Technical Reports of the Institute of Cetacean Research (2025) pp. 46–51

Technical Report (not peer reviewed)

Results of the IWC-Pacific Ocean Whale and Ecosystem Research (IWC-POWER) dedicated sighting survey in 2024—An overview—

Hiroto MURASE[1,*] and Isamu YOSHIMURA[2]

[1] *Laboratory of Cetacean Biology, Tokyo University of Marine Science and Technology, 4–5–7 Konan, Minato-ku, Tokyo 108–8477, Japan*

[2] *Kyodo Senpaku Co. Ltd., 4–5 Toyomi-cho, Chuo-ku, Tokyo 104–0055, Japan*

**Contact e-mail: hmuras0@kaiyodai.ac.jp*

ABSTRACT

This paper outlines the main results of the 2024 dedicated sighting survey of the International Whaling Commission-Pacific Ocean Whale and Ecosystem Research (IWC-POWER). The IWC-POWER surveys are designed and implemented by the IWC Scientific Committee, in special partnership with the Government of Japan. The surveys have been conducted since 2010 as the first phase with the long-term objective to 'provide information to allow determination of the status of populations (and thus stock structure is inherently important) of large whales that are found in the North Pacific waters and provide the necessary scientific background for appropriate conservation and management actions'. The 2024 survey was conducted successfully between 2 August and 10 October 2024 in the southern Chukchi Sea and the eastern Bering Sea by the Japanese R/V *Yushin-Maru* No. 2. This was the first time the POWER cruise was conducted in the southern Chukchi Sea while the eastern Bering Sea was surveyed in 2017. The following whale species were sighted in the survey area: fin (80 schools/149 individual), common minke (5/6), humpback (20/36), gray (44/78), bowhead (1/2), sperm (3/3) and killer (18/85) whales. No sighting of North Pacific right whales was made. Photo-identification data were collected from 34 fin, 14 humpback, 5 gray, 1 bowhead and 10 killer whales. A total of 21 biopsy samples were collected from 7 fin, 2 sei, 8 humpback, 3 gray and 1 killer whales. A total of 163 sonobuoys were deployed, of which 150 were successful, for a total of over 545 monitoring hours. Data collected during this survey will be used mainly for abundance estimation and stock structure purposes.

INTRODUCTION

The International Whaling Commission-Pacific Ocean Whale and Ecosystem Research (IWC-POWER) program is an international research effort in the North Pacific coordinated by the IWC and designed by the IWC Scientific Committee (SC) in special partnership with the Government of Japan. Scientists from the Institute of Cetacean Research (ICR) and the cooperative institutes such as Tokyo University of Marine Science and Technology participate regularly in the IWC-POWER program, both in designing and implementing the surveys. The IWC-POWER surveys in the North Pacific follow the series of IWC International Decade for Cetacean Research/Southern Ocean Whale and Ecosystem Research (IDCR/SOWER) surveys that have been conducted in the Antarctic since 1978 (Matsuoka *et al.*, 2003).

The long-term objective of the IWC-POWER is to 'provide information to allow determination of the status of populations (and thus stock structure is inherently important) of large whales that are found in the North Pacific waters and provide the necessary scientific background for appropriate conservation and management actions'. The first survey of this program was conducted in 2010 and the most recent one in 2024 as part of the Phase I (IWC, 2024a). The Phase I survey would be completed in 2025 and the IWC SC is preparing for the next phase related to medium and long-term priorities, based on the results of the first phase (IWC, 2024b).

The objective of this document is to present an overview of the 2024 IWC-POWER focusing on the results within the survey area. The details are provided in Murase *et al.* (2024). General background of the IWC-POWER including objectives, research area, and general methodology is described in Matsuoka (2020).

OVERVIEW OF RESULTS OF THE 2024 IWC-POWER SURVEY

Itinerary

The survey was conducted between 2 August and 10 October 2024 by the Japanese R/V *Yushin-Maru* No. 2. The itinerary is shown in Table 1.

