

JAPAN PROGRESS REPORT ON CETACEAN RESEARCH May 2004 to April 2005

(compiled by)

Hidehiro Kato and Tomio Miyashita
National Research Institute of Far Seas Fisheries,
5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633, Japan

This report summarizes cetacean research conducted during the period from May 2004 to April 2005 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 on June in 2000, information on small cetaceans is not 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 and at times to be decided by the Government of Japan.

Okamura (NRIFS) returned from the University of Washington in US in January 2005.

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	2.1.1
True Blue whale	<i>B. m. intermedia</i>	Southern Hemisphere,	2.1.1, 4.1
Pygmy blue whale	<i>B. m. brevicauda</i>	Southern Hemisphere	2.1.1
Fin whale	<i>B. physalus</i>	Sea of Okhotsk, North Pacific, Southern Hemisphere.	2.1.1, 3.2, 4.1, 6.2, 7
Sei whale	<i>B. borealis</i>	North Pacific, Southern Hemisphere	2.1.1, 4.1, 4.2, 4.3, 6.1
Minke whale			
Common minke whale	<i>B. acutorostrata</i>	North Pacific, Sea of Japan	2.1.1, 4.2, 4.5, 6.1
Antarctic minke whale	<i>B. bonaerensis</i>	Southern Hemisphere	2.1.1, 2.1.2, 2.2, 4.1, 4.2, 6.1
Bryde's whale	<i>B. edeni</i>	North Pacific, coastal waters off Kochi and off Kasasa (south west Japan), North Atlantic, Southern Hemisphere	2.1.1, 3.1.1, 3.2, 4.2, 6.1, 6.2, 7
Humpback whale	<i>Megaptera novaeangliae</i>	North Pacific, Southern Hemisphere	2.1.1, 4.1, 6.2, 7
Right whale	<i>Eubalaena glacialis</i>	North Pacific	2.1.1, 4.1
Sperm whale	<i>Physeter macrocephalus</i>	North Pacific, off Ogasawara Is., South Pacific, North Atlantic, Southern Hemisphere	2.1.1, 2.3, 3.1, 4.2, 4.4, 4.5, 6.1, 6.2, 7, 8

Southern bottlenose whale	<i>Hyperoodon planifrons</i>	Southern Hemisphere	2.1.1
---------------------------	------------------------------	---------------------	-------

2. Sighting data

2.1 Field work

2.1.1 Systematic, shipboard

The NRIFS and FAJ conducted a total of nine dedicated shipboard sighting and other related surveys using research vessels and three sighting surveys using airplane from May 2004 to April 2005 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 May 2004 to April 2005.

Name of vessel	Main objective	Period and region	Scientists on board*
[North Pacific]			
<i>Kurosaki</i>	Sighting survey for common minke whales	April 12 – May 11, Sendai Bay	Ebisui, T. (TS/NRIFS), Yonezaki, S. (TS/NRIFS), Okumura Tomohiro (TS/NRIFS), Okumura Toshiki (TS/NRIFS), Tanaka Y. (TS/NRIFS)
<i>Shonan-maru No.2</i>	Sighting survey for mainly common minke whales	May 12 – June 30, Sea of Japan	Saito, T. (TS/NRIFS), Noji, S. (TS/NRIFS)
<i>Shonan-maru</i>	Sighting survey for large cetaceans	July 24-Sep 21, Sub-area 13	Miyashita, T. (NRIFS), Hiruda, H. (TS/NRIFS)
<i>Shonan-maru No.2</i>	Sighting survey for large cetaceans	July 24-Sep 21, Sub-area 9	Saito, T. (TS/NRIFS), Honda, M. (TS/NRIFS)
<i>Shunyo-maru</i>	Acoustic and sighting survey for sperm whales	Aug. 13 – Aug. 26, Off the Pacific coast of Japan	Shimada, H. (NRIFS), Itou, H. (TS/NRIFS), Nishimaki, M. (TS/NRIFS), Okumura, T. (TS/NRIFS), Fujiwara, G. (TS/NRIFS)
<i>Kurosaki</i>	Experimental cruise for cetacean satellite tracking	Sep. 22 – Oct. 12, Off the Pacific coast of Japan	Noji, S. (TS/NRIFS), Tomiyama, K. (TS/NRIFS), Tanaka, Y. (TS/NRIFS), Hashimoto, K. (TS/NRIFS)
<i>Kurosaki</i>	Diving time for Baird's beaked and sperm whale	July 12 – August 10, Off the coast of Chiba prefecture	Minamikawa, S. (NRIFS), Kawashima, M. (TS/NRIFS), Izumi, S. (TS/NRIFS), Hashimoto, K. (TS/NRIFS), Tanaka, Y. (TS/NRIFS)
<i>Kurosaki</i>	Cetacean sightings, marking and biopsy	Oct. 20 – Dec. 2, 2004 Off the Pacific coast of Japan	Noji, S. (TS/NRIFS), Tomiyama, K. (TS/NRIFS), Tanaka, Y. (TS/NRIFS), Hashimoto, K. (TS/NRIFS)
<i>Kanou-maru</i>	Cetacean sightings	Feb. 1- 25, 2005 Around Iki and Tsushima Islands	Ebisui, T. (TS/NRIFS), Nishimaki, M. (TS/NRIFS), Okumura, Tomohiro (TS/NRIFS), Endo, K. (TS/NRIFS), Kai, S. (Nagasaki prefecture)

