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CIRCULAR COMMUNICATION TO COMMISSIONERS, CONTRACTING GOVERNMENTS
AND MEMBERS OF THE SCIENTIFIC COMMITTEE
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Supplement to the 'Research Plan for Cetacean Studies in the Western North Pacific under Special Permit (JARPNII)'

The Government of Japan has requested that the Supplement to the 'Research Plan for Cetacean Studies in the Western North Pacific under Special Permit (JARPNII)' (see SC/54/O2) be circulated to Commissioners, Contracting Governments and the Scientific Committee. The supplement describes the modifications based on the proposals and suggestions made by the Scientific Committee at the recent Annual Meeting in Shimonoseki.

A copy of the Supplement is attached.

Dr. Nicky Grandy
Secretary to the Commission

Supplement of "Research Plan for Cetacean Studies in the Western North Pacific under Special Permit (JARPN II)" (SC/54/O2)

Government of Japan

1. GENERAL REMARKS

The full scale research plan for the second phase of the Japanese Whale Research Program under Special Permit in the Western North Pacific (JARPN II), based on the results of the feasibility studies conducted in 2000 and 2001, was presented at the 54th Annual Meeting of the International Whaling Commission (at Shimonoseki in 2002; SC/54/02). An in-depth review was conducted at the Scientific Committee (SC) in accordance with the IWC guidelines, and a number of constructive comments and proposals were made. This paper is a supplement to the JARPN II research plan, and describes the modifications made based on the constructive proposals, and shows the basic policy of Japan as welcoming constructive suggestions in the conduct of the full-scale JARPN II.

Although some members of the Scientific Committee expressed concerns over the research design, others welcomed the proposed research and underlined that this comprehensive research will contribute to understanding the feeding ecology of cetaceans both in the western North Pacific, and in general (IWC/54/4). After considering the overall discussions of the Committee, Japan has decided to carry out the full JARPN II research program with the modifications described herein.

During the Committee discussions, some members expressed the view that all the objectives of JARPN II can be achieved by non-lethal means alone, but we do not agree with this view. The final objective of JARPN II to construct a marine ecosystem model requires quantitative data on when, where, how much, and what kind of prey species whales consume. Such data can only be obtained by collecting and analyzing the stomach contents of whales systematically sampled from an extensive area over time. On the other hand, Japan has been also conducting research using non-lethal methods. Lethal and non-lethal methods will be used to best meet the research objectives.

There was also disagreement on the effects of the research catches on the sei whale stock sampled, but it should be noted that concern for the adverse effect of the catches is based on data from the 1970s. According to recent Japanese sighting surveys, sei whale abundance has recovered considerably and now exceeds that of minke whales. Their relative biomass in the western North Pacific is the second after sperm whales, and they need to be included as a target species from the scientific standpoint, since they must play an important role in the marine ecosystem. As shown in Appendix 6 of the full scale JARPN II research plan (SC/54/O2), the sei whale stock will continue to increase even if 50 animals are sampled.

There were also arguments over the research design of JARPN II particularly with respect to the objectives related to stock structure. However, it is inappropriate to point out inadequacies concerning this specific research objective, since JARPN II is designed for the optimal achievement of the main objectives related to ecosystem studies, while at the same time providing data related to the other objectives. Useful scientific data for all the objectives has been obtained from the feasibility study, which proves that the research design is appropriate.

Lastly, as mentioned in the full scale research plan for JARPN II (SC/54/O2), participation of foreign scientists interested in Japan's research program is welcomed.

2. SUPPLEMENTS TO THE ORIGINAL RESEARCH PLAN

2.1 Additional Sighting Surveys for Abundance Estimate of Large Whales Including Sei Whales

According to the sighting survey results (conducted in June and July) as part of the JARPN and JARPN II feasibility studies, it was estimated that 28,400 sei whales were distributed in the western North Pacific (north of lat. 35°N, and from the coast of Japan to long. 170°E). However, some members of the Scientific Committee expressed their doubts as to its reliability and accuracy, since the estimate for the entire area was derived from surveys covering about 50% of the area and extrapolated using JSV data.

Although we believe that the estimates are sufficiently reliable, we will carry out an additional sighting survey covering the entire research area, using a dedicated sighting vessel apart from the research fleet in order to improve the reliability and accuracy of the sei whale abundance estimate. During the JARPN II feasibility studies, large baleen whales such as blue and right whales rarely seen in the area, were sighted, and we will also collect sighting information on these species during the full JARPN II.

