

Japan. Progress report on cetacean research, April 2008 to March 2009, with statistical data for the *calendar year* 2008 or the season 2008/09

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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; 4.1
Fin whale	<i>B. physalus</i>	North Pacific, Southern Hemisphere.	6.3.2; 8
Sei whale	<i>B. borealis</i>	North Pacific, Southern Hemisphere	6.2
Common minke whale	<i>B. acutorostrata</i>	North Pacific, Sea of Japan	2.1.1; 4.2; 6.3.2; 8; 9
Antarctic minke whale	<i>B. bonaerensis</i>	Southern Hemisphere	6.2
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
Humpback whale	<i>Megaptera novaeangliae</i>	North Pacific, Southern Hemisphere	2.1.1; 4.2; 6.3.2; 8
Sperm whale	<i>Physeter macrocephalus</i>	North Pacific, South Pacific, North Atlantic off Africa, Southern Hemisphere	2.1.1; 4.2; 6.2; 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 in the North Pacific. 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 6 January 2009 to 26 February 2009. The Government of Japan offered a research vessel (*Shonan-maru No.2*) as in the past. The main objectives were to: 1) investigate temporal changes in the spatial distribution of Antarctic minke whales in relation to recession of the pack ice using a combination

of line transect survey, photo-identification studies and biopsy/mark-recapture effort; 2) continue research on blue whales, and; 3) continue research on humpback and southern right whales, as in previous years. Research was conducted in the Antarctic waters from 82° E to 95° E for 31 days. Paul Ensor (cruise leader, New Zealand), Saeko Kumagai (Japan), Sanna Kuningas (Finland) and Paula Olson (USA) participated in the survey as scientists. Yasunari Tsuda, Chief Radio Operator of the *Shonan Maru No.2* conducted acoustics research during the cruise. The details of the cruise and results are reported as Document SC/61/XX.

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
Northern right whale	18/07-12/09/08	Western North Pacific	1	T. Kishiro
Humpback whale	18/07-12/09/08	Western North Pacific	2	T. Kishiro
	25/04-3/6/08	Western North Pacific	1	T. Miyashita
Bryde's whale	18/07-12/09/08	Western North Pacific	4	T. Kishiro
Common minke whale	14/6-16/07/08	Sea of Japan	15	T. Kishiro
	18/07-12/09/08	Western North Pacific	11	T. Kishiro
	25/04-3/6/08	Western North Pacific	13	T. Miyashita
Sperm whale	18/07-12/09/08	Western North Pacific	42	T. Kishiro
	11/08-22/08/08	Western North Pacific	36	T. Kishiro
	25/04-3/6/08	Western North Pacific	1	T. Miyashita
	18/9-14/8/08	Western North Pacific	27	T. Iwasaki

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 2008, using a total of 24 whale watching boats belong to the WATB. The survey lasted 12 days in July and August, and T. Kishiro (NRIFSF), eight research assistants and 24 fishermen members of WATB acted as the researchers on board. A total of 6 schools (10 individuals) of Bryde's whales were sighted in July and 18 schools (26 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 Prefecture Government. 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) have conducted simulation tests using the newly developed abundance estimation model and applied the model to the real IDCR/SOWER data.

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 whale	Dorsal fin	Kochi/ East China Sea stock and Kagoshima/ East China Sea Stock	4 (Kochi), and 0 (Kagoshima)	Y	52 (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 52 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 the movements of coastal Bryde's whales.

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	two 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
Blue whale	Antarctic	2008/09 6	Y	0	6	NRIFSF
Humpback whale	Antarctic	2008/09 23	Y	0	23	NRIFSF

Antarctic minke whale	Antarctic	2008/09 4	Y	0	4	NRIFSF
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Skin biopsy sampling was conducted during the IWC/SOWER sighting survey cruises in the Southern Hemisphere as mentioned in Section 2.1.1.

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

From 9 September to 20 October 2008, the JARPN II coastal component was conducted off Kushiro, Hokkaido, northeastern Japan, using four small-type whaling catcher boats. Kato (TUMST), Yoshida, Kishiro, Miyashita, Iwasaki, Kanaji (NRIFSF), Yasunaga, and Oikawa (ICR) conducted the 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 5,381.4 n. miles (521.3 hours) was searched, and 108 schools (110 individuals) of common minke whales, a humpback whale and two sperm whales were detected. Of these, 50 common minke whales (32 males and 18 females) were collected. Further information can be found in SC/61/O5 and the part of ICR in this report.

In 2008, NRIFSF conducted whale prey species surveys in the offshore region of the western North Pacific enclosed by latitude from 35°N to 41°N and longitude from 146°E and 148°E excluding the Russian EEZ from 21 July to 3 August by the trawler-type research vessel, *Shunyo-Maru* (887GT: NRIFSF). The objective was to examine prey environment and prey preference of Bryde's whale *Balaenoptera edeni* in cooperation with the sampling survey of the whale by *Nisshin-Maru* and three sighting/sampling vessels conducted by ICR. Watanabe (NRIFSF), Kumagai (ICR), and Sato (Mie University) joined this survey. The distribution, abundance, and size composition of the prey species were investigated with the midwater trawl, MOCNESS (Multiple Opening/Closing Net and Environment Sampling System), Twin NORPAC net (North Pacific Standard net), and quantitative echosounder in the daylight period. A conductivity-Temperature-Depth (CTD) profiler cast was made down to 500 m depth at each sampling station to determine the oceanographic condition. A total of 21 times of trawl samplings, 8 times of MOCNESS samplings, and 29 times of NORPAC net samplings and CTD casts were conducted. The result suggests that Bryde's whale preferred prey rich environment in or close to the Kuroshio front and subarctic boundary as their main habitat, and preferred Japanese anchovy *Engraulis japonicus*. Further details are given in Appendix 2 of the SC/61/O4.

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 2008 or the season 2008/09

JARPNII and JARPAII

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
Antarctic minke whale	Scientific permit	Areas V, VIW	375	304	679	1
Antarctic fin whale	Scientific permit	Areas V, VIW	0	1	1	0
Common minke whale	Scientific permit	W. North Pacific	108	61	169	Offshore: 0

						Coastal: 2
Sei whale	Scientific permit	W. North Pacific	44	56	100	0
Bryde's whale	Scientific permit	W. North Pacific	30	20	50	0
Sperm whale	Scientific permit	W. North Pacific	2	0	2	0

6.3 Anthropogenic mortality of large whales for the calendar year 2008 or the season 2008/09

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

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 incidental mortality of large cetaceans (bycatch) by Japanese fisheries, by Prefecture in January-December 2008, are shown below. Species and figures are based on the reports of prefecture governments to the FAJ, 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	8	Hokkaido	K	NA	FPN	F	FAJ	
	10	Aomori						
	11	Iwate						
	6	Miyagi						
	1	Akita						
	1	Chiba						
	7	Niigata						
	9	Toyama						
	24	Ishikawa						
	3	Fukui						
	1	Shizuoka						
	7	Mie						
	6	Kyoto						
	4	Wakayama						
	1	Shimane						
	3	Yamaguchi						D
	1							
	8	Kochi						K
	17	Nagasaki						
	1	Miyazaki						
5	Kagoshima							
Humpback whale	1	Iwate	R					
	1	Mie						
	1	Kumamoto						
Fin whale	1	Wakayama	K					

Gear: FPN=Stationary uncovered pounds nets

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

The Government of Japan has as policy not to present information on small cetaceans in the progress report.

8. STRANDINGS

The provisional number of large whale strandings in Japan, for the period January-December 2008, 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 whale	7	7	FAJ	-
Fin whale	1	1	FAJ	-
Humpback whale	1	1	FAJ	-
Sperm whale	12	12	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

In relation to development for ecosystem modeling by Ecopath with Ecosim (EwE), Watanabe (NRIFSF) obtained feeding parameters, such as stomach content composition and daily ration, of the major large-sized fish and squid species, like swordfish, neon flying squid, and blue shark, collected by gillnet and/or pole-and-line samplings in the western North Pacific (see SC/J09/JR21). Furthermore, Watanabe estimated habitat selection and prey preference of common minke whale in the Kushiro area, northern Japan, in autumn based on the data from whale prey species survey in their habitat as well as the stomach content data of the whales obtained by Kishiro, Yoshida and their colleagues and distribution data of the whales collected by ICR during 2002-2007. The results indicate that the common minke whale might prefer rich prey environment affected by the Oyashio, and immature whales prefer walleye pollock *Theragra chalcogramma* while mature animals prefer Pacific saury *Cololabis saira*, although both frequently fed on Japanese anchovy *Engraulis japonicus* in some years. Further details are given in the documents of SC/J09/JR6 and SC/J09/JR11. Watanabe also contributed to the estimation of prey preference of common minke, Bryde's (*B. edeni*) and sei (*B. borealis*) whales in the offshore region of the western North Pacific (see SC/J09/JR10).

10. LITERATURE CITED

11. PUBLICATIONS

11.1 Published or 'In Press' papers only

Kasamatsu, F., Miyashita, T. and Yoshioka, M. 2009. Field Guide to Whales, Dolphins and Porpoises. (New edition). Supervised by Ohsumi, S., Illustration by Motoyama, K. University of Tokyo Press. 148pp. [In Japanese]

Kishiro, T. 2008. Coastal cetaceans in Japan - Bryde's whales ranging from the coastal waters off Japan. In (Kato, H. eds.) Marine mammals, Mammalogy in Japan 3. pp51-74. University of Tokyo Press. 293pp. [In Japanese]

- Miyashita, T. 2008. Sighting survey – Monitoring of cetacean resources. In (Kato, H. eds.) Marine mammals, Mammalogy in Japan 3. pp177-202. University of Tokyo Press. 293pp. [In Japanese]
- Okamura, H., Kiyota, M., and Kitakado, T. 2008. A resource selection model for analyzing pseudoreplicated data due to grouping behavior of animals. *Journal of Agricultural, Biological, and Environmental Statistics* 13 (3): 294-312.
- Okamura, H. and Semba, Y. 2009. A novel statistical method for validating the periodicity of vertebral growth band formation in elasmobranch fishes. *Canadian Journal of Fisheries and Aquatic Sciences*, In Press
- Oozeki, Y., Takasuka, A., Okamura, H., Kubota, H., and Kimura, R. 2009. Patchiness structure and mortality of Pacific saury *Cololabis saira* larvae in the northwestern Pacific. *Fisheries Oceanography*, In Press
- Tojo, N., Shimizu, D., Yasuma, H., Kawahara, S., Watanabe, H., Yonezaki, S., Murase, H. and Miyashita, K. 2008. Quantitative analysis of isada krill (*Euphausia pacifica*) distribution in the western North Pacific. *Bulletin of the Japanese Society of Fisheries Oceanography*, 72: 165-173. [In Japanese with English abstract]
- Watanabe, H., Kubodera, T., Ichii, T., Sakai, M., Moku, M. and Seitou, M. 2008. Diets and maturity stages of neon flying squid *Ommastrephes bartramii* in the Kuroshio-Oyashio transition region of the western North Pacific during autumn and spring. *Journal of the Marine Biological Association of the United Kingdom*, 88: 381-389.