[Southern Hemisphere]			
<i>Shonan-maru</i> (IWC/SOWER)	Sighting SOWER/Antarctic	Jan.4-Mar.9, 2005, Area III in the Antarctic	Ensor, P. (New Zealand), Sekiguchi, K.(Japan), Olson, P. (USA), Morse, L.(USA)
<i>Shonan-maru No.2</i> (IWC/SOWER)	Sighting SOWER/Antarctic	Jan.4-Mar.9, 2005, Area III in the Antarctic	Findlay, K. (South Africa), Yoshimura, I. (Japan), Friedrichsen, G. (USA), Waerebeek, K.V. (Belgium)

* TS: temporal technical staff

The IWC/SOWER (Southern Ocean Whale and Ecosystem Research) Antarctic sighting cruise was conducted from 4 January to 9 March 2005. This cruise consisted of a minke whale survey and several research experiments. Primary research objectives during the Antarctic survey were collection of sighting information, as well as other biological data, (1) to investigate the relationship between minke whale abundance and the pack ice, (2) to carry out a series of experiments that would address (a) problems encountered with the analysis of previous cruises and (b) the possibilities of using different sampling strategies on future cruises, and (3) to obtain an abundance estimate using a CPII track design that could help contribute towards an evaluation of the effect of track design differences on the abundance estimates obtained from CPII and CPIII. In addition, the opportunity will be taken to obtain information on all cetacean species. The government of Japan offered two research vessels (*Shonan-maru* and *Shonan-maru No.2*) and crew for this program, as has been in the case for the last 27 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 III (0°E-70°E) for 47 days. P. Ensor (New Zealand) acted as the cruise leader. K. Findlay (South Africa) participated in the cruise as the senior scientist, G. Friedrichsen (USA), L. Morse (USA), P. Olson (USA), K. Sekiguchi (Japan), K.V. Waerebeek (Belgium) and I. Yoshimura. (Japan) participated as researchers. The details of the cruise and results will be separately reported at the 57th IWC/SC meeting.

Shimada took part in the 46th Japanese Antarctic Research Expedition (JARE46) in austral summer season, 2004/2005. Japanese Antarctic ice breaker, *Shirase* was used in the cruise. The sighting survey was conducted for 45 days under JARE46. The objective of the survey was to explore the Antarctic minke whales distribution density within pack ice. The survey area was in the waters from 40°E to 150°E, mainly from 40°E to 50°E and from 75°E to 85°E. The research method is used a passing mode. The primary observers and the researcher used binoculars with reticules and angle board. In addition to the sighting survey, ice information monitored using automatic system.

Table 2. Large cetaceans sighted by Japanese dedicated sighting surveys (*Shonan-maru* and *Shonan-maru No.2*) in the Southern Hemisphere in the 2004/2005 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	R	MiA	Sp	Bo
A 8	32	-	4	-	-	-	1	1
16	50	-	-	-	-	-	-	-
B 7	974	2	-	3	-	106	17	8
8	809	6	5	12	-	316	7	29
9	391	-	-	15	-	27	4	-
10	183	-	-	16	-	16	1	5

11	476	-	-	275	-	17	-	15
12	366	1	114	182	-	11	-	-
13	249	-	-	10	1	5	-	2
D 8	276	-	9	2	-	-	2	3
16	99	-	-	-	-	-	-	-
17	169	-	-	-	-	-	-	-
E 8	122	-	-	-	-	-	16	-
17	270	-	-	-	-	-	-	-
18	278	4	-	-	-	-	1	-
Total	4,744	13	132	515	1	498	49	63

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 4,744 n. miles and 6,730 n.miles for the Southern Hemisphere and the North Pacific (in summer), respectively (Tables 2 and 3). During the biopsy and marking surveys, systematic sighting data were also obtained.

