

JAPAN PROGRESS REPORT ON CETACEAN RESEARCH April 2003 to April 2004

(compiled by)

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This report summarizes cetacean research conducted during the period from April 2003 to April 2004 by the National Research Institute of Far Seas Fisheries / Fisheries Research Agency (hereafter NRIFS) and the Fisheries Agency of the Ministry of Agriculture, Forestry and Fisheries, the Government of Japan (hereafter FAJ) with cooperation from other related organizations.

In accordance with the statement on small cetaceans made by the Japanese representative at the 52nd Annual meeting of IWC in June 2000, information on small cetaceans has not been included in the progress report for this year. Thus the report covers only cetacean species within the competence of IWC. The information on small cetaceans will be made available to interested parties through methods, forms and at times to be decided by the Government of Japan.

1. Species and stocks studied

Following species and stocks were studied by NRIFS and FAJ in cooperation with other organizations (excluding small cetaceans):

Common name	Scientific name	Area/stock(s)	Items referred to
Blue whale	<i>Balaenoptera musculus musculus</i>	North Pacific	2.1, 2.2, 4.1
True Blue whale	<i>B. m. intermedia</i>	Southern Hemisphere,	
Pygmy blue whale	<i>B. m. breviceauda</i>	Southern Hemisphere	
Fin whale	<i>B. physalus</i>	Sea of Okhotsk, North Pacific, Southern Hemisphere.	2.1
Sei whale	<i>B. borealis</i>	North Pacific, Southern Hemisphere	4.2, 4.5, 6.1
Minke whale	<i>B. acutorostrata</i>	North Pacific, Sea of Japan, Sea of Okhotsk	2.1, 2.2, 4.1, 4.2
Common minke whale			4.4, 6.1, 6.2, 7
Antarctic minke whale			
Bryde's whale	<i>B. edeni</i>	North Pacific, coastal waters off Kochi and off Kasasa (south west Japan), North Atlantic, Southern Hemisphere	2.1, 3.2, 4.2, 6.2
(continue)			
Humpback whale	<i>Megaptera novaeangliae</i>	North Pacific, Southern	2.1, 4.1, 6.2

		Hemisphere	
Gray whale	<i>Escherichius robustus</i>	North Pacific	2.1, 3.1
Right whale	<i>Eubalaena glacialis</i>	North Pacific	2.1, 6.2
Sperm whale	<i>Physeter macrocephalus</i>	North Pacific, off Ogasawara Is., South Pacific, North Atlantic, Southern Hemisphere	2.1, 4.2, 4.4, 6.1 6.2, 7, 8
Southern bottlenose whale	<i>Hyperoodon planifrons</i>	Southern Hemisphere	2.1

2. Sighting data

2.1 Fieldwork

2.1.1 Systematic, shipboard

The NRIFS and FAJ conducted a total of eleven dedicated shipboard sighting and other related surveys using research vessels and three sighting surveys - using airplane from April 2003 to April 2004 in the North Pacific and the Southern Hemisphere, in cooperation with other scientific organizations such as The Institute of Cetacean Research (ICR) etc. All of the vessels are equipped with a top barrel. Names of the vessels, scientists on board, and period of each cruise are given in Table 1.

Table 1. Name of vessels, scientists on board for the sighting and other research in the North Pacific and the Southern Hemisphere from April 2003 to April 2004.

Name of vessel	Main objective	Period and region	Scientists on board*
[North Pacific]			
<i>Kurosaki</i> (Japan-Korea joint survey)	Sighting survey for mainly common minke whales	April 11 – May 10, Western Sea of Japan	Saito, T. (TS/NRIFS), Okumura, T. (TS/NRIFS), Okumura, T. (TS/NRIFS), Nitta, T. (TS/NRIFS)
<i>Shonan-maru No.2</i> (Japan-Korea joint survey)	Sighting survey for mainly common minke whales	May 12 – June 30, Sea of Japan	Miyashita, T. (NRIFS; June 19- June 30), Saito, T. (TS/NRIFS; May 12 – June 16), Noji, S. (TS/NRIFS), Sohn, H. (R. of Korea; June 19 – June 30)
<i>Shonan-maru</i>	Sighting survey for mainly common minke whales	July 22-Sep 19, Eastern Sea of Okhotsk	Saito, T. (TS/NRIFS), Hayashi, T. (TS/NRIFS), Chvetsov, E. (Russian Federation)
<i>Shonan-maru No.2</i>	Sighting survey for mainly common minke whales	July 22-Sep 19, Western Sea of Okhotsk	Miyashita, T. (NRIFS), Tokuda, D. (TS/NRIFS), Vladimirov, A. (Russian Federation)
<i>Shunyo-maru</i>	Acoustic and sighting survey for sperm whales	Aug. 18-Sep. 16, Off the Pacific coast of Japan	Shimada, H. (NRIFS), Itou, H. (TS/NRIFS), Nishimaki, M. (TS/NRIFS), Okumura, T. (TS/NRIFS), Ebisui, T. (TS/NRIFS)

