

# JAPAN PROGRESS REPORT ON CETACEAN RESEARCH, May 2005 TO April 2006, WITH STATISTICAL DATA FOR THE CALENDAR YEAR 2005

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This report summarises information obtained from 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 from May 2005 to April 2006 with statistical data for the calendar year 2005. 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. Hidehiro Kato moved to Tokyo University of Marine Science and Technology on 1 August, 2005. Shingo Minamikawa was recruited into NRIFS on 1 April, 2006. Whale resources research sections in NRIFS moved to Yokohama from Shimizu on 1 March in 2006.

## 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, 2.2
True Blue whale	<i>B. m. intermedia</i>	Southern Hemisphere,	2.1.1
Fin whale	<i>B. physalus</i>	North Pacific, Southern Hemisphere.	2.1.1, 2.2, 4.1, 4.2, 6.1, 6.2.1
Sei whale	<i>B. borealis</i>	North Pacific, Southern Hemisphere	2.1.1, 2.2, 4.2, 6.1
Common minke whale	<i>B. acutorostrata</i>	North Pacific, Sea of Japan	2.1.1, 2.2, 4.2, 6.1, 6.2, 6.2.1
Antarctic minke whale	<i>B. bonaerensis</i>	Southern Hemisphere	2.1.1, 2.2, 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 off Africa, Southern Hemisphere	2.1.1, 2.2, 3.1.1, 3.1.3, 4.1, 4.2, 6.1
Humpback whale	<i>Megaptera novaeangliae</i>	North Pacific, Southern Hemisphere	2.1.1, 2.2, 4.1, 6.2, 6.2.1
Right whale	<i>Eubalaena glacialis</i>	North Pacific	2.1.1, 4.1, 6.2.1,
Sperm whale	<i>Physeter macrocephalus</i>	North Pacific, off Ogasawara Is., South Pacific, North Atlantic off Africa, Southern Hemisphere	2.1.1, 4.2, 6.1, 6.2.1,
Southern bottlenose whale	<i>Hyperoodon planifrons</i>	Southern Hemisphere	2.1.1,

## 2. Sightings data

### 2.1 Field work

#### 2.1.1 SYSTEMATIC

The NRIFS and FAJ conducted a total of eight dedicated shipboard sighting and other related surveys using research vessels and one sighting surveys using airplane in the North Pacific, 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 2005 to April 2006.

Name of vessel	Main objective	Period and region	Scientists on board*
[North Pacific]			
<i>Shonan-maru No.2</i>	Sighting survey for mainly common minke whales	May 12 – June 30, Northern Sea of Japan	Saito, T. (TS/NRIFS), Noji, S. (TS/NRIFS)
<i>Shonan-maru</i>	Sighting survey for large cetaceans	July 29-Sep 20, East of the Kamchatka Peninsula	Miyashita, T. (NRIFS), Hiruda, H. (TS/NRIFS), Kornev, S. (Russian observer)
<i>Shonan-maru No.2</i>	Sighting survey for large cetaceans	July 29-Sep 20, East of the Kuril Islands	Saito, T. (TS/NRIFS), Noji, S. (TS/NRIFS), Gusakov, P. (Russian observer)
<i>Shunyo-maru</i>	Acoustic and sighting survey for sperm whales	Aug. 23 – Sep. 12, Off the Pacific coast of Japan	Shimada, H. (NRIFS), Itou, H. (TS/NRIFS), Kusano, A. (TS/NRIFS), Okumura, T. (TS/NRIFS), Fujiwara, G. (TS/NRIFS)
<i>Kurosaki</i>	Experimental cruise for cetacean satellite tracking	Sep. 28 – Oct. 18, Off the Pacific coast of Japan	Noji, S. (TS/NRIFS), Masuda, H. (TS/NRIFS), Tanaka, Y. (TS/NRIFS), Hashimoto, K. (TS/NRIFS)
<i>Kurosaki</i>	Diving time for Baird's beaked whale	May 11 – July 9, Sea of Japan	Minamikawa, S. (NRIFS), Kawashima, M (TS/NRIFS), Izumi, S. (TS/NRIFS), Fujiwara, G. (TS/NRIFS), Tanaka, Y. (TS/NRIFS)
<i>Kurosaki</i>	Cetacean sightings, marking and biopsy	Oct. 25 – Dec. 7 Off the Pacific coast of Japan	Noji, S. (TS/NRIFS), Masuda, Y. (TS/NRIFS), Tanaka, Y. (TS/NRIFS), Hashimoto, K. (TS/NRIFS)
[Southern Hemisphere]			
<i>Shonan-maru No.2 (IWC/SOWER)</i>	Sighting SOWER/Antarctic	Dec. 22-Feb.22, 2006, Area III in the Antarctic	Ensor, P. (New Zealand), Sekiguchi, K. (Japan), Olson, P. (USA), Stafford, K. (USA)