With cooperation among the NRIFS, Kochi prefecture government 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 July and August 2004, using a total of 33 whale watching boats belong to the WATB. The survey lasted 6 days in July and 5 days in August, and T. Kishiro (NRIFS), 10 research assistants and 33 fishermen members of WATB acted as the researchers on board. A total of 51 schools (59 individuals) of Bryde's whales were sighted in July and 23 schools (24 individuals) of the whales were sighted in August.

A sighting survey for Bryde's whales was also conducted in the coastal waters off Kasasa, Southwest end of Kyushu, in August 2004, under the cooperation among the NRIFS, Kagoshima prefecture government, and Nomaike Fishery Cooperative Union (NFCU). A total of 18 whale watching boats (belong to the NFCU) was used as the research vessels. The surveys lasted 6 days. Kishiro and 14 research assistants (Kasasa Ebisu Maritime Museum and Kagoshima University) acted as the researchers on board. A total of 18 schools (26 individuals) of Bryde's whales were detected during the surveys.

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 sightings surveys.

Table 3. Large cetacean sighted by Japanese dedicated surveys (*Shonan-maru*, *Shonan-maru No.2* and *Kurosaki*) operated in the North Pacific during 2004 summer season (April to October 2004) in addition two local sighting surveys off Kochi and Kagoshima in August. The number is given by 10°square based on the noon position of the vessels. Species code: MiC = common minke, R = Right whale, for others see Table 2.

10° square	Distance (n.miles)	Number of whales sighted							
		MiC	Br	F	Sp	R	Se	H	B
M 20	740	10	109	1	1	-	-	-	-
21	2,136	30	-	-	199	-	-	-	-
22	28	-	-	-	-	-	-	-	-

23	68	-	-	-	-	-	-	-	-
N 20	717	10	-	11	-	-	-	-	-
21	585	11	-	-	-	-	-	-	-
22	223	-	-	7	19	-	21	-	2
23	1,131	19	-	52	48	1	104	28	18
24	1,067	3	-	28	45	-	22	3	1
P23	35	-	-	-	-	-	-	17	-
Total	6,730	83	109	99	312	1	147	48	21

A cetacean sighting survey was conducted in Caribbean waters during the period of 17 April-14 May, under the FAO Project (GCP/RLA/140/JPN), using the research vessel *Shonan-maru*. All the eight Caribbean fisheries officers and assistances (1 from each of St. Lucia, St. Kitts & Nevis, Antigua & Barbuda, Barbados, Trinidad & Tobago, St. Vincent & the Grenadines, Dominica, and Grenada) were on board. Yoshida joined as senior scientist. The survey covered 1274.9 n. miles of the primary searching distance and resulted in sightings of 76 schools (1063 animals) including 3 sightings of humpback whales (4 animals), 5 of Bryde's whales (5 animals), and 4 of sperm whales (4 animals). Unfortunately, it is thought that bad weather conditions had reduced the detectability of cetaceans and number of cetacean sightings.

In order to accumulate 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 NRIFSF, ICR, Kyodo Senpaku Kaisya, Ltd. (KSK), and Overseas Fishery Cooperation Foundation supported the survey. All the 11 African researchers were on board (3 from Guinea and 1 from each of Mauritania, Mali, Senegal, Guinea Bissau, Cote d'Ivoire, Benin, Gabon, and Namibia) and searched cetaceans from the upper deck and search mast of the vessel. Yoshida and M. Mori (KSK) also joined the survey. In the offshore waters, sea condition was not suitable for the sighting survey. Thus, the survey was conducted mainly in the coastal waters. A total of 418.1 n. miles was searched in the period 22-31 January 2005 and sightings of 19 cetacean schools (569 animals), including a school of 2 Bryde's whales, were obtained.

In winter, dedicated sighting surveys were conducted in the North Pacific and also sighting data was obtained during the transit from the SOWER (Table 4).

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 southern hemisphere and the North Pacific in 2004/2005 autumn-winter season (October 2004-March 2005). For species code see Table 2 and 3.

