

# SC/M17/ForInfo12 Rev1

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## 1999 SC report Annex D

IWC



INTERNATIONAL  
WHALING COMMISSION

state subsequently left the Commission then the continued implementation of the RMP could be compromised. As such, the sub-committee **recommends** that the Commission develop appropriate provisions that ensure that any data supplied by a member country for use under the RMP remains available to the Scientific Committee in the event that a member country withdraws from the Commission.

(3) POSSIBILITY OF ALLOWING 'SLIGHTLY MORE LIMITED RESTRICTIONS' WHERE DATA OF GREAT INTEREST TO THE COMMITTEE ARE OWNED BY A NON-MEMBER NATION

Last year the Committee agreed 'that it would be useful to attempt to make an estimate for the entire CM area for 1995.' At this year's meeting abundance estimates for the CM area that incorporated data collected by Iceland were referred to this sub-committee. These data were made available to the Committee during its current meeting, but no arrangements had been made for continuing access. The sub-committee recognised that Iceland was not currently a member of the IWC and as such was under no obligation to supply data or meet other requirements and guidelines when conducting surveys. The sub-committee also recognised that the Committee may have interest in having data available to it from abundance surveys conducted by non-member states with respect to other aspects of its work.

The sub-committee recognised that in both the case of the use of an estimate under the RMP and the use of an estimate to address other issues of interest to the Committee, limitations on the use of such data for analyses beyond that required for the RMP or the issue for which they were supplied might be considered. Such restrictions might include ensuring safeguarding the rights of collectors for the first use of the data for their own purposes. Such restrictions might be included as a part of the conditions under which the data would be provided to the IWC. The sub-committee considered that such restrictions should not necessarily preclude the use of abundance estimates from such data as long as there was adequate access to the data for use in the RMP. The sub-committee stressed that within the RMP context such data would need to be available without restriction to accredited scientists. However, the publication of results of analyses not clearly and directly related to implementation issues, without the agreement and/or collaboration with the data collectors, could be forbidden.

The sub-committee **recommends** that a set of guidelines be developed for the types of availability restrictions that it would consider acceptable if a non-member country, individual scientists or international organisation were to provide data for use in the RMP. In developing such guidelines, consideration should be given both to the needs for ensuring continuing adequate implementation of the RMP and the limitations on data uses that would facilitate and encourage the provision of such data.

(4) COMMITTEE POLICY ON REVIEWING PUBLISHED ESTIMATES IF THE RAW DATA ARE NOT AVAILABLE

The sub-committee **recommends** that the Committee should not review estimates for use in an application of the RMP based on data that it judges do not adequately meet its requirements and guidelines. However, the sub-committee **recommends** that the Committee should consider the specifics of any data set in terms of its requirements and guidelines. It should evaluate the degree to which the data are adequate for use in the RMP and should judge the relative importance in terms of the behaviour of the RMP in those areas where the requirements were not met and guidelines were not followed. In particular, some aspects of the guidelines dealing with prior notification and timing of data

provision, etc. may be inappropriate or irrelevant depending upon the situation under which the survey was conducted by a non-member country.

In the case of the 1995 Icelandic data for the CM area, Appendix 9 provides an evaluation of these data in terms of the RMP requirements and guidelines. It was noted that the several members of the Committee had participated in the planning meeting in Tromsø for this survey. In addition, the methodology and procedures were similar to those used in the previous NASS-87 and 89 surveys. Moreover, results of analyses in SC/50/RMP10 suggested that if a standard line transect estimator was used with these data the resulting estimate would be negatively biased. With the exception of the issue of data availability, the sub-committee did not identify any issues in its review of SC/50/RMP10 and the supplementary information provided to the sub-committee in Sigurjónsson *et al.* (1996) that would have precluded the use of the abundance estimate in SC/50/RMP10 for use within the RMP. However, members of the Committee may wish to conduct additional analyses to verify the acceptability of the estimate for use in the RMP if the data become permanently available.

#### 8.4 Western North Pacific Bryde's whales

##### 8.4.1 Specification of Implementation Simulation Trials

The Scientific Committee completed the Comprehensive Assessment of North Pacific Bryde's whales at its 1996 meeting and recommended development of *Implementation Simulation Trials*. At last year's meeting, the Committee considered information about stock identity and historical catches of North Pacific Bryde's whales. It identified seven tasks which, if completed during the intersessional period, would assist in the development of *Implementation Simulation Trials*. An intersessional e-mail correspondence group chaired by Punt was established to facilitate completion of these tasks.

