

# Japan. Progress report on cetacean research, April 2007 to March 2008, with statistical data for the *calendar year* 2007 or the season 2007/08

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This report summarises information obtained from:

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## NATIONAL RESEARCH INSTITUTE OF FAR SEAS FISHERIES (NRIFSF)

### 1. SPECIES AND STOCKS STUDIED

IWC Common name	Scientific name	Area/stock(s)	Items referred to
Blue whale	<i>Balaenoptera musculus</i>	Southern Hemisphere, North Pacific	2.1.1
Fin whale	<i>B. physalus</i>	North Pacific, Southern Hemisphere.	2.1.1; 4.1; 6.3.2
Sei whale	<i>B. borealis</i>	North Pacific, Southern Hemisphere	4.2
Common minke whale	<i>B. acutorostrata</i>	North Pacific, Sea of Japan	2.1.1; 4.2; 6.3.2; 8
Antarctic minke whale	<i>B. bonaerensis</i>	Southern Hemisphere	2.1.1
Bryde's whale	<i>B. edeni</i>	North Pacific, coastal waters off Kochi	2.1.1; 3.1.1; 3.1.3; 3.2; 4.2; 8
Humpback whale	<i>Megaptera novaeangliae</i>	North Pacific, Southern Hemisphere	2.1.1; 4.1; 8
Gray whale	<i>Eschrichtius robustus</i>	North Pacific	6.3.2; 8
Sperm whale	<i>Physeter macrocephalus</i>	North Pacific, South Pacific, North Atlantic off Africa, Southern Hemisphere	2.1.1; 8

### 2. SIGHTINGS DATA

#### 2.1 Field work

##### 2.1.1 Systematic

The NRIFSF and Fisheries Agency of the Government of Japan (FAJ) conducted a total of six dedicated shipboard sighting surveys using research vessels and one sighting survey using airplane in the North Pacific, in cooperation with other scientific organizations such as ICR. All of the vessels are equipped with a top barrel.

The IWC/SOWER (Southern Ocean Whale and Ecosystem Research) Antarctic sighting cruise was conducted in a part of Area IV from 24 December 2007 to 26 February 2008. The Government of Japan offered a research vessel (*Shonan-maru No.2*) as in the past. The main objectives were to: (1) survey waters outside the pack ice for minke whales in collaboration with an aerial survey of waters inside the pack ice conducted by Australian Division (the aerial survey was cancelled); (2); continue research on blue whales, and; (3) continue research on fin, southern right, and humpback whales. Research was conducted in the Antarctic waters from 100° E to 120° E

for 45 days. Paul Ensor (cruise leader, New Zealand), Keiko Sekiguchi (Japan), Paula Olson and Laura Morse (USA) participated in the survey as scientists. The details of the cruise and results are reported as Document SC/60/IA1.

During the sighting surveys in the North Pacific, the following provisional numbers of sightings of large cetaceans were obtained:

Target species	Date	Area	No. of sightings	Contact person/institute and references
Fin whale	18/5-28/06/07	Sea of Japan, Sea of Okhotsk	19	T. Miyashita (NRIFSF), SC/60/NPM4
Bryde's whale	28/07-9/09/07	Western North Pacific	15	H. Shimada (NRIFSF)
Common minke whale	18/5-28/06/07	Sea of Japan, Sea of Okhotsk	53	T. Miyashita, SC/60/NPM4
	28/07-9/09/07	Western North Pacific	5	H. Shimada
	15/09-14/10/07	Western North Pacific	2	T. Miyashita
Sperm whale	30/07-13/09/07	Western North Pacific	155	H. Shimada
	28/07-9/09/07	Western North Pacific	72	H. Shimada
	24/07-03/09/07	Western North Pacific	76	H. Shimada
	15/09-14/10/07	Western North Pacific	1	T. Miyashita

A sighting survey within the pack ice area using the ice breaker *Shirase* with passing mode was planned under the 49<sup>th</sup> Japanese Antarctic Research Expedition (JARE49) in the austral summer season 2007/2008. The objective of the survey was to explore the Antarctic minke whales distribution density within the pack ice. The primary observers and the researcher used binoculars with reticules and angle board. During the sighting survey, ice information was monitored using an automated recording system. The survey was conducted off the western Enderby Land in one day in December 2007 and three days in late February 2008. A total of five schools (five animals) of Antarctic minke whales and three schools (three animals) of unidentified whales were sighted. The condition of pack ice was hard and narrow in the late of February because of strong north eastern wind.

In cooperation with Kochi Prefecture Government and the Whale Watching Association in Tosa Bay (WATB), the NRIFSF conducted a sighting surveys on Bryde's whales in the coastal waters off Kochi in July and August 2007, using a total of 30 whale watching boats belong to the WATB. The survey lasted ten days in July and August, and T. Kishiro (NRIFSF), ten research assistants and 30 fishermen members of WATB acted as the researchers on board. A total of 14 schools (16 individuals) of Bryde's whales were sighted in July and 9 schools (11 individuals) in August.

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 of Guinea, Guinea-Bissau, and Sierra Leone by Boussoura National Research Center of Fisheries Science, Republic of Guinea, using the research vessel "*GENERAL LANSANA CONTE*", under collaboration of ICR and NRIFSF. All the 10 African researchers were on board (four from Guinea and one from each of Mauritania, Gambia, Guinea-Bissau, Sierra Leone, Cameroon, and Gabon) and searched cetaceans from upper deck and search mast. Yoshida (NRIFSF) also joined the survey, for technical support. A total of 558.2 n. miles was searched in the period 27 January – 5 February 2008 and sightings of 29 cetacean schools (1944 individuals), including 2 Bryde's whale schools (2 animals) and a mother-calf pair of common minke whales, were recorded.

An aerial sighting survey using a small airplane (Cessna 172P) was conducted to obtain information on distribution and abundance of cetaceans inhabiting coastal waters of western Kyushu, Japan. Yoshida carried out the survey with N. Ogawa (TUMST), under collaboration with Nagasaki Prefectural Office. The survey was carried out on 8 and 9 November, 2008. During the flight of 366.5 n. miles, no sightings of large cetaceans were obtained.

### 2.1.2 Opportunistic, platforms of opportunity

Opportunistic sighting data have been collected during operations of the Small Type Whaling and dolphin fisheries. The results will be released on the website of FAJ/MAFF/GJPN.

## 2.2 Analyses/development of techniques

Okamura (NRIFSF) and Kitakado (TUMST) conducted simulation tests using the newly developed abundance estimation model and applied the model to the real IDCR/SOWER data (see SC/F08/A2 and SC/F08/A7). The results showed that the model performance is satisfactory.

## 3. MARKING DATA

### 3.1 Field work

#### 3.1.1 Natural marking data

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Bryde's whales	Dorsal fin	Kochi/ East China Sea stock and Kagoshima/ East China Sea Stock	2(Kochi), and 0(Kagoshima)	Y	48(Kochi), and 25(Kagoshima)	T, Kishiro/NRIFSF

Photographs were collected from local sighting cruises for the coastal Bryde's whales off Kochi and Kasasa. A cumulative total of 48 Bryde's whales (Kochi) and 25 Bryde's whales (Kasasa) have been individually identified mainly by the shape of dorsal fin. Photographs have been deposited in the NRIFSF. Kishiro and co-workers are examining these photographs to study possible site fidelity.

#### 3.1.2. Artificial marking data

None.

#### 3.1.3 Telemetry data

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute; refs
Bryde's whale	Satellite	1	13 days	T. Kishiro/NRIFSF

## 3.2 Analyses/development of techniques

Kishiro continued the attempt to attach the satellite tags using handy air gun on coastal Bryde's whales off Kochi, and examined the movements of those whales in the south western coast off Japan.

## 4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

### 4.1 Biopsy samples (summary only)

Species	Area/stock	Calendar year/ season no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Southern right whale	Antarctic	9	Y	0	9	NRIFSF
Fin whale	Antarctic	3	Y	0	3	NRIFSF
Humpback whale	Antarctic	7	Y	0	7	NRIFSF

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.