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<i>Kurosaki</i>	Experimental cruise for cetacean satellite tracking	Oct. 16 – Nov. 14, Off the Pacific coast of Japan	Noji, S. (TS/NRIFS), Sato, H. (TS/NRIFS), S. Izumi (TS/NRIFS), K. Hashimoto (TS/NRIFS)
<i>Kurosaki</i>	Diving time for Baird's beaked and sperm whale	July 16 – August 8, Off the coast of Chiba prefecture	Minamikawa, S. (NRIFS), Kawashima, M (TS/NRIFS), S. Izumi (TS/NRIFS), K. Hashimoto (TS/NRIFS), T. Nitta, T. (TS/NRIFS)
<i>Kurosaki</i>	Cetacean sightings, marking and biopsy	Feb. 8 – Mar. 22, 2004 Off the Pacific coast of Japan	Noji, S. (TS/NRIFS), Sato, H. (TS/NRIFS), S. Izumi (TS/NRIFS), K. Hashimoto (TS/NRIFS)
<i>Kanou-maru</i>	Cetacean sightings	Feb. 16-Mar.11, 2004 Around Iki and Tsushima Islands	Shimada, H. (NRIFS; Feb. 16-28), Ebisui, T. (TS/NRIFS), Nishimaki, M. (TS/NRIFS), Okumura, T. (TS/NRIFS), Endo, K. (TS/NRIFS)
[Southern Hemisphere]			
<i>Shonan-maru (IWC/SOWER)</i>	Sighting SOWER/Blue & Antarctic	Dec.19-Mar.8, 2004, Area V-east in the Antarctic	Ensor, P. (New Zealand), Mori, M. (Japan), Olson, P. (USA), Ljungblad, D. (USA)
<i>Shonan-maru No.2 (IWC/SOWER)</i>	Sighting SOWER/Blue & Antarctic	Dec.19-Mar.8, 2004, Area V-east in the Antarctic	Matsuoka, K. (Japan), Sekiguchi, K. (Japan), Olavarria, C. (Chile), Morse, L. (USA)

The IWC/SOWER (Southern Ocean Whale and Ecosystem Research) Antarctic sighting cruise was conducted from 19 December 2003 to 8 March 2004. This cruise consisted of the blue whale research component and the minke whale assessment component. The main purpose of the blue whale component was to obtain scientific information relevant to developing shipboard identification methods for separating “true” blue whales (*Balaenoptera musculus intermedia*) from “pygmy” blue whales (*B. m. brevicauda*). For this purpose, acoustic surveys, biopsy skin sampling, digital video recording, photo-identification, and body length estimation were undertaken in addition to the sighting survey. The government of Japan offered two research vessels (*Shonan-maru* and *Shonan-maru #2*) and crew for this program, as has been in the case for the past 26 years. H. Kato (NRIFS) acted as the organizer of the cruise and as a member of the steering group of the program. The research area planned in Area VE (170°E-170°W) including the Ross Sea for 66 days. A total of 23 sightings (50 animals) of blue whale were recorded during the survey. P. Ensor (New Zealand) acted as the cruise leader. K. Matsuoka (Japan) participated in the cruise as the senior scientist, D. Ljungblad (USA), M. Mori (Japan), L. Morse (USA), C. Olavarria (Chile), P. Olson (USA), K. Sekiguchi (Japan), participated as researchers. The details of the cruise and results will be separately reported at the 56th IWC/SC meeting.