10° square	Distance (n.miles)	Number of whales sighted						
		F	H	Se	Br	MiA	Sp	Bo
E 10	426	-	-	-	-	-	1	5
11	269	-	-	-	-	-	-	-
F 11	144	-	-	-	-	-	-	-
12	517	2	-	3	-	2	3	-
13	491	-	-	-	-	-	8	-
14	517	-	-	-	-	-	-	-
15	266	-	-	-	-	-	-	-

G15	266	-	-	-	-	-	9	-
16	478	-	-	-	-	-	1	-
17	550	-	-	-	-	-	-	-
18	468	-	-	-	1	-	-	-
K19	126	-	-	-	-	-	-	-
20	515	-	-	2	-	-	5	-
L 20	254	-	-	-	-	-	12	-
21	335	-	15	-	2	-	-	-
M 19	457	-	-	-	-	-	-	-
20	239	-	-	-	-	-	-	-
21	1,254	-	-	-	-	-	69	-
22	95	-	-	-	-	-	-	-
Total	7,667	2	15	5	3	2	108	5

2.1.2 Systematic aerial surveys

Aerial sighting survey using large helicopters on board the ice breaker, *Shirase* was conducted to obtain information on distribution density within pack ice region in the Antarctic. Five researchers including Shimada, two pilots and one crew board the helicopter. Aerial line transect survey was conducted in the waters on continental shelf off Showa station in the austral summer. Three flights were carried out on 29 December, 8 and 12 February, 18 sightings of Antarctic minke whales were obtained within pack ice region in total flights of 5 hours 47 minutes.

Aerial sighting surveys using small planes (CESSNA 172P) were conducted to obtain information on abundance and distribution of coastal cetacean species in 4 areas of Japanese coastal waters (Sendai Bay-Tokyo Bay, Hibiki Nada-Genkai Nada, Ariake Sound-Tachibana Bay, and Omura Bay). Yoshida and Minamikawa carried out the surveys under with collaboration from two Japanese aquariums (Ibaraki Prefectural Oarai aquarium, Shimonoseki Marine Science Museum). K. Hattori (Hokkaido National Fisheries Research Institute, Fisheries Research Agency) was also joined the survey in Sendai Bay-Tokyo Bay. In Sendai Bay-Tokyo Bay, two surveys were carried out on 24 and 29 October 2004. All the 39 sightings including an unidentified large toothed whale were obtained during the flight of 506.1 n. miles. In Hibiki Nada and Genkai Nada, a total of 315.3 n. miles was searched on 11 October 2004 and 2 sightings were recorded. In Ariake Sound and Tachibana Bay, 222.2 n. miles was searched on 7 October 2004 and 23 schools of cetaceans were detected. A survey carried out in Omura Bay on 7 October 2004, which was resulted in 18 sightings under the 63.3 n. miles flight. No sightings of large cetaceans except a sighting of an unidentified large toothed whale were obtained.

2.1.3 Platforms of opportunity

Opportunistic sighting data have been collected during operations by the small type whaling and by dolphin fisheries. The data are available will be available on the website of FAJ/MAFF/GJPN.

2.2 Analyses/development of techniques

Okamura and H. Kitakado (Tokyo University of Marine Science and Technology) investigated the performance of a hazard probability model for estimating abundance of Antarctic minke whales using the simulation data. Okamura and co-workers developed a new statistical method of habitat selection by animals taking the correlation structure into account.

Miyashita and Kato analyzed the past sighting data in the western North Pacific especially for sperm whales. Cumulative sighting information for the past twenty years in the western North Pacific confirmed the past knowledge that sperm whales distributed in deep, offshore waters, but they also occurred the shore where the continental shelf is narrow and the water deep.

Shimada H. Murase (ICR) analyzed polynya 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 III. Un-surveyed area in waters south of the ice-edge line was recalculated. They suggested an obvious relationship between un-surveyed area in polynya south of the ice-edge line of 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 above-mentioned and these were preserved for future analysis.

Photographs were also collected from local sighting cruises for the coastal Bryde's whales off Kochi and Kasasa. A cumulative total of 44 Bryde's whales (Kochi) and 25 Bryde's whales (Kasasa) have been individually identified by mainly shape of dorsal fin, which has been deposited in 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

Two Discovery marks were recovered from an Antarctic minke whale during the 2004/2005 JARPA. Recovery and marking data are follows:

Recovery data					
No.	Date	Position	Sex	Body length (m)	
39128	5 Feb., 2005	72° 59'S, 172° 12'E	Female	8.87m	
39130					
Marking data					
No.	Date	Position	R/V	Result	Estimated body length (ft)
39128	4 Jan, 1981	66° 16'S, 140° 57'E	Vdumchivy 34	PH	29
39130		66° 16'S, 140° 57'E		PH	-

Minamikawa and his co-workers tried to attach these tags 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).

Kishiro and his co-workers tried to attach the satellite tags (ARGOS transmitting tags) using handy air gun and small boats (5 to 10 tons) to Bryde's whales in the coastal waters off Kochi during the sighting survey conducted in 18 to 23 July. One animal was successfully attached and tracked for three days.