##### 8.4.1.1 PROGRESS DURING INTERSESSIONAL PERIOD

Punt presented the report of the intersessional Correspondence Group on the Specification of *Implementation Simulation Trials* for the Western North Pacific Bryde's Whales (Appendix 10).

##### 8.4.1.2 DEVELOPMENT OF TRIALS

The sub-committee considered the new information regarding stock structure for North Pacific Bryde's whales.

Pastene presented document SC/50/RMP9. The nucleotide sequence of the mitochondrial DNA (mtDNA) control region was determined to examine the pattern of genetic variation within and between ocean basins in the ordinary form Bryde's whale. A total of 221 samples were examined, 150 from the western North Pacific, 24 from the western South Pacific (south Fijian), 24 from the eastern South Pacific (Peruvian) and 23 from the eastern Indian Ocean (south Javan). For comparison, sequences of seven local form animals from the Solomon Islands and Kochi were used.

A consensus 358 base pairs segment of the control region was used. A total of 50 unique sequences (haplotypes) was identified, 48 in the ordinary form and two in the local form. The overall nucleotide diversity in the ordinary form was 1.10%. The western North Pacific sample was divided into two longitudinal sectors, Gr-A (10°N-35°N; 130°E-155°E,  $n=79$ ) and Gr-B (10°N-40°N; 155°E-180°,  $n=71$ ). Homogeneity tests were conducted using the chi-squared test of independence, the haplotype (Hst) statistic and the sequence (Kst\*) statistic. No significant differences in mtDNA composition were found between the two longitudinal sectors in the western North Pacific. In contrast

significant genetic differences were found among the western North Pacific, western South Pacific, eastern South Pacific and eastern Indian Ocean regions supporting the view that independent genetic populations of the ordinary form Bryde's whales occur in these oceanic regions. The study provided no evidence to support the occurrence of more than one population of the ordinary form in the western North Pacific.

The range of sequence divergence among ordinary form individuals was 0.28-3.74%. These values were much lower than the divergence calculated between ordinary form and local form whales (6.71-16.96%). At the population level, genetic distances among ordinary form populations were well correlated with their geographical locations. A negative value for the net inter-population distance was found between the two sectors in the western North Pacific. Among Pacific Ocean populations, the range was 0.11-0.60% while that between the Pacific and Indian Ocean populations was 0.74-1.09%. Genetic distances between ordinary form populations and the animals from Kochi ranged from 7.41% to 9.25% while those between ordinary form populations and the animals from the Solomon Islands ranged from 14.34% to 15.58%.

In discussion, Baker noted that the second most common haplotype for Bryde's whales in the Western North Pacific was the most common haplotype found in the Western South Pacific and raised the possibility of movement from the North to the South Pacific. Polacheck noted that the results of one test for differences between the Gr-A and Gr-B sectors were very close to significant ( $P=0.0520$ ). Pastene responded that because the other two statistics were far from significant and the net genetic distance was very low (zero) he would disregard the near-significant results for the Hst statistic.

Perrin presented SC/50/RMP13 which summarised available information on distribution relative to water depth of Bryde's whales in the Philippines. The information was requested by the sub-committee last year because of the suggested possibility of using a depth contour (the 1000-m isobath was mentioned) as the offshore limit of distribution of the local form Bryde's whales in the western Pacific. There are only six confirmed records. Five were in inner waters of about 250-1,000m depth; these were presumably of the local form. One sighting (unidentified but presumably of the ordinary form) was made off the eastern coast of Mindanao, in water some 5km deep. There are no records between 1km and 5km. Catch positions within the Philippines EEZ for 96 whales taken during Philippine commercial whaling in 1983-85 are thought to have been falsified; there is some evidence that the whales were captured outside the EEZ to the east and northeast. The limited data indicate that the 1,000m isobath would not be suitable to delimit the offshore distribution of the local form because more information (from sightings cruises) is needed on distribution over intermediate depths (1,000-5,000m) in the region.

Hatanaka queried the interpretation that water depth limits the distribution of animals, and he suggested the alternative interpretation that animals are distributed mainly in the water between islands.