Research areas are sub-areas 8 and 9, and surveys will be conducted in June and July of 2002, and in May and June of 2003. An abundance estimate for the surveyed areas will be calculated from these surveys. Surveys will be conducted along preset track lines under certain conditions (wind force 4 or less on the Beaufort scale and visibility 2 miles or more). The closing mode will be employed, and when animals are sighted, the vessel will close in at once to confirm whales species and number.

2.2 Satellite Tagging Experiment

Various experiments have been conducted using satellite tags to study cetacean migration. The use of satellite tags to complement JARPN II was also suggested at the Scientific Committee meeting. Although satellite tags have various problems, we will add a satellite tagging experiment to JARPN II. We will use satellite tags, about five for each research year, made by Teronics Ltd., as they are known to be very reliable, and attempt tagging whales with the view of obtaining data from one or two animals. Bryde's and minke whales will be the primary target in order to identify migration route and breeding areas.

Note:
We have attempted to tag two Antarctic minke whales during the JARPA program in the Antarctic, using a towing type of satellite tag made in Japan. Of the two, one failed to send out any signals after tagging, but the other one transmitted data for sixty days. In the 2000 JARPNII program, we made ten similar satellite tags and tried tagging whales, but there were various problems including: a) the joint between the antenna and the body of the tag was L-shaped and fragile, b) the magnetic switch did not function and the tag was always "on, c) we did not succeed in making the tags any smaller or lighter, and d) the electric circuit board was not durable and could not take shocks or impacts. To test their transmitting ability, we set three tags adrift. We succeeded in receiving signals from only one of them, and while it was designed to transmit signals for sixty days, we received them for only two weeks.

Dr. Bruce Mate and others have reported results of satellite tagging experiments on large whales. For instance, they tagged ten blue whales during their feeding period and have reported on the migration data obtained (MARINE MAMMAL SCIENCE 15 (4): 1246-1257, Oct., 1999). It is said that information on ten animals over the same period is necessary for understanding the migration; however, they had invested as many as 85 satellite tags to obtain these result at an estimated production cost of as much as 34 million yen. This kind of mass tagging is difficult both in terms of cost and time, and a more efficient and reliable method of tagging needs to be developed.

2.3 Discovery mark and Spaghetti Tags

In view of the SC comments, we intend to tag whales using .410 Discovery marks for the full-scale JARPN II and study the migration route of large whales including minke whales, which should give us direct evidence for investigating stock structure. We have disposed of the mark shooting guns used in past IWC/IDCR research cruises, so we need to make tagging marks and special cartridge cases. The preparations will take some time, but as soon as they are ready, we will tag whales in the JARPN II programs, and, whenever there is time to spare, in other Japanese sighting surveys, including those conducted in the lower latitudes in winter in 2003, in an effort to collect migration data. When conditions permit, we will also conduct feasibility experiments, using spaghetti tags attached with streamers, for individual identification of minke and other large whales. Research protocols, including the number of tags to be employed, are still being considered.

2.4 Possibility of Estimating Prey Species by DNA Analysis of Feces

A method to identify prey species (e.g., krill) consumed by whales from feces samples obtained by net sampling was presented at the IWC/54 SC meeting, possibly allowing identification of prey species by non-lethal method (SC/54/O7). However, Japan expressed doubts as to its usefulness in terms of the primary objective of JARPNII since the method does not provide any resolution in space or time, nor the amount of prey consumed. In order to investigate the possible effectiveness of DNA analysis of feces, we will directly compare the colon contents (feces) with the stomach contents of whales taken to examine the usefulness and limits of feces analysis. At the same time, we plan to search for DNA regions useful for prey species identification, using prey samples taken from the stomach.

2.5 Possibility of Estimating Prey Species by Stable Isotopes and Fatty Acid Composition

It was noted at the 54IWC/SC meeting that non-lethal methods should be applied to the feeding ecology studies.

The Institute of Cetacean Research has already started on stable isotope analyses, and some of the results have been reported at the JARPN Review Meeting (SC/F2K/J20). The results suggested that the different ratio of stable isotopes in whales will reflect the trophic levels of prey, but it is not yet possible to identify specific prey species. Therefore, we intend to conduct prey species composition analysis from the stomach and isotope analysis of epidermal material of whales concurrently to evaluate the usefulness of isotope analysis using biopsy samples.

Research on fatty acid composition is already going on in collaboration with the College of Bioresource Science, Nihon University. The studies define the fatty acid composition of the prey species, and the blubber, muscle tissues and liver of various whale species, investigate whether it is possible to identify prey species by means of the fatty acid composition of the blubber using biopsy samples, and whether fatty acid composition reflects the long-term consumption of prey species. We plan to continue analyses and examine possibilities until 2003.