\* TS: temporal technical staff

The IWC/SOWER (Southern Ocean Whale and Ecosystem Research) Antarctic sighting cruise was conducted from 22 December to 22 February 2006. The main objectives were to: (1) carry out a series of survey experiments designed to improve and interpret estimates of Antarctic minke whale abundance from previous cruises; (2) undertake a feasibility study for fin whale research in waters north of 60°S, involving a sighting survey, acoustic sampling and biopsy sampling of the skin for genetic analyses; (3) continue previous research on blue whales (including collecting biopsy samples, acoustic data, photographs for identifying individual animals and behavioural data); and (4) continue research on humpback whales. The government of Japan offered a research vessel (*Shonan-maru No.2*) and crew for this program, as has been in the case for the last 28 years. The research area planned in the western part of Area III (000° - 020°E) for 50 days. The feasibility study for fin whale research (and most of the humpback whale research) was to be conducted in the area bounded by latitudes 55°00'S and 61°00'S for 23 days. Research on minke and blue whales was to be conducted in the vicinity of the ice edge for 27 days. Paul Ensor (cruise leader, New Zealand), Paula Olson (USA), Keiko Sekiguchi (Japan) and Kate Stafford (USA) participated as researchers. The details of the cruise and results will be separately reported at the 58th IWC/SC meeting.

The sighting survey using passing mode was conducted under the 47th Japanese Antarctic Research Expedition (JARE47) in austral summer season, 2005/2006. The objective of the survey was to explore the Antarctic minke whales distribution density within pack ice. The primary observers and the researcher used binoculars with reticules and angle board. During the sighting survey, ice information was monitored using automatic system.

Table 2. Large cetaceans sighted by Japanese dedicated sighting surveys (*Shonan-maru No.2*) in the Southern Hemisphere in the 2005/2006 austral summer season (including 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, R = right whale, 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 7	270	-	185	118	-	-	-	-
8	543	-	37	206	2	1	1	4
9	18			7		-		-
B 7	984	26	-	22	-	141	10	5
8	1160	34	-	128	-	705	23	19
9	108	-	-	2	-	83	-	-
D 8	118	-	-	-	-	-	-	-
E 8	106	-	-	2	-	-	6	-
Total	3,307	60	222	485	2	930	40	28

In the North Pacific, a total of seven sighting and related research cruises were conducted. Of these, four cruises were mainly engaged in sighting survey. Miyashita and Shimada worked in planning, track designs, and searching methods of all the above cruises.

Russian Federation kindly granted the permission to survey in the EEZ east of the Kuril Islands and the Kamchatka Peninsula, and the sighting surveys were conducted in summer using *Shonan-maru* and *Shonan-maru No.2* (SC/58/NPM5).

Total searching distances made during the sighting cruises were 3,307 n. miles and 6,715 n.miles for the Southern Hemisphere and the North Pacific (in summer), respectively (Tables 2 and 3).

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 2005, using a total of 27 whale watching boats belong to the WATB. The survey lasted six days in July and three days in August, and T. Kishiro (NRIFS), 10 research assistants and 27 fishermen members of WATB acted as the researchers on board. A total of 31 schools (33 individuals) of Bryde's whales were sighted in July and 13 schools (13 individuals) in August.

A sighting survey for Bryde's whales was also conducted in the coastal waters off Kasasa, Southwest end of Kyushu, in August 2005, under the cooperation among the NRIFS, Kagoshima prefecture government, and Nomaie Fishery Cooperative Union (NFCU). A total of 18 whale watching boats (belong to the NFCU) was used as the research vessels. The surveys lasted five days. Kishiro and seven research assistants (Kasasa Ebisu Maritime Museum and Kagoshima University) acted as the researchers on board. A total of 32 schools (32 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)* with simultaneous normal sighting activity. It succeeded in detecting some diving sperm whales overlooked by normal sighting activity.