Research area

The research area for POWER 2024 was set in the US Exclusive Economic Zone (EEZ) from 51°N to 69°N and from approximately 175°W to 157°W (Figure 1). The southern Chukchi Sea stratum had not been previously surveyed by the IWC-POWER programme, while the northeastern and southeastern Bering Sea strata were surveyed in 2017.

Research vessel and scientific personnel

The R/V *Yushin-Maru* No. 2 was used for this survey. The specifications of the vessel are given in Table 2.

Four international researchers were nominated by the IWC SC for this survey:

Hiroto Murase (Japan): Cruise Leader (CL)
Jessica Crance (USA): Acoustics, photo-ID
Peter Duly (USA): Photo-ID data management, seabird sighting
Isamu Yoshimura (Japan): sighting data, marine debris and biopsy sample management

Searching effort

The survey was conducted using methods based on the guidelines of the IWC SC. Survey trackline coverage in the research area was 78.2% (1,253.3 n.miles of a planned distance of 1,603.4 n.miles), with a total of 585.4 n.miles in Passing with abeam closing mode (NSP) and 667.9 n.miles in Independent Observer passing mode (IO) (Table 3). Additionally, 88.2 n.miles were surveyed during transit between Japan to and from Dutch Harbor, and Dutch Harbor to and from the research area.

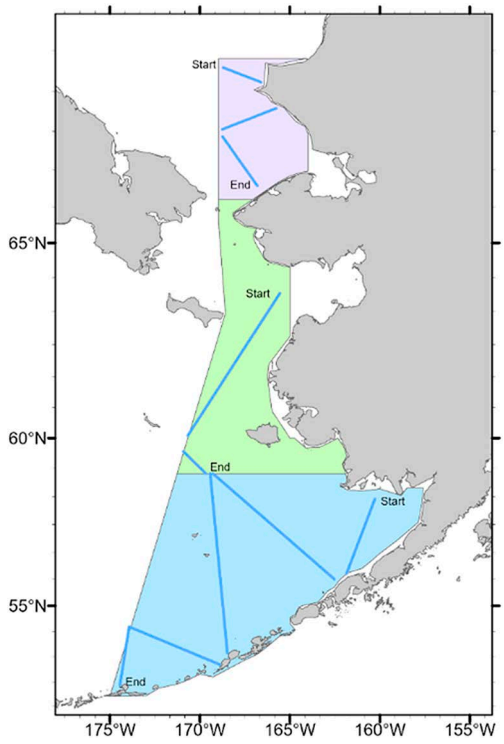

Figure 1. The entire research area (thin black line) and survey track lines (blue line) with start and end points for the 2024 IWC-POWER survey. Purple: southern Chukchi Sea stratum; green: northeastern Bering Sea stratum; blue: southeastern Bering Sea stratum.

Table 1
The 2024 IWC-POWER survey itinerary.

Date (ship's time)	Event
1-Aug-2024	Pre-cruise meeting held at Shiogama
2-Aug	Vessel departed Shiogama
10-Aug	Vessel arrived at Dutch Harbor
12-Aug	Pre-cruise meeting held at Dutch Harbor
13-Aug	Vessel departed Dutch Harbor
17-Aug	Vessel started the survey in the research area
	Research Area (39 days)
24-Aug	Vessel completed the survey in the research area
26-Sep	Vessel arrived at Dutch Harbor
28-Sep	Post-cruise meeting held at Dutch Harbor
29-Sep	Vessel departed Dutch Harbor
10-Oct	Vessel arrived at Shiogama
11-Oct	Post-cruise meeting held at Shiogama

Table 2
Specifications of the R/V *Yushin-Maru* No. 2.