3. FURTHER EXPLANATION OF THE RESEARCH PLAN

3.1 Re-examination of the Sei Whale Diet

Feeding ecology and ecosystem studies in sub-areas 7, 8, and 9 are planned for the full-scale JARPN II, and sei whales are included as target species owing to their abundance and large biomass (see Research Plan, SC/54/O2 Appendix 1).

According to past commercial whaling data, sei whales not only feed on zooplankton such as krill and copepods, but also on fish such as chub mackerel, Pacific saury, and Japanese anchovy, as well as cephalopods such as Japanese common squid. It has also been reported that their prey species differ by the months surveyed. They are known to have fed mostly on copepods in the seas around Kamchatka Peninsula in the past (Kawamura, 1977), but entirely on krill, Pacific saury, chub mackerel, and common squid, all commercial fishery resources, in the Pacific coasts off northern Japan (sub-area 7) (Mizue, 1952; Nemoto, 1962). This seems to indicate that the sei whale diet differs by geographical area as with minke whales, but there is no information on what they eat in the area between the two regions. The studies can be positioned as a survey covering the gap in prey species information of sei whales, and it should contribute to elucidating their diet composition in the North Pacific.

The amount of prey consumption by sei whales in the western North Pacific was calculated using a standard metabolism model and two other methods. It is estimated that they consume 2.18 to 4.5 million tons of marine living resources annually. It is estimated that sei whales eat 0.8 to 1.6 million tons of prey in the research area (abundance at 9,900; see Research Plan, SC/54/O2 Appendix 1). Since they are reported to have fed entirely on krill, Pacific saury, chub mackerel, and common squid, all commercial fishery resources, in the Pacific coasts off northern Japan (sub-area 7) in the past, they can be considered to have a large effect on the ecosystem, if we assume that they still feed on similar prey species in the research area. It is, therefore, essential to estimate the amount of prey consumption by sei whales in order to understand the ecosystem in the research area.

3.2 Re-examination of Sampling of Sperm Whale

Sperm whales are still treated as a feasibility study in the full-scale JARPN II, and we plan to take ten animals.

This is because we have found out from the two-year feasibility studies that a) deep-sea squids which conduct daily vertical migration to the surface layer at night accounted for about 17% of their prey species, that b) they also eat fish such as walleye pollock and longfin grenadier (see SC/54/O17, Appendix 3), and that c) they are expected to play a large part in the pelagic ecosystem since their biomass is extremely large compared with other whale species (see Research Plan, SC/54/O2 Appendix 1). The results of the survey will be used as input to the ecosystem model we intend to construct.

In the 2000 and 2001 feasibility studies, sperm whales were only sampled from sub-area 7, which was the research area for the ecosystem studies, and it was shown that they tend to consume different squid species in the coast and the offshore area. In the full-scale JARPN II, the research area has been extended to long. 170°E, and it will be desirable to sample extensively from the whole area, but since there is no information for sub-areas 8 and 9, sampling of sperm whales from these off-shore areas is especially desirable. Past sampling during the two

feasibility studies has shown that prey species differ considerably by animal, so we need to sample more than one whale from these sub-areas.

3.3 Prey Surveys in the Coastal Area

In the full research program, small-type whaling catcher boats will operate to sample minke whales in the coastal area in spring and autumn to cover the temporal and spatial gaps, which cannot be covered by the *Nisshin Maru* fleet. Prey surveys to estimate prey preference of minke whales will be conducted concurrently with the coastal sampling survey.

The prey surveys will cover a wider area than the whale sampling surveys so as to find out how prey species are distributed. Schools of fish found by the research vessel (*Kyoshin Maru* No.2) equipped with an echo sounder (EK500), will be identified for species and size by a trawler following a few miles behind. Also we will conduct mid-water trawlings from a 100m depth and predetermined stations. Trawl catches will be weighed after sorting them by species, and body length and body weight will be measured for major species. Some frozen samples will be taken for later analysis. Whale sighting surveys will be conducted in the passing mode, and oceanographic data will be collected using CTD. We will estimate the prey preference of cetaceans by comparing the data obtained from the prey surveys and the stomach contents of sampled whales.

4. REFERENCE

Gales, N.J. and Jarman, S.N. 2002. A non-lethal genetic method for identifying whale prey. Paper SC/54/O7 presented to the IWC Scientific Committee, May 2002 (unpublished). 6 pp.