In order to accumulate further information on distribution and density of cetaceans off the western North Africa, a sighting survey was conducted in coastal waters from southern Guinea to Sierra Leone by Boussoura National Research Center of Fisheries Science, Republic of Guinea, using the research vessel "*GENERAL LANSANA CONTE*", under collaboration of NRIFS and ICR. All the 11 African researchers were on board (four from Guinea and one from each of Mauritania, Senegal, Sierra Leone, Cote d'Ivoire, Togo, Benin, and Cameroon) and searched cetaceans from upper deck and search mast. Yoshida joined the survey. A total of 618.8 n. miles was searched in the period 18-27 January 2006 and sightings of 36 cetacean schools (1567 animals), including 2 Bryde's whale schools (3 animals) and 13 schools of 57 sperm whales, were recorded.

Table 3. Large cetacean sighted by Japanese dedicated surveys (*Shonan-maru*, *Shonan-maru No.2* and *Kurosaki*) operated in the North Pacific during 2005 summer season (May to October 2005) 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, for others see Table 2.

10° square	Distance (n.miles)	Number of whales sighted						
		MiC	Br	F	Sp	Se	H	B
M 20	510	1	78	-	-	-	-	-
21	411	-	17	-	21	2	-	-
N 20	2,735	18	-	1	-	-	-	-
21	670	8	-	-	2	-	-	-
22	690	11	-	12	39	6	50	4
23	428	2	-	4	11	2	6	3
P 22	86	-	-	-	1	-	-	-
23	1,185	3	-	58	6	-	62	-
Total	6,715	43	95	75	80	10	118	7

Table 4. Large cetacean sighted by Japanese dedicated sighting surveys (*Kurosaki*), and transit cruises of the SOWER by *Shonan-maru No.2*) in the southern hemisphere and the North Pacific in 2005/2006 autumn-winter season (October 2005-March 2006). For species code see Table 2 and 3.

10° square	Distance (n.miles)	Number of whales sighted			
		B	Br	Sp	Bo
E 10	80	2	-	-	-
11	137	1	-	1	3
F 12	132	-	-	1	-
13	248	-	-	-	-
14	305	-	-	-	-
15	222	-	-	2	-
G 16	134	-	-	2	-
17	102	-	2	14	-
K19	120	-	-	-	-
20	291	-	-	-	-
L 20	200	-	-	1	-
M 21	633	-	-	95	-
Total	2,604	3	2	116	3

Aerial sighting surveys using small airplanes (CESSNA 172P) were conducted to obtain information on distribution and abundance of cetaceans inhabiting coastal waters of Japan: Sendai Bay-Tokyo Bay and western part of Inland Sea. Yoshida and Minamikawa carried out the surveys under collaboration of four Japanese aquariums (Ibaraki Prefectural Oarai aquarium, Kamogawa Sea

World, Miyajima Public Aquarium, and Shimonoseki Marine Science Museum). K. Hattori (Hokkaido National Fisheries Research Institute, Fisheries Research Agency) also joined the survey in Sendai Bay-Tokyo Bay. Surveys were conducted in Sendai Bay-Tokyo Bay on 29 August and 1 September 2005, and in western Inland Sea on 17 and 21 October 2005. During the flight distance of 578.5 n. miles and 839.7 n.miles in Sendai Bay-Tokyo Bay and western Inland Sea, respectively, no sightings of large cetaceans were recorded in both areas.

#### **2.1.2 OPPORTUNISTIC, PLATFORMS OF OPPORTUNITY**

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

#### *2.2 Analyses/development of techniques*

Okamura, Minamikawa and H. Kitakado (Tokyo University of Marine Science and Technology) developed a new model to estimate the abundance of long-diving animals, which incorporates information on surfacing/diving patterns into the estimation procedure (Okamura, Minamikawa and Kitakado, 2005). Using a simulation, they investigated whether population sizes can be accurately estimated when only the mean cue production rate, without information on surfacing/diving patterns, is available. The simulation showed that the new model can provide less biased abundance estimates, whereas neglecting surfacing/diving patterns can result in serious underestimates of abundance, in particular for long-diving animals.

