwestern areas of the island.

### Duplicate sightings

During the summer survey, duplicate sightings in IO mode were recorded for  $g(0)$  estimations. A total of 174 whale schools were sighted by either TOP or IOP observers, with 51 confirmed duplicates. By species, blue whales had 25 total sightings with 7 duplicates, fin whales had 45 sightings with 14 duplicates, sei whales had 65 sightings with 23 duplicates, and Bryde's whales had 36 sightings with 8 duplicates. Common minke whales had 4 sightings with no duplicates detected. These duplicate detection rates will be used for calculating detection probability  $g(0)$  to adjust future abundance estimates.

### *Winter (Hachijojima Island)*

A total of 279 humpback whale schools (428 individuals) were sighted, with whales concentrated in waters shallower than 200 m around the southeastern and southwestern areas of the island (Table 6, Figure 7).

Photo-identification images were collected from 218 individuals (including duplicates from dedicated surveys, opportunistic surveys, and images provided by Nature Kikaku Co.) (Table 6). Two mother-calf pairs were confirmed during the opportunistic surveys. No feeding behavior was observed throughout the survey period.

A notable observation was a sighting of a North Pacific right whale (*Eubalaena japonica*) at Hachijojima Island on 30 March 2025, the first record for the island. The individual was photographed during commercial whale watching operations, and the image was provided by Nature Kikaku Co. (Figure 8).



Figure 8. North Pacific right whale sighted at Hachijojima Island on 30 March 2025, the first record for this area. Photo: Nature Kikaku Co.

### **Experiments**

#### *Sighting distance and angle experiment*

Distance and angle estimation experiments were conducted during both spring and summer surveys to calibrate observer measurements. In spring, experiments were conducted by YS1 on 18 May and YS2 on 29 April. In summer, KY7 conducted the experiment on 27 August and YS1 on 25 September. These experiments followed the IWC/SOWER and IWC-POWER protocols (IWC, 2012).

### *Photo-ID*

A total of 159 individuals were photographed across all seasons (Table 7). In spring, 11 individuals were photographed, including five humpback whales and six killer whales. Summer surveys yielded only three photo-IDs (one blue whale, one humpback whale, and one killer whale) due to the focus on abundance estimation using IO mode. The Hachijojima Island survey was most productive with 145 humpback whale individuals photographed. All photographs were stored in the ICR catalog for future stock structure and movement analyses.

### *Biopsy sampling*

Biopsy skin samples were collected using the Larsen system from 21 individuals (Table 8). Spring surveys collected 15 samples: YS1 collected 5 samples (4 common minke whales, 1 fin whale) and YS2 collected 10 samples (6 common minke whales, 4 fin whales). Summer surveys collected 6 samples, all fin whales from YS1. No biopsy

**Table 7**  
Number of individuals photographed during the 2024 dedicated sighting surveys, by seasonal survey, research vessel and species.

Species	Spring	Summer	Hachijojima	Total
Blue whale	0	1	0	1
Humpback whale	5	1	145	151
Killer whale	6	1	0	7
<b>Total</b>	<b>11</b>	<b>3</b>	<b>145</b>	<b>159</b>

**Table 8**  
Number of biopsy samples collected during the 2024 dedicated sighting surveys, by seasonal survey, research vessel and species.

Species	Spring	Summer	Hachijojima	Total
Common minke whale	10	0	0	10
Fin whale	5	6	0	11
<b>Total</b>	<b>15</b>	<b>6</b>	<b>0</b>	<b>21</b>

sampling was conducted during the Hachijojima Island survey. All samples were stored at the ICR laboratory and will be used in genetic analyses for investigating the stock structure of those species in the future.

#### *Satellite tagging*

Satellite tags were deployed in the spring and summer surveys. A total of 13 satellite tags were deployed in the spring (common minke whales only), and 4 tags in the summer (fin whales only). Additionally, 2 acoustic tags were deployed on fin whales during the spring survey by YS2. A MINTAG, a newly developed smaller and lighter implantable satellite tag designed for long-distance deployment on fast swimming rorquals, was successfully deployed on one fin whale during the summer survey by YS1. Tracking data are available at <https://mintag-project.com/follow-the-whales/#mintag-2024>. This experimental tag aims to enable year-round tracking with improved retention time and reduced drag compared to conventional tags. Tracking and behavioral data obtained from these tags will contribute to the elucidation of the movement patterns of whales and the timing of migration between high latitude feeding areas and low latitude breeding areas.

## **HIGHLIGHTS OF THE SURVEY**

The sighting surveys conducted in 2024 provided valuable data for studies on cetacean distribution and abundance across three seasons in both feeding and breeding areas. Key findings from each season are summarized below.

#### *Spring Survey (April–May)*

The spring survey successfully collected data on whale migration and stock structure in the western North Pacific. Common minke whales, the primary target species, were sighted in 35 schools (41 individuals), and 13 satellite tags were deployed, providing valuable data on their movement patterns. Notably, the continued presence of fin whales in the Okhotsk Sea was confirmed, with 33 schools (53 individuals) recorded. Humpback whales were abundantly observed in coastal waters of the Pacific side (43 schools/60 individuals), concentrated between 39°N–42°N, with many sightings west of Cape Erimo. These distribution patterns suggest seasonal northward migration toward feeding grounds. Bryde's whales were also sighted in small numbers, with 40°N representing the northern limit of their distribution. The successful deployment of two acoustic tags on fin whales by YS2 represents a new experimental approach for studying whale vocalizations.

#### *Summer Survey (August–September)*

The summer survey provided crucial data for abundance estimation using IO mode, with sei whales being the most abundant baleen whale species (80 schools/96 individuals). The duplicate detection rates in IO mode are essential for calculating detection probability  $g(0)$  for adjustment of future abundance estimates. Blue whales (22 schools/23 individuals) were concentrated primarily north of 45°N between 153°E–170°E. The successful deployment of a MINTAG on one fin whale represents a significant technological advancement, marking the first successful deployment from a large research vessel. Sperm whales were the most abundant species overall (114 schools/243 individuals), widely distributed throughout both survey areas between 35°N–51.5°N and 153°E–170°E. However, rough weather conditions limited the survey extent to 38°N instead of the planned 35°N, with the remaining southern area scheduled for coverage in 2025.

#### *Winter Survey (Hachijojima Island, December–March)*

A total of 279 humpback whale schools (428 individuals) were sighted over 29 survey days, concentrated in waters shallower than 200 m around the island. The combination of dedicated surveys (14 days) and opportunistic surveys aboard commercial whale watching vessels (15 days) proved effective for maintaining continuous monitoring despite weather constraints. Photo-identification images were collected from 218 individuals, providing valuable data for abundance estimates and individual tracking. The first recorded sighting of a North Pacific right whale at Hachijojima Island on 30 March 2025 represents a significant discovery for this critically endangered species. ICR has primarily conducted summer feeding area surveys, but with the addition of winter breeding area surveys around Hachijojima Island, a comprehensive year-round survey system linking feeding and breeding areas has been established. This year-round monitoring system is expected to elucidate the life history of this species in the western North Pacific, contribute to expanding fundamental knowledge of distribution patterns, migration routes, and reproductive dynamics of baleen whales under environmental changes such as the recent marked increase in sea surface temperatures, and provide a scientific foundation for appropriate resource management.

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