Call sign	JPPV
Length overall [m]	69.61
Molded breadth [m]	11.5
Gross tonnage (GT)	747
Barrel height [m]	19.5
IO barrel height [m]	13.5
Upper bridge height [m]	11.5
Bow height [m]	6.5
Engine power [PS/kW]	5,303/3,900

Table 3

Summary of the searching effort (time and distance), experimental time (hours) in the survey area of the 2024 IWC-POWER survey.

Area	Area Code	Leg No.	Start	End	NSP		IO		NSP+IO		Photo-ID, Biopsy, TDR tag	Estimated angle and distance training/ experiment
		Start	Date	Date	Time	Dist.	Time	Dist.	Time	Dist.	Time	Time
		End	Time	Time		(n.m.)		(n.m.)		(n.m.)		
Research Area Southern Chukchi Sea (Leg 301–308)	70	301	17-Aug.	22-Aug.	6:22:54	72.32	6:40:22	74.89	13:03:16	147.21	2:23:26	0:00:00
	US EEZ	308	6:00	18:30								
Research Area Northeastern Bering Sea (Leg 101–109)	71	101	24-Aug.	30-Aug.	10:18:43	117.48	11:45:11	133.95	22:03:54	251.43	0:48:21	3:59:19
	US EEZ	109	7:23	18:20								
Research Area Southeastern Bering Sea (Leg 151–177)	72	151	1-Sep.	24-Sep.	34:17:02	395.60	39:42:42	459.08	73:59:44	854.68	4:46:23	6:45:44
	US EEZ	177	6:00	19:09								

Table 4

Number of sightings for all species observed in the research area during the 2024 IWC-POWER survey (original track lines), by effort mode. NSP: Normal Passing with abeam closing mode; IO: Independent Observer mode, OE: Top down (TD) and drifting (DR). Numbers of Individuals include the number of calves.

Species	NSP			IO			OE			Total		
	Sch.	Ind.	Calf	Sch.	Ind.	Calf	Sch.	Ind.	Calf	Sch.	Ind.	Calf
Fin whale	39	76	0	41	73	0	0	0	0	80	149	0
Like fin	0	0	0	3	4	0	0	0	0	3	4	0
Common minke whale	3	4	0	0	0	0	2	2	0	5	6	0
Like minke	0	0	0	1	1	0	0	0	0	1	1	0
Humpback whale	9	9	0	10	26	0	1	1	0	20	36	0
Like humpback	0	0	0	1	1	0	0	0	0	1	1	0
Gray whale	14	23	0	23	47	0	7	8	0	44	78	0
Like gray	1	1	0	0	0	0	0	0	0	1	1	0
Bowhead whale	1	2	0	0	0	0	0	0	0	1	2	0
Sperm whale	3	3	0	0	0	0	0	0	0	3	3	0
Killer whale	5	43	6	12	39	0	1	3	0	18	85	6
Harbour porpoise	2	3	1	3	4	0	0	0	0	5	7	1
Dalli type Dall's porpoise	6	41	0	3	11	0	0	0	0	9	52	0
Unid. type Dall's porpoise	3	16	0	0	0	0	0	0	0	3	16	0
Unid. large baleen whale	5	5	0	8	8	0	1	1	0	14	14	0
Unid. small cetacean	1	2	0	0	0	0	0	0	0	1	2	0
Unid. cetacean	0	0	0	4	4	0	0	0	0	4	4	0

Summary of the sightings

The following whale species were sighted in the survey area: fin (80 schools/149 individual), common minke (5/6), humpback (20/36), gray (44/78), bowhead (1/2), sperm (3/3) and killer (18/85) whales (Table 4). No sighting of North Pacific right whales was made. These data will be mainly used to estimate abundance of several species.

Geographical distribution by species

Fin whale

Fin whales were observed, primarily in the western part of the southeastern Bering Sea stratum (Figure 2). Sea temperatures ranged from 3.9 to 9.2°C (25th to 75th quartiles: 7.8–8.7°C).