Miyashita and Kato reviewed the past sighting data from 1980's in the western North Pacific to examine the cetacean fauna. Eight baleen whales (blue, fin, sei, Bryde's, common minke, humpback, northern right and gray whales) and sperm whales were positively confirmed. Based on the abundance estimate of major species, sperm whales have the largest biomass in the waters (Miyashita and Kato, 2005).

Shimada analyzed aerial sighting data using the helicopter on board the ice breaker *Shirase* in 2004/2005, to examine the distribution and density of the Antarctic minke whales within pack ice (Shimada and Kato, 2005). The number of sightings was 10 schools and 19 animals of the minke whales in total during three flights. The minke whales were distributed in polynia and lead within ice field south of ice edge.

### **3. Marking data**

#### *3.1 Field work*

##### **3.1.1 NATURAL MARKING DATA**

During the sighting surveys in the North Pacific, 30 humpback whales and three blue whales were photo identified (SC/58/NPM5). All photographs are deposited in NRIFS.

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. Kishiro and co-workers continued to examine these data with respect to the relationship between areas and re-sighting.

##### **3.1.2. ARTIFICIAL MARKING DATA**

There was no recovery of Discovery mark during the present period.

##### **3.1.3 TELEMETRY DATA**

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 and Kasasa during the sighting survey in July and August. The tags were successfully attached to these animals and they had been tracked for the maximum of 40 days.

### 3.2 Analyses/development of techniques

Kishiro and Minamikawa continued to develop the attachment system of the satellite tags using handy air gun to Bryde's whales off Kochi.

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 from 1989 to 2005 (Kishiro *et al.*, 2005). Two individuals were seen in both areas in different years, and one individual was seen in both areas in the same year from early August (in Kasasa) to late September (in Kochi). These results indicated the direct evidence of the movements of Bryde's whales from the southwest coast off Kyushu to the south-western part of the Tosa Bay, and mixing of the whales between those two areas.

## 4. Tissue/biological samples collected

### 4.1 Biopsy samples

Species	Area/stock	Calendar year/ season no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Blue whale (true)*	Antarctic	36	Y	0	36	NRIFS
Fin whale	Antarctic	26	Y	0	26	NRIFS
Bryde's whale**	N.Pacific	1	Y	0	1	NRIFS
Right whale	Antarctic	2	Y	0	2	NRIFS
Humpback whale	Antarctic	71	Y	0	71	NRIFS

\*) provisional subspecies based on morphological feature. \*\*) unexpectedly collected during satellite tracking experiment.

Skin biopsy sampling was conducted on an opportunistic basis during the sighting survey cruises in the North 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. 25 – Dec. 7, 2005. 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) , Y. Masuda (TS/NRIFS) were on board *Kurosaki*.

### 4.2 Samples from directed catches

Species	Area/stock	Season total	Archived (Y/N)	Tissue type(s)	Contact person/institute
Antarctic minke whale	Antarctic	853	Y	S, B, M, Other*	ICR
Fin whale	Antarctic	10	Y	S, B, M, Other	ICR
Common minke whale	N. Pacific	220	Y	S, B, M, Other	NRIFS/ICR
Sei whale	N. Pacific	100	Y	S, B, M, Other	ICR
Bryde's whale	N. Pacific	50	Y	S, B, M, Other	ICR
Sperm whale	N. Pacific	5	Y	S, B, M, Other	ICR

\*: S: skin; B: blubber; M: muscle; Other: for details, see SC/58/O7, O8, O9, and O10.

As listed above, under the scientific permits, 853 Antarctic minke whales and 10 fin whales were taken in the Antarctic (under the 2005/06 JARPA II program) and 100 common minke whales, 100 sei whales, 50 Bryde's whales, and 5 sperm whales were sampled in the western North Pacific (under offshore component of the 2005 JARPN II program). In addition, 120 minke whales were separately caught off Sanriku and Kushiro under coastal component of the revised 2005 JARPN II program as mentioned below. Extensive biological materials were collected from the sampled whales. Details of these materials are described in the cruise reports (SC/58/O7, O8, O9 and O10) and the progress report of the ICR, Tokyo (SC/58/Oxx).