3.2 Analyses/development of techniques

Miyashita and Iwasaki further developed the appropriate firing powder for the Larsen biopsy gun. The powder has the ability that the tip of darts (imported) fully penetrated into "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 attach system of the satellite tags using handy air gun to Bryde's whales off Kochi. Using the system, Kishiro and co-workers could attach a tag to one animal but the tag might be fallen out after three days tracking. They continue to improve the system.

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.

Kishiro and co-workers further examined the natural marking data (photographs of dorsal fin) of the coastal Bryde's whales off Kochi and Kasasa deposited in 1989 to 2004, and a total of 69 individuals (44 in Kochi and 25 in Kasasa) were successfully identified and catalogued. The mean inter annual re-sighting rate of same individuals in the same waters from 2001 to 2003 was 0.43 in Kochi and 0.45 in Kasasa, respectively. One individual was seen in both areas in early August (in Kasasa) and late September (in Kochi) in 2004. This result revealed direct evidence of the movement of the coastal Bryde's whales from southwest coast off Kyushu to the south-western part of the Tosa Bay.

Kishiro collaborated with A. Punt (Washington University) and C. Allison (IWC) in estimating the mixing rate of the western North Pacific Bryde's whales between the tentative sub stock areas using simple model filter developed by Punt and Japanese tags released and recovery data.

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 Oct. 20 – Dec. 2, 2004 (the ship also conducted lines transect sighting survey along the predetermined track line). The main target for the cruise was small cetaceans, but large cetaceans were also targeted at opportunistic base. S. Noji (Temporary technical staff (TS)/ NRIFS), K. Tomiyama (TS/NRIFS) were on board of *Kurosaki*.

Table 5. Large cetacean biopsy samples collected through Japanese research, May 2004 - March 2005. In addition, some samples were obtained through JARPA and JARPN II as referred in 57/SC/O3, O4 and O5.

Species	Area	No. collected	Archived (Y/N)	No. analyzed	Total holdings	Contact Institute
Blue whale (true)*	Antarctic	5	Y	0	5	NRIFS
Fin whale	Antarctic	7	Y	0	7	NRIFS
Sei whale	N.Pacific	4	Y	0	4	NRIFS
Antarctic minke**	Antarctic	1	Y	0	1	NRIFS
Right whale	Antarctic	2	Y	0	2	NRIFS
Humpback whale	Antarctic	44	Y	0	44	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 2004/05 JARPA program) and 100 common minke whales, 50 Bryde's whales, 100 sei whales and 3 sperm whales in the western North Pacific (under the 2004 JARPN II program, offshore components) respectively. In addition, 59 minke whales were separately caught off Kushiro as 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/57/O3, O4, and O5) and the progress report of the ICR, Tokyo (SC/57/O15).

The first survey of revised JARPN II coastal component was conducted from 13 September to 31 October 2004 in coastal waters off Kushiro, northeast Japan (northern 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, Kishiro, Yoshida and Miyashita operated the survey. Sampling of whales was conducted in the coastal waters within 50 nautical miles from Kushiro port, and all the animals taken were landed on the research station in the port for biological examination. During the survey, a total of 6,923.9 n. miles (635.4 hours) was surveyed for whale sampling, the 151 schools (156 individuals) of common minke whales were sighted, and a total of 59 common minke whales (47 males and 12 females) were sampled. Dominant prey species revealed from the first stomach of the animals were Japanese anchovy *Engraulis japonicus* and Pacific saury *Cololabis saira*. Further information is given in SC/57/O4.

The second survey is conducted with the schedule from 11 April to 31 May, 2005 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. Sampling of whales is conducted in the coastal waters within 50 n. miles (mainly in 30 n. miles) from Ayukawa port, Miyagi and all the animals taken are landed on the research station in the port for biological examination. Results of the second survey will be reported at the next 58th annual Commission meeting of IWC in 2006.

4.3 Prey survey for special permit program (JARPN II)

A prey survey was conducted in September 2004 in cooperation with the whale sampling surveys as a part of JARPN II study. The objectives of the prey survey were to examine prey environment in the late season (autumn) and to estimate prey preference (selection) of whales. The survey area consisted of two parts: an offshore region (42.0-44.5N, 165.5-167.0E) where many sei whales had been sighted by the *Nisshin-maru* unit and a coastal region off Kushiro, Hokkaido where the coastal survey for minke whale was being made by small-type whaling catcher boats. The trawler-type research vessel, *Shunyo-maru* (887GT) belonging to the Fisheries Research Agency joined the prey survey. Kawahara (NRIFS) organized the cruise as cruise leader, and H. Watanabe (NRIFS), S. Yonezaki (NRIFS), H. Murase (ICR), H. Matsukura (Hokkaido University) and M. Ichihara (Hokkaido University) joined the survey. Acoustic data were acquired during the daytime by steaming at about 10 knots with the quantitative echosounder (EK60 with operating frequency at 38, 70 and 120 kHz). Species and size compositions of acoustical backscatterings were identified with mid-water trawl and MOCNESS. Also mid-water trawlings were made at predetermined stations. The oceanographic data were collected with CTD.