11.2 Unpublished literature

- Kitakado, T., Okamura, T. Kishiro, H. and Miyashita, T. 2008. Potential difficulties and challenging issues in line transect surveys for the estimation of whale abundance. 5th World Fisheries Congress Program & Abstract, Yokohama, October 2008. P. 259. [Available from the author]
- Miyashita, T. and Kato, H. (2008) Sighting surveys in the western North Pacific and contribution to the cetacean resources management. 5th World Fisheries Congress Program & Abstract, Yokohama, October 2008. P. 259. [Available from the author]
- Mori, M., H. Watanabe, T. Hakamada, K. Matsuoka, H. Murase, T. Tamura, and K. Konishi. 2008. Introduction of an ecosystem model of the western North Pacific: progress made and future work. Fifth Congress on World Fisheries. Yokohama, Japan, October 2008. [Available from the author]
- Ohnisi, S., Yamakawa, T., Okamura, H., Akamine, T., and Narimatsu, Y. 2008. †Effective use of a von Bertalanffy growth model †- case studies for various species -. Abstracts for the Annual Meeting of the Japanese Society of Fisheries Oceanography, 2008. [Available from the author, In Japanese]
- Okamura, H. and Kiyoya, M. 2008. Bias of trend estimation using a lognormal distribution for zero-inflated data. Abstract for the Annual Meeting of the Japanese Society of Fisheries Science, 2008, p.7. [Available from the author, In Japanese]
- Okamura, H. 2008. Analysis of animal movement data using a Bayesian method. Annual Meeting of the Japanese Society of Mammalogy, 2008. [Available from the author, In Japanese]
- Oozeki, Y., Takasuka, A., Kubota, H., Kimura, R., and Okamura, H. 2008. Patchiness structure and mortality of Pacific saury, *Cololabis saira*, larvae in the Northwestern Pacific. The 32nd Annual Larval Fish Conference, Kiel, August 4-7 2008, pp. 39-40. [Available from the author]
- Shimada, H. 2008. Cetacean Sighting Survey within Pack Ice using IceBreaker, Shirase. XXXI Symposium on Polar Biology Program & Abstract, Tokyo, December 2008. p.243. [Available from the author]
- Takasuka, A., Okamura, H., Oozeki, Y., Kamada, T., Weber, E., McClatchie, S. 2008. Comparison of species-specific spawning characteristics and a trial to predict spawning habitat of small pelagic fish. Abstract for the Annual Meeting of the Japanese Society of Fisheries Science, 2009, p.67. [Available from the author, In Japanese]
- Tojo, N., Matsukura, R., Yasuma, H., Yonezaki, S., Watanabe, H., Kawahara, S., Murase, H. and Miyashita, K. 2008. Spatial analysis of Isada Krill (*Euphausia pacifica*) distribution in frontal environments in the North Pacific Ocean. Fourth International Symposium on GIS, Spatial Analysis in Fishery and Aquatic Science. Rio de Janeiro, Brazil, August 2008. [Available from the author]
- Tojo, N., Murase, H., Matsukura, R., Yasuma, H., Yonezaki, S., Watanabe, H., Kawahara, S. and Miyashita, K. 2008. Isada Krill (*Euphausia pacifica*) distribution in frontal environments in the North Pacific Ocean. The Second Meeting of Asian Fisheries Acoustics Society. Busan, Korea, November 2008. [Available from the author]

- Yamashita, H., Inada, H., Okamura, H., Ochi, Y., and Ogawa, M. 2008. Comparison of jigging catchabilities by underwater fishing light with different light source, color, and irradiance for neon flying squid *Ommastrephes bartramii*. 5th World Fisheries Congress Program & Abstract, Yokohama, October 20-25 2008, p. 313. [Available from the author]
- Watanabe, H. 2008. Role of tuna and billfish species as predator in the marine ecosystems. Symposium of spring meeting of Japanese Fisheries Society in 2008, Conservation and sustainable utilization of large sized predator in the marine ecosystems. Shimizu, Japan, March 2008. [Available from the author]

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
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; 2.2, 4.2; 4.3;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, W. North Pacific	2.1, 2.2, 4.1, 4.2; 4.4
Bryde's whale	<i>Balaenoptera edeni</i>	W. North Pacific	2.1; 2.2; 3.1;4.2; 4.4
Blue whale	<i>Balaenoptera musculus</i>	Antarctic, W. North Pacific	2.1; 3.1, 4.1, 4.4
Fin whale	<i>Balaenoptera physalus</i>	Antarctic, W. North Pacific	2.1; 4.1; 4.2, 4.3, 4.4
Humpback whale	<i>Megaptera novaeangliae</i>	Antarctic, W. North Pacific	2.1; 2.2; 3.1; 4.1
Sperm whale	<i>Physeter macrocephalus</i>	Antarctic, W. North Pacific	2.1, 2.2, 4.2; 4.3;4.4
Southern bottlenose whale	<i>Hyperoodon planifrons</i>	Antarctic	2.1

2. SIGHTINGS 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 2008/09 austral summer season in the Antarctic Areas V and VIW and during year 2008 in the North Pacific. Details of the sighting component of those surveys are given in the cruise reports: SC/61/O3 for JARPA II and SC/61/O4 for JARPN II-offshore component and SC/61/O5, SC/61/O6 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.

JARPA II

Target species	Date	Area	School / No. of sightings	Contact person/institute and references
Antarctic minke whale	10 Dec/08-20/Mar/09	Areas V and VI	1,973/4,883	S. Nishiwaki (ICR); SC/61/O3
Blue whale	10 Dec/08-20/Mar/09	Areas V and VI	15/30	S. Nishiwaki (ICR); SC/61/O3
Fin whale	10 Dec/08-20/Mar/09	Areas V and VI	122/491	S. Nishiwaki (ICR); SC/61/O3
Sei whale	10 Dec/08-20/Mar/09	Areas V and VI	5/7	S. Nishiwaki (ICR); SC/61/O3
Humpback whale	10 Dec/08-20/Mar/09	Areas V and VI	418/735	S. Nishiwaki (ICR); SC/61/O3
Southern right whale	10 Dec/08-20/Mar/09	Areas V and VI	1/1	S. Nishiwaki (ICR); SC/61/O3
Sperm whale	10 Dec/08-20/Mar/09	Areas V and VI	77/91	S. Nishiwaki (ICR); SC/61/O3
Southern bottlenose whale	10 Dec/08-20/Mar/09	Areas V and VI	32/61	S. Nishiwaki (ICR); SC/61/O3

JARPN II-Offshore component

Target species	Date	Area	School / No. of sightings	Contact person/institute and references
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Common minke whale	6June-29Aug/08	Western North Pacific	75/77	T. Tamura (ICR); SC/61/O4
Like minke whale	6June-29Aug/08	Western North Pacific	12/12	T. Tamura (ICR); SC/61/O4
Sei whale	6June-29Aug/08	Western North Pacific	300/525	T. Tamura (ICR); SC/61/O4
Bryde's whale	6June-29Aug/08	Western North Pacific	363/526	T. Tamura (ICR); SC/61/O4
Blue whale	6June-29Aug/08	Western North Pacific	33/45	T. Tamura (ICR); SC/61/O4
Fin whale	6June-29Aug/08	Western North Pacific	90/121	T. Tamura (ICR); SC/61/O4
Humpback whale	6June-29Aug/08	Western North Pacific	27/37	T. Tamura (ICR); SC/61/O4
North Pacific right whale	6June-29Aug/08	Western North Pacific	5/6	T. Tamura (ICR); SC/61/O4
Sperm whale	6June-29Aug/08	Western North Pacific	275/591	T. Tamura (ICR); SC/61/O4

2.1.2 Opportunistic, platforms of opportunity

None

2.2 Analyses/development of techniques

Target species	Date	Area	Methods/effort	Parameters/factors measured	Contact person/Institute; refs
Antarctic minke whales	31/Dec/89-8/Mar/2005	Antarctic	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (in preparation)
Humpback whales	31/Dec/89-8/Mar/2005	Antarctic	Line transect survey; Standard methodology	Distribution; Abundance	K. Matsuoka, ICR (submitted)
Common minke whales	6/Jun/2002-30/Jul/2007	W North Pacific	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (SC/J09/JR15)
Bryde's whales	6/Jun/2002-30/Jul/2007	W North Pacific	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (SC/J09/JR15)
Sei whales	6/Jun/2002-30/Jul/2007	W North Pacific	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (SC/J09/JR15)
Sperm whales	6/Jun/2002-30/Jul/2007	W North Pacific	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (SC/J09/JR15)
Common minke whales	11/Sep/2002-7/Oct/2007	Off Kushiro	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (SC/J09/JR8)
Common minke whales	20/Apr/2005-3/May/2006	Off Sanriku	Line transect survey; Standard methodology	Distribution; Abundance	T. Hakamada, ICR (SC/J09/JR8)
Sei whales	1/Jul/2000-31/Jul/2007	North Pacific	Line transect survey; Spatial Modelling (GAM)	Distribution; Abundance	H. Murase, ICR (Appendix 2 of SC/J09/JR36)
Sei whales	2/Aug/2000-30/Jul/2007	North Pacific	Line transect survey; Spatial Modelling (NPMR)	Distribution	K. Konishi, ICR (SC/J09/JR19)

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.
Blue whale	Body	Area V	8			ICR; SC/61/O3
Blue whale	Body	Area VI	3			ICR; SC/61/O3
Humpback whale	Body	Area V	35			ICR; SC/61/O3
Humpback whale	Body	Area VI	4			ICR; SC/61/O3

*: These photos will be examined and incorporated into the ICR catalogue.

JARPN II-Offshore component

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)*	Catalogue total	Contact person/institute; refs
Blue whale	Dorsal fin	Western North Pacific	5			ICR; SC/61/O4
Blue whale	Body	Western North Pacific	2			ICR; SC/61/O4
Blue whale	Body	Western North Pacific	5			ICR; SC/61/O4
Humpback whale	Body	Western North Pacific	1			ICR; SC/61/O4
Humpback whale	Dorsal fin	Western North Pacific	1			ICR; SC/61/O4
North Pacific right whale	Body	Western North Pacific	2			ICR; SC/61/O4
North Pacific right whale	Head	Western North Pacific	3			ICR; SC/61/O4
North Pacific right whale	Other	Western North Pacific	1			ICR; SC/61/O4

*: Catalogue under construction

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	21 days	T. Tamura (ICR); SC/61/O7

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 2008/09 austral summer season in Areas V and VIW. The second full-scale survey of JARPA II

was carried out between 10 December 2008 and 22 March 2009. The total searching distance was 14,351.4n.miles. Out of 700 schools (3,115 individuals) of primary sighted Antarctic minke whales by sighting/sampling vessels, 642 schools (1,339 individuals) were targeted for sampling, and a total of 679 animals were sampled.