Based on results of a two-year feasibility study conducted in 2002 and 2003, the coastal component of JARPN II was revised to be conducted twice a year and to sample 60 common minke whales in each of spring and autumn. The first survey of the revised JARPNII was carried out from 13 September to 31 October, 2004, off Kushiro. Then, the second survey was conducted in a period from 11 April to 21 May, 2005, off Sanriku district, 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, Miyashita, and Iwasaki conducted the survey. Whales were sampled in coastal waters within 30 nautical miles from Ayukawa port in the district, and all the animals taken were landed at the research station in the port for biological examination. During the survey, a total of 5245.8 n. miles (466.9 hours) was surveyed for whale sampling, sightings of 202

minke whale schools (205 individuals) were recorded with sightings of 2 humpback whale schools (2 individuals), and a total of 60 minke whales (23 males and 37 females) were sampled. Dominant prey species found from forestomach of animals was Japanese sand lance *Ammodytes personatus*. Krill *Euphausia pacifica* and Japanese anchovy *Engraulis japonicus* were also observed. Further information is noted in SC/58/O9.

In autumn season from 7 September to 12 October, 2005, the JARPN II coastal survey was conducted again in the coastal waters off Kushiro, northeast Japan (northern part of the sub-area 7), using same type and number of boats/vessels. Kato, Kishiro, Yoshida and Miyashita conducted the survey. Sampling was made in the coastal waters within 50 nautical miles from Kushiro port, and all the animals taken were landed in the port for biological examination. A total of 6,653.7 n. miles (602.3 hours) was searched, 144 schools (145 individuals) of common minke whales were sighted, and a total of 60 common minke whales (45 males and 15 females) were sampled. Japanese anchovy *Engraulis japonicus* Krill and Walleye Pollock *Theragra chalcogramma* were found as dominant prey species. Further information is given in SC/58/O10.

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 almost the same as in the last year study. In 2005 three prey surveys were conducted in cooperation with the whale sampling surveys; one in the offshore region in the western North Pacific and two in the coastal regions of Pacific side of Japan.

The prey survey in the offshore region was conducted in July-August 2005 in cooperation with the whale sampling survey by *Nisshin-maru* with three sighting/sampling vessels and one dedicated sighting vessel. The trawler-type research vessel, *Shunyo-maru* (887GT) belonging to the FRA joined to the prey survey as in the last year. Kawahara (NRIFS) organized the cruise as cruise leader, and Watanabe, Yonezaki (NRIFS), Murase (ICR) and Shimizu (Hokkaido University) joined the prey survey. The survey consisted of two terms, the first from 12 to 27 July and the second from 29 July to 11 August. The survey was conducted in two blocks similar to the previous surveys; a block of 36°00'-38°00'N and 144°45'-147°45'E in the first term, the other of 40°00'-46°00'N and 157°00'-159°00'E in the second term. The species and size compositions of echoes on EK60 (38, 70 and 120 kHz) were identified with the samples taken by a mid-water trawl net (30mx30m mouth opening and 17.5 mm mesh size liner) and a Multiple Opening and Closing Nets Environmental Sampling System (MOCNESS: 1mx1m mouth opening and 0.33mm mesh size). Trawl operations at pre-determined stations were also made for the prey species unsuitable to the acoustic survey such as Pacific saury. The oceanographic data were collected with CTD and OPCS. In the first term, prey species of Bryde's whales were investigated. The abundance of anchovy (adults and juveniles) were low while they were found in the stomachs of Bryde's whales. Most of the trawl catches were 'shirasu' (anchovy larvae). In the second term, prey species of minke and sei whales were investigated. In the northern part where minke whales were abundant, large-sized saury were caught by the trawl net. In the southern part where sei whales were abundant, pelagic fishes such as Japanese anchovy (5-10 cm in body length) were distributed. Further details are given in Appendixes of the SC/58/O8.

Two prey surveys were conducted in the coastal regions of Pacific side of Japan in cooperation with the minke whale sampling surveys by small-type whaling catcher boats and dedicated sighting vessels. The first prey survey was conducted off Ayukawa, northern Honsyu in April 2005. The trawler-type research vessel, *Takuyo-maru* (120GT) belonging to Miyagi Prefecture Fisheries Research and Development Center (MPFRDC) joined to the prey survey for the first time. Nagashima (MPFRDC), Nagaki (MPFRDC), Yonezaki (NRIFS), Murase (ICR) and Shimizu (Hokkaido University) joined the prey survey. The survey was conducted in the coastal area off Miyagi and partly Fukushima Prefectures (37°40'-38°40'N and 20-200m in depth). The survey area was stratified into seven strata with latitude and depth. Zigzag track lines were set within each stratum and along the lines the acoustic survey with EK500 (38, 120 and 200 kHz) was conducted at 9 knots during the daytime. The species and size compositions of echoes were identified with the samples taken by a mid-water trawl net (7mx3.5m mouth opening and 3mm mesh size liner). The oceanographic data were collected with CTD and EPCS. A preparatory sighting survey was made for marine mammals such as northern fur seal. Adults and larvae of sand lance were found in the shallower strata; the former near the bottom and the latter in the mid layers. Krill were found in the deeper strata. The distribution patterns of minke whale and northern fur seal seemed to be closely related to the distribution pattern of adult sand lance. Further details are given in Appendixes of the SC/58/O9.