In the offshore region, Japanese anchovy and Pacific saury were main component of the trawl samples, but their abundances were relatively low. The result of MOCNESS sampling indicated that copepods (*Neocalanus cristatus*, *N. plumchrus* and *N. flemingeri*) which were main prey of sei whale in spring and summer, were found at depths below 150 m. The result indicates that there were little prey species for sei whale above 100 m in the region in autumn. The sub-arctic water (cold and low-salinity) was characteristic of the offshore region, covered partly with the warm surface water. Further details are given in Appendices 1 and 2 of SC/57/O3. In the coastal region, dense schools of Japanese anchovy and walleye pollack were found during the acoustic survey. A few catches were made for Pacific saury and no catches for common squid. The results coincide with the information from the commercial fisheries and are different from the results in 2002 survey, suggesting large yearly changes in the prey environment surrounding minke whales. The cold Oyashio current was characteristic of the coastal region, with warmer water in the north and south. Further details are given in Appendices 1 and 3 of SC/57/O4.

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/57/O15). N. Tanishige (Port of Nagoya Aquarium) examined a sperm whale stranded in Shizuoka in August 2004, collected and sent to NRIFS a skin sample.

4.5 Analyses/development of techniques

Kato and Kishiro examined earplugs of 99 common minke whales collected under coastal survey off Kushiro in the 2002 and 2004 JARPN II program, and aged 72 whales.

Kishiro and Kato preliminary examined reproductive status of 47 males and 12 females of common minke whales collected from coastal survey off Kushiro under the 2004 JARPN II program.

Kato, Kishiro and T. Bando (ICR) examine age and length structure of sperm whales stranded at Ohura coast, Kagoshima, Southern Japan in January 2001. They found specific feature and association of male bachelor school. The result will be published somewhere in near future.

5. Pollution studies

ICR conducted further pollution study under the leadership of Y. Fujise (ICR), and results are summarized in SC/57/O15.

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 2004/05 JARPA. (Special permit research program in the Antarctic, based on Article VIII of the ICWR). In addition, the Government also authorized the sampling limits of 160 minke whales (including 50 minke whales for coastal program), 50 Bryde's whales, 100 sei whales and 10 sperm whales in the North Pacific for research purpose under the 2004 JARPN II (Special permit research program in the western North Pacific, based on Article VIII of the ICWR).

Under these scientific permits, 440 minke whales were taken in the Antarctic (under JARPA program) and 159 minke whales, 50 Bryde's whales, 100 sei whales and 3 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/57/O3, O4, and O5) and the progress report of the ICR (SC/57/O15).

Table 6. Direct catch of large cetaceans by Japan, April 2004-March 2005.

Species	Type of catch	Area/stock	Male	Female	Total holdings
Antarctic minke whale	Special permit	Antarctic	177	263	440
Common minke whale	Special permit	N. Pacific	137	22	159
Sei whale	Special permit	N. Pacific	47	53	100
Bryde's whale	Special permit	N. Pacific	19	31	50
Sperm whale	Special permit	N. Pacific	0	3	3

6.2 Other non-natural mortality for the calendar year 2004

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 2004. 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
	Hokkaido	Trap net	11
	Aomori	Trap net	1
	Iwate	Trap net	7

Common minke whale	Miyagi	Trap net	5
	Miyagi	Other coastal fishery	1
	Chiba	Trap net	3
Common minke whale	Kanagawa	Trap net	2
	Niigata	Trap net	3
	Toyama	Trap net	16
	Ishikawa	Trap net	12
	Fukui	Trap net	4
	Shizuoka	Trap net	1
	Mie	Trap net	1
	Kyoto	Trap net	4
	Wakayama	Trap net	4
	Shimane	Trap net	4
	Yamaguchi	Trap net	2
	Kochi	Trap net	5
	Fukuoka	Trap net	1
	Saga	Trap net	3
	Nagasaki	Trap net	16
	Kumamoto	Trap net	1
	Miyazaki	Trap net	2
	Kagoshima	Trap net	4
	Total		113
	Bryde's whale	Chiba	Trap net
Nagasaki		Trap net	1
Total			2
Humpback whale	Wakayama	Trap net	1
	Kochi	Trap net	1
	Nagasaki	Trap net	1
	Oita	Other coastal fishery	1
	Kagoshima	Trap net	1
Total		5	
Total			120

- 1) Recorded to the place where fishing gears are registered.
- 2) Besides above records, one humpback whale was incidentally taken by the trap net in Kochi, but later released alive.