The 2008 JARPN II offshore survey was conducted from 6 June to 29 August in sub-areas 7, 8 and 9 of western North Pacific. The total searching distance was 5,757.6n.miles. Out of 66 common minke whales sighted, 59 animals were sampled; out of 386 sei whales sighted, 100 were sampled; out of 234 Bryde's whales sighted, 50 animals were sampled; out of 277 sperm whales sighted, 2 were sampled. The 2008 JARPN II coastal survey of Sanriku was conducted between 14 April and 18 May. The total searching distance was 5,275.9n.miles. Out of 94 schools (96 individuals) sighted, 60 animals were sampled. The 2008 coastal survey of Kushiro was conducted from 9 September to 20 October. The total searching distance was 5,381.4n.miles. Out of 108 schools (110 individuals) sighted, 50 animals were sampled. Details of these surveys are given in the cruise reports: SC/61/O3 for JARPA II and SC/61/O4 for JARPN II-offshore component, SC/61/O6 for JARPN II-coastal component (Ayukawa) and SC/61/O5 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)

JARPA II

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed *	Total holdings	Contact person/institute
Fin whale	Area V	08/09-1	Y			ICR
Humpback whale	Area V	08/09-13	Y			ICR

*: Under analysis

JARPN II-Offshore component

Species	Area/stock	Calendar year/ season - no. collected	Archived (Y/N)	No. analysed *	Total holdings	Contact person/institute
Humpback whale	Western North Pacific	2008-1	Y	0		ICR
Blue whale	Western North Pacific	2008-3	Y	0		ICR
Sei whale	Western North Pacific	2008-1	Y	0		ICR
North Pacific right whale	Western North Pacific	2008-4	Y	0		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 *	Cont act perso
Antarctic minke whale	Antarctic	Body length and sex	679	Y		ICR
Antarctic minke whale	Antarctic	External body proportion	679	Y		ICR
Antarctic minke whale	Antarctic	Photographic record and external character	678	Y		ICR
Antarctic minke whale	Antarctic	Standard measurements of blubber thickness	679	Y		ICR
Antarctic minke whale	Antarctic	Body weight	679	Y		ICR
Antarctic minke whale	Antarctic	Body weight by parts	9	Y		ICR
Antarctic minke whale	Antarctic	Skull measurement (Length and breadth)	645	Y		ICR

Antarctic minke whale	Antarctic	Observation of lactation status	304	Y		ICR
Antarctic minke whale	Antarctic	Measurement of mammary gland	304	Y		ICR
Antarctic minke whale	Antarctic	Testis weight	375	Y		ICR
Antarctic minke whale	Antarctic	Weight of stomach content	650	Y		ICR
Antarctic minke whale	Antarctic	Diatom film observation	679	Y		ICR
Antarctic minke whale	Antarctic	Blood plasma for physiological study	675	Y		ICR
Antarctic minke whale	Antarctic	Earplug for age determination	676	Y		ICR
Antarctic minke whale	Antarctic	Ocular lens for age determination	201	Y		ICR
Antarctic minke whale	Antarctic	Tympanic bulla for chemical analysis	71	Y		ICR
Antarctic minke whale	Antarctic	Largest baleen plate for chemical analysis	676	Y		ICR
Antarctic minke whale	Antarctic	Vertebral epiphyses for biological study	554	Y		ICR
Antarctic minke whale	Antarctic	Observation and collection of ovary	304	Y		ICR
Antarctic minke whale	Antarctic	Histological sample of endometrium	7	Y		ICR
Antarctic minke whale	Antarctic	Histological sample of mammary gland	304	Y		ICR
Antarctic minke whale	Antarctic	Histological sample of testis	375	Y		ICR
Antarctic minke whale	Antarctic	Milk sample for chemical study	2	Y		ICR
Antarctic minke whale	Antarctic	Tissue samples for genetic study	679	Y		ICR
Antarctic minke whale	Antarctic	Blubber, muscle and liver tissues for environmental monitoring	679	Y		ICR
Antarctic minke whale	Antarctic	Lung and liver tissues for environmental monitoring	40	Y		ICR
Antarctic minke whale	Antarctic	Gross pathological observation (thyroid, lung, stomach and gonad)	679	Y		ICR
Antarctic minke whale	Antarctic	Tissues for histopathological study	95	Y		ICR
Antarctic minke whale	Antarctic	Tissues for various study	6	Y		ICR
Antarctic minke whale	Antarctic	Tissues for nutrient study	1	Y		ICR
Antarctic minke whale	Antarctic	Stomach contents for food and feeding study	73	Y		ICR
Antarctic minke whale	Antarctic	Stomach contents for environmental monitoring	21	Y		ICR
Antarctic minke whale	Antarctic	Samples of internal and external parasites	6	Y		ICR
Antarctic minke whale	Antarctic	Photographic record of foetus	195	Y		ICR
Antarctic minke whale	Antarctic	Foetal length and weight	195	Y		ICR
Antarctic minke whale	Antarctic	Fetal ocular lens for age determination	68	Y		ICR
Antarctic minke whale	Antarctic	Foetal tissues for genetic study	193	Y		ICR
Antarctic minke whale	Antarctic	Tissue samples for construction of monitoring system of infectious disease	9	Y		ICR
Antarctic minke whale	Antarctic	Fetal sample for clarification of jaw opening mechanism	2	Y		ICR
Antarctic minke whale	Antarctic	Fetal sample for clarification of hind-limb disappearance mechanism	2	Y		ICR
Fin whale	Antarctic	Body length and sex	1	Y		ICR
Fin whale	Antarctic	External body proportion	1	Y		ICR
Fin whale	Antarctic	Photographic record and external character	1	Y		ICR

Fin whale	Antarctic	Standard measurements of blubber thickness	1	Y		ICR
Fin whale	Antarctic	Body weight by parts	1	Y		ICR
Fin whale	Antarctic	Skull measurement (Length and breadth)	1	Y		ICR
Fin whale	Antarctic	Observation of lactation status	1	Y		ICR
Fin whale	Antarctic	Measurement of mammary gland	1	Y		ICR
Fin whale	Antarctic	Weight of stomach content	1	Y		ICR
Fin whale	Antarctic	Diatom film observation	1	Y		ICR
Fin whale	Antarctic	Blood plasma for physiological study	1	Y		ICR
Fin whale	Antarctic	Earplug for age determination	1	Y		ICR
Fin whale	Antarctic	Ocular lens for age determination	1	Y		ICR
Fin whale	Antarctic	Tympanic bulla for chemical analysis	1	Y		ICR
Fin whale	Antarctic	Largest baleen plate for chemical analysis	1	Y		ICR
Fin whale	Antarctic	Vertebral epiphyses for biological study	1	Y		ICR
Fin whale	Antarctic	Observation and collection of ovary	1	Y		ICR
Fin whale	Antarctic	Histological sample of endometrium	1	Y		ICR
Fin whale	Antarctic	Histological sample of mammary gland	1	Y		ICR
Fin whale	Antarctic	Tissue samples for genetic study	1	Y		ICR
Fin whale	Antarctic	Blubber, muscle and liver tissues for environmental monitoring	1	Y		ICR
Fin whale	Antarctic	Lung and liver tissues for environmental monitoring	1	Y		ICR
Fin whale	Antarctic	Gross pathological observation (thyroid, lung, stomach and gonad)	1	Y		ICR
Fin whale	Antarctic	Tissues for various study	1	Y		ICR
Fin whale	Antarctic	Tissues for lipid study	1	Y		ICR
Fin whale	Antarctic	Tissues for nutritional component study	1	Y		ICR
Fin whale	Antarctic	Tissues for chemical study	1	Y		ICR
Fin whale	Antarctic	Tissues for nutrient study	1	Y		ICR
Fin whale	Antarctic	Stomach contents for food and feeding study	1	Y		ICR

*: Samples and data are currently under analysis

JARPN II-Offshore component

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	59	Y		ICR
Common minke whale	Western North Pacific	External body proportion	59	Y		ICR
Common minke whale	Western North Pacific	Photographic record and external character	59	Y		ICR
Common minke whale	Western North Pacific	Diatom film record	59	Y		ICR
Common minke whale	Western North Pacific	Standard measurements of blubber thickness (five points)	59	Y		ICR
Common minke whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	9	Y		ICR
Common minke whale	Western North Pacific	Body weight	59	Y		ICR

Common minke whale	Western North Pacific	Body weight by parts	9	Y		ICR
Common minke whale	Western North Pacific	Skin tissues (DNA)	59	Y		ICR
Common minke whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	59	Y		ICR
Common minke whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	59	Y		ICR
Common minke whale	Western North Pacific	Tissues for various analysis	59	Y		ICR
Common minke whale	Western North Pacific	Tissues for virus test	59	Y		ICR
Common minke whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	6	Y		ICR
Common minke whale	Western North Pacific	Uterine horn; measurement and endometrium sample	6	Y		ICR
Common minke whale	Western North Pacific	Collection of ovary	6	Y		ICR
Common minke whale	Western North Pacific	Photographic record of foetus	5	Y		ICR
Common minke whale	Western North Pacific	Foetal sex (identified by visual observation)	5	Y		ICR
Common minke whale	Western North Pacific	Foetal length and weight	5	Y		ICR
Common minke whale	Western North Pacific	External measurements of foetus	5	Y		ICR
Common minke whale	Western North Pacific	Foetal tissues for various analysis	5	Y		ICR
Common minke whale	Western North Pacific	Testis and epididymis; weight and histological sample	52	Y		ICR
Common minke whale	Western North Pacific	Collection of plasma sample	59	Y		ICR
Common minke whale	Western North Pacific	Collection of whole blood sample	59	Y		ICR
Common minke whale	Western North Pacific	Stomach content, conventional record	59	Y		ICR
Common minke whale	Western North Pacific	Volume and weight of stomach content in each compartment	59	Y		ICR
Common minke whale	Western North Pacific	Stomach contents for feeding study	56	Y		ICR
Common minke whale	Western North Pacific	Record of external parasites	59	Y		ICR
Common minke whale	Western North Pacific	Collection of external parasites	1	Y		ICR
Common minke whale	Western North Pacific	Record of internal parasites	59	Y		ICR
Common minke whale	Western North Pacific	Earplug for age determination	59	Y		ICR
Common minke whale	Western North Pacific	Tympanic bulla for age determination	59	Y		ICR
Common minke whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	59	Y		ICR
Common minke whale	Western North Pacific	Baleen plate measurements (length and breadth)	59	Y		ICR
Common minke whale	Western North Pacific	Length of each baleen plate series	57	Y		ICR
Common minke whale	Western North Pacific	Vertebral epiphyses sample	59	Y		ICR
Common minke whale	Western North Pacific	Number of ribs	59	Y		ICR
Common minke whale	Western North Pacific	Brain weight	9	Y		ICR
Common minke whale	Western North Pacific	Skull measurement (length and breadth)	53	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)	15	Y		ICR
Sei whale	Western North Pacific	Body weight	100	Y		ICR
Sei whale	Western North Pacific	Body weight by parts	15	Y		ICR
Sei whale	Western North Pacific	Skin 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	Tissues for various analysis	100	Y		ICR
Sei whale	Western North Pacific	Tissues for virus test	80	Y		ICR
Sei whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	56	Y		ICR
Sei whale	Western North Pacific	Collection of maternal milk sample	1	Y		ICR
Sei whale	Western North Pacific	Uterine horn; measurement and endometrium sample	55	Y		ICR
Sei whale	Western North Pacific	Collection of ovary	56	Y		ICR
Sei whale	Western North Pacific	Photographic record of foetus	36	Y		ICR
Sei whale	Western North Pacific	Foetal sex (identified by visual observation)	36	Y		ICR
Sei whale	Western North Pacific	Foetal length and weight	36	Y		ICR
Sei whale	Western North Pacific	External measurements of foetus	36	Y		ICR
Sei whale	Western North Pacific	Foetal tissues for various analysis	36	Y		ICR
Sei whale	Western North Pacific	Testis and epididymis; weight and histological sample	44	Y		ICR
Sei whale	Western North Pacific	Collection of plasma sample	100	Y		ICR
Sei whale	Western North Pacific	Collection of whole blood sample	100	Y		ICR
Sei whale	Western North Pacific	Whole blood samples from umbilical cord	27	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	Stomach contents for feeding study	77	Y		ICR
Sei whale	Western North Pacific	Record of external parasites	100	Y		ICR
Sei whale	Western North Pacific	Collection of external parasites	4	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	99	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)	99	Y		ICR
Sei whale	Western North Pacific	Length of each baleen plate series	92	Y		ICR
Sei whale	Western North Pacific	Vertebral epiphyses sample	100	Y		ICR
Sei whale	Western North Pacific	Number of vertebrae	16	Y		ICR