Humpback whale

Humpback whales were observed throughout the re-

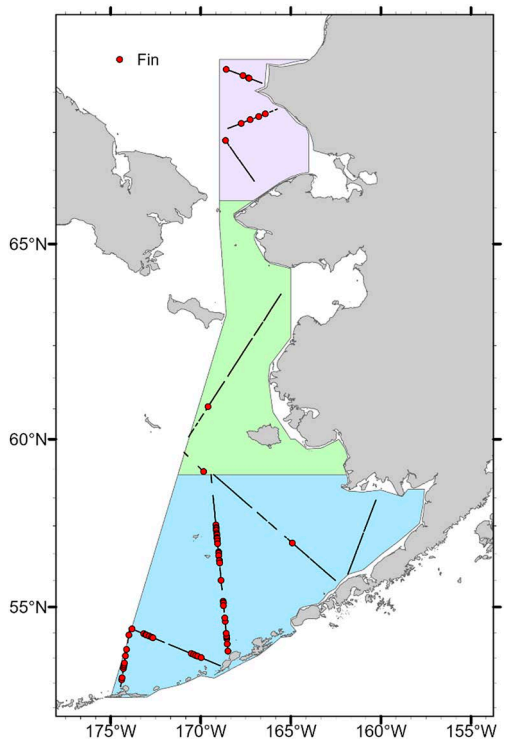

Figure 2. The searching effort (black lines) and sighting positions (red circles) of fin whales during the 2024 IWC-POWER survey.

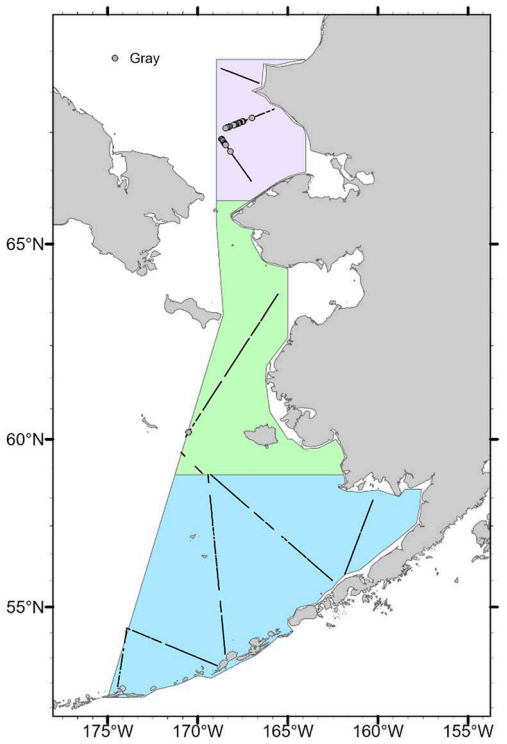

Figure 4. The searching effort (black lines) and sighting positions (gray circles) of gray whales during the 2024 IWC-POWER survey.

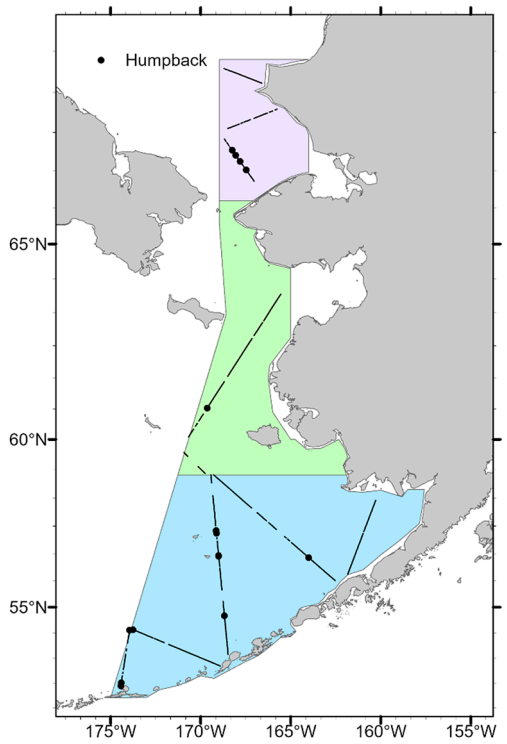

Figure 3. The searching effort (black lines) and sighting positions (black circles) of humpback whales during the 2024 IWC-POWER survey.