### 4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or bycatches

From 10 September to 31 October 2007, the JARPN II coastal component was conducted off Kushiro, Hokkaido, northeastern Japan, using four small-type whaling catcher boats, and one echo sounder-trawl and dedicated sighting survey vessel (see below and the part of ICR in this report). Kato (TUMST), Kishiro, Yoshida, Miyashita, Iwasaki, and Kanaji conducted the sampling survey. Sampling was carried out in the coastal waters

within 50 nautical miles from Kushiro, and all the animals collected were landed at the Kushiro port for biological examination. A total of 6,827.7 n. miles (637.6 hours) was searched, and 98 schools (99 individuals) of common minke whales were detected and the 50 common minke whales (33 males and 17 females) were collected. Further information can be found in SC/60/O7 and the part of ICR in this report.

In 2007, three prey surveys were conducted. Of these, two surveys were conducted in the coastal regions off Ayukawa and Kushiro in cooperation with the common minke whale sampling surveys by small-type whaling catcher boats. Other survey was conducted in the offshore region of the western North Pacific in cooperation with sampling surveys of the Bryde's, sei, and common minke whales by *Nisshin-Maru* and catcher boats. Related oceanographic data were also collected in each survey. During prey survey, we also conducted sighting survey for cetaceans by the same vessel.

The coastal prey survey off Ayukawa was conducted in April 2007 by trawler-type research vessels; *Takuyomaru* (120GT: Miyagi Prefecture Fisheries Research and Development Center; MPFRDC). Takahashi (MPFRDC), Nagashima (MPFRDC), Shiraishi (MPFRDC), Yonezaki (NRIFSF), and Matsukura (Hokkaido University) joined the survey. The species and size compositions detected by the echo-sound survey were identified with the samples taken with mid-water trawls. Further details are given in Appendices of the SC/60/O6.

The offshore prey survey was conducted in the western North Pacific in July – September 2007 by trawler-type research vessel, *Kaiko-maru* (860GT: Kaiko Senpaku K.K.). Murase (ICR), Yonezaki (NRIFSF), and Matsukura (Hokkaido University) joined the survey. The species and size compositions detected by the echo-sound survey were identified with the samples taken with mid-water trawls, Isaacs-Kidd midwater trawl (IKMT), and NORPAC nets. Further details are given in Appendices of the SC/60/O5.

The coastal prey survey off Kushiro was conducted from 9 September to 10 October 2007 using a trawler-type research vessel, *Kaikou-maru*. Kiwada (ICR), Watanabe (NRIFSF), and K. Kato (TUMST) joined the survey. The distribution, abundance, and size composition of the prey were investigated with the quantitative echosounder, midwater trawl, and IKMT by target and pre-determined samplings. Pre-determined samplings were conducted mainly for Pacific saury and common squid that are difficult to detect by echosounder. A total of 958.4 nautical miles was searched and 26 times of trawl samplings and 2 times of IKMT samplings were conducted. During this survey, 7 schools (7 individuals) of common minke whales were detected. Further details are given in Appendices of the SC/60/O7.

#### 4.3 Samples from stranded animals

See the part of ICR in this report.

#### 4.4 Analyses/development of techniques

None.

### 5. POLLUTION STUDIES

See the part of ICR in this report.

## 6. STATISTICS FOR LARGE CETACEANS

#### 6.1 Corrections to earlier years' statistics for large whales

None.

#### 6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2007 or the season 2007808

JARPNII and JARPAII

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
Antarctic minke whale	Scientific permit	Areas III E, IV and VW	273	278	551	0
Common minke whale	Scientific permit	W. North Pacific	107	50	157	1
Sei whale	Scientific permit	W. North Pacific	54	46	100	0
Bryde's whale	Scientific permit	W. North Pacific	23	27	50	0
Sperm whale	Scientific permit	W. North Pacific	0	3	3	0

### 6.3 Anthropogenic mortality of large whales for the calendar year 2007 or the season 2007/08

#### 6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)

No established system is available in Japan (at least by FAJ and NRIFSF) to collect information on ship strike. However the FAJ has continuously exchanged information on this with the Ministry of Land Infrastructure and Transport, which is responsible for the control and monitoring of vessel navigations and safety.

#### 6.3.2 Fishery bycatch of large whales

Provisional figures for non-natural mortality of large cetaceans (bycatch) by Japanese fisheries, by Prefecture in January-December 2007, is shown below. Species and figures are based on the reports of prefecture governments to the Fisheries Agency, which are reports from individual fishermen or fishery cooperative unions.

Whale species	No.	Location	Fate	Target fish species	Gear	How observed	Source or contact
Common minke whale	12	Hokkaido	K	NA	FPN	F	FAJ
	1		D				
	1		R	crab	FIX		
	4	Aomori	K	NA	FPN		
	15	Iwate					
	5	Miyagi					
	3	Chiba					
	1	Kanagawa					
	3	Niigata					
	17	Toyama					
	19	Ishikawa					
	5	Fukui					
	1	Shizuoka					
	1		D		MIS		
	10	Mie	K	NA	FPN		
	7	Kyoto					
	7	Wakayama					
	2	Shimane					
	1	Yamaguchi					
	14	Kochi					
	1	Saga					
	16	Nagasaki					
	1	Kumamoto					
4	Miyazaki						
5	Kagoshima						
Fin whale	1	Iwate					
Humpback whale	1	Mie					
Gray whale	1	Iwate	D				

Gear: FPN=Stationary uncovered pounds nets, FIX= Traps (not specified), MIS=miscellaneous gear

How observed: F = Fishery onboard observer

Target fish species : NA=not available

Fate of whale: R = released alive, D = discarded dead or seriously injured, K = kept for sale or specimen

## 7. STATISTICS FOR SMALL CETACEANS

Not applicable.

## 8. STRANDINGS

The provisional number of large whale strandings in Japan, for the period January-December 2007, is shown below. 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.

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Common minke whales	5	5	FAJ	-
Bryde's whales	2	2	FAJ	-
Humpback whale	1	1	FAJ	-
Gray whale	1	1	FAJ	-
Sperm whale	8	8	FAJ	-

Information on stranded cetaceans has been officially collected by the Far Seas Fisheries Division of the FAJ, 1-2-1, Kasumigaseki, Tokyo 100-8597, Japan. NRIFSF assisted FAJ to compiling the data and necessary sampling. In addition, ICR and the National Science Museum (3-23-1, Hyakunin-cho, Shinjuku-ku, Tokyo 169-0073, Japan) voluntarily collected relevant information on strandings (see the part of ICR in this report).

## 9. OTHER STUDIES AND ANALYSES

Okamura (NRIFSF) and his colleagues continued to develop a Bayesian model to assess the impact of the fur seal on the sandlances in the western North Pacific to estimate the effects of top predator consumption.

In relation to progress for ecosystem modelling by Ecopath and Ecosim, Watanabe continued to obtain feeding parameters like prey species composition and daily ration for the major large-sized predators except for cetaceans such as skipjack, albacore, and neon flying squid by stomach content analysis for these species.

## 10. LITERATURE CITED

### 11. PUBLICATIONS

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

Murase, H., T. Tamura, Kiwada, H., Y. Fujise, H. Watanabe, H. Ohizumi, S. Yonezaki, and S. Kawahara. 2007. Prey selection of common minke and Bryde's whales in the western North Pacific in 2000 and 2001. *Fish. Oceanogr.* 16: 186-201.