Sei whale	Western North Pacific	Number of ribs	100	Y		ICR
Sei whale	Western North Pacific	Brain weight	16	Y		ICR
Sei whale	Western North Pacific	Skull measurement (length and breadth)	84	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)	8	Y		ICR
Bryde's whale	Western North Pacific	Body weight	50	Y		ICR
Bryde's whale	Western North Pacific	Body weight by parts	8	Y		ICR
Bryde's whale	Western North Pacific	Skin 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	Tissues for various analysis	50	Y		ICR
Bryde's whale	Western North Pacific	Tissues for virus test	39	Y		ICR
Bryde's whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	20	Y		ICR
Bryde's whale	Western North Pacific	Uterine horn; measurement and endometrium sample	20	Y		ICR
Bryde's whale	Western North Pacific	Collection of ovary	20	Y		ICR
Bryde's whale	Western North Pacific	Photographic record of foetus	9	Y		ICR
Bryde's whale	Western North Pacific	Foetal sex (identified by visual observation)	9	Y		ICR
Bryde's whale	Western North Pacific	Foetal length and weight	9	Y		ICR
Bryde's whale	Western North Pacific	External measurements of foetus	9	Y		ICR
Bryde's whale	Western North Pacific	Foetal tissues for various analysis	9	Y		ICR
Bryde's whale	Western North Pacific	Testis and epididymis; weight and histological sample	30	Y		ICR
Bryde's whale	Western North Pacific	Collection of plasma sample	50	Y		ICR
Bryde's whale	Western North Pacific	Collection of whole blood sample	50	Y		ICR
Bryde's whale	Western North Pacific	Whole blood samples from umbilical cord	8	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	Stomach contents for feeding study	18	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	5	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	1	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	Largest baleen plate for morphologic study and age determination	50	Y		ICR
Bryde's whale	Western North Pacific	Baleen plate measurements (length and breadth)	48	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	8	Y		ICR
Bryde's whale	Western North Pacific	Number of ribs	50	Y		ICR
Bryde's whale	Western North Pacific	Brain weight	8	Y		ICR
Bryde's whale	Western North Pacific	Skull measurement (length and breadth)	42	Y		ICR
Sperm whale	Western North Pacific	Body length and sex	2	Y		ICR
Sperm whale	Western North Pacific	External body proportion	2	Y		ICR
Sperm whale	Western North Pacific	Photographic record and external character	2	Y		ICR
Sperm whale	Western North Pacific	Diatom film record	2	Y		ICR
Sperm whale	Western North Pacific	Standard measurements of blubber thickness (five points)	2	Y		ICR
Sperm whale	Western North Pacific	Detailed measurements of blubber thickness (eleven points)	2	Y		ICR
Sperm whale	Western North Pacific	Body weight	2	Y		ICR
Sperm whale	Western North Pacific	Body weight by parts	2	Y		ICR
Sperm whale	Western North Pacific	Skin tissues (DNA)	2	Y		ICR
Sperm whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Heavy metal analysis)	2	Y		ICR
Sperm whale	Western North Pacific	Blubber, muscle, liver and kidney tissues (Organochlorines analysis)	2	Y		ICR
Sperm whale	Western North Pacific	Tissues for various analysis	2	Y		ICR
Sperm whale	Western North Pacific	Tissues for virus test	2	Y		ICR
Sperm whale	Western North Pacific	Testis and epididymis; weight and histological sample	2	Y		ICR
Sperm whale	Western North Pacific	Collection of plasma sample	2	Y		ICR
Sperm whale	Western North Pacific	Collection of whole blood sample	2	Y		ICR
Sperm whale	Western North Pacific	Stomach content, conventional record	2	Y		ICR
Sperm whale	Western North Pacific	Volume and weight of stomach content in each compartment	2	Y		ICR
Sperm whale	Western North Pacific	Stomach contents for feeding study	2	Y		ICR
Sperm whale	Western North Pacific	Record of external parasites	2	Y		ICR
Sperm whale	Western North Pacific	Record of internal parasites	2	Y		ICR
Sperm whale	Western North Pacific	Collection of internal parasites	2	Y		ICR
Sperm whale	Western North Pacific	Maxillary teeth for age determination	2	Y		ICR
Sperm whale	Western North Pacific	Vertebral epiphyses sample	2	Y		ICR
Sperm whale	Western North Pacific	Number of vertebrae	2	Y		ICR
Sperm whale	Western North Pacific	Number of ribs	2	Y		ICR
Sperm whale	Western North Pacific	Brain weight	2	Y		ICR

Sperm whale	Western North Pacific	Skull measurement (length and breadth)	2	Y		ICR
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*: 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	60	Y		ICR
Common minke whale	Western North Pacific	External body proportion	60	Y		ICR
Common minke whale	Western North Pacific	Photographic record and external character	60	Y		ICR
Common minke whale	Western North Pacific	Diatom film record	60	Y		ICR
Common minke whale	Western North Pacific	Body scar record	60	Y		ICR
Common minke whale	Western North Pacific	Measurements of blubber thickness (5 points)	60	Y		ICR
Common minke whale	Western North Pacific	Detailed measurements of blubber thickness (11 points)	5	Y		ICR
Common minke whale	Western North Pacific	Whole body weight	60	Y		ICR
Common minke whale	Western North Pacific	Body weight by parts	5	Y		ICR
Common minke whale	Western North Pacific	Skin tissues for DNA study	60	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, spleen, blubber, heart and ventral groove for various analysis	60	Y		ICR
Common minke whale	Western North Pacific	Urine for various analysis	11	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, and blubber for heavy metal analysis	60	Y		ICR
Common minke whale	Western North Pacific	Muscle, liver, kidney, and blubber for organochlorine analysis	60	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	5	Y		ICR
Common minke whale	Western North Pacific	Mammary gland; lactation status, measurement and histological sample	37	Y		ICR
Common minke whale	Western North Pacific	Uterine horn; measurements and endometrium sample	37	Y		ICR
Common minke whale	Western North Pacific	Collection of ovary	37	Y		ICR
Common minke whale	Western North Pacific	Photographic record of foetus	7	Y		ICR
Common minke whale	Western North Pacific	Foetal length and weight	7	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	2	Y		ICR

Common minke whale	Western North Pacific	Testis and epididymis; weight and histological sample	23	Y		ICR
Common minke whale	Western North Pacific	Stomach contents, convenient record	60	Y		ICR
Common minke whale	Western North Pacific	Volume and weight of stomach content in each compartment	60	Y		ICR
Common minke whale	Western North Pacific	Observation of marine debris in stomach	60	Y		ICR
Common minke whale	Western North Pacific	Collection of stomach contents for feeding study	52	Y		ICR
Common minke whale	Western North Pacific	Record of external parasites	60	Y		ICR
Common minke whale	Western North Pacific	Earplug for age determination	60	Y		ICR
Common minke whale	Western North Pacific	Tympanic bulla for age determination	60	Y		ICR
Common minke whale	Western North Pacific	Eye lens for age determination	60	Y		ICR
Common minke whale	Western North Pacific	Largest baleen plate for morphologic study and age determination	60	Y		ICR
Common minke whale	Western North Pacific	Baleen plate measurements (length and breadth)	60	Y		ICR
Common minke whale	Western North Pacific	Photographic record of baleen plate series	60	Y		ICR
Common minke whale	Western North Pacific	Length of baleen series	60	Y		ICR
Common minke whale	Western North Pacific	Vertebral epiphyses sample	60	Y		ICR
Common minke whale	Western North Pacific	Number of ribs	60	Y		ICR
Common minke whale	Western North Pacific	Skull measurement (length and breadth)	60	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	18	Y		NRIFSF
Common minke whale	Western North Pacific	Uterine horn; measurement and endometrium sample	18	Y		NRIFSF
Common minke whale	Western North Pacific	Collection of ovary	18	Y		NRIFSF
Common minke whale	Western North Pacific	Testis and epididymis; weight and histological sample	32	Y		NRIFSF
Common minke whale	Western North Pacific	Collection of blood plasma sample	35	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	49	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	49	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
Fin whale	Sea of Japan	Skin and/or muscle	1	Y		H. Ishikawa; ICR
Fin whale	Western North Pacific	Skin, blubber	1	Y		H. Ishikawa; ICR
North Pacific right whale	Western North Pacific	Skin and/or muscle	1	Y		H. Ishikawa; ICR
Common minke whale	Sea of Japan	Skin, blubber	2	Y		H. Ishikawa; ICR

Common minke whale	Okhotsk Sea	Skin and/or muscle	2	Y		H. Ishikawa; ICR
Sperm whale	Western North Pacific	Skin and/or muscle	1	Y		H. Ishikawa; ICR

*: Samples are from whales stranded and reported to the Fisheries Agency of Japan as well as from other sources.

** : Under analysis.

4.4 Analyses/development of techniques

JARPA/JARPA II analyses/research

Stock structure

Up to three of the six microsatellite loci routinely used for the Antarctic minke whales were analyzed for the 07/08 JARPA II samples. Analysis of the rest of the loci in the samples is ongoing.

Microsatellite analysis for the humpback whale samples collected as biopsy during the JARPA surveys was conducted using additional eight loci to the previous six loci.

Biological parameters

The preparation of testis tissue of whales collected in 2007/08 JARPA II survey was completed for determination of maturity.

Other studies

A co-operative study with the University of California at Davis 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 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.

Information on photo-identification of blue whales collected by JARPA and JARPA II in the Antarctic feeding ground was summarized and a preliminary examination of matches within the feeding ground was performed (SC/61/SH3).

JARPN/JARPN II analyses/research

The IWC SC carried out a workshop to review the progress made in the research conducted under JARPN II in its first six years (2002-2007). An Independent Review Panel (IEP) examined a total of 36 scientific papers prepared by Japanese scientists, related to the main objectives of the JARPN II as well to other important research contributions. Below is a summary of the papers presented to the review workshop, which include ICR scientists.

Feeding ecology and ecosystem studies

SC/J09/JR8 estimated the abundance of common minke whales in the coastal regions of Sanriku and Kushiro in order to estimate prey consumption by the common minke whales. Abundance is defined here as the number of whales present in a given area and at a particular time. These estimates could be used for input for ecosystem models in the JARPN II survey area as well. The estimated numbers off Kushiro are 601, 968, 368, 316, 241 and 142 in 2002-2007, respectively. The estimated numbers off Sanriku are 247 and 123 in 2005 and 2006, respectively. It should be noted that these numbers should not be used for assessment, because they do not represent estimates of *stock* abundance of the common minke whale. This is because sighting surveys used for the estimation of the number of whales covered only a limited area of the stock distribution, during a particular time of its migration to northern feeding grounds. Further, depending of changing environmental factors, the number of whales sighted in this limited area and time, could be different from year to year.

The stomach contents of common minke whales sampled off Sanriku (April-May) and Kushiro (September-October) in 2002-2007 JARPN II were analyzed (SC/J09/JR9). In Sanriku region, the dominant prey species consisted of krill (*Euphausia pacifica*) and fishes (Japanese sand lance *Ammodytes personatus* and Japanese anchovy *Engraulis japonicus*). In the Kushiro region the dominant prey species consisted of krill (*E. pacifica*), fish (Japanese anchovy, Pacific saury *Cololabis saira* and walleye pollock *Theragra chalcogramma*) and squid (Japanese flying squid *Todarodes pacificus*). The total prey consumptions in the Sanriku region of Japanese sand lance, Japanese anchovy and krill were estimated as 683-1,616 tons, 150-194 tons and 1-109 tons, respectively

(2005-2006). In Kushiro region the total prey consumption of Pacific saury, walleye pollock, Japanese flying squid and Japanese anchovy was estimated as 39-1,075 tons, 95-2,322 tons, 3-1,753 tons and 308-1,422 tons, respectively (2002-2007).

Results of a prey preference study of common minke whales in the coastal waters of Sanriku were given in SC/J09/JR10. To estimate prey preference sampling surveys of common minke whales and their prey surveys were conducted in the same area at the same timing (April). A prey preference index, Manly's α , was used in the analysis. Common minke whales fed on krill, Japanese anchovy and sand lance (adult). These are important species of local commercial fisheries. Common minke whales showed preference for adult sand lance. As previously reported in other regions, krill was not a preferable prey for minke whales. Ecosystem modelling work suggested that change in functional form had substantial effect on predation impact on sand lance by minke whales. Functional response can be estimated if long term prey preference data are available.