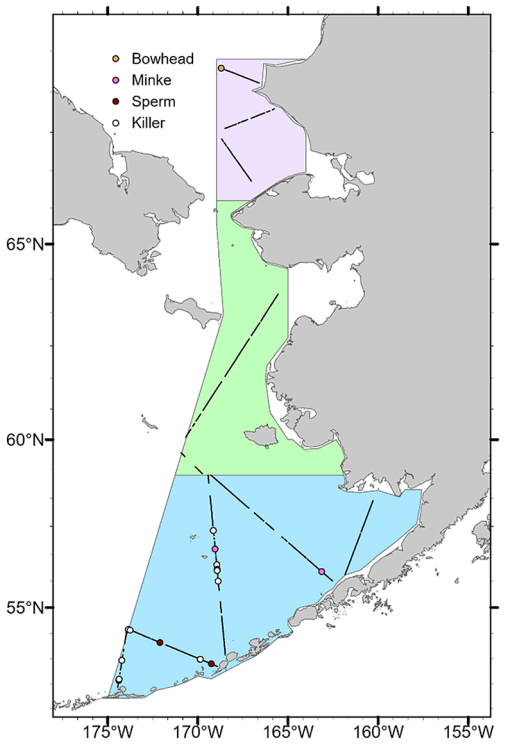

Figure 5. The searching effort (black line) and primary sighting positions of bowhead (yellowish brown circle), common minke (pink circles), sperm (brown circles) and killer (white circles) whale during the 2024 IWC-POWER survey.

search area (Figure 3). Sea temperatures ranged from 4.0 to 9.0°C (25th to 75th quartiles: 7.6–8.2°C).

Gray whale

Gray whales were observed, primarily in the southern Chukchi Sea stratum (Figure 4). Sea temperatures ranged from 3.7 to 7.1°C (25th to 75th quartiles: 3.9–5.4°C).

Other species

Sightings distributions of bowhead, common minke, sperm and killer whales are shown in Figure 5.

Identification of duplicated sightings

A total of 129 resighting was detected during IO Mode involving several baleen whale species. These data will be used to estimate *g*(0), which in turn will be used to adjust abundance estimates.

Photo-ID experiments

Photo-ID data were obtained from a total of 64 individuals: fin (34 individuals), humpback (14), gray (5), bowhead (1) and killer (10) whales (Table 5). Images collected during the survey were uploaded to the IWC master photographic database in Adobe Lightroom (LR). Photo-ID data will be used to study movement, distribution and stock structure of the species involved.

Biopsy sampling

Biopsy samples were collected during the entire cruise including transits for 21 individual whales: 7 fin, 2 sei, 8 humpback, 3 gray and 1 killer whales (Table 6). Every biopsy sampling was documented photographically. All biopsy samples were catalogued and stored on the vessel in cryo-vials frozen at a temperature of −30°C. These samples will be used for molecular genetics analyses on stock identification.

Sonobuoys

A total of 163 sonobuoys were deployed, of which 150 were successful, for a total of over 545 monitoring hours. Species detected include fin (106 buoys, 70.6%), killer (35, 23.3%), sperm (32 buoys, 21.3%), humpback (31, 20.6%), gray (7, 4.6%), and North Pacific right (3, 2.0%) whales. Other signals detected include bowhead whales (1, 0.6%), walrus (3, 2.0%), unidentified pinniped (1, 0.6%), earthquakes (1, 0.6%), and distant seismic airguns (1, 0.6%).