#### 11.2 Unpublished literature

Kato, H., Kishiro, T. and Bando, T. 2007. Social structure of a male Sperm whale school based on mass-stranding at Ohura coast, Kagoshima, Japan in January 2002. The workshop "Sperm whales and ecosystems: past, present and future" held in conjunction with the 17<sup>th</sup> Biennial Conference on the biology of Marine mammals. Cape Town, South Africa, November, 2007. [Available from the author]

Miyashita, T. 2007. Current status and management of whales in the North Pacific. Resume of Symposium on ecology of whales and dolphins. Nagasaki, Japan, Oct. 2007. [Available from the author, In Japanese]

Murase, H., Nagashima, H., Yonezaki, S., Matsukura, R. and Kitakado, T. 2008. Prediction of spatial distribution patterns of cetacean prey species in Sendai Bay using generalized additive model (GAM). Abstracts for the Annual Meeting of Japanese Society of the Japanese Society of Fisheries Science, Shizuoka, Japan, March 2008. P28. [Available from the author, In Japanese]

Shimada, H. 2007. Sighting survey of whale within ice field in the Antarctic. Abstracts for the Japanese Antarctic Research Expedition Symposium 2007. Tokyo, Japan, June 2007. [CD-ROM, Available from the author, In Japanese]

# INSTITUTE OF CETACEAN RESEARCH (ICR)

## 1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific name	Area/stock(s)	Items referred to
Southern right whale	<i>Eubalaena australis</i>	Antarctic	2.1;3.1; 4.1
North Pacific right whale	<i>Eubalaena japonica</i>	W. North Pacific	2.1
Common minke whale	<i>Balaenoptera acutorostrata</i>	W. North Pacific	2.1; 4.2; 4.4
Antarctic minke whale	<i>Balaenoptera bonaerensis</i>	Antarctic	2.1; 2.2; 4.2; 4.4
Sei whale	<i>Balaenoptera borealis</i>	Antarctic	2.1
Sei whale	<i>Balaenoptera borealis</i>	W. North Pacific	2.1; 4.2; 4.4
Bryde's whale	<i>Balaenoptera edeni</i>	W. North Pacific	2.1; 4.2; 4.4; 9
Blue whale	<i>Balaenoptera musculus</i>	Antarctic	2.1; 3.1; 4.1
Blue whale	<i>Balaenoptera musculus</i>	W. North Pacific	2.1; 3.1
Fin whale	<i>Balaenoptera physalus</i>	Antarctic	2.1; 4.1; 4.4
Fin whale	<i>Balaenoptera physalus</i>	W. North Pacific	2.1; 4.1
Humpback whale	<i>Megaptera novaeangliae</i>	Antarctic	2.1; 2.2; 3.1; 4.1;4.4
Humpback whale	<i>Megaptera novaeangliae</i>	W. North Pacific	2.1; 3.1; 4.1
Sperm whale	<i>Physeter macrocephalus</i>	Antarctic	2.1
Sperm whale	<i>Physeter macrocephalus</i>	W. North Pacific	2.1; 4.2; 4.4
Southern bottlenose whale	<i>Hyperoodon planifrons</i>	Antarctic	2.1

## 2. SIGHTING DATA

### 2.1 Field work

#### 2.1.1 Systematic

The Institute of Cetacean Research (ICR) conducts systematic sighting surveys along their primary research programs JARPA II (Japanese Whale Research Program under Special Permit in the Antarctic-Phase II) and JARPN II (Japanese Whale Research Program under Special Permit in the North Pacific-Phase II). Below is a summary of the sighting data obtained during the 2007/08 austral summer season in the Antarctic Areas IIIIE, IV and VW and during year 2007 in the North Pacific. Details of the sighting component of those surveys are given in the cruise reports: SC/60/O4 for JARPA II and SC/60/O5 for JARPN II-offshore component and SC/60/O6, SC/60/O7 for JARPN II-coastal component.

Sighting surveys in transit from Japan to SOWER home port and from SOWER home port to Japan are conducted by ICR scientists. These data are being examined and will be summarized in future.

#### JARPAII

Target species	Date	Area	School/Animals of sightings	Contact person/institute and references
Antarctic minke whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	926/1,961	H. Ishikawa (ICR); SC/60/O4
Blue whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	49/92	H. Ishikawa (ICR); SC/60/O4
Fin whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	60/172	H. Ishikawa (ICR); SC/60/O4
Sei whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	2/2	H. Ishikawa (ICR); SC/60/O4
Humpback whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	1,433/2,753	H. Ishikawa (ICR); SC/60/O4
Southern right whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	75/101	H. Ishikawa (ICR); SC/60/O4
Sperm whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	295/295	H. Ishikawa (ICR); SC/60/O4
Southern bottlenose whale	15/Dec/07-24/Mar/08	Area III, Area IV and Area V	84/168	H. Ishikawa (ICR); SC/60/O4

## JARPN II-Offshore component

Target species	Date	Area	School /Animal of sightings	Contact person/institute and references
Common minke whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	155 / 157	K. Matsuoka (ICR); SC/60/O5
Blue whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	18 / 25	K. Matsuoka (ICR); SC/60/O5
Fin whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	58/ 71	K. Matsuoka (ICR); SC/60/O5
Sei whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	389/ 707	K. Matsuoka (ICR); SC/60/O5
Bryde's whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	459/ 687	K. Matsuoka (ICR); SC/60/O5
Humpback whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	54 / 97	K. Matsuoka (ICR); SC/60/O5
North Pacific right whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	1 / 1	K. Matsuoka (ICR); SC/60/O5
Sperm whale	11/ May/ 07-6/ Sep./ 07	W. North Pacific	392/ 971	K. Matsuoka (ICR); SC/60/O5

### 2.1.2 Opportunistic, platforms of opportunity

None

## 2.2 Analyses/development of techniques

Analyses on distribution and abundance were conducted using data obtained systematically during the sighting surveys of the JARPA. Estimation of the abundance has involved standard methodology. Papers on abundance estimation of Antarctic minke and humpback whales are being prepared for publication.

Target species	Date	Area	Methods/effort	Parameters/factors measured	Contact person/institute; refs
Antarctic minke whale	31/Dec/89-8/Mar/2005	Antarctic	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (in preparation)
Humpback whale	31/Dec/89-8/Mar/2005	Antarctic	Line transect survey. Standard methodology	Distribution; Abundance	K. Matsuoka, ICR (submitted)

## 3. MARKING DATA

### 3.1 Field work

#### 3.1.1 Natural marking data

#### JARPA II

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)*	Catalogue total**	Contact person/institute; refs
Humpback whale	Fluke	Area III	1			ICR;SC/60/O4
Humpback whale	Dorsal fin	Area III	3			ICR;SC/60/O4
Humpback whale	Body	Area III	3			ICR;SC/60/O4
Humpback whale	Fluke	Area IV	6			ICR;SC/60/O4
Humpback whale	Dorsal fin	Area IV	16			ICR;SC/60/O4
Humpback whale	Head	Area IV	7			ICR;SC/60/O4
Humpback whale	Body	Area IV	5			ICR;SC/60/O4
Humpback whale	Other	Area IV	5			ICR;SC/60/O4
Blue whale	Dorsal fin	Area III	20			ICR;SC/60/O4
Blue whale	Body	Area III	14			ICR;SC/60/O4
Blue whale	Head	Area III	6			ICR;SC/60/O4
Blue whale	Dorsal fin	Area IV	1			ICR;SC/60/O4
Blue whale	Body	Area IV	2			ICR;SC/60/O4
Blue whale	Head	Area IV	1			ICR;SC/60/O4
Southern right whale	Head	Area IV	32			ICR;SC/60/O4
Southern right whale	Fluke	Area IV	1			ICR;SC/60/O4



Southern right whale	Body	Area IV	2			ICR;SC/60/O4
Southern right whale	Head	Area V	3			ICR;SC/60/O4

\*= These pictures will be incorporated into the catalogue after further examination.

\*\*= Till 2004/05 austral summer season the catalogue includes 502, 243 and 153 photo-id pictures of the humpback, southern right and blue whales, respectively.

#### JARPN II-Offshore component

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)*	Catalogue total*	Contact person/institute; refs
Blue whale	Body	W. North Pacific	93			ICR; SC/60/O5
Humpback whale	Body	W. North Pacific	10			ICR; SC/60/O5

\*= Catalogue under construction

#### 3.1.2. Artificial marking data

None.