Results of a prey preference study of common minke whale in the coastal waters of Kushiro were presented in SC/J09/JR11. Results suggest that the slope water region of less than 18°C SST is a rich prey environment in both the epi- and mesopelagic zones. Common minke whale might prefer the rich prey environment affected by the Oyashio not only in the continental shelf region where walleye pollock, Pacific saury, and euphausiids are distributed but also in the offshore region where Pacific saury and euphausiids are distributed. It is suggested that immature common minke whales prefer walleye pollock while mature animals prefer Pacific saury, although both frequently fed on Japanese anchovy in some years in the area within 50 nautical miles from Kushiro.

Relationship between body size, maturity and feeding habit of common minke whales in Sanriku area in spring season was reported in SC/J09/JR12. The total number of whales examined was 227 (91 males and 136 females). Three species, krill, Japanese sand lance and Japanese anchovy were found in stomachs, of which sand lance was the most dominant prey species, followed by anchovy. All the whales but two were sighted in waters with a depth of 20-100m. No obvious difference was observed in their sighting positions between males and females, immature and mature animals, and the three prey species. Examination of the frequency of prey species consumed by whales of different lengths and by whales of different sexual maturity status showed little difference.

The relationship between body size, maturity and feeding habit of common minke whales in Kushiro area in autumn season was reported in SC/J09/JR13. The total number of whales examined was 254 (182 males and 72 females). Occurrence of prey species in stomachs differed significantly with maturity stage. Smaller and immature whales tend to feed on walleye pollock and krill whilst larger and mature whales tend to feed on Pacific saury. Japanese flying squid was consumed only by mature whales. Japanese anchovy was equally consumed by immature and mature whales. For the coastal waters off Kushiro in the fall season the results suggested that migration and prey preference of common minke whales differed with maturity stage and that on the continental shelf and slope regions immature whales showed a greater preference for walleye Pollock and krill than mature whales.

In order to estimate prey consumption by common minke, Bryde's, sei and sperm whales in the early and late feeding seasons, the numbers of the whales distributed in JARPN II survey area were estimated in SC/J09/JR15. The estimates were also intended as input for ecosystem models in the JARPN II survey area. It was suggested that the estimates were affected by migration patterns of the whales. Considering the migration pattern suggested by sighting survey data, the estimates are 7,338 in the early and 2,976 in the late season for the common minke, 7,744 in the early and 5,406 in the late season for the sei whales 1,677 in the early and 9,797 in the late season for the Bryde's whales and 15,929 in the early and 20,292 in the late season for the sperm whales. It should be noted that these estimates should not be used for assessment because the estimated figures represent only a part of the population considered.

The stomach contents of common minke, sei and Bryde's whales sampled in the western North Pacific from May to September in 2000-2007 JARPN II, were analyzed in SC/J09/JR16. The main prey species of common minke whale consisted of one copepod, two krill, two squids and eight fish. The main prey species of sei whale consisted of two copepods, three krill and four fish. The main prey species of Bryde's whale consisted of five krill, one squid and four fish. There were seasonal and geographical changes of prey species. The total prey consumption by three baleen whales during the feeding season was estimated to be 1.6 million tons. The prey consumption of Japanese anchovy, mackerels and Pacific saury by three baleen whales were estimated as 739 thousands tons, 140 thousands tons and 43 thousands tons, respectively.

The stomach contents of sperm whales sampled in the western North Pacific from May to September each year from 2000 to 2007 were analyzed in SC/J09/JR17. Thirty-eight prey species consisting of 33 squids, 1 octopus and 4 fishes, were identified. Sperm whales fed mainly on various deep-sea squids. The most important prey species were 4 squids (*Taningia danae*, *Histioteuthis dofleini*, *Belonella pacifica borealis* and the eight armed squid *Gonatopsis borealis*). Sperm whales feed mainly on prey in the mesopelagic and/or bottom during daytime. The seasonal prey consumption (from May to September) by sperm whales in this region was calculated to be nearly 1.2 million tons. The consumption of neon flying squid *Ommastrephes bartrami* was estimated to be

30,000 tons. Estimated feeding contribution rates of the surface layer to predation by sperm whales in each sub-area were ranged from 4.7 to 11.4%. The influence on the surface layer of the marine ecosystem resulting from consumption by sperm whales can not be disregarded, because the biomass of sperm whales is large.

Prey preferences of common minke, Bryde's and sei whales at meso scale were estimated (SC/J09/JR18) using data from the concurrent surveys of cetacean sampling and prey of cetaceans. The surveys were conducted as a part of the offshore component of JARPNII from 2002 to 2007. A prey preference index, Manly's α , was used in the analysis. The sum of Manly's α for all prey species is 1 and prey species with large values of Manly's α indicates preference for it. Minke whales showed preference toward pelagic fishes as previously reported. Bryde's whales showed preference for anchovy. Sei whales showed preference for copepods. Although the preys of three baleen whale species overlapped Manly's α suggested their trophic niches were different from each other. Minke and sei whales coexisted in same survey blocks but their prey utilization patterns were different.

SC/J09/JR19 presented a model for density prediction of common minke, sei and Bryde's whales in the western North Pacific during the feeding season. Data used for the model were densities estimated from dedicated sighting survey data in JARPN II, and satellite information on surface temperature, surface height and chlorophyll. The predicted density distributions by the analysis suggested spatial distribution patterns of whales and differences in the pattern among whale species.

SC/J09/JR20 examined time trend of blubber thickness in common minke, sei and Bryde's whales, and the factors influencing the energy storage in these whales. Results suggested that the blubber thickness of minke whale has increased during the JARPN and JARPN II period; that of sei whales has increased during the 5-years of the JARPN II period, while that in Bryde's whales have decreased during 7 years. The feeding areas of Bryde's and sei whales showed limited overlap, and their distribution is separated by sea surface temperature (SST). Further studies were suggested to assist in the interpretation of these results.

SC/J09/JR21 presents the progress made on developing an ecosystem model based on Ecopath with Ecosim. The results suggest that in average terms: 1) when minke whales are the only species that are harvested by 4% of its biomass (catch of other species are kept constant at current catch rate), depending on the functional response form assumed for the species, it is not certain whether catch of some Japanese fisheries resources (e.g. anchovy, Pacific saury, skipjack tuna, mackerels) will increase or not; 2) when sei and Bryde's whales are each the only species that are harvested by 4% of their biomass, regardless of the functional response form assumed for the species, catch of anchovy, skipjack tuna, and mackerels may increase; 3) when minke, sei and Bryde's whales are all harvested by 4% of their biomass, a positive increase in catch is expected for most of the fish resources (i.e. anchovy, skipjack tuna and mackerels); and 4) when sperm whales are the only species that are harvested by 4% of its biomass, depending on the functional response form assumed for the species, catch of anchovy, Pacific saury, mackerels and skipjack tuna may decrease, but catch of neon-flying squid may increase.

Monitoring Environmental Pollutants in Cetaceans and the Marine Ecosystem

To investigate temporal changes of Hg levels in the western North Pacific, total Hg concentrations in muscle samples from common minke, Bryde's and sei whales were measured (SC/J09/JR23). Total Hg levels were in the order: mature common minke whales (0.22 ± 0.07 ppm wet wt.) > mature sei whales (0.052 ± 0.009) = mature Bryde's whales (0.046 ± 0.008). Yearly changes of total Hg levels in zooplankton and pelagic fishes were not observed in the period 1995-2007. Apart from common minke whales from sub-area 9, significant yearly changes of levels in whales were not observed. For minke whales in sub-area 9, levels decreased from 1994 to 1999 but increased from 2000 to 2007. Results of a multi linear regression analysis suggested that changes of Hg levels in sub-area 9 reflect changes in food habitat of minke whale rather than changes in accumulation levels in the environment.

SC/J09/JR23 also examined total Hg level in prey samples of whales: two zooplanktons (krill *E. Pacifica*; copepods *Neocalanus spp.* and *Calanus sp.*), six pelagic fishes (Japanese anchovy; Pacific saury; walleye pollock; mackerels; Pacific pomfret). Total Hg levels in krill and copepods ranged from <0.001-0.013 and 0.003-0.010 ppm dry wt., respectively. Total Hg levels in the pelagic fishes were in the order: Pacific pomfret (0.232 ± 0.027) > walleye pollock (0.045) = Pacific saury (0.039 ± 0.016) = Japanese anchovy (adult) (0.037 ± 0.025) > Japanese anchovy (larval fish) (0.005 ± 0.003). No yearly changes of total Hg level were observed for krill and Japanese anchovy during the period 1995-2007. Variation of Hg levels in pelagic fishes from the western North Pacific was not related to sampling year.

SC/J09/JR24 presents information on PCB levels in blubber samples of common minke, Bryde's and sei whales from the western North Pacific. The range of levels in these species was 0.13-4.0, 0.04-0.21 and 0.03-0.47 ppm wet wt., respectively. Yearly changes of PCB levels were not observed in common minke, Bryde's and sei whales in the period 2002-2007. Results of previous studies suggested that PCB levels had been continually decreasing in this oceanic region (1980's-1990's). Results from JARPN II suggest that the level has been stabilized since 2002.

SC/J09/JR24 also presented information on PCB level in air and surface seawaters from the western North Pacific. The range of levels was ND-22 pg/m³ for air samples and 1.5-11 ng/L for sea water samples. PCB levels in seawater decreased from coastal to offshore regions. The trend in level of air samples was not clear.

SC/J09/JR25 examined the accumulation characteristics of mercury, a toxic element, and selenium, an antagonist, as well as the inter-species difference of sensitivity to mercury toxicity. Total mercury (T-Hg), methyl mercury (MeHg) and selenium (Se) levels in the liver, kidneys and muscle were measured. T-Hg and MeHg levels were higher in the order of sperm whale > common minke whale > Bryde's whale. Se levels were higher in the order of sperm whale > Bryde's whale > common minke whale. The order of the T-Hg and Se levels in the tissues of the common minke and Bryde's whales was kidneys > liver > muscle, and that of MeHg was liver > muscle > kidneys. The order of the T-Hg and Se levels in the tissues of sperm whales was liver > kidneys > muscle.

Stock Structure

SC/J09/JR26 assigned minke whales into genetically distinct stocks using a combination of microsatellite analysis and a Bayesian clustering approach. Samples of 2,542 minke whales collected during the offshore component of JARPNI and JARPNI from 1994 to 2007, during the coastal component of JARPNI from 2002 to 2007, and from bycatches in the set net fishery along the Japanese coast from 2001 to 2007, were analyzed using 16 microsatellite loci. Approximately 91% of the individuals were assigned into 'J' and 'O' stocks based on their high membership probability (>90%). It was also found that a) the 'O' stock individuals appeared to migrate, although rarely, to the Sea of Japan, b) the 'J' stock individuals migrated to sub-area 7W (Figure 1) of the North Pacific side and very rarely to further east, and c) the sub-area 2 (Figure 1) was mainly occupied by the J stock. Temporal distribution of the assigned bycatches collected from sub-area 7 (Figure 1) indicated seasonal movement of the whales with the number of the 'O' stock increased in spring.

SC/J09/JR27 investigated morphometric differences between 'J' and 'O' stock animals, as identified by the microsatellite analysis in SC/J09/JR26. Marked differences in morphometry were found between both stocks. SC/J09/JR27 also conducted a morphometrics analysis of common minke whales in sub-areas 7, 8 and 9 to evaluate the plausibility of four stock structure hypotheses adopted by IWC in RMP *Implementation Simulation Trials* in 2003. Analysis of covariance (ANCOVA) using body length as a covariate is used to test if there are significant differences in morphometric measurements among groups compared. Apart from differences between 'J' and 'O' stocks animals no other significant geographic or temporal differences were found. Results of the analyses support hypothesis B and are inconsistent with hypotheses C and D.