Table 8. Summary of large cetacean bycatch and strandings in January – December 2004 by species and type of fisheries. For further details see Tables 7 and 9. [I]= incidental take. (provisional figures).

Species	Trap net	Other coastal fishery	Strandings	Total
	[I]	[I]	[I]	
Common minke whale	112	1	8	121
Bryde's whale	2	0	1	3
Humpback whale	4	1	1	6
Fin whale	0	0	2	2
Sperm whale	0	0	4	4
Total	118	2	16	136

7. Stranding

Information on 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, Chuo-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 2004 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
Common minke whale	Hokkaido	4
	Miyagi	1
	Ishikawa	1
	Kyoto	1
	Fukuoka	1
	Total	8
Bryde's whale	Kumamoto	1
Humpback whale	Kochi	1
Fin whale	Ibaraki	1
	Ishikawa	1
	Total	2
Sperm whale	Hokkaido	1
	Chiba	1
	Shizuoka	1
	Wakayama	1
Total	4	
Total		16

1) Recorded to the place where strandings occurred.

8. Other studies and analyses

Kawahara and his co-workers have improved the Multspec-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 sightings 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 single camera method.

9. Publications (excluding IWC volumes and documents submitted to the IWC meetings)

Bando, T., Zanitani, R., Fujise, Y. and Kato, H. 2005. Biological parameters of the Antarctic minke whales based on materials collected by the JARPA in 1987/88 to 2003/04. Pre-JARPA Review meeting. JA/J05/PJR5. 14pp. Tokyo, January 2005

Branch, T. A., Matsuoka, K. and Miyashita, T. 2004. Evidence for increases in Antarctic blue whales based on Bayesian modeling. *Marine Mammal Science* 20(4) p.726-754.

- Fujise, Y., Matsuoka, K., Murase, H., Nishiwaki, S. and Kato, H. 2004. Existence of hot spots of large sized baleen whale concentration in pelagic zone of the western North Pacific; its biological and oceanographical features. PICES XIII (S4-1983) p.46 Honolulu, October, 2004
- Iwasaki, T. 2004. Geographical movement of the bottlenose dolphins harvested in the coastal waters off the Kii Peninsula Abstract for 75th annual meeting of the Zoological Society of Japan p148 (in Japanese)
- Iwasaki, T. 2005. Dolphin fishery in Shizuoka. 50th meeting of Research Center for Fisheries Resources Management (Institute of Cetacean Research)
- Iwasaki, T. and Minamikawa, S. 2004. Antenna length of ARGOS transmitter. *Enyo* No.115 p7-9 (in Japanese)
- Iwasaki, T., Shirouzu, H., Higashi, H. and Yamashita, S. 2004. Effect of a satellite tag attachment on blood characteristics in the bottlenose dolphin (*Tursiops truncatus*) - continued research. Abstract for 10th annual conference of the Japanese Society of Zoo and Wildlife Medicine p109 (in Japanese)
- Iwasaki, T. and Yoshida, H. 2005. Significance to examine catch of the dolphin fishery in Okinawa. Abstract for the presentation of the research results on dolphin fishery in Okinawa Prefecture. March 10, 2005, Nago, Okinawa, Japan. p7 (in Japanese)
- Kato, H. 2004. Future of whales and men. Dr. Kato's guide to cetology. The MAINICHI student daily newspaper. The MAINICHI, Tokyo p.6. 2004. (in Japanese)
- Kato, H. 2004. Marine mammals. pp.90-92. In: *A handbook on fisheries science*. Seibutsu-Kenkyuusha. Tokyo 654pp. (in Japanese)
- Kato, H. 2004. Cetaceans. pp.194-197. In: *A handbook on fisheries science*. Seibutsu-Kenkyuusha. Tokyo 654pp. (in Japanese)
- Kato, H. 2004. A close connection between whales and the Kuroshio warm current. Abstract. The first Symposium of graduate school of Kuroshio Marine Science, Kochi university. p.13, Kochi, September, 2004. (in Japanese)
- Kato, H. 2004. Case study: Stock management and population biology of cetacean. pp180-187. In: Matsuda, H et al. (eds). *Sustainable use of fisheries resources and CITE criteria on classification of the Appendix*. 249pp. GGT. Tokyo, September 2004. (in Japanese)
- Kato, H. 2004. "Kujira damari", fantastic Aggregate place of Large Whales in Tosa. *Farming Japan*. 38(6) p.17-21.
- Kato, H. 2004. Life history and behavior of whales. pp.9-22. In: Japanese society of zoology (edi.). *Marine wildlife -animals-*. Tokyo, November 2004. 22pp. (in Japanese)
- Kato, H. 2004. Cetaceans in the Northern Four islands. Abstract. p3. Symposium "Let's talk wildlife of the Northern Four island". Marine Wildlife Centre of Japan. p.3 Sapporo, December 2004 (in Japanese)
- Kato, H. 2004. Cetaceans in the Tosa bay. Abstract. P.1-2. Special seminar by the graduate school of Kuroshio Science, Kochi University. Kochi, December 2004 (in Japanese)
- Kato, H., Kishiro, T., Bando, T., Ohata, K. and Tamai, K. 2005. Age and body length structure of a male sperm whale school stranded at Ohura coast, Kagoshima, January 2002. NOAA/CARP CARP/LH/2. 8pp. Woods Hole, March 2005.
- Kawanaka, M., Morishima, Y., Sugiyama, H., Arakawa, K. and Kishiro, T. 2005. Life history and taxonomy of type X larval spiruroid nematode (1). Abstract for the 74th annual meeting of the Japanese Society of Parasitology, Yonego, April 2005
- Kishiro, T. 2004. Baird's beaked whale, *Berardius bairdii*, Sea of Japan, Sea of Okhotsk and Pacific Ocean. Pp.78-79. In Muto F (eds.) *The Current status of international fishery stocks*. Fisheries Agency and Fisheries Research Agency. 111p.
- Kitakado, H., Fujise, Y., Zenitani, R., Hakamada, T. and Kato, H. 2005. Estimation of natural mortality coefficient for Antarctic minke whales through VPA studies. Pre-JARPA Review meeting. JA/J05/PJR21. 13pp. Tokyo, January 2005
- Minamikawa, S., Iwasaki, T. and Kishiro, T. 2004. Diving behavior of a Baird's beaked whale (*Berardius bairdii*). Abstracts of XXVII Symposium on Polar Biologyp.71 Tokyo, December, 2004
- Miyashita, T. 2004. Cetacean sighting survey - present and future. *Mammalian Science* 44 (1) p.97-101 (in Japanese)
- Miyashita, T. and Kato, H. 2004. Distribution of cetaceans in the western North Pacific inferred from systematic sighting survey. PICES XIII(W6-1973) p.262 Honolulu December, 2004.
- Miyashita, T. and Kato, H. 2005. Sightings of sperm whales in the western North Pacific for the past twenty years. NOAA/CARP CARP/FP/5. 6pp. Woods Hole, March 2005.

