

SC/43/Mi19

The 1991/92
Research Plan of Whale Resources
in
the Antarctic

The Government of Japan

May, 1991

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1. Introduction

Japan implemented the feasibility studies in two successive years in 1987/88 and 1988/89 on the basis of the plan revised from "Program for the Research on the Southern Hemisphere Minke Whale and for the Preliminary Research on the Marine Ecosystem in the Antarctic" submitted to the IWC in 1987. After the feasibility studies for two years, Japan commenced the research program in Area IV in 1989/90 and in Area V in 1990/91.

The research for 1991/92 is the third year of the program with no major changes from the long-term program made in 1987 (which was amended in 1989).

The research plan for 1991/92, as clearly described in the objectives of the plan below in this page aims at the estimation of biological parameters necessary for the management of minke whale stocks in the Antarctic, and the ascertainmnet of the role of the whales in the marine ecosystem in the Antarctic. In particular, through continuous monitoring by the research over a long period, it aims at the collection of information relating to the stock size, segregation by sex and age, natality, mortality and the change in stock size, which are indispensable for the management of the Antarctic minke whale stocks.

The research is expected to improve the knowledge useful for practical solutions on the various problems associated with the utilization of the whale resources arising from uncertainties of the existing biological knowledge.

2. Objectives (no change from the previous plan)

1. Estimation of the Biological Parameters Required for the Stock Management of the Southern Hemisphere Minke Whale

The primary objective of the program is to estimate the age-specific natural mortality rate by samples through stochastic sampling carried out in combination with systematic sighting surveys. The program is also designed to estimate the stock size and its changes, including the monitoring of the recruitment, required for stock management, and the reproductive parameters and their changes based on the same samples.

2. Elucidation of the Role of Whales in the Antarctic Marine Ecosystem

The program includes, as its another objective, the elucidation of the roles of whales in the Antarctic marine ecosystem. The most important component for this objective is the collection and analysis of data on the prey-predator relationships among krills, fishes and squids and whales.

The description above has been based on the original research plan (SC/39/04) with some amendment made in the research plan in 1989/90 season (SC/41/SHMi 13). It is the same with the description made in the communication to the IWC from the Government of Japan in October 1989 for circulation, entitled 'Japanese response and reconsideration on Japanese scientific research proposal for special permits.'

3. Number, sex, size and stock of the animals to be taken (no change from the previous plan except the sampling area)

Three hundred (300) minke whales with allowance $\pm 10\%$, the same as in the proposal of the last year, will be sampled. Samples are to be collected without predetermination of sexes. Samplings are to be made in Area IV.

4. Opportunities for participation in the research by scientists of other nations (no change from the previous plan)

Opportunities for participation in the research by foreign scientists are available as described in the research proposal presented to the IWC in the previous years. The following are the particulars for participation by foreign scientists.

1. Opportunities for Participation by Foreign Scientists

Opportunities for participation in the research under this program will be given to any scientists to the extent allowed by accommodation and other logistic consideration, provided that such participation does not cause inconveniences in the implementation of the program. The selection of the participants are to be finalized by the Whale Research Coordinating Committee, which will consider the various conditions such as accommodation and others for determination.

2. Conditions for Participation

i) Costs:

Costs for participation, such as travel expences to and from the port of embarking on and disembarking from the research vessel, meals on board the research vessel, and any special instruments required by the participant are to be borne by the participant.

ii) Indemnification and insurance for casualty or personal injury on board the research vessels:

The Institute of Cetacean Research and the crew of the research vessel or research team will not be able to take responsibility for any casualty or personal injury that might be inflicted upon the foreign participants resulting from their negligence or force majeure.

iii) Cancellation of the participation:

Any participants who are found to have intentionally sabotaged in the course of implementation of the researches and thereby impaired the execution of such researches shall be cancelled of their participation in this program.

5. Possible effect on conservation of the stock

The IWC Scientific Committee at its 42nd Annual Meeting agreed in the course of Comprehensive Assessment of the stocks that the estimated stock size of the minke whales in Area IV was 74,692 (IWC/42/4;p.13). At the same meeting, a conservative interim catch limit of 583 for Area IV was calculated by the Scientific Committee (IWC/42/4;p.18). As the research in Area IV is conducted in every other year, the proposed sample size of 300 to be taken in Area IV for 1991/92 would be synonymous to the catch of 150 per year on the basis of the average take over the two year. It is clear that the take of this sample size would not affect the conservation of the stock in any way.

6. Outline of the 1991/92 survey

1. Number of Vessels

- One factory ship (research base)
- Three sighting-sampling vessels
- Two sighting vessels*

2. Survey period

From November 1991 to April 1992

3. Stratification of the research area and research

cruise-tracks are the same as in the surveys in the previous years.

4. Samples/data to be collected

- i) Sighting data (including other whale species than minke whales)

- ii) Biological samples/data

Stock identity, age, maturity, breeding, nutrition, distribution of heavy metal, hormone, and parasites.

* These two vessels are used for this program after the end of IDCR survey. The area for sighting surveys by the Japanese research program will be determined following the finalization of the IDCR cruise plan for 1991/92 season.

iii) Weather, oceanography, and environment

Environmental factors such as weather, sea ice, water temperature, marine debris, heavy metal contamination in the sea water and in the atmosphere.

iv) Biopsy and satellite telemetry (as feasibility studies)

Shooting test for attachment of the satellite telemetry transmitter to the whale body is planned on the shipboard.

7. Relationship between the sample size and the precision of the estimation of natural mortality rate

This subject was the main points of discussion at the 42nd IWC/SC. Japan examined in details on the subject matter pursuant to the Resolution on Special Permit Catches by Japan in the Southern Hemisphere (IWC/42/37) adopted by the Commission at the 42nd Annual Meeting, and concluded that it is possible to estimate the natural mortality rate with the sample size of 300. Appendix to this research proposal contains the extract from the paper submitted by Japan to the Commission, Response to the Resolution for Reconsideration on the Japanese Research Program in the Antarctic for 1990/91, in which the examination on the subject matter is expounded.

APPENDIX

Extract from "Response to the Resolution for Reconsideration on the Japanese Research Program in the Antarctic for 1990/91" by the Government of Japan

2.2. Reconsideration on the Precision of the Estimation of Natural Mortality Rate

Further consideration has been given to the precision of estimation of average natural mortality coefficient and the detectability of the changes of age-specific natural mortality coefficient which have been the focus of the discussion at the IWC/SC. The Japanese research deploys three sampling vessels for 100 days. Within the framework of this effort, the upper limit of the take of animals while maintaining the randomness of the sampling is 400 to 500. However, in the Japanese program, the average M is estimated using the stock size estimated from the sighting surveys (N) and the age-composition obtained from the research take of the whales (p). Therefore, the estimation of M is affected by precision of the estimation of both N and p . In order to enhance the precision of N , searching distance of sighting must be increased while it is necessary to increase the number of sampled animals for enhancement of the precision of p . Because sampling vessels are used for both sighting and sampling, the increasing effort for sampling requires decrease of time to be used for sighting, which inevitably result in the lowering of the precision of the estimation of N . In consideration of these, within the constraints of the present scale of the research, appropriate balance of efforts must be considered between sighting and sampling.

The calculation being based on the above conditions, the average M for all year-classes can be obtained with standard error of approximately 0.03, if the annual sample of around 300 animals are obtained for 8 times (16 years). Furthermore, it is expected that the age dependency of M is high (M increases more than 4% with age). Annex B is provided addressing this aspect in detail. In summary, the present annual sample size of 300 animals is found to be appropriate and not to be changed.