SC/J09/JR28 examined the status of scars on the skin of minke whales, and whether or not it is possible to identify the stock of the individual animal based on external morphological scars using samples of western North Pacific common minke whales collected by JARPNI. This study was assisted by the genetic assignment to stocks shown in SC/J09/JR26. Assignments of the number of scars were not a complete diagnostic for the minke whales samples for 'J' and 'O' stocks. However, at least there is a strong likelihood that animals which have no scars on the body were 'J' stock animals.

SC/J09/JR29 investigated genetic variation at mtDNA control region in samples of western North Pacific common minke whales to describe their stock structure, and then to examine the plausibility of four stock structure hypotheses adopted at the final stage of the *ISTs* process by IWC SC in 2003. It was found that a) whales from 'J' stock existed in sub-area 7W with low but large enough numbers to cause genetic heterogeneity observed in the 7W samples as well as between the 7W and other samples; b) after exclusion of the 'J' stock whales, the survey area was occupied mainly by 'O' stock, which provide support to hypothesis B; and c) the hypotheses C and D were not supported.

SC/J09/JR30 investigated genetic variation at 16 hypervariable microsatellite DNA markers to describe stock structure in common minke whales, and then to examine the plausibility of four stock structure hypotheses adopted at the final stage of the *ISTs* process by IWC Scientific Committee in 2003. It was found that a) whales from the 'J' stock existed in sub-area 7W with low but large enough numbers to cause genetic heterogeneity observed in the 7W samples as well as between the 7W and other samples, b) except the 'J' stock whales, the survey area was mainly occupied by 'O' stock, which provide support to hypothesis B, and c) the hypotheses C and D were not supported because no other genetically distinct coastal stock was observed. Heterogeneity found for a single microsatellite locus in sub-area 9 should be further investigated in the context of hypothesis A.

SC/J09/JR31 examined genetic variations at 17 microsatellite loci and 299 bp of mitochondrial DNA (mtDNA) control region were analyzed to investigate the existence of genetically differentiated sub-stocks of Bryde's whales in the sub-area 1 (stock hypothesis 4). No evidence was found of genetic differentiation between the samples from the 1W and 1E (separated at 153°E), indicating these JARPNI samples came from a genetically same group of Bryde's whales. The same result was found when historical samples from the central western North Pacific and around Ogasawara Islands were incorporated into the analysis.

SC/J09/JR32 examined genetic variation at 17 microsatellite loci and 487 bp of mitochondrial DNA (mtDNA) control region sequences in samples of sei whales in order to describe their stock structure in the western North

Pacific. The samples used consisted of 489 whales collected during JARPNII (2002-2007) in the area between 143°E and 170°E. In order to explore their stock structure in a wider geographic area, a total of 301 whales (298 for the mtDNA analyses) collected from the 1972 and 1973 commercial whaling in the North Pacific from 165°E to 139°W were incorporated into the analysis. All the tests conducted found no evidence of genetic differences within as well as between the JARPNII and commercial whaling samples. This study indicated that the open water of the North Pacific was mainly occupied by individuals from a single stock.

SC/J09/JR33 analyzed genetic variations at 15 microsatellite DNA loci and mitochondrial DNA (mtDNA) control region sequences in samples of sperm whales collected during JARPNII from 2000 to 2007 in order to examine the effectiveness of these genetic markers for stock structure study of the species. Analyses of mtDNA and microsatellite markers in the total of 45 sperm whales demonstrated that these genetic markers were variable enough to explore stock structure of sperm whales. Statistical tests found no evidence of deviation from the expected Hardy-Weinberg genotypic proportion at all of the 15 microsatellite loci. At this point no signal of multiple stocks in the research area was found.

Other Results

SC/J09/JR34 examined oceanographic conditions in the offshore and the coastal (off Kushiro) components of JARPN II using output from an operational ocean prediction system (FRA-JCOPE). Oceanographic observations with CTD and XCTD were conducted in the cetacean prey surveys in JARPN II. These observations were incorporated into the prediction system. The survey covered from subarctic area to the adjacent area of the subtropical area where common minke, Bryde's and sei whales were found. The survey area was located between the Kuroshio Extension and the Subarctic Front, where the water mass was characterized by the subarctic water, subtropical water and mixed water. Understanding of the oceanographic conditions is fundamental for marine ecological study. The results of the oceanographic survey in this paper were used in other studies related to feeding ecology of whales (e.g. SC/J09/JR10, SC/J09/J11 and SC/J09J18).

SC/J09/JR35 reported the Density Index (DI: individuals / 100 n.miles) and monthly distribution pattern of blue, fin, humpback and right whales from May to September in the western North Pacific based on JARPN (1994-1999) and JARPN II (2000-2007) sighting data. Among four species, fin whales were most frequently sighted, and next were blue, humpback and right whales in order. Northward migration pattern of whales were observed for these species. Additionally, sighting areas of these species were spread out compared to the previous information except for right whales.

The report of the JARPN II review workshop is presented to this meeting as Document SC/61/Rep1 (IWC, 2009). ICR scientists have already conducted some additional analysis in response to the recommendations from the review workshop. These additional analyses in the field of feeding ecology and ecosystem, pollutant monitoring and stock structure are shown in Documents SC/61/JR1-9 presented to this meeting.

Other current laboratory analyses

The stomach contents of 59 common minke, 100 sei, 50 Bryde's, and 2 sperm whales sampled in sub-area 7, 8 and 9 from May to August during 2008 JARPN II survey, were analyzed. Furthermore, the stomach contents of 60 common minke whales sampled near Sanriku's coastal-area from April to May and 50 common minke whales sampled near Kushiro's coastal-area from September to October during 2008 JARPN II survey, were analyzed. Qualitative and quantitative information on prey consumption of the whale species are collected to understand their feeding ecology and role in the ecosystem.

The preparations of testis tissue of whales collected in 2007 JARPN II offshore and coastal survey was completed for determination of maturity.

Control region sequencing of mtDNA was completed for the common minke whale sample collected from the coastal (N=110) components of 2008 JARPNII as well as the minke whale (N=59), Brydes whale (N=50), sei whale (N=100), and sperm whale (N=cc) samples collected from the offshore part of 2008 JARPNII. Microsatellite analysis (15-17 loci depending on the species) for the same samples is on going.

In a co-operative study with TUMST, microsatellite analysis of Antarctic minke whale fetus is ongoing to investigate paternity in the JARPA samples. This information will be used to estimate abundance.

In a co-operative study with Tokai University, molecular genetic analysis of MHC gene was conducted in order to develop microsatellite markers occurring within its region.

In a co-operative study with Korean scientists, development of SNPs (single nucleotide polymorphic) from common minke whales was started to apply them in future studies on stock identification of the species around Korean and Japanese waters.

5. POLLUTION STUDIES

See item 4.4 above.

6. STATISTICS FOR LARGE CETACEANS

6.1 Corrections to earlier years' statistics for large whales

See the part of NRIFSF in this report.

6.2 Direct catches of large whales (scientific permits) for the calendar year 2008 (North Pacific) and the season 2007/08 (Antarctic)

See the part of NRIFSF in this report.

6.3 Anthropogenic mortality of large whales for the calendar year 2008 or the season 2008/09

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

See the part of NRIFSF in this report

6.3.2 Fishery bycatch of large whales

See the part of NRIFSF in this report.

7. STATISTICS FOR SMALL CETACEANS

The Government of Japan has as policy not to present information on small cetaceans in the progress report.

8. STRANDINGS

See the part of NRIFSF in this report.

9. OTHER STUDIES AND ANALYSES

A total of 317 samples of whale products obtained from the Japanese retail market during September and October in 2008 were examined genetically (mtDNA control region sequencing analysis) for determining species identity.

A genetic study on dwarf minke whales from the western South Pacific and Antarctic Areas IV and V was completed with Chilean scientists of the research center CEQUA. A paper was accepted for publication in a specialized journal.

10. LITERATURE CITED

International Whaling Commission. 2009. The Report of the Expert Workshop to review the ongoing JARPN II Programme. Paper SC/61/Rep1 presented to this meeting.

11. PUBLICATIONS

11.1 Published or 'In Press' papers only

Bando, T., Mori, M., Tanaka, E., Zenitani, R., Hakamada, T., Fujise, Y. and Kato, H. 2008. Estimation of biological parameters to improve the stock management of the Southern Hemisphere minke whale. *Suisan Shigen Kanri Danwakaihou* 42: 11-16 (in Japanese).

Bhuiyan, M.M.U., Suzuki, Y., Watanabe, H., Hirayama, H., Matsuoka, K., Fujise, Y., Ishikawa, H., Ohsumi, S. and Fukui, Y. 2008. Attempts at in vitro fertilization and culture of in vitro matured oocytes in sei (*Balaenoptera borealis*) and Bryde's (*B. edeni*) whales. *Zygote* 16: DOI 10.1017/S0967199408004887.

Fujise, Y. 2008. Report of the IWC/JARPA Review. *Geiken Tsushin* 438: 1-9 (in Japanese).

Goto, M. and Pastene, L.A. 2008. Review of the stock structure of the Antarctic minke whale using samples from JARPA. *Suisan Shigen Kanri Danwakaihou* 42: 4-10 (in Japanese).

Hakamada, T. 2008. Method of abundance estimation and its application to JARPA. *Geiken Tsushin* 439: 12-19 (in Japanese).

Ishikawa, H. and Shigemune, H. 2008. Comparative experiment of whaling grenades in the Japanese Whale Research Program under Special Permit (JARPA and JARPN). *Jpn. J. Zoo Wildl. Med.* 13(1): 21-28.

Konishi, K. 2008. Cost-benefit in baleen whales.-Biology, diet and nutrient interaction. *Geiken Tsushin* 438: 10-17 (in Japanese).

Konishi, K., Tamura, T., Zenitani, R., Bando, T., Kato, H. and Walløe, L. 2008. Decline in energy storage in the Antarctic minke whale (*Balaenoptera bonaerensis*) in the Southern Ocean. *Polar Biol* 31:1509-1520.

Nagashima, H., Murase, H., Yonezaki, S., Matsukura, R., Minami, K., Nagaki, T., Kawahara, S. and Miyashita, K. 2008. Species identification of prey fish schools for minke whale in Sendai Bay using acoustic descriptors and environmental information. *Miyagi Pref. Rep. Fish. Sci. No.8*: 15-25 (in Japanese).

Nishiwaki, S. 2008. An outline of the field research activity under the JARPA. *Suisan Shigen Kanri Danwakaihou* 42: 1-3 (in Japanese).

Ohishi, K., Fujise, Y. and Maruyama, T. 2008. *Brucella* spp. in the western North Pacific and Antarctic cetaceans: a review. *J. Cetacean. Res. Manage.* 10(1): 67-72.

Pastene, L.A. 2008. Contribution of JARPA to the management and conservation of large baleen whales. *Suisan Shigen Kanri Danwakaihou* 42: 32-35.

Tamura, T. 2008. Elucidation of the role of whales in the Antarctic marine ecosystem through the krill feeding. *Suisan Shigen Kanri Danwakaihou* 42: 17-24 (in Japanese).

Toji, N., Shimizu, D., Yasuma, H., Kawahara, S., Watanabe, H., Yonezaki, S., Murase, H. and Miyashita, K. 2008. Quantitative analysis of isada krill (*Euphausia pacifica*) distribution in the western North Pacific. *Bull. Jpn. Soc. Fish. Oceanogr.* 72(3): 165-173 (in Japanese).

Tsuki, K., Sato, A., Kaneko, H., Yasunaga, G., Fujise, Y. and Nomata, H. 2009. Comparison of physiologically significant imidazole dipeptides in cetaceans sampled in Japanese Whale research (short paper). *Sci. Rep. Hokkaido Fish. Exp. Stn.* 74:25-28.