Another prey survey was conducted off Kushiro, eastern Hokkaido in September 2005. The trawler-type research vessel, *Kaiyo-maru # 7* (499GT) belonging to Nippon Kaiyo Co., Ltd. (NK) joined to the prey survey. Kawahara (NRIFS) organized the cruise as cruise leader, and Yamamoto and Umeki (NK) joined the prey survey. While the whale sampling survey was conducted in the coastal waters within the 30 nautical miles (max 50 nautical miles) from Kushiro, the prey survey was conducted in wider area from Cape Erimo (143°15'E) to Cape Nosappu (about 146°00'E) and north of 41°00'N, excluding the waters shallower than 50m in the coastal zone. The area was divided into inshore and offshore areas, and zigzag track lines were set to cover the areas. The species and size compositions of echoes on ER60(38 and 120 kHz) were identified with the samples taken by mid-water trawl net (30mx30m mouth opening and 17.5 mm mesh size liner) and Isaacs-kidd Midwater Trawl (IKMT). Another type of trawl survey was conducted at pre-determined stations mainly for Pacific saury and common squid that are unsuitable to the acoustic survey. The oceanographic data were collected with CTD on board *Kaiyo-maru # 7*. *Kyoshin-maru No.2* (368 GT), a dedicated sighting vessel, conducted the acoustic and CTD surveys too. The acoustic data are being analyzed now. Japanese anchovy was distributed in the surface layer on the continental shelf and in the open sea but the abundance seemed to be lower compared to the previous two surveys. Small- and medium/large-sized walleye pollock were found above the bottom of the shallow and deep parts of the continental shelf, respectively. Southern migration of Pacific saury to eastern Hokkaido was delayed due to the northward extrusion of warm water. In summary the prey circumstance for minke whale was not good in that season. Further details are given in Appendixes of the SC/58/O10.

#### 4.3 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/Oxx).

#### 4.4 Analyses/development of techniques

Kishiro and Kato preliminary examined reproductive status of 45 males and 15 females of common minke whales collected from coastal survey off Kushiro under the 2005 JARPN II program.

### 5. Pollution studies

ICR conducted further pollution study under the leadership of Y. Fujise (ICR), and results are summarized in SC/58/Oxx.

### 6. Statistics for large cetaceans

#### 6.1 Direct catches from scientific permits of Japan, April 2005-March 2006.

Species	Type of catch	Area/stock	Males	Females	Total
Antarctic minke whale	Scientific permit	Antarctic	462	391	853
Fin whale	Scientific permit	Antarctic	4	6	10
Common minke whale	Scientific permit	N. Pacific	154	66	220
Sei whale	Scientific permit	N. Pacific	51	49	100
Bryde's whale	Scientific permit	N. Pacific	21	29	50
Sperm whale	Scientific permit	N. Pacific	3	2	5

The Government of Japan issued the permit to the Institute of Cetacean Research, Tokyo (ICR) to take no more than 935 Antarctic minke whales and ten fin whales for the 2005/06 JARPA II (Special permit research program in the Antarctic, based on Article VIII of the ICRW). In addition, the Government also authorized the whale sampling with limits of 220 common minke whales (including 120 animals for coastal component), 100 sei whales, 50 Bryde's whales, and 10 sperm whales in the North Pacific for the 2005 revised JARPN II (Special permit research program in the western North Pacific, based on Article VIII of the ICRW).