#### 3.1.3 Telemetry data

One satellite tag was attached to a sei whale in the Western North Pacific. However no data were received subsequent to the marking.

#### 3.2 Analyses/development of techniques

None.

### 4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

Tissue and biological samples (lethal and non-lethal sampling) were obtained during the surveys of the JARPA II during the 2007/08 austral summer season in Areas III, IV and VW. The first full-scale survey of JARPA II was carried out between 15 December 2007 and 24 March 2008. The total searching distance was 14,575.4 n.miles. Out of 501 schools (979 individuals) of primary sighted Antarctic minke whales by sighting/sampling vessels, 473 schools (912 individuals) were targeted for sampling, and a total of 551 animals were sampled.

The 2007 JARPN II offshore survey was conducted from 11 May to 6 September in sub-areas 7, 8 and 9 of western North Pacific. The total searching distance was 17,200.5 n.miles. Out of 148 common minke whales sighted by the sighting/sampling vessels, 100 animals were sampled; out of 548 sei whales sighted, 100 were sampled; out of 376 Bryde's whales sighted, 50 animals were sampled; out of 620 sperm whales sighted, 3 were sampled. The 2007 JARPN II coastal survey of Sanriku was conducted between 16 April and 31 May 2007. The total searching distance was 7,793.7.00 n.miles. Out of 166 schools (171 individuals) sighted, 57 animals were sampled. The 2007 coastal survey of Kushiro was conducted from 10 September to 31 October 2007. The total searching distance was 6,827.7 n.miles. Details of these surveys are given in the cruise reports: SC/60/O4 for JARPA II and SC/60/O5 for JARPN II-offshore component, SC/59/O6 for JARPN II-coastal component (Ayukawa) and SC/60/O7 for JARPN II-coastal component (Kushiro).

A summary of the samples and data obtained are given in items 4.1 and 4.2 below.

#### 4.1 Biopsy samples (summary only)

##### JARPAII

Species	Area/stock	Calendar year/season-no. collected	Archived (Y/N)	No. analysed *	Total holdings **	Contact person/institute
Blue whale	Area III	07/08-4	Y			ICR
Blue whale	Area IV	07/08-1	Y			ICR
Fin whale	Area III	07/08-3	Y			ICR
Humpback whale	Area III	07/08-1	Y			ICR

Humpback whale	Area IV	07/08-4	Y			ICR
Southern right whale	Area IV	07/08-16	Y			ICR
Southern right whale	Area V	07/08-2	Y			ICR
Sperm whale (carcass)	Area IV	07/08-1	Y			ICR

\*= Under analysis

\*\*=Till 2004/05 austral summer season a total of 22, 28, 342, 1 and 36 biopsy samples of blue, fin, humpback, sei and southern right whales were collected and analyzed

#### JARPNII-Offshore component

Species	Area/stock	Calendar year/season-no. collected	Archived (Y/N)	No. analysed *	Total holdings	Contact person/institute
Fin whale	W. North Pacific	2007-2	Y		5	ICR
Humpback whale	W. North Pacific	2007-1	Y		10	ICR

\*= Under analysis

#### 4.2 Samples from directed catches (scientific permits)

##### JARPA II

Species	Area/stock	Samples and Data	No. collected	Archived (Y/N)	No. analysed*	Contact person/institute
Antarctic minke whale	Areas IIIE, IV and VW	Photographic record of external character	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Body length and sex identification	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Measurement of external body proportion	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Whole body weight	101	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Body weight by parts	32	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Skull measurement (length and breadth)	532	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Standard measurement of blubber thickness (two points)	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Observation of lactation status	278	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Measurement of mammary gland	278	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Testis weight	273	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Weight of stomach content	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Diatom film observation	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Blood plasma for physiological study	550	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Earplug for age determination	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Eye lens for age determination	187	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Tympanic bulla for chemical analysis	55	Y		ICR

Antarctic minke whale	Areas IIIE, IV and VW	Largest baleen plate for chemical analysis	550	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Vertebral epiphyses for biological study	445	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Observation and collection of ovary	278	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Histological sample of endometrium	14	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Histological sample of mammary gland	278	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Milk sample for chemical study	1	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Histological sample of testis	273	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Skin and liver tissues for genetic study	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Blubber, muscle and liver tissues for environmental monitoring	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Lung and liver tissues for environmental monitoring	42	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Gross pathological observation (thyroid, lung, stomach and gonad)	551	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Tissues for histopathological study	67	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Tissues for various study (muscle, blubber)	6	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Tissues for nutrient study (muscle, blubber, ventral groove)	1	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Collection of stomach contents for food and feeding study	46	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Collection of stomach contents for environmental monitoring	22	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	External parasites	6	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Internal parasites	2	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Photographic record of fetus	170	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Fetal length and weight	170	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Collection of small fetus	3	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Fetal eye lens for age determination	55	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Fetal skin for genetic study	170	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Fetus for embryological study	6	Y		ICR
Antarctic minke whale	Areas IIIE, IV and VW	Cyamid for phylogenetic study	3	Y		ICR

\*=Samples and data are currently under analysis

#### JARPNII-Offshore component

Species	Area/stock	Samples and Data	No. collected	Archived (Y/N)	No. analysed *	Contact person/inst
Common minke whale	Western North Pacific	Body length and sex	100	Y		ICR
Common minke whale	Western North Pacific	External body proportion	100	Y		ICR
Common minke whale	Western North Pacific	Photographic record and external character	100	Y		ICR

Common minke whale	Western North Pacific	Diatom film record	100	Y		ICR
Common minke whale	Western North Pacific	Standard measurements of blubber thickness (five points)	100	Y		ICR
Common minke whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	15	Y		ICR
Common minke whale	Western North Pacific	Whole body weight	100	Y		ICR
Common minke whale	Western North Pacific	Body weight by parts	15	Y		ICR
Common minke whale	Western North Pacific	Skin/blubber tissues (DNA)	100	Y		ICR
Common minke whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	100	Y		ICR
Common minke whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	100	Y		ICR
Common minke whale	Western North Pacific	Blubber, muscle tissues (chemical composition analysis)	5	Y		ICR
Common minke whale	Western North Pacific	Lung tissue for air pollutant analysis	8	Y		ICR
Common minke whale	Western North Pacific	Tissues for lipid analysis	15	Y		ICR
Common minke whale	Western North Pacific	Tissues for various analysis	100	Y		ICR
Common minke whale	Western North Pacific	Tissues for virus test	92	Y		ICR
Common minke whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	14	Y		ICR
Common minke whale	Western North Pacific	Uterine horn; measurement and endometrium sample	14	Y		ICR
Common minke whale	Western North Pacific	Collection of ovary	14	Y		ICR
Common minke whale	Western North Pacific	Photographic record of foetus	7	Y		ICR
Common minke whale	Western North Pacific	Foetal sex (identified by visual observation)	7	Y		ICR
Common minke whale	Western North Pacific	Foetal length and weight	7	Y		ICR
Common minke whale	Western North Pacific	External measurements of foetus	7	Y		ICR
Common minke whale	Western North Pacific	Foetal blubber tissues for DNA analysis	7	Y		ICR
Common minke whale	Western North Pacific	Foetal tissues for various analysis	7	Y		ICR
Common minke whale	Western North Pacific	Foetal eye lens for age determination analysis	7	Y		ICR
Common minke whale	Western North Pacific	Testis and epididymis; weight and histological sample	86	Y		ICR
Common minke whale	Western North Pacific	Collection of plasma sample	100	Y		ICR
Common minke whale	Western North Pacific	Collection of blood sample	100	Y		ICR
Common minke whale	Western North Pacific	Blood samples from umbilical cord	3	Y		ICR
Common minke whale	Western North Pacific	Plasma samples from umbilical cord	5	Y		ICR
Common minke whale	Western North Pacific	Stomach content, conventional record	100	Y		ICR
Common minke whale	Western North Pacific	Volume and weight of stomach content in each compartment	100	Y		ICR
Common minke whale	Western North Pacific	Collection of stomach contents for feeding study	100	Y		ICR
Common minke whale	Western North Pacific	Record of external parasites	100	Y		ICR
Common minke whale	Western North Pacific	Collection of external parasites	6	Y		ICR
Common minke whale	Western North Pacific	Record of internal parasites	100	Y		ICR
Common minke whale	Western North Pacific	Earplug for age determination	100	Y		ICR
Common minke whale	Western North Pacific	Tympanic bulla for age determination	100	Y		ICR