Estimated Angle and Distance Experiment

The Estimated Angle and Distance Experiment was conducted on 2 September for 6 hours 45 minutes whilst in the research area. A total of 72 trials were conducted for each platform (TOP and IO barrels and upper bridge). The data will be used to calibrate observed angle and distance based on known angle and distance.

Marine macro debris observation

A total of 14 marine macro debris objects were observed. Four items were recorded 'on effort' (i.e., during the first 15 minutes of each hour) and 10 items were recorded during 'off effort'.

Satellite tagging studies

Deployment of SPLASH10-f-333 (Wildlife Computers, U.S.) during the high sea transit was planned but no attempt was made during this cruise due to inclement weather during the high sea transit.

HIGHLIGHTS OF THE SURVEY

It is concluded that the 2024 IWC-POWER survey was completed successfully by a group of international scientists and crews (Figure 6), and that valuable data were collected for several cetacean species. Such data will allow studies on distribution, abundance and stock structure in this particular area of the North Pacific.

Table 5

Summary of the Photo-ID'd experiments, by each species conducted during the entire 2024 IWC-POWER survey.

Photo-ID	Fin	Humpback	Gray	Bowhead	Killer	Total
Entire 2024 IWC-POWER	34	14	5	1	10	64

Table 6

Summary of the number of species-specific biopsy samples collected in the entire 2024 IWC-POWER survey.

Biopsy samples	Fin	Sei	Humpback	Gray	Killer	Total
Entire 2024 IWC-POWER	7	2	8	3	1	21

Figure 6. Researchers and crew of the 2024 IWC-POWER survey with the *Yushin-Maru* No. 2 in the background. The picture was taken at the end of the cruise in Dutch Harbor.

This was the first time for POWER to enter the southern Chukchi Sea stratum mainly for gray whale studies. During the 2024 POWER cruise, only small concentrations of fin and humpback whales were observed around the Pribilof Islands in the southeastern Bering Sea stratum. Notably, they were virtually absent in Bristol Bay and the right whale critical habitat in 2024. These two species were widely distributed in this stratum in the 2017 POWER cruise, but sightings were rare on the shelf in 2024 compared to 2017. The differences between 2017 and 2024 need further investigations.

ACKNOWLEDGEMENTS

We acknowledge the Governments of the US (NOAA Fisheries) and Japan (Fisheries Agency of Japan) for their assistance in the research permit and funding for this cruise and Iain Staniland and Secretariat of the IWC for their support and funding for this cruise. We also acknowledge the steering group of this cruise, and the Technical Advisory Group (TAG) group, and Mioko Taguchi and other staff of the Institute of Cetacean Research as well as the staff of Kyodo Senpaku Co. LTD., for their arrangements and support for this cruise. We also thank the crew of the R/V *Yushin-Maru No.2* for their hard work and dedication. Finally, we thank the TEREP Editorial Team for editorial check.

REFERENCES

International Whaling Commission. 2024a. Report of the IWC-POWER Planning Meeting, 17–19 October 2023, Seattle, WA, USA. *J. Cetacean Res. Manage*. (Suppl.) 26: 597–608.

International Whaling Commission. 2024b. Report of the Technical Advisory Group Workshop on Planning for the Medium-Long Term IWC-POWER Programme, Tokyo, 24–26 January 2024. *J. Cetacean Res. Manage.* (suppl.) 26: 611–636.

Matsuoka, K. 2020. An outline of the IWC-Pacific Ocean Whale and Ecosystem Research (IWC-POWER) including results of the 2019 survey. *Technical Reports of the Institute of Cetacean Research (TEREP-ICR)* No.4: 23–34.

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.

Murase, H., Crance, J., Duly, P., Yoshimura, I and Kasai, H. 2024. Cruise report of the 2024 IWC-Pacific Ocean Whale and Ecosystem Research (IWC-POWER). Available from https://iwc.int/document_3789.download (access on 6 July 2025).