Under the scientific permits, 853 Antarctic minke whales and 10 fin whales were taken in the Antarctic (under the JARPA II program) and 220 minke whales, 100 sei whales, 50 Bryde's whales, and 5 sperm whales were also collected in the western North Pacific (under the revised JARPN II program including both offshore and coastal components), as listed above. Extensive biological



materials were collected from the sampled whales. Details of materials are noted in cruise reports (SC/58/O7, O8, O9, and O10) and the progress report of the ICR (SC/58/Oxx).

#### 6.2 Non-natural mortality for the calendar year 2005

Table 7. Non-natural mortality of large cetaceans (bycatch) by Japanese fisheries, by Prefecture in January-December 2005. 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	Area/stock	Total	Cause	Methodology
Common minke whale	Hokkaido	14	FPN	Post mortem
	Aomori	5		
	Iwate	10		
	Miyagi	7		
	Ibaraki	1		
	Chiba	5		
	Niigata	4		
	Toyama	8		
	Ishikawa	17		
	Fukui	4		
	Shizuoka	2		
	Mie	4		
	Kyoto	5		
	Wakayama	4		
	Shimane	2		
	Yamaguchi	4		
	Kochi	13		
	Nagasaki	8		
		3		
	Miyazaki	1	FPN	
Kagoshima	1	FPN		
Total		122		
Gray whale	Miyagi	2	FPN	Post mortem
	Chiba	1		
	Total		3	
Humpback whale	Ishikawa	1	FPN	Post mortem
	Mie	1		
	Wakayama	1		
	Total		3	

Besides above records, one Humpback whale evacuated from FPN in Chiba.

FPN: Stationary uncovered pounds nets, GN: Gillnets (not specified)

Under requests from the Miyagi prefectural office and Onagawa town office, Kato and his colleagues (H. Ishikawa, T. Bando and T. Mogoe of ICR) engaged in biological investigation of gray whales entangled in Miyagi mentioned in Table 7. Many biological materials including entire skeletons, external measurements, earplugs, reproductive organs, tissues, parasites, stomach contents and others were collected by them. Details of their investigation are reported by SC/58/O14.

#### 6.2.1 STRANDINGS OR DEAD WHALES ENCOUNTERED AT SEA

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, ICR and 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 2005 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 <sup>1)</sup>	No. of individuals
Common minke whale	Hokkaido	5
	Miyagi	1
	Akita	1
	Niigata	1
	Kagoshima	1
	Total	9
Fin whale	Akita	1
	Okinawa	1
	Total	2
Omura's whale	Miyazaki	1
Right whale	Tokyo	1
Humpback whale	Chiba	1
	Miyazaki	1
	Total	2
Sperm whale	Hokkaido	1
	Fukushima	1
	Chiba	2
	Shizuoka	2
	Mie	1
	Kagoshima	1
	Okinawa	1
	Total	9
Total		24

#### 6.2.2 OBSERVED OR REPORTED SHIP STRIKES

There is no system for FAJ and NRIFS to collect information on ship strike, while FAJ has continuously exchanged information with Ministry of Land Infrastructure and Transport which is responsible for the control and monitoring of vessel navigations and safety.

#### 6.2.3 FISHERY BYCATCH

See 6.2.

### 9. Other studies and analyses

All matters are covered in the earlier sections.

### 10. Literature cited

- Kishiro, T. *et al.* 2006. Cruise report of the coastal survey on common minke whales off Kushiro, northern Japan: the 2005 JARPN II survey. Part II - Coastal component off Kushiro. SC/58/O10.
- Kishiro, T., Okano, K., Tokuhira, Y., Nakanishi, Y., Nonoshita, Y. and Kato, H. 2005. Movement and residency of the coastal Bryde's whales off southwest Japan suggested from photo-identification study. Abstract

- for IX International Mammalogical Congress, Sapporo, Japan. p.401
- Miyashita, T. 2006. Cruise report of the sighting survey in the waters east of the Kuril Islands and the Kamchatka Peninsula in 2005. SC/58/NPM5.
- Miyashita, T. and Kato, H. 2005. Current status of large and small cetacean stock in the western North Pacific. Abstract for IX International Mammalogical Congress, Sapporo, Japan. p.131-132
- Nishiwaki, S. *et al.* 2006. Cruise report of the 2005/06 feasibility survey of JARPA II. SC/58/O7.
- Shimada, H. and Kato, A. 2005. Sighting survey of whale using helicopter within ice field in the Antarctic. Abstract for XXVIII Symposium on Polar Biology. p.57
- Tamura, T. *et al.* 2006. Cruise report of the Japanese Whale Research Program under Special Permit in the western North Pacific - Phase II (JARPN II) in 2005. Part I- Offshore component. SC/58/O8.
- Yoshida, H. *et al.* 2006. Cruise report of the coastal survey on common minke whales off Sanriku coast, northeastern Japan: the Japanese Whale Research Program under Special Permit in the western North Pacific - Phase II (JARPN II) in 2005. Part II - Coastal component off Sanriku. SC/58/O9.