Table 2. Large cetaceans sighted by Japanese dedicated sighting surveys (*Shonan-maru* and *Shonan-maru No.2*) in the Southern Hemisphere in the 2003/2004 austral summer season (including SOWER/Blue whale cruises, SOWER/Antarctic cruises and those before and after the cruises). The number is given by 10°square based on the noon position of vessels. Species code: B = blue, F = fin, H = humpback, Se = sei, MiA = Antarctic minke, Sp = sperm, Bo = southern bottlenose whale.

10° square	Distance (n.miles)	Number of whales sighted						
		B	F	H	Se	MiA	Sp	Bo
A 22	136	-	1	1	-	-	-	-
23	414	-	5	-	-	11	1	-
24	61	-	-	4	-	7	-	-
B 24	1,089	7	-	9	1	372	27	12
25	1,656	3	118	149	-	111	16	30
C 23	74	-	-	-	-	20	-	-
24	1,033	10	-	10	-	1278	11	-
25	529	25	11	72	-	319	9	-
26	384	-	-	-	-	57	-	-
27	15	-	-	-	-	5	-	-
D21	18	-	-	-	-	-	-	-
22	56	-	-	-	6	-	-	-
Total	5,465	45	135	245	7	2,180	64	42

In the North Pacific, a total of 9 sighting and related research cruises were conducted. Of these, 6 cruises were mainly engaged in sighting survey with biopsy skin sampling on an opportunistic basis. T. Miyashita (NRIFS) and Shimada worked in planning, track designs, and searching methods of all the above cruises.

Total searching distances made during the sighting cruises were 5,455 n. miles and 6,374 n.miles for the Southern Hemisphere and the North Pacific, respectively. During these cruises, common minke whale sighting survey in the Sea of Okhotsk and the Sea of Japan were led by Miyashita who also provided the IWC/SC oversight. Additionally during the biopsy and marking surveys, systematic sighting data were also obtained.

Miyashita took part in the Korean sighting survey in April in the southern coastal waters off Korea for oversight task requested by the IWC/SC. The survey was conducted using *R/V Tamgu 3* to obtain information on the distribution and density of common minke whales.

With cooperation among the NRIFS, Kochi prefecture government (KPG) and the Whale Watching Association in Tosa Bay (WATB), the sighting surveys on Bryde's whales were conducted in the coastal waters off Kochi in September and November 2003, using a total of 36 whale watching boats belong to the WATB. The survey lasted 6 days in September and 8 days in November, and T. Kishiro (NRIFS), 13 research assistants and 34 fishermen members of WATB

acted as the researchers on board. A total of 3 schools (5 individuals) of Bryde's whales were sighted in September and 8 schools (12 individuals) of the whales were sighted in November.

A sighting survey for Bryde's whales was also conducted in the coastal waters off Kasasa, Southwest end of Kyushu, in August 2003, with cooperation among the NRIFS, Kagoshima prefecture government (KAPG), and Nomaiké Fishery Cooperative Union (NFCU). A total of 18 whale watching boats (belong to the NFCU) were used as the research vessels. The survey lasted 6 days. Kishihiro and 13 research assistants (Kasasa Ebisu Maritime Museum and Kagoshima University) acted as the researchers on board. A total of 14 schools (21 individuals) of Bryde's whales were detected during the surveys.

Table 3. Large cetaceans sighted by Japanese dedicated surveys (*Shonan-maru*, *Shonan-maru No.2* and *Kurosaki*) operated in the North Pacific during 2003 summer season (April to September 2003) and two local sighting surveys off Kochi and Kagoshima in August, September and November. The number is given by 10°square based on the noon position of the vessels. Species code: MiC = common minke whale, Br=Bryde's whale, F = fin whale, R = northern right whale, G = gray whale.

10° square	Distance (n.miles)	Number of whales sighted					
		MiC	Br	F	Sp	R	G
M 19	169	4	-	-	-	-	-
20	1,477	22	38	1	-	-	-
21	443	-	-	-	107	-	-
N 20	595	9	-	1	-	-	-
21	1,595	46	-	-	1	-	-
22	62	-	-	-	-	2	-
P 20	86	5	-	-	-	-	-
21	1,342	49	-	95	-	12	6
22	605	4	-	16	-	6	-
Total	6,374	139	38	113	108	20	6

Cetacean sighting surveys were conducted in the coastal waters of four Caribbean countries (Dominica, St. Lucia, St Vincent & the Grenadines, and Grenada) in the period of 7-12 July 2003, by scientists of each country under the sponsorship of the NRFIS and ICR. H. Yoshida (NRIFS) joined in the survey carried out in coastal waters of Grenada. The survey covered 72.8 nautical miles of primary searching distance and resulted in sightings of 7 schools (363 animals).