Yasunaga, G. 2008. Effects of environmental changes on cetacean in the Antarctic Ocean-Environmental pollutant-. *Suisan Shigen Kanri Danwakaihou* 42: 25-31 (in Japanese).

Yunoki, K., Ishikawa, H., Fukui, Y. and Ohnishi, M. 2008. Chemical properties of epidermal lipids, especially sphingolipids, of the Antarctic minke whale. *Lipids* (2008) 43: 151-159.

11.2 Unpublished literature

Acevedo, J., Allen, J., Castro, C., Félix, F., Rasmussen, K., Flórez-González, L., Aguayo-Lobo, A., Secchi, E., Llano, M., Garita, F., Forestell, P., Haase, B., Capella, J., Dalla Rosa, L., Ferrina, D., Plana, J., Tobón, I.C., Kaufman, G., Flak, P., Scheidat, M. and Pastene, L.A. 2008. Migratory destination of humpback whales from the eastern south pacific population as revealed by photo identification analysis. Paper SC/60/SH20 presented to the IWC Scientific Committee, June 2008 (unpublished). 8pp.

Acevedo, J., Huckle-Gaete, R., Secchi, E., Allen, J., Aguayo-Lobo, A., Dalla Rosa, L., Haro, D., and Pastene, L.A. 2008. Photoidentification analysis of humpback whales from three high latitude localities of the Eastern South Pacific population (Stock G). Paper SC/60/SH27 presented to the IWC Scientific Committee, June 2008 (unpublished). 5pp.

Bando, T., Kato, H., Kishiro, T., Goto, M., Yasunaga, G., Saito, T., Tabata, S., Morita, Y., Okamoto, R., Maeda, H., Inagaki, M., Nagatsuka, S., Ebisui, T., Nakai, K., Matsumoto, A., Gokita, A. and Kawahara, S. 2008. Cruise report of the Second Phase of the Japanese Whale Research Program under Special Permit in the Western North Pacific (JARPN II) in 2007 - coastal component off Sanriku. Paper SC/60/O6 presented to the IWC Scientific Committee, June 2008 (unpublished). 27pp.

Cristina, C., Acevedo, J., Allen, J., Dalla Rosa, L., Flórez-González, L., Aguayo-Lobo, A., Rasmussen, K., Llano, M., Garita, F., Forestell, P., Secchi, E.R., García Godos, I., Ferrina, D., Kaufman, G., Scheidat, M. and Pastene, L.A. 2008. Migratory movements of humpback whales (*Megaptera novaeangliae*) between Machalilla National Park, Ecuador and southeast Pacific. Paper SC/60/SH23 presented to the IWC Scientific Committee, June 2008 (unpublished). 6pp.

Goto, M., Kanda, N., Pastene, L.A., Bando, T. and Hatanaka, H. 2009. Differences in cookie cutter shark-induced body scar marks between J and O stocks of common minke whales in the western North Pacific. Paper SC/J09/JR28 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 7pp.

Goto, M., Kanda, N., Kishiro, T., Yoshida, H., Kato, H. and Pastene, L.A. 2009. Mitochondrial DNA analysis on stock structure in the western North Pacific common minke whales. Paper SC/J09/JR29 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 10pp.

Hakamada, T. 2009. Examination of the effects on whale stocks of future JARPN II catches. Paper SC/J09/JR36 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 51pp.

Hakamada, T., Matsuoka, K. and Miyashita, T. 2009. The number of western North Pacific common minke whales (*Balaenoptera acutorostrata*) distributed in JARPN II coastal survey areas. Paper SC/J09/JR8 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 12pp.

Hakamada, T., Matsuoka, K. and Miyashita, T. 2009. Distribution and the number of western North Pacific common minke, Bryde's, sei and sperm whales distributed in JARPN II Offshore component survey area. Paper SC/J09/JR15 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 18pp.

Hakamada, T. and Bando, T. 2009. Morphometric analysis on stock structure in the western North Pacific common minke whale (*Balaenoptera acutorostrata*). Paper SC/J09/JR27 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 13pp.

Ishikawa, H., Goto, M., Ogawa, T., Bando, T., Kiwada, H., Isoda, T., Kumagai, S., Mori, M., Tsunekawa, M., Ohsawa, T., Fukutome, K., Koyanagi, T., Kandabashi, S., Kawabe, S., Sotomura, N., Matsukura, R., Kato, K., Matsumoto, A., Nakai, K., Hasegawa, M., Mori, T., Yoshioka, S. and Yoshida, T. 2008. Cruise report of the Second Phase of the Japanese Whale Research Program under Special Permit in the Antarctic (JARPA II) in 2007/2008. Paper SC/60/O4 presented to the IWC Scientific Committee, June 2008 (unpublished). 19pp.

Kanda, N., Goto, M., Kishiro, T., Yoshida, H., Kato, H. and Pastene, L.A. 2009. Individual identification and mixing of the J and O stocks around Japanese waters examined by microsatellite analysis. Paper SC/J09/JR26 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 9pp.

Kanda, N., Goto, M., Kishiro, T., Yoshida, H., Kato, H. and Pastene, L.A. 2009. Microsatellite analysis of minke whales in the western North Pacific. Paper SC/J09/JR30 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 14pp.

Kanda, N., Goto, M. and Pastene, L.A. 2009. Stock structure of Bryde's whales in the western North Pacific as revealed by microsatellite and mitochondrial DNA analyses. Paper SC/J09/JR31 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 8pp.

Kanda, N., Goto, M., Yoshida, H. and Pastene, L.A. 2009. Stock structure of sei whales in the North Pacific as revealed by microsatellite and mitochondrial DNA analyses. Paper SC/J09/JR32 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 14pp.

Kanda, N., Goto, M. and Pastene, L.A. 2009. Genetic characteristics of sperm whales sampled during JARPN II from 2000 to 2007 as revealed by mitochondrial DNA and microsatellite analyses. Paper SC/J09/JR33 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 5pp.

Kato, H., Ishikawa, H., Miyashita, T. and Takaya, S. 2008. Status report of conservation and researches on the western gray whales in Japan May 2007-April 2008 Paper SC/60/O8 presented to the IWC Scientific Committee, June 2008 (unpublished). 9pp.

Kishiro, T., Kato, H., Yoshida, H., Miyashita, T., Iwasaki, T., Kanaji, Y., Ryono, T., Tabata, S., Morita, Y., Okamoto, R., Maeda, H., Nagatsuka, S., Ogawa, N., Nakai, K., Ebisui, T., Matsumoto, A., Gokita, A., Kiwada, H. and Kawahara, S. 2008. Cruise report of the second phase of the Japanese Whale Research Program under

- Special Permit in the Western North Pacific (JARPN II) in 2007 - coastal component off Kushiro. Paper SC/60/O7 presented to the IWC Scientific Committee, June 2008 (unpublished). 33pp.
- Kishiro, T., Yoshida, H., Goto, M., Bando, T. and Kato, H. 2009. Methodology and survey procedure under the JARPN II – coastal component of Sanriku and Kushiro-, with special emphasis on whale sampling procedures. Paper SC/J09/JR3 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 27pp.
- Kishiro, T., Yoshida, H., Tamura, T., Konishi, K., Kanda, N., Okamoto, R. and Kato, H. 2009. Relationship between body size, maturity, and feeding habit of common minke whales off Kushiro in autumn season, from 2002-2007 whale sampling surveys under the JARPN II coastal components off Kushiro. Paper SC/J09/JR13 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 25pp.
- Kiwada, H., Kumagai, S. and Matsuoka, K. 2009. Methodology and procedure of the dedicated sighting surveys in JARPN II –Offshore and coastal component of Sanriku and Kushiro-. Paper SC/J09/JR2 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 16pp.
- Konishi, K., Kiwada, H., Matsuoka, K., Hakamada, T. and Tamura, T. 2009. Density prediction modeling and mapping of common minke, sei and Bryde's whales distribution in the western North Pacific using JARPN II (2000-2007) data set. Paper SC/J09/JR19 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 20pp.
- Konishi, K., Tamura, T., Goto, M., Bando, T., Kishiro, T., Yoshida, H. and Kato, H. 2009. Trend of blubber thickness in common minke, sei and Bryde's whales in the western North Pacific during JARPN and JARPN II periods. Paper SC/J09/JR20 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 4pp.
- Leeper, R., Best, P., Branch, T., Donovan, G., Murase, H. and Van Waerebeek, K. 2008. Report of review group of data sources on odontocetes in the Southern Ocean in preparation for IWC/CCAMLR workshop in August 2008. Paper SC/60/EM2 presented to the IWC Scientific Committee, June 2008 (unpublished). 10pp.
- Matsuoka, K., Nishiwaki, S., Murase, H., Kanda, N., Kumagai, S. and Hatanaka, H. 2008. Influence of sea ice concentration in the research area on IDCR-SOWER estimation. Paper SC/60/IA12 presented to the IWC Scientific Committee, June 2008 (unpublished). 9pp.
- Matsuoka, K., Otani, H., Isoda, T., Wada, A., Kumagai, S., Ohshima, T., Yoshimura, I., Sugiyama, K., Aki, M., Kato, K., Bhuiyan, M.M.U., Funasaka, N., Suzuki, Y., Sudo, R., Motohashi, Y., Mori, M., Tsunekawa, M., Inagake, D., Murase, H. and Ogawa, T. 2008. Cruise report of the Second Phase of the Japanese Whale Research Program under Special Permit in the Western North Pacific (JARPN II) in 2007 (Part I) - offshore component. Paper SC/60/O5 presented to the IWC Scientific Committee, June 2008 (unpublished). 40pp.
- Matsuoka, K., Kiwada, H., Fujise, Y. and Miyashita, T. 2009. Distribution of blue (*Balaenoptera musculus*), fin (*B. physalus*), humpback (*Megaptera novaeangliae*) and North Pacific right (*Eubalaena japonica*) whales in the western North Pacific based on JARPN and JARPN II sighting surveys (1994 to 2007). SC/J09/JR35 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 12pp.
- Mori, M. and Butterworth, D.S. 2008. Some modifications to the current ADAPT-VPA model for Antarctic minke whales. Paper SC/60/IA13 presented to the IWC Scientific Committee, June 2008 (unpublished). 5pp.
- Mori, M., Watanabe, H., Hakamada, T., Tamura, T., Konishi, K., Murase, H. and Matsuoka, K. 2009. Development of an ecosystem model of the western North Pacific. Paper SC/J09/JR21 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 49pp.
- Murase, H., Watanabe, H., Yonezaki, S., Tamura, T., Matsuoka, K., Fujise, Y. and Kawahara, S. 2009. Methodology and procedures of cetacean prey surveys in JARPN II –Offshore Component-. Paper SC/J09/JR7 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 11pp.