## 11. Publications

### 11.1 Published or 'In Press' papers only

- Hayashi, K., Yoshida, H., Nishida, S., Goto, M., Pastene, L. A., N. Kanda, Baba, Y. and Koike, H. Balancing selection of the MHC *DQB* locus in the finless porpoise. *Zoological Science* (in Press)
- Sakai, N., Nikaido, M., Hamilton, H., Goto, M., Kato, H., Kanda, H., L.A. Pastene., Cao, Y., R.E. Fordyce., Hasegawa, M. and Okada, N. 2005. Mitochondrial phylogenetics and evolution of mysticete whales. *Syst.Biol.*54(1):77-90
- Okamura, H. 2005. Multi-species management based on ecosystem model and application to the western North Pacific. pp. 72-86 *In: Aoki et al.* (ed.) *Regime-shift and Fisheries Management*, Kouseisha Koseikaku, Tokyo, 141pp.
- Okamura, H., Kitakado, T. and Mori, M. 2005. An improved method for line transect sampling in Antarctic minke whale surveys. *The Journal of Cetacean Research and Management* 7(2) : 97-106.
- Okamura, H., Minamikawa, S. and Kitakado, T. 2006. Effect of surfacing patterns on abundance estimates of long-diving animals. *Fisheries Science* (In Press)

### 11.2 Unpublished literature

- Kato, H., M. Kobayashi, E. M. Grigoryev, H. Yoshida, K. Sasamori, H. Sato, and N. Ohtaishi. (2005): Marine Mammals in the Northern Four Islands (Kunashiri, Itrup, Habomai and Shikotan Islands). Abstract for IX International Mammalogical Congress, Sapporo, Japan. p.136
- Kato, H. 2005. Current status and future prospect of western North Pacific humpback whales. Abstract for SPLASH-Asia International Symposium, Tokyo, Japan. p.11.
- Kawahara, S. 2005. Cetacean resources off Japan's coast. Port of Nagoya Public Aquarium, June 24 2005 (in Japanese).
- Kishiro, T. 2005. Age determination methods of toothed whales. Abstract for the 2<sup>nd</sup> meeting of the central branch of Japanese society of fisheries science Shimizu. (in Japanese) p.2-3
- Kuroki, M., Watanabe, G., Sasakawa, Y., Yoneda, K., Iwasaki, T. and Taya, K. 2005. Monitoring steroid hormones in eyes to evaluate reproductive status. Abstract for IX International Mammalogical Congress, Sapporo July 31-August 5 2005. p. 244.
- Miyashita, T., Vladimirov, V. A. and Kato, H. 2005. Current status of cetaceans in the Sea of Okhotsk. Abstract for PICES 14th Annual Meeting, Vladivostok, Russia. p.33
- Murase, H., Shimada, H., Kitakado, T. 2005. Estimation of Antarctic minke whale abundance in the Weddell Sea region and the Antarctic using a GAM-based spatial model with special reference to the animals in the unsurveyed large polynya. Abstract for 3<sup>rd</sup> International symposium on GIS, Shanghai, China. p.90
- Okamura, H., Minamikawa, S. and Kitakado, T. 2005. Abundance estimate of long diving whales. p.22.  
Abstract of the second meeting of the Chubu regional branch of the Japanese Society of Fisheries Science in 2005. (in Japanese).
- Suzuki, M., Endo, N., Kato, H., Kishiro, T. and Asahina, K. Urine concentrating ability in cetacean species. p.272-273. Abstract for 16th Biennial Conference on the Biology of Marine Mammals, San Diego, USA.
- Yonezaki, S., Murase, H., Kiwada, K., Watanabe, H., Nishiwaki, S. and Kawahara, S. 2005. Characteristics of distribution patterns of minke whale and prey species off Kushiro. 2005 Hiroshima meeting of the Japanese society of fisheries Oceanography (in Japanese).