In order to obtain further information on distribution of cetaceans inhabiting coastal waters of the western part of the North Africa, a sighting survey was conducted by Boussoura National Research Center of Fisheries Science, Republic of Guinea, using the research vessel "GENERAL LANSANA CONTE". The NRIFS, ICR, Kyodo Senpaku Kaisya, Ltd. (KSK) supported the survey. Yoshida and Yoshimura (KSK) joined the survey. A total of 514.5 n.miles was searched in the period 24 January-7 February 2004 and sightings of 62 cetacean schools (2,188 animals), including two Bryde's whale schools (four individuals), were obtained.

A sighting survey was conducted in Caribbean waters during the period of 17 April-14 May, under the FAO Project (GCP/RLA/140/JPN). H. Yoshida (NRIFS) joined the survey. Sightings of cetaceans including humpback whales, Bryde's whales, and sperm whales were obtained.

Table 4. Large cetacean sighted by Japanese dedicated sighting surveys (*Kurosaki*, *Kanou-maru*) and transit cruises of the SOWER by *Shonan-maru* and *Shonan-maru No.2*) in the North Pacific in 2003/2004 autumn-winter season (October 2003-March 2004). Species codes; see Tables 2 and 3.

10° square	Distance (n.miles)	Number of whales sighted					
		Br	B	Se	Sp	Mi	R
J 21	142	1	-	-	-	-	-
K 20	369	1	-	-	-	-	-
21	103	-	-	-	-	-	-
L 20	79	-	-	-	-	-	-
M 19	305	-	-	-	8	4	-
20	456	-	-	-	19	-	1
21	1,481	-	1	2	59	-	2
Total	2,935	2	1	2	86	4	3

2.1.2 Systematic aerial surveys

An aerial sighting survey for cetaceans was conducted in the coast 1 waters off the Boso Peninsula from 27 July to 4 August 2003 using a small aircraft (CESSNA 04 Titan; Fixed wing and twin engines). Kishiro, Shimada, Yoshida and one research assistant (Kamogawa Sea World Aquarium) acted as the researchers on board. The survey consisted of five flights and the total searching distances following the line transects were 810.1 n. miles. During surveys, several schools of sperm whales and many other cetaceans were sighted.

Aerial sighting surveys using small planes (CESSNA 172P) were also conducted to obtain information on abundance and distribution of coastal cetacean species in 3 areas of Japanese coastal waters (Ise-Mikawa Bays, Ariake Sound-Tachibana Bay, and western parts of the Inland Sea-Hibiki Nada). Yoshida (NRIFS) and Minamikawa (NRIFS) conducted the surveys in collaboration from 3 Japanese aquariums (Minamichita Beachland Aquarium, Shimonoseki Marine Science Museum, the Toba Aquarium). In the Ise-Mikawa Bays, 2 surveys were carried out on 5 and 7 October 2003 and 159 sightings were obtained during the flight of 1243.6km. In the Ariake Sound-Tachibana Bay, a total of 481.7 km was searched and 60 sightings were recorded in a survey conducted on 18 October 2003. A survey carried out in western parts of the Inland Sea-Hibiki Nada on 19 October 2003 resulted in 64 sightings for the 737.8 km flight. No sightings of large cetaceans were obtained.

With the cooperation between the NRIFS and the Nagasaki prefecture government, Shimada and Nagasaki Pef. conducted aerial sighting surveys on small cetacean in the waters around Iki and Tsushima Islands. Two flights were conducted using a CESSNA 172P on March and 12 April 2004.

2.1.3 Platforms of opportunity

Opportunistic sighting data have been collected during operations by the small-type whaling and by dolphin fisheries.

2.2 Analyses/development of techniques

Miyashita further improved the voice recording system to apply the IWC/SOWER back up plan when the research vessel could not enter the Ross Sea. The system connected to the vessel's anemometer to directly obtain information on the wind speed and direction.