Common minke whale	Western North Pacific	Eye lens for age determination	100	Y		ICR
Common minke whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	100	Y		ICR
Common minke whale	Western North Pacific	Baleen plate measurements (length and breadth)	98	Y		ICR
Common minke whale	Western North Pacific	Length of each baleen plate series	100	Y		ICR
Common minke whale	Western North Pacific	Vertebral epiphyses sample	100	Y		ICR
Common minke whale	Western North Pacific	Number of ribs	100	Y		ICR
Common minke whale	Western North Pacific	Brain weight	15	Y		ICR
Common minke whale	Western North Pacific	Skull measurement (length and breadth)	96	Y		ICR
Sei whale	Western North Pacific	Body length and sex	100	Y		ICR
Sei whale	Western North Pacific	External body proportion	100	Y		ICR
Sei whale	Western North Pacific	Photographic record and external character	100	Y		ICR
Sei whale	Western North Pacific	Diatom film record	100	Y		ICR
Sei whale	Western North Pacific	Standard measurements of blubber thickness (five points)	100	Y		ICR
Sei whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	26	Y		ICR
Sei whale	Western North Pacific	Whole body weight	100	Y		ICR
Sei whale	Western North Pacific	Body weight by parts	26	Y		ICR
Sei whale	Western North Pacific	Skin/blubber tissues (DNA)	100	Y		ICR
Sei whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	100	Y		ICR
Sei whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	100	Y		ICR
Sei whale	Western North Pacific	Blubber, muscle tissues for chemical composition analysis	4	Y		ICR
Sei whale	Western North Pacific	Lung tissues for air pollutant analysis	10	Y		ICR
Sei whale	Western North Pacific	Tissues for lipid analysis	27	Y		ICR
Sei whale	Western North Pacific	Tissues for various analysis	100	Y		ICR
Sei whale	Western North Pacific	Tissues for virus test	79	Y		ICR
Sei whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	46	Y		ICR
Sei whale	Western North Pacific	Uterine horn; measurement and endometrium sample	46	Y		ICR
Sei whale	Western North Pacific	Collection of ovary	46	Y		ICR
Sei whale	Western North Pacific	Photographic record of foetus	25	Y		ICR
Sei whale	Western North Pacific	Foetal sex (identified by visual observation)	25	Y		ICR
Sei whale	Western North Pacific	Foetal length and weight	25	Y		ICR
Sei whale	Western North Pacific	External measurements of foetus	25	Y		ICR
Sei whale	Western North Pacific	Foetal tissues for various analysis	23	Y		ICR
Sei whale	Western North Pacific	Foetal lens for age determination	23	Y		ICR
Sei whale	Western North Pacific	Testis and epididymis; weight and histological sample	54	Y		ICR
Sei whale	Western North Pacific	Collection of blood plasma sample	100	Y		ICR
Sei whale	Western North Pacific	Collection of blood sample	100	Y		ICR

Sei whale	Western North Pacific	Blood samples from umbilical cord	15	Y		ICR
Sei whale	Western North Pacific	Plasma samples from umbilical cord	22	Y		ICR
Sei whale	Western North Pacific	Stomach content, conventional record	100	Y		ICR
Sei whale	Western North Pacific	Volume and weight of stomach content in each compartment	100	Y		ICR
Sei whale	Western North Pacific	Collection of stomach contents for feeding study	100	Y		ICR
Sei whale	Western North Pacific	Record of external parasites	100	Y		ICR
Sei whale	Western North Pacific	Collection of external parasites	12	Y		ICR
Sei whale	Western North Pacific	Record of internal parasites	100	Y		ICR
Sei whale	Western North Pacific	Collection of internal parasites	9	Y		ICR
Sei whale	Western North Pacific	Earplug for age determination	100	Y		ICR
Sei whale	Western North Pacific	Tympanic bulla for age determination	100	Y		ICR
Sei whale	Western North Pacific	Eye lens for age determination	100	Y		ICR
Sei whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	100	Y		ICR
Sei whale	Western North Pacific	Baleen plate measurements (length and breadth)	100	Y		ICR
Sei whale	Western North Pacific	Length of each baleen plate series	100	Y		ICR
Sei whale	Western North Pacific	Vertebral epiphyses sample	100	Y		ICR
Sei whale	Western North Pacific	Number of vertebrae	26	Y		ICR
Sei whale	Western North Pacific	Number of ribs	100	Y		ICR
Sei whale	Western North Pacific	Brain weight	25	Y		ICR
Bryde's whale	Western North Pacific	Body length and sex	50	Y		ICR
Bryde's whale	Western North Pacific	External body proportion	50	Y		ICR
Bryde's whale	Western North Pacific	Photographic record and external character	50	Y		ICR
Bryde's whale	Western North Pacific	Diatom film record	50	Y		ICR
Bryde's whale	Western North Pacific	Standard measurements of blubber thickness (five points)	50	Y		ICR
Bryde's whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	13	Y		ICR
Bryde's whale	Western North Pacific	Whole body weight	50	Y		ICR
Bryde's whale	Western North Pacific	Body weight by parts	13	Y		ICR
Bryde's whale	Western North Pacific	Skin/blubber tissues (DNA)	50	Y		ICR
Bryde's whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	50	Y		ICR
Bryde's whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	50	Y		ICR
Bryde's whale	Western North Pacific	Blubber, muscle tissues for chemical composition analysis	4	Y		ICR
Bryde's whale	Western North Pacific	Lung tissue for air pollutant analysis	8	Y		ICR
Bryde's whale	Western North Pacific	Tissues for lipid analysis	13	Y		ICR
Bryde's whale	Western North Pacific	Tissues for various analysis	50	Y		ICR
Bryde's whale	Western North Pacific	Tissues for virus test	38	Y		ICR
Bryde's whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	27	Y		ICR