- Murase, H. and Shimada, H. 2004. How many whales are there in unusual large polynya? - Impact of largest polynya in 25 years satellite observation periods on abundance estimation of Antarctic minke whales. Abstract of XXVII Symposium on Polar Biology. Tokyo, p.72. (In Japanese)
- Ohizumi, H. and Kato, H. 2004. Food of toothed whales in the northern North Pacific; geographic and temporal variation. PICES XIII (W6-2125) p.261 Honolulu, October, 2004
- Okamura, H. 2005. Ecosystem models: present and future. Gekkan Kaiyo 37(3) p.205-211 (in Japanese)
- Shimada, H. 2004. Antarctic minke whale within pack ice region, NIPR NEWS 171, p.6 (in Japanese)
- Shimada, H. 2004. Cetacean sighting survey and Antarctic minke whale within pack ice region. Abstract of Lectures in the Shirase College p.2December, 2004 (in Japanese)
- Sugiyama, H., Morishima, Y., Arakawa, K., Kawanaka, M. and Kishiro, T. 2005. Life history and taxonomy of type X larval spiruroid nematode (2). Abstract for the 74th annual meeting of the Japanese Society of Parasitology, Yonego, April 2005
- Yasunaga, G., Fujise, Y., Zenitani, R., Honda, K. and Kato, H. 2005 Yearly trend of trace accumulation in liver of Antarctic minke whales, *Balaenoptera bonaerensis*. Pre-JARPA Review meeting. JA/J05/PJR13. 27pp. Tokyo, January 2005
- Yasunaga, G., Fujise, Y., Zenitani, R., Tanabe, S. and Kato, H. 2005. Spatial and temporal variation in organochlorine contaminations in the Antarctic minke whales. .Pre-JARPA Review meeting. JA/J05/PJR14. 15pp. Tokyo, January 2005
- Zenitani, R. and Kato, H. 2005. Long-tenn trend of age at sexual maturity of Antarctic mink whales by counting transition phase in earplugs. Pre-JARPA Review meeting. JA/J05/PJR7. 13pp. Tokyo, January 2005