Kato and his coworkers further developed the ID-keys to discriminate sub-species of blue whales from the shipboard survey documented in SC/54/IA8. Authors of this paper concluded that nose-hole type (they classified three types based on relative position of anterior tip of bristles and central groove) and the relative body proportion (so called *tadpole* or *torpedo* shape) are promising keys to discriminate the two sub-species of blue whales during shipboard or a trial sighting surveys. This was endorsed by the Scientific Committee at the 54th meeting. This year, using biopsy samples collected under the SOWER program, Kato and Yoshida confirmed that there is genetic separation between the two provisional sub-species based on relative body proportion.

Okamura and Kitakado improved a hazard probability model for test mating abundance of Antarctic minke whales. Okamura and co-workers reviewed statistical methods related to resource selection by animals and wrote some computer programs. Programs appeared on the website of National Research Institute of Far Seas Fisheries.

Shimada, and H. Murase (ICR) analyzed sea ice condition in relation to the Antarctic minke whale distribution pattern in the austral summer using metrological satellite data for 2nd and 3rd IDCR/SOWER circumpolar surveys in Area IV. Un-surveyed area in waters south of the ice-edge line was recalculated. They suggested an obvious relationship between sea ice coverage and the minke whale abundance estimates.

3. Marking data

3.1 Field work

3.1.1 Natural marking data

Many photographs were taken through the dedicated sighting cruises mentioned above. These were preserved for future analysis. Three gray whales were photo identified during the sighting surveys in the Sea of Okhotsk.

Photographs were also collected from local sighting cruises for the coastal Bryde's whales off Kochi and Kasasa. A cumulative total of 43 Bryde's whales (Kochi) and 24 Bryde's (Kasasa) have been individually identified mainly by the shape of dorsal fin. Photos have been deposited in the NRIFS under the cooperative program. Kishiro and co-workers continued to examine these data with respect to the relationship between areas and re-sighting.

3.1.2 Artificial marking

Under the leadership of Iwasaki, two cruises by *R/V Kurosaki* were conducted mainly to develop an artificial marking system. The first cruise took place for satellite tracking in Oct 16 Nov. 14, 2003, and the second one was for artificial marking (spaghetti type tag) and archival tags in Feb 8 - Mar. 22 2004. Both cruises were conducted off the Pacific coast of northern Japan (Table 1).

Additionally Minamikawa and his co-workers tried to attach these tag to sperm whales, and other cetaceans in the water off Pacific coast of the Boso peninsula in July. Dive parameters such as

dive depth, dive duration, surface intervals of each dive were measured. These data will be used for more accurate estimation of $g(0)$.

3.2 *Analyses/development of techniques*

Iwasaki improved the radio direction finding system for the data loggers and pop-up archival transmitting tags adrift on the sea. Using the system, Iwasaki, S. Noji (TS/NRIFS), S. Izumi (TS/NRIFS) and K. Hashimoto (TS/NRIFS) were able to retrieve the pop-up archival tag again in November 2003 during the *Kurosaki* cruise (the first retrieval by Noji (F) in 2002). Iwasaki continues to improve the system.

Miyashita and Iwasaki made up the appropriate firing powder for the Larsen biopsy gun. The powder has the ability that the tip of darts (imported) fully penetrated to "Tatami" (Japanese traditional mat made of the dried rush, approximately 5cm in thickness) with the shooting range of 40m. In general, the results were successful, however, some of the darts have too much clearance within the gun barrel and such darts have less shooting range. Darts having less clearance will be made.

Kishiro, Minamikawa, Iwasaki and Kato developed the attachment as stem for the satellite tags and the data logger for Bryde's whales off Kochi. Attempts to attach them using a hand harpoon and small whale watching boat were largely unsuccessful. They have been developing the new attachment system using an air gun, and the system will be tried next year. Kishiro, K. Ohata (Kochi University) and co-workers further examined the natural marking data of the coastal Bryde's whales off Kochi and Kasasa using photographs of dorsal fins deposited from 1998 to 2003. A total of 67 individuals (43 in Kochi and 24 in Kasasa) were successfully identified and catalogued. Among them, 31 whales (46.3%) had nicks in their dorsal fins, and the remaining 36 whales were identified by the distinct shape of the dorsal fin and the lateral body scars such as the wound from the propeller strikes. Photographic evidence suggested that the whales spend a maximum period of at least six months from May to October in both Kochi and Kasasa areas. Adult-calf pairs and feeding behaviors were seen in both areas.