Bryde's whale	Western North Pacific	Collection of milk sample	1	Y		ICR
Bryde's whale	Western North Pacific	Uterine horn; measurement and endometrium sample	27	Y		ICR
Bryde's whale	Western North Pacific	Collection of ovary	27	Y		ICR
Bryde's whale	Western North Pacific	Photographic record of foetus	15	Y		ICR
Bryde's whale	Western North Pacific	Foetal sex (identified by visual observation)	15	Y		ICR
Bryde's whale	Western North Pacific	Foetal length and weight	15	Y		ICR
Bryde's whale	Western North Pacific	External measurements of foetus	14	Y		ICR
Bryde's whale	Western North Pacific	Foetal tissues for DNA study	15	Y		ICR
Bryde's whale	Western North Pacific	Foetal tissues for various analysis	13	Y		ICR
Bryde's whale	Western North Pacific	Foetal lens for age determination	13	Y		ICR
Bryde's whale	Western North Pacific	Testis and epididymis; weight and histological sample	23	Y		ICR
Bryde's whale	Western North Pacific	Collection of plasma sample	50	Y		ICR
Bryde's whale	Western North Pacific	Collection of blood sample	50	Y		ICR
Bryde's whale	Western North Pacific	Blood samples from umbilical cord	11	Y		ICR
Bryde's whale	Western North Pacific	Plasma samples from umbilical cord	13	Y		ICR
Bryde's whale	Western North Pacific	Stomach content, conventional record	50	Y		ICR
Bryde's whale	Western North Pacific	Volume and weight of stomach content in each compartment	50	Y		ICR
Bryde's whale	Western North Pacific	Collection of stomach contents for feeding study	50	Y		ICR
Bryde's whale	Western North Pacific	Record of external parasites	50	Y		ICR
Bryde's whale	Western North Pacific	Collection of external parasites	6	Y		ICR
Bryde's whale	Western North Pacific	Record of internal parasites	50	Y		ICR
Bryde's whale	Western North Pacific	Collection of internal parasites	7	Y		ICR
Bryde's whale	Western North Pacific	Earplug for age determination	50	Y		ICR
Bryde's whale	Western North Pacific	Tympanic bulla for age determination	50	Y		ICR
Bryde's whale	Western North Pacific	Eye lens for age determination	50	Y		ICR
Bryde's whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	50	Y		ICR
Bryde's whale	Western North Pacific	Baleen plate measurements (length and breadth)	50	Y		ICR
Bryde's whale	Western North Pacific	Length of each baleen plate series	50	Y		ICR
Bryde's whale	Western North Pacific	Vertebral epiphyses sample	50	Y		ICR
Bryde's whale	Western North Pacific	Number of vertebrae	13	Y		ICR
Bryde's whale	Western North Pacific	Number of ribs	50	Y		ICR
Bryde's whale	Western North Pacific	Brain weight	13	Y		ICR
Bryde's whale	Western North Pacific	Skull measurement (length and breadth)	47	Y		ICR
Sperm whale	Western North Pacific	Body length and sex	3	Y		ICR
Sperm whale	Western North Pacific	External body proportion	3	Y		ICR
Sperm whale	Western North Pacific	Photographic record and external character	3	Y		ICR

Sperm whale	Western North Pacific	Diatom film record	3	Y		ICR
Sperm whale	Western North Pacific	Standard measurements of blubber thickness (five points)	3	Y		ICR
Sperm whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	3	Y		ICR
Sperm whale	Western North Pacific	Body weight	3	Y		ICR
Sperm whale	Western North Pacific	Body weight by parts	3	Y		ICR
Sperm whale	Western North Pacific	Skin/blubber tissues (DNA)	3	Y		ICR
Sperm whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	3	Y		ICR
Sperm whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	3	Y		ICR
Sperm whale	Western North Pacific	Blubber, muscle tissues for chemical composition analysis	3	Y		ICR
Sperm whale	Western North Pacific	Lung tissue for air pollutant analysis	2	Y		ICR
Sperm whale	Western North Pacific	Tissues for lipid analysis	3	Y		ICR
Sperm whale	Western North Pacific	Tissues for various analysis	3	Y		ICR
Sperm whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	3	Y		ICR
Sperm whale	Western North Pacific	Collection of spermaceti sample	3	Y		ICR
Sperm whale	Western North Pacific	Collection of milk sample	1	Y		ICR
Sperm whale	Western North Pacific	Uterine horn; measurement and endometrium sample	3	Y		ICR
Sperm whale	Western North Pacific	Collection of ovary	3	Y		ICR
Sperm whale	Western North Pacific	Collection of plasma sample	3	Y		ICR
Sperm whale	Western North Pacific	Collection of blood sample	3	Y		ICR
Sperm whale	Western North Pacific	Stomach content, conventional record	3	Y		ICR
Sperm whale	Western North Pacific	Volume and weight of stomach content in each compartment	3	Y		ICR
Sperm whale	Western North Pacific	Collection of stomach contents for feeding study	3	Y		ICR
Sperm whale	Western North Pacific	Record of external parasites	3	Y		ICR
Sperm whale	Western North Pacific	Collection of external parasites	1	Y		ICR
Sperm whale	Western North Pacific	Record of internal parasites	3	Y		ICR
Sperm whale	Western North Pacific	Collection of internal parasites	3	Y		ICR
Sperm whale	Western North Pacific	Maxillary teeth for age determination	3	Y		ICR
Sperm whale	Western North Pacific	Vertebral epiphyses sample	3	Y		ICR
Sperm whale	Western North Pacific	Number of vertebrae	3	Y		ICR
Sperm whale	Western North Pacific	Number of ribs	3	Y		ICR
Sperm whale	Western North Pacific	Brain weight	2	Y		ICR
Sperm whale	Western North Pacific	Skull measurement (length and breadth)	3	Y		ICR

\*=Samples and data are currently under analysis



JARPN II – Coastal (Sanriku)

Species	Area/stock	Samples and Data	No. collected	Archived (Y/N)	No. analysed*	Contact person/institute
Common minke whale	Western North Pacific	Body length and sex	57	Y		ICR
Common minke whale	Western North Pacific	External body proportion	57	Y		ICR
Common minke whale	Western North Pacific	Photographic record and external character	57	Y		ICR
Common minke whale	Western North Pacific	Diatom film record	57	Y		ICR
Common minke whale	Western North Pacific	Body scar record	57	Y		ICR
Common minke whale	Western North Pacific	Measurements of blubber thickness (5 points)	57	Y		ICR
Common minke whale	Western North Pacific	Detailed measurements of blubber thickness (11 points)	2	Y		ICR
Common minke whale	Western North Pacific	Whole body weight	57	Y		ICR
Common minke whale	Western North Pacific	Body weight by parts	2	Y		ICR
Common minke whale	Western North Pacific	Skin tissues for DNA study	57	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, spleen, blubber, heart and ventral groove for various analysis	57	Y		ICR
Common minke whale	Western North Pacific	Urine for various analysis	8	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, and blubber for heavy metal analysis	57	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, and blubber for organochlorine analysis	57	Y		ICR
Common minke whale	Western North Pacific	Collection of blood plasma	54	Y		ICR
Common minke whale	Western North Pacific	Muscle and vertebra for lipid analysis	2	Y		ICR
Common minke whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	36	Y		ICR
Common minke whale	Western North Pacific	Uterine horn; measurements and endometrium sample	36	Y		ICR
Common minke whale	Western North Pacific	Collection of ovary	36	Y		ICR
Common minke whale	Western North Pacific	Photographic record of foetus	6	Y		ICR
Common minke whale	Western North Pacific	Foetal length and weight	6	Y		ICR
Common minke whale	Western North Pacific	External measurement of foetus	5	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, heart, blubber and skin tissues of foetus	5	Y		ICR
Common minke whale	Western North Pacific	Collection of foetus	1	Y		ICR
Common minke whale	Western North Pacific	Testis and epididymis; weight and histological sample	21	Y		ICR
Common minke whale	Western North Pacific	Stomach contents, convenient record	57	Y		ICR
Common minke whale	Western North Pacific	Volume and weight of stomach content in each compartment	57	Y		ICR

Common minke whale	Western North Pacific	Observation of marine debris in stomach	57	Y		ICR
Common minke whale	Western North Pacific	Collection of stomach contents for feeding study	50	Y		ICR
Common minke whale	Western North Pacific	Record of external parasites	57	Y		ICR
Common minke whale	Western North Pacific	Earplug for age determination	57	Y		ICR
Common minke whale	Western North Pacific	Tympanic bulla for age determination	57	Y		ICR
Common minke whale	Western North Pacific	Eye lens for age determination	57	Y		ICR
Common minke whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	57	Y		ICR
Common minke whale	Western North Pacific	Baleen plate measurements (length and breadth)	56	Y		ICR
Common minke whale	Western North Pacific	Photographic record of baleen plate series	57	Y		ICR
Common minke whale	Western North Pacific	Length of baleen series	57	Y		ICR
Common minke whale	Western North Pacific	Vertebral epiphyses sample	57	Y		ICR
Common minke whale	Western North Pacific	Number of ribs	57	Y		ICR
Common minke whale	Western North Pacific	Skull measurement (length and breadth)	57	Y		ICR