- Murase, H., Kawahara, S., Nagashima, H., Onodera, K., Tamura, T., Okamoto, R., Yonezaki, S., Matsukura, R., Minami, K., Miyashita, K., Yoshida, H., Goto, M., Bando, T., Inagake, D., Okazaki, M., Okamura, H. and Kato, H. 2009. Estimation of prey preference of common minke whales (*Balaenoptera acutorostrata*) in a coastal component (off Sanriku) of JARPN II in 2005 and 2006. Paper SC/J09/JR10 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 15pp.
- Murase, H., Tamura, T., Isoda, T., Okamoto, R., Yonezaki, S., Watanabe, H., Tojo, N., Matsukura, R., Miyashita, K., Kiwada, H., Matsuoka, K., Nishiwaki, S., Inagake, D., Okazaki, M., Okamura, H., Fujise, Y. and Kawahara, S. 2009. Prey preferences of common minke (*Balaenoptera acutorostrata*), Bryde's (*B. edeni*) and sei (*B. borealis*) whales in offshore component of JARPN II from 2002 to 2007. Paper SC/J09/JR18 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 31pp.
- Okazaki, M., Inagake, D., Masujima, M., Murase, H., Watanabe, H., Yonezaki, S., Nagashima H., Matsuoka, K., Kiwada, H. and Kawahara, S. 2009. Oceanographic conditions of the western North Pacific based on oceanographic data during the JARPN II. Paper SC/J09/JR34 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 13pp.
- Pastene, L.A., Kitakado, T. and Hatanaka, H. 2008. Research proposal accompanying management variant 2 of the RMP *Implementation* for western North Pacific Bryde's whale. Paper SC/60/PF19 presented to the IWC Scientific Committee, June 2008 (unpublished). 10pp.
- Pastene, L.A., Acevedo, J., Goto, M. and Aguayo-Lobo, A. 2008. Bryde's whale off Chile: a note on distribution and population genetic structure. Paper SC/60/SH35 presented to the IWC Scientific Committee, June 2008 (unpublished). 13pp.
- Pastene, L.A., Hatanaka, H., Fujise, Y., Kanda, N., Murase, H., Tamura, T., Miyashita, T. and Kato, H. 2009. The Japanese Whale Research Program under Special Permit in the western North Pacific Phase-II (JARPN II): origin, objectives and research progress made in the period 2002-2007, including scientific considerations for the next research period. Paper SC/J09/JR1 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 73pp.
- Tamura, T., Matsuoka, K. and Fujise, Y. 2009. Methodology and survey procedure under the JARPN II - offshore component- with special emphasis on whale sampling procedures. Paper SC/J09/JR4 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 16pp.
- Tamura, T., Konishi, K., Isoda, T., Okamoto, R. and Bando, T. 2009. Prey consumption and feeding habits of common minke, sei and Bryde's whales in the western North Pacific. Paper SC/J09/JR16 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 36pp.
- Tamura, T., Konishi, K., Goto, M., Bando, T., Kishiro, T., Yoshida, H., Okamoto, R. and Kato, H. 2009. Prey consumption and feeding habits of common minke whales in coastal areas off Sanriku and Kushiro. Paper SC/J09/JR9 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 18pp.
- Tamura, T., Kubotera, T., Ohizumi, H., Konishi, K. and Isoda, T. 2009. Feeding habits of sperm whales and their impact on neon flying squid resources in the western North Pacific. Paper SC/J09/JR17 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 22pp.
- Watanabe, H., Yonezaki, S., Kiwada, H., Kumagai, S., Kishiro, T., Yoshida, H. and Kawahara, S. 2009. Methodology and procedures of common minke whale's prey surveys in JARPN II – Coastal component of Kushiro-. Paper SC/J09/JR6 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 12pp.
- Watanabe, H., Yonezaki, S., Kiwada, H., Kumagai, S., Kishiro, T., Yoshida, H. and Kawahara, S. 2009. Distribution and abundance of prey species and prey preference of common minke whale *Balaenoptera acutorostrata* in the coastal component of JARPN II off Kushiro from 2002 to 2007. Paper SC/J09/JR11 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 37pp.

Yasunaga, G. and Fujise, Y. 2009. Temporal trends and factors affecting mercury levels in common minke, Bryde's and sei whales and their prey species in the western North Pacific. Paper SC/J09/JR23 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 13pp.

Yasunaga, G. and Fujise, Y. 2009. Temporal trends and factors affecting PCB levels in baleen whales and environmental samples from the western North Pacific. Paper SC/J09/JR24 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 10pp.

Yasunaga, G. and Fujise, Y. 2009. Accumulation features of total and methyl mercury and selenium in tissues of common minke, Bryde's and sperm whales from the western North Pacific. Paper SC/J09/JR25 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 11pp.

Yonezaki, S., Nagashima, H., Murase, H., Yoshida, H., Bando, T., Goto, M., Kawahara, S. and Kato, H. 2009. Methodology and procedures of surveys of prey of common minke whales JARPN II - Coastal component of Sanriku. Paper SC/J09/JR5 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 6pp.

Yoshida, H., Kishiro, T., Goto, M., Bando, T., Tamura, T., Konishi, K., Okamoto, R. and Kato, H. 2009. Relationship between body size, maturity, and feeding habit of common minke whales off Sanriku in spring season, from 2003-2007 whale sampling surveys under the JARPN II coastal component off Sanriku. Paper SC/J09/JR12 presented to the IWC Scientific Committee Expert Workshop to review the JARPN II Programme, Yokohama, Japan, January 26-30 2009 (unpublished). 20pp.

11.3 Oral presentations at congresses and symposium

Bhuiyan, M.M.U., Suzuki, Y., Watanabe, H., Hirayama, H., Matsuoka, K., Fujise, Y., Ishikawa, H., Ohsumi, S. and Fukui, Y. 2008. Attempts at Production of Sei Whale (*Balaenoptera borealis*) Cloned Embryos by Interspecies Somatic Cell Nuclear Transfer. 101st Meeting of the Japanese Society of Animal Reproduction, Fukuoka, Japan, September 2008.

Funasaka, N., Yoshioka, M. and Fujise, Y. 2008. Anatomical and histological characteristics of the Harderian gland in the common minke whale *Balaenoptera acutorostrata*. 5th World Fisheries Congress, Yokohama, Japan, October 2008. Supplement p.453.

Funasaka, N., Yoshioka, M. and Fujise, Y. 2008. Anatomical and histological characteristics of the Harderian gland in the common minke whale *Balaenoptera acutorostrata*. Asian Collaborative Forum for Women Researchers in Science and Technology, Encourage and Empower the Next Generation, Mie, Japan, December 2008. Supplement p.49.

Ishikawa, H., Tajima, Y., Yamada, T., Hiruta, H. and Kohara, K. 2008. Stranding records in Japan. 2007. The 19th Congress of the Sea of Japan Cetology Research Group, Kanazawa, Japan, June 2008.

Kato, S., Ishikawa, H. and Shimada, T. 2008. Histological study of the Esophagus and Stomach in the Minke Whale. Third Conference of U.S.-Japan Panel on Aerospace-Diving Physiology & Technology, and Hyperbaric Medicine (3rd New UJNR), Oita, Japan, November 2008.

Konishi, K., Tamura, T., Isoda, T., Okamoto, R., Matsuoka, K. and Hakamada, T. 2008. Prey consumptions and feeding strategies of three baleen whale species around the Kuroshio-current extension. The Role of Marine Mammals in the Ecosystem in the 21st Century, Dartmouth, Canada, September 2008.

Mori, M., Hakamada, T., Matsuoka, K., Murase, H., Tamura, T., Watanabe, H. and Konishi, K. 2008. Introduction of an ecosystem model of the western North Pacific: progress made and future work for its application to multi-species management. 5th World Fisheries Congress, Yokohama, Japan, October 2008. Supplement p.259.

Mori, M., Watanabe, T., Hakamada, T., Tamura, T., Konishi, K., Murase, H. and Matsuoka, K. 2008. ECOPATH model of the Western North Pacific (Oyashio~Transition~Kuroshio region). 2008 Ecosystem Studies of Sub-Arctic Seas(ESSAS) Annual Science Meeting, Halifax, Canada, September 2008.

- Murase, H., Nagashima, H., Yonezaki, S., Matsukura, R. and Kitakado, T. 2008. Application of Generalized Additive Mode (GAM) to acoustic survey data to model relationships between environment factors and distribution patterns of pelagic fish and krill: A case study in Sendai Bay, Japan. International Symposium on Ecosystem Approach with Fisheries Acoustics and Complementary Technologies (SEAFACETS), Bergen, Norway, August 2008.
- Murase, H., Yasuma, H., Matsukura, R., Takao, Y., Taki, K., Hayashi, T., Yabuki, T., Tamura, T., Konishi, K., Matsuoka, K., Nishiwaki, S. and Naganobu, M. Distribution patterns and biomasses of Antarctic krill (*Euphausia superba*) and ice krill (*E. crystallophias*) with note on distribution of Antarctic minke whales (*Balaenoptera bonaerensis*) in the Ross Sea in 2005. 14th CCAMLR/WG-EMM meeting, Saint-Petersburg, Russia, August 2008.
- Murase, H., Kitakado, T., Matsuoka, K., Nishiwaki, S. and Naganobu M. 2008. Predator-prey relationship in spatial context –Is the distribution pattern of krill the determinant factor of the distribution pattern of Antarctic minke whale?-. Symposium on the Role of Marine Mammals in the Ecosystem in the 21st century (sponsored by NAFO-ICES-NAMMCO), Dartmouth, Canada, September 2008.
- Naganobu, M., Nishiwaki, S., Yasuma, H., Matsukura, R., Takao, Y., Taki, K., Hayashi, T., Watanabe, Y., Yabuki, T., Yoda, Y., Noiri, Y., Kuga, M., Yoshikawa, K., Kokubun, N., Murase, H., Matsuoka, K. and Ito, S. 2008. Relationships between oceanographic environment and distribution of krill and baleen whales in the Ross Sea and adjacent waters, Antarctica in 2004/05. 14th CCAMLR/WG-EMM meeting, Saint-Petersburg, Russia, August 2008.
- Pastene, L.A., Goto, M. and Kanda, N. 2008. Utility of genetic analyses for the management of large whales: applications and limitations. 5th World Fisheries Congress, Yokohama, Japan, October 2008. Supplement p.259.
- Shimada, T., Yamaguchi, T., Kai, H., Yoshihara, T., Segawa, M., Kato, S., Kawazato, H. and Ishikawa, H. 2008. Why can the whale dive deeply? –Histological characteristics–. Third Conference of U.S.-Japan Panel on Aerospace-Diving Physiology & Technology, and Hyperbaric Medicine (3rd New UJNR), Oita, Japan, November 2008.
- Shimada, T. and Ishikawa, H. 2008. Functional Morphology of the Whale skins. Third Conference of U.S.-Japan Panel on Aerospace-Diving Physiology & Technology, and Hyperbaric Medicine (3rd New UJNR). Oita, Japan, November 2008.
- Shimada, T., Yamaguchi, T., Segawa, M. and Ishikawa, H. 2008. Functional Morphology of the Whale Hearts. Third Conference of U.S.-Japan Panel on Aerospace-Diving Physiology & Technology, and Hyperbaric Medicine (3rd New UJNR), Oita, Japan, November 2008.
- Tajima, Y., Ishikawa, H., Makara, M., Suzuki, Y. and Yamada, T. 2008. A report of postmortem investigation on marine mammals stranded in Japan during 2007. The 19th Congress of the Sea of Japan Cetology Research Group, Kanazawa, Japan, June 2008.
- Tajima, Y., Makara, M., Suzuki, Y., Ishikawa, H. and Yamada, T. 2008. A report of postmortem investigation on marine mammals stranded in Japan during 2007. The 14th Meeting of the Japanese Society of Zoo and wildlife Medicine, Kobe, Japan, September 2008.
- Tamura, T. and Konishi, K. 2008. Feeding strategy and prey consumption of Antarctic minke whale *Balaenoptera bonaerensis* in the Southern Ocean. The Role of Marine Mammals in the Ecosystem in the 21st Century, Dartmouth, Canada, September 2008.
- Tojo, N., Matsukura, R., Yasuma, H., Yonezaki, S., Watanabe, H., Kawahara, S., Murase, H. and Miyashita, K. 2008. Spatial analysis of Isada Krill (*Euphausia pacifica*) distribution in frontal environments in the North Pacific Ocean. Fourth International Symposium on GIS/Spatial Analyses in Fishery and Aquatic Sciences, Rio de Janeiro, Brazil, August 2008.
- Tojo, N., Murase, H., Matsukura, R., Yasuma, H., Yonezaki, S., Watanabe, H., Kawahara, S. and Miyashita, K. 2008. Isada Krill (*Euphausia pacifica*) distribution in frontal environments in the North Pacific Ocean. The Second Meeting of Asian Fisheries Acoustic Society, Incheon, Korea, November 2008.