Minamikawa, Iwasaki and Kato developed the system of attaching a data logger incorporated with a satellite tag on the large and deep diving cetaceans using air guns. It can be retrieved using ARGOS tracking system and direction finder after detaching from the animal. The shooting range of this system is about 30m. Thus, it became possible to attach the device to cetaceans which are difficult to approach.

4. Tissue/biological samples collected

4.1 *Biopsy samples*

Skin biopsy sampling was conducted on an opportunistic basis during the sighting survey cruises in the North/South Pacific and the Southern Hemisphere as mentioned in Section 2.1.1. Furthermore, one biopsy/marketing cruise was conducted off the Pacific coast of the Main Island of Japan from Feb 8 - Mar 22, 2004 (the ship also conducted line transect sighting survey along the predetermined track line). S. Noji (Temporary technical staff (TS)/ NRIFS), Sato (TS/NRIFS), S. Izumi (TS/NRIFS) and K. Hashimoto (TS/NRIFS) were on board of *Kurosaki*.

Table 5. Large cetacean biopsy samples collected through Japanese research, April 2003 - May 2004. In addition, some samples were obtained through JARPA and JARPN II as referred in 56/SC/O12 and O13.

Species	Area	No. collected	Archived (Y/N)	No. analyzed	Total holdings	Contact Institute
Blue whale (true)*	Antarctic	6	Y	0	6	NRIFS
Antarctic Minke whale	Antarctic	1	Y	0	1	NRIFS
Humpback whale	Antarctic	2	Y	0	2	NRIFS
Southern bottlenose whale**)	Antarctic	1	Y	0	1	NRIFS

*) provisional subspecies based on morphological feature. **) collected from drifted carcass.

4.2 Samples from direct catches or bycatch

As detailed in Table 6, under the scientific permits, 440 Antarctic minke whales were taken in the Antarctic (under the 2003/04 JARPA program) and 100 common minke whales, 50 Bryde's whales, 50 sei whales and 10 sperm whales in the western North Pacific (under the 2003 JARPN II program, offshore components) respectively. In addition, 50 minke whales were separately caught under coastal component of the JARPN II program as below. Extensive biological materials were collected from the sampled whales. Details of such materials are described in the cruise reports (SC/56/O12, O13, O14) and the progress report of the ICR; Tokyo (SC/56/)20).

After the two-year feasibility study in 2000 and 2001, the full-scale survey of the Japanese Whale Research Program under Special Permit in the western North Pacific-Phase II (JARPN II) was started in 2002. Under the program, the JARPN II coastal component was planned to cover the temporal and spatial gap of the research, and to check the logistic feasibility in the first two years (2002 and 2003). The first survey was conducted from September to October 2002 in the coastal waters off Kushiro, northeast Japan and finished successfully. The second survey was conducted from 8 April to 2 May 2003 in coastal waters off Sanriku, northeastern Japan {middle part of the sub-area 7), using four small-type whaling catcher boats, one echo sounder-trawl survey vessel and one dedicated sighting survey vessel. Kato, Yoshida, Kishiro, and Iwasaki conducted the survey.

Sampling of whales was conducted in the coastal waters within 30 nautical miles from Ayukawa port, and all the animals taken were landed at the research station in the port for biological examination. During the survey, a total of 3,833.6 n. miles (342.9 hours) was surveyed for whale sampling, the 184 schools (188 individuals) of minke whales were sighted, and a total of 50 minke whales (21 males and 29 females) were sampled. Dominant prey species revealed from the first stomach of the animals were Japanese sand lance *Ammodytes personatus*, and Krill *Euphausia pacifica*. Further information is noted in SC/56/O14.

4.3 Prey survey for special permit program (JARPN II)

One of the main objectives of the JARPN II survey is to estimate the prey preference (prey selection) of cetaceans. The method to estimate the prey preference is a most the same as in last year's study. The concurrent whale and prey surveys were conducted in the offshore area in June-July 2003. The whale survey was conducted by the Nisshin-maru with three sighting/sampling vessels and one dedicated sighting vessel as in last year's survey.