\*=Samples and data are currently under analysis

#### JARPN II-Coastal (Kushiro)

Species	Area/stock	Samples and Data	No. collected	Archived (Y/N)	No. analysed*	Contact person/institute
Common minke whale	Western North Pacific	Body length and sex	50	Y		NRIFSF
Common minke whale	Western North Pacific	External body proportion	50	Y		NRIFSF
Common minke whale	Western North Pacific	Photographic record and external character	50	Y		NRIFSF
Common minke whale	Western North Pacific	Diatom film record	50	Y		NRIFSF
Common minke whale	Western North Pacific	Standard measurements of blubber thickness (five points)	50	Y		NRIFSF
Common minke whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	5	Y		NRIFSF
Common minke whale	Western North Pacific	Whole body weight	50	Y		NRIFSF
Common minke whale	Western North Pacific	Body weight by parts	5	Y		NRIFSF
Common minke whale	Western North Pacific	Skin tissues (DNA)	50	Y		NRIFSF
Common minke whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	50	Y		NRIFSF
Common minke whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	50	Y		NRIFSF
Common minke whale	Western North Pacific	Tissues for various analysis	50	Y		NRIFSF

Common minke whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	17	Y		NRIFSF
Common minke whale	Western North Pacific	Uterine horn; measurement and endometrium sample	17	Y		NRIFSF
Common minke whale	Western North Pacific	Collection of ovary	17	Y		NRIFSF
Common minke whale	Western North Pacific	Testis and epididymis; weight and histological sample	33	Y		NRIFSF
Common minke whale	Western North Pacific	Collection of blood plasma sample	48	Y		NRIFSF
Common minke whale	Western North Pacific	Stomach content, conventional record	50	Y		NRIFSF
Common minke whale	Western North Pacific	Volume and weight of stomach content in each compartment	50	Y		NRIFSF
Common minke whale	Western North Pacific	Collection of stomach contents for feeding study	47	Y		NRIFSF
Common minke whale	Western North Pacific	Record of external parasites	50	Y		NRIFSF
Common minke whale	Western North Pacific	Earplug for age determination	49	Y		NRIFSF
Common minke whale	Western North Pacific	Tympanic bulla for age determination	36	Y		NRIFSF
Common minke whale	Western North Pacific	Eye lens for age determination	50	Y		NRIFSF
Common minke whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	50	Y		NRIFSF
Common minke whale	Western North Pacific	Baleen plate measurements (length and breadth)	50	Y		NRIFSF
Common minke whale	Western North Pacific	Length of each baleen plate series	50	Y		NRIFSF
Common minke whale	Western North Pacific	Photographic record of baleen plate series	50	Y		NRIFSF
Common minke whale	Western North Pacific	Vertebral epiphyses sample	50	Y		NRIFSF
Common minke whale	Western North Pacific	Number of ribs	50	Y		NRIFSF
Common minke whale	Western North Pacific	Brain weight	5	Y		NRIFSF
Common minke whale	Western North Pacific	Skull measurement (length and breadth)	50	Y		NRIFSF

\*= Samples and data are currently under analysis.

#### 4.3 Samples from stranded animals

Species	Area/stock	Tissue type(s)	No. collected	Archived (Y/N)	No. analysed**	Contact person/institute
Common minke whale	Western North Pacific	Sample for DNA analysis*	1	Y		ICR
Common minke whale	Sea of Japan	Sample for DNA analysis*	2	Y		ICR
Common minke whale	Okhotsk Sea	Sample for DNA analysis*	4	Y		ICR
Bryde's whale	Western North Pacific	Blubber, skin, mammary gland, ear plug and stomach contents	1	Y		ICR

Gray whale	Western North Pacific	Blubber, skin, eye lens, ear plug, baleen plate, external parasites and whole skeleton	1	Y		ICR
Sperm whale	Western North Pacific	Sample for DNA analysis*	2	Y		ICR
Sperm whale	East China Sea	Muscle, upper tooth	1	Y		ICR

\* Skin and/or muscle

\*\*Under analysis

#### 4.4 Analyses/development of techniques

##### JARPA/JARPA II analyses/research

###### *Monitoring of the Antarctic ecosystem*

Preparation of earplugs of Antarctic minke whales collected during the 2005/06 JARPA II survey for age determination was completed. Preparation of earplugs collected during the 2006/07 JARPA II surveys is currently underway. Age determination of fin whales sampled during the 2005/06 JARPA II survey was completed.

The ADAPT-VPA assessment methodology (Mori *et al.*, 2007) which estimates recruitment trend and natural mortality rate of Antarctic minke whales was modified in two aspects. One is the revision of the stock-recruitment relationship, and the other is the simplification of the functional form of the carrying capacity. AIC indicate that the model which includes the above two modifications is better, compared to the previous version of the model (see SC/60/IA13).

The feeding habits, prey consumption and the annual trends in energy storage in the Antarctic minke whale were further examined in response to some suggestions offered during the JARPA review meeting (IWC, 2007). Papers are being prepared for publication.

A study was conducted to examine feeding strategy and prey consumption of Antarctic minke whales in the Southern Ocean. Results will be presented to the symposium 'The role of marine mammals in the ecosystem in the 21<sup>st</sup> century' to be held in Dartmouth, Nova Scotia, Canada, between 29 September and 1 October 2008.

###### *Stock structure*

Laboratory work on the Restriction Fragment Length Polymorphism (RFLP) analysis of the mitochondrial DNA (mtDNA) was completed for the Antarctic minke whales collected in JARPA II 2005/06.

Control region sequencing of mtDNA and analysis of 16microsatellite loci was conducted for the 2006/07 JARPAII fin whale samples.

###### *Other analyses/research*

Current distribution, abundance and abundance trend of humpback whale in Areas IV and V, south of 60°S were examined by using JARPA sighting data. A paper was submitted for publication.

Using biopsy samples from 411 humpback whales obtained during JARPA and the IDCR/SOWER cruises, a genetic study was conducted to describe their genetic population structure in parts of the Antarctic feeding grounds. Samples were obtained from the IWC management Areas III ( $n=81$ ), IV ( $n=172$ ), V ( $n=97$ ) and VI ( $n=61$ ), and were examined for (i) sex determination; (ii) the sequence variation of the first 334bp nucleotides of the mtDNA control region; and (iii) genetic variation at the genotypes of six microsatellite loci. A paper is being prepared for publication.

A genetic study on dwarf minke whales from the western South Pacific was completed in collaboration with Chilean scientists of the research center CEQUA. A paper was submitted for publication.

In order to study oceanographic conditions in the research area of JARPA and JARPA II, which is necessary to understand the habitat environment of whales, XBT, XCTD and CTD surveys were conducted during the JARPA and JARPA II surveys. The analyses of oceanographic data are conducted in co-operation with the Tohoku University, Japan.

An examination of the interaction between oceanography, krill and Antarctic minke whale in the Ross Sea and adjacent waters was conducted in a research co-operation between ICR and NRIFS. Results will be presented to the symposium 'The role of marine mammals in the ecosystem in the 21<sup>st</sup> century' to be held in Dartmouth, Nova Scotia, Canada, between 29 September and 1 October 2008.

A co-operative study with scientists at the University of California at Davis, US, is in progress to investigate the population structure of blue whales worldwide using molecular genetics markers, introns of nuclear genes. Main contribution of ICR to the project is to provide biopsy samples of the 16 blue whales obtained in Antarctic waters during JARPA in 1994-2001. A manuscript for publication is in preparation by a senior author.

A co-operative study with Macquarie University, Australia, is in progress to investigate the population structure of blue whales in the two main feeding aggregations of the species in Australia and in Southern Hemisphere using novel microsatellite markers. Main contribution of ICR to the project is to provide biopsy samples of the 16 blue whales obtained in Antarctic waters during JARPA in 1994-2001. A manuscript for publication is in preparation by a senior author.

In a co-operative research with JAMSTEC, antibodies against *Brucella* in serum samples of Antarctic minke whales from 2004/05 JARPA(n=50) are being examined by agglutination test using *B. abortus* as antigen.