The trawler-type research vessel, *Shunyo-maru* (887GT) belonging to the Fisheries Research Agency joined the prey survey for JARPN II in July. Kawahara organized the cruise as cruise leader, and H.Watanabe (Oceanic squid section, NRIFS), H. Murase (ICR), M. Ichihara (Hokkaido

University) and Y. Harada (Tokyo University of Fisheries) joined the cruise. The species and size compositions of echoes from a sophisticated acoustic device (EK60) were identified with the samples taken by a mid-water trawl net and a Multiple Opening and Closing Nets Environmental Sampling System newly introduced to the survey. Trawl operations at pre-determined stations were also made for the prey species which were difficult to detect by acoustic survey. The oceanographic data were collected with CTD on board *Shunyo-maru*. Further details are given in Appendix 1 of the SC/56/O13.

A similar prey survey was conducted concurrently with the coastal components of the JARPN II, using trawler-type research vessel, *Kaiyo-maru* # 7 (499.0GT) in April 2003. Kawahara acted as cruise leader and H. Watanabe (Oceanic squid section, NRIFS), M. Ichihara (Hokkaido University), Y. Suenaga and M. Kataoka (Nippon Kaiyo Co., Ltd.) joined the cruise. The vessel is equipped with a sophisticated acoustic device (EK60). While the whale sampling, survey was conducted, the prey species survey was conducted in wider area off the Pacific coast of the northern Japan to cover the distribution of main prey species, excluding the 10 n.miles from the coastal lines. The species and size compositions of echoes were identified with the samples taken by mid-water trawl net, Isaacs-kidd Midwater Trawl (IKMT) and Bongo nets. Another type of trawl survey was conducted at pre-determined stations mainly for prey species which were difficult to detect by the acoustics. The oceanographic data were collected with CTD on board *Kaiyo-maru* #7. Further details are given in Appendix 1 and 2 of SC/56/O14.

4.4 Samples from stranded animals

Several tissues of stranded minke whales and other whales were collected by ICR and the details are given in the ICR progress report (SC/56/O20). Hara and H. Sato examined a sperm whale stranded in Wakayama and collected tooth and skin samples.

4.5 Analyses/development of techniques

Kato, in cooperation with R. Zenitani (ICR), T. Bando (ICR) and Kishiro, examined earplugs of 389 baleen whales collected under JARPN II in 2002 to 2003, and aged 155 common minke, 70 Bryde's and 64 sei whales. To obtain age information for animals whose earplugs were not sampled or not well formed, they examined baleen plates of 98 Antarctic minke whales collected 2002/03 and 2003/04 JARPA operations respectively. Kato, Yoshida and Kishiro preliminarily examined the reproductive status of 21 male and 29 female common minke whales collected under coastal survey program of the 2003 JARPN II.

5. Pollution studies

ICR conducted further pollution study under the leadership of Y. Fujise (ICR), and results are summarized in SC/56/O20.

6. Statistics for large cetaceans

6.1 Direct catches

The Government of Japan issued the Institute of Cetacean Research Tokyo (ICR) permits to take no more than 440 Southern Hemisphere minke whales for 2003/04 JARPA. (Special permit research program in the Antarctic, based on Article VIII of the ICRW). In addition, the Government also authorized the sampling limits of 150 minke whales (including 50 minke whales for coastal program), 50 Bryde's whales, 50 sei whales and 10 sperm whales in the North Pacific for research

purpose under the 2003 JARPN II (Special permit research program in the western North Pacific, based on Article VIII of the ICRW).

Under these scientific permits, 440 minke whales were taken in the Antarctic (under JARPA program) and 150 minke whales, 50 Bryde's whales, 50 sei whales and 10 sperm whales in the western North Pacific (under JARPN II program including both offshore and coastal components), respectively (Table 6). Extensive biological materials were collected from the sampled whales. Details of such materials are described in the cruise reports (SC/56/O12, O13, O14) and the progress report of the ICR (SC/56/O20).

Species	Type of catch	Area/stock	Male	Female	Total holdings
Antarctic minke whale	Special permit	Antarctic	200	240	440
Common minke whale	Special permit	N. Pacific	114	36	150
Sei whale	Special permit	N. Pacific	23	27	50
Bryde's whale	Special permit	N. Pacific	19	31	50
Sperm whale	Special permit	N. Pacific	1	9	10

6.2 Other non-natural mortality for the calendar year 2003

All of information relevant to this item is given in Tables 7 and 8.

Table 7. Other non-natural mortality of large cetaceans (bycatch) by Japanese fisheries, by Prefecture in January-December 2003. Species and figures are based on reports of prefecture governments to the Fisheries Agency which are reports from individual fishermen or fishery cooperative unions (provisional figures).

Species	Prefecture ¹⁾	Type of fishery	No. of individuals
Minke whale	Hokkaido	Trap net	16
	Aomori	Trap net	8
	Iwate	Trap net	12
	Miyagi	Trap net	6
	Chiba	Trap net	2
	Kanagawa	Trap net	3
	Toyama	Trap net	11
	Niigata	Trap net	6
	Ishikawa	Trap net	14
	Fukui	Trap net	1
	Mie	Trap net	1
	Kyoto	Trap net	4
	Wakayama	Trap net	3
	Shimane	Trap net	5
	Yamaguchi	Trap net	1
	Kochi	Trap net	7
	Nagasaki	Trap net	20
	Kumamoto	Trap net	2
	Miyazaki	Trap net	1
	Kagoshima	Trap net	2
	Total		125
Humpback whale	Hokkaido	Trap net	1
	Mie	Trap net	1
	Wakayama	Trap net	1

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	Total		3
Right whale	Wakayama	Trap net	1
Bryde's whale	Shizuoka	Trap net	1
Total			130

1) Recorded to the place where fishing gears are registered.

2) Besides above records, two minke whales were incidentally taken by the trap net in Kochi, but later released alive.

Table 8. Summary of large cetacean bycatch and strandings in January – December 2003 by species and type of fisheries. For further details see Tables 7 and 9. [I]= incidental take. (provisional figures).

Species	Trap net [I]	Strandings	Total
Minke whale	125	12	137
Bryde's whale	1	0	1
Humpback whale	3	0	3
Right whale	1	0	1
Sperm whale	0	12	12
Total	130	24	154

Stranding

Information of stranded cetaceans has been officially collected by the Far Seas Fisheries Division of the FAJ, 1-2-1, Kasumigaseki, Tokyo 100, Japan, The information is summarized in Tables 9. NRIFS assisted FAJ to compiling the data and necessary sampling. In addition, the Institute of Cetacean Research, Tokyo Suisan Building, 4-18 Toyomi, Chiyoda-ku, Tokyo 104, Japan and T. Yamada (National Science Museum; Hyakunin-cho, Shinjuku-ku, Tokyo 164, Japan) voluntarily collected relevant information on strandings.

Table 9. Large cetacean strandings in Japan, January-December 2003. Species and figures are based on reports of prefecture governments to the Fisheries Agency which are reports from individual fishermen, fishery cooperative unions or the general public (provisional figures).

Species	Prefecture ¹⁾	No. of Individuals
Minke whale	Hokkaido	3
	Miyagi	1
	Akita	1
	Ishikawa	2
	Shizuoka	1
	Shimane	1
	Nagasaki	2
	Kagoshima	1
	Total	12
Sperm whale	Hokkaido	3
	Aomori	1
	Iwate	1
	Chiba	2
	Kanagawa	2
	Shizuoka	1

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Kochi	1
Okinawa	1
Total	12
Total	24

- 1) Recorded to the place where strandings occurred.
- 2) Besides above records, following large cetaceans were stranded or accidentally entered the harbor but safely driven to the sea, one minke whale in Nagasaki and one sperm whale in Chiba.

8. Other studies and analyses

Kawahara and his co-workers have improved the Multispec-type ecosystem model for the future multi-species management in the western North Pacific. Walleye pollack was added to the model and several test-runs were made with changes in major parameters.

Shimada conducted a cruise to detect locations of sperm whales under water using a passive sonar and hydrophone system on *Shunyo-maru (887GT)*. It succeeded in detecting some diving sperm whales overlooked by simultaneously conducted sighting surveys.

Shimada developed the equipment to measure length of swimming whales. This equipment consists of a digital video and a laser range finder. Since operating conditions are not limited, this equipment is excellent and has the same accuracy as the stereo camera method or the camera method.

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