In a co-operative study with Obihiro University of Agriculture and Veterinary Medicine, Obihiro, Japan, an examination of the reproductive physiology in the Antarctic minke whale is being conducted. During the period of this report, the following research topics were investigated: 1) Vitrification of immature oocytes and in vitro production of cloned embryos derived from somatic cells in minke, sei and Bryde's whales, 2) Analyses of developmental and genetic factors in the early stage of minke whale fetuses, 3) Studies on in vitro maturation, fertilization by micro-insemination, and embryonic development of frozen-thawed Antarctic minke whale immature oocytes, 4) Studies on function and morphology of placenta and uterus in pregnant Antarctic minke whales. Some of these results have been already presented or published (see section 11).

## JARPN II analyses/research

### *Biological data*

Earplugs of common minke, sei and Bryde's whales collected from 2004-2006 JARPN II surveys had been prepared for age determination. The preparations of testis tissue of whales collected in 2006 JARPN II survey was completed for determination of maturity.

In preparation for the JARPN II review meeting a data-base was completed with biological information of whales sampled between 2002 and 2007, including reproductive status of the animals.

### *Feeding ecology and ecosystem studies*

The stomach contents of 100 common minke, 100 sei, 50 Bryde's, and 3 sperm whales sampled in sub-area 7, 8 and 9 during the 2007 JARPN II survey, were analyzed. Furthermore, the stomach contents of 57 common minke whales sampled near Sanriku's coastal-area and 50 common minke whales sampled near Kushiro's coastal-area during the 2007 JARPN II survey, were analyzed.

In order to evaluate the possible impact of whales migrating to the JARPN II survey area on Japanese commercially important fisheries resources, an initial ecosystem model of the JARPN II survey area was built using the Ecopath-with Ecosim software, and initial test runs were conducted. Results will be presented to the '5<sup>th</sup> World Fisheries Congress' to be held in Yokohama, Japan, between 20 and 24 October 2008.

A study was conducted to examine the prey consumption and feeding strategies of three baleen whale species around the Kuroshio-current extension. Results will be presented to the symposium 'The role of marine mammals in the ecosystem in the 21<sup>st</sup> century' to be held in Dartmouth, Nova Scotia, Canada, between 29 September and 1 October 2008.

### *Environmental effects on cetaceans and marine ecosystem*

Organochlorines (PCBs, DDTs, CHLs, HCHs, HCB, etc.) and trace elements (Mn, Fe, Ni, Cu, Zn, Cd, Hg and Pb) are being analyzed in organs and tissues of common minke, Bryde's, sei and sperm whales collected during the 2007 JARPN II survey.

### *Stock structure*

Common minke whales sampled during the coastal (n=107) and pelagic (n=100) components of JARPNII in 2007 were analyzed for mtDNA control region sequencing and 17 microsatellite loci. Bryde's whales (n=50), sei whales (n=100), and sperm whales (n=3) sampled in 2007 during JARPNII were analyzed for genetic variation in mtDNA control region and 15-17 microsatellite loci. In preparation for the JARPNII review meeting, genetic database for all of the JARPNII samples from 2000-2007 was constructed and population genetic analysis using it is underway.

### *Other analyses/research*

In order to estimate cetacean prey selectivity as an input to the ecosystem models, accurate abundance estimation of cetacean prey species is being investigated using hydro-acoustic data. This estimation is being made as a co-operative study with Hokkaido University, Japan. Methodology for TS estimation of copepods, krill and sand lance was developed in this study. Acoustic species identification methods based on a multivariate statistical analysis was developed and the results indicated that krill, Japanese anchovy and sand lance in Sendai Bay could be identified with 90% accuracy.

Examination of parasitic fauna in Bryde's, sei and sperm whales collected during JARPN II surveys is being conducted in co-operation with the National Science Museum, Tokyo, Japan.

Organochlorines (PCBs, DDTs, CHLs, HCHs, HCB, etc.) and trace elements (Mn, Fe, Ni, Cu, Zn, Cd, Hg and Pb) are being analyzed in organs and tissues of common minke, Bryde's, sei and sperm whales collected during the 2006 JARPN II survey. This study is being conducted in co-operation with Ehime University, Matsuyama, Japan. In the co-operative study, a method for a rapid measurement of PCB levels in blubber of common minke whales is being developed.

In a co-operative study with the Center for Marine Environmental Studies, Ehime University, Matsuyama, Japan, the relationships between residue levels of organochlorine and Cytochrome P450 (CYP) is being investigated using samples from common minke whales in the western North Pacific.

In a co-operative study with Kyushu University, Fukuoka, Japan, molecular genetic analysis of *MHC* gene was conducted in order to determine the level of polymorphism of the *DQB* alleles for the Antarctic minke, sei, Bryde's and the sperm whale, to develop the methodology for analyzing different MHC locus, MHC-DRB, in cetacean. In another co-operative study with this university, molecular genetic analysis of *Tbx4* gene in cetaceans is being conducted. Results of these studies were published (see Section 11).

In a co-operative study with Tokai University and National Science Museum, Japan, stomach contents of sperm whales were analyzed in order to determine the feeding ecology of sperm whales. This study was useful to understand the impact of sperm whales on prey species of the surface ecosystem.

In a co-operative study with Hokkaido University, Japan, a molecular endocrinological study was conducted to investigate molecular basis of endocrine regulation in seawater adaptation of cetacean. Results were published (see Section 11).

In a co-operative research with JAMSTEC, antibodies to *Brucella* in serum samples of common minke (n=100), sei (n=50), Bryde's (n=50) and sperm (n=4) whales from 2006 and 2007 JARPN II offshore surveys and of common minke whales (n=76) from 2007 JARPN II coastal survey, are being examined by agglutination test using *B. abortus* as antigen.

In a co-operative study with University of Tsukuba, Tsukuba, Japan, physicochemical properties and molecular structures of oxygen-binding hemoproteins from cetaceans is being investigated.

In a co-operative study with TUMST, a Bayesian analytical tool is being developed to infer stock structure of whales. This study incorporates spatial component into the model to better describe the stock structure for conducting management.

In a co-operative study with University of Tokyo, molecular genetic analysis of *Hox* gene complex was conducted in order to describe genetic diversity in limb formation in mammals. Because cetacean species have adapted to their marine environment with transformed and reduced limbs, comparison between cetaceans and terrestrial mammal will allow us to study evolution and function of the gene. A manuscript for publication is in preparation by a senior author.

In a cooperative study with TUMST a Generalized Additive Model (GAM) was applied to acoustic survey data to model relationships between environmental factors and distribution patterns of pelagic fish and krill in Sendai Bay, Japan. Results will be presented to the 'ICES 6<sup>th</sup> symposium in Acoustics: Ecosystem Approach with Fisheries Acoustics and Complementary Technologies (SEAFACETS)' to be held in Bergen, Norway in June 2008.

## 5. POLLUTION STUDIES

See item 4.4

## 6. STATISTICS FOR LARGE CETACEANS

### 6.1 Corrections to earlier years' statistics for large whales

See the part of NRIFSFS in this report.

### 6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2007 (North Pacific) and the season 2007/08 (Antarctic)

See the part of NRIFSFS in this report.

### 6.3 Anthropogenic mortality of large whales for the calendar year 2007 or the season 2007/08

#### 6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)

See the part of NRIFSFS in this report.

#### 6.3.2 Fishery bycatch of large whales

See the part of NRIFSFS in this report.

## 7. STATISTICS FOR SMALL CETACEANS

Not applicable.

## 8. STRANDINGS

See the part of NRIFSFS in this report.

## 9. OTHER STUDIES AND ANALYSES

In collaboration with scientists from the TUMST, a document on a research program accompanying Management Variant 2 for western North Pacific Bryde's whale was prepared in the context of the RMP *Implementation* process for this species in this ocean basin (SC/60/PFI9).

In a co-operative research with TUMST, methods of age determination and multi-readers aging systems are being developed.

A total of 320 samples of whale products obtained from the Japanese retail market during September and October in 2007 were examined genetically (mtDNA control region sequencing analysis) for determining species identity.

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