Since the accuracy of the positions of the commercial catch is suspect, the sub-committee agreed that these data could not be used to make inferences about stock structure or distribution.

SC/50/CAWS6 summarised the information on stock identity and distribution for Bryde's whales in the eastern South Pacific. The Bryde's whale has been difficult to study

in this region due to its similarity with the sei whale. Whaling stations continued to confuse both species until 1973 in Peru and 1981 in Chile. Bryde's whales are found in this region from the Equator to 37°S. Morphometric and genetic studies have separated Bryde's whales from Peru from animals from the western South and North Pacific and from animals from the Indian Ocean. No firm evidence exists to support additional stock structure in the eastern South Pacific. Most of the whaling operations and assessment of Bryde's whales in Peru were carried out in square H34 (0°-10°S; 80°W-90°W). Bryde's whales seem to occur in most months of the year in this square but especially during the austral summer. On the other hand, Bryde's whales in Chile seem to occur mainly in the central area (35°S-37°S) in spring-summer associated with a seasonal upwelling event. Relationships between Peruvian and Chilean Bryde's whales are unknown.

Best introduced a review of the distribution and population separation of Bryde's whales off southern Africa (SC/50/CAWS13), as requested last year. Available catch, sightings and biological data suggest that there are three stocks in the region. An inshore population (the South African Inshore Stock) occurs over the continental shelf of South Africa south of about 30°S, and appears to be non-migratory, although it may move up the west coast in winter. A pelagic population (the Southeast Atlantic Ocean Stock) occurs on the west coast of southern Africa, ranging from equatorial regions to about 34°S, and appears to migrate north in autumn and south in spring. A third (pelagic) population (the Southwest Indian Ocean Stock) occurs south of Madagascar northwards. Whales from the Southeast Atlantic Ocean Stock are larger than those from the other two stocks, and differ in scarring, baleen shape, diet, fecundity and seasonality of reproduction from those in the South African Inshore Stock. Circumstantial evidence suggests that the individual from Durban regarded as 'abnormal' may have been from the Southwest Indian Ocean Stock.

SC/50/RMP18 summarised the mark-recapture data for Western North Pacific Bryde's whales by 5° square using all available information (51 animals). The mark-recapture data indicate that: (a) the animals found in the whaling grounds in summer come from a wide latitudinal band from 5°S to 30°N where they are found in winter, and (b) intermingling of animals is observed from 5°S to 40°N and 130°E to 180°. The movements of 16 animals from or to the 5° squares including islands showed that all were connected to the offshore squares without islands. It was believed that this implies that the mark-recapture data do not support the existence of the local form around the islands.

It was noted that the interpretation of the information in SC/50/RMP18 needed to account for the historical distribution of effort. For example, the lack of recaptures in the southern longitudinal bands was not surprising owing to the lack of historical effort in this area. Polacheck commented that there did not appear to be much longitudinal movement of animals marked north of 20°N. He noted that only one animal had been recaptured more than 20° longitude away from where it was marked, although this may also be a consequence of the distribution of effort.

On the basis of inferences from where the local form has been shown to occur, historical commercial catches, sightings from research surveys and observations based on whalewatching as described in Appendix 11. Hatanaka argued that any Bryde's whales around the Hawaiian Islands, Midway Island, the Kiribati Group, the Caroline Islands, and the Northern Marianas should be considered to

be of the ordinary form. Perrin disagreed, noting that no surveys had been conducted near the Hawaiian Leeward Islands and that just because ordinary form Bryde's whales are found near an island does not imply that the local form cannot also occur there. Brownell commented that the situation for Midway Island and the Hawaiian Islands may be quite different from that for the islands in Indo-Pacific including the other island groups noted by Hatanaka.

Hatanaka presented SC/50/RMP11 which proposed three hypotheses regarding stock structure for western North Pacific Bryde's whales based on the results of 1996 Comprehensive Assessment, the outcomes of the intersessional e-mail correspondence group and other available information. These are: (1) only the ordinary form is found in stock division b (SC/50/RMP11, fig. 2), (2) animals of the local form are found around oceanic islands within this division, and (3) Southern Hemisphere Bryde's whales move into division b occasionally. SC/50/RMP11 suggested that the first of these hypotheses was supported by several sources of information, while no information negating it exists. The author believed that there is no information to support the second and third hypotheses. SC/50/RMP11 proposed three options for *Implementation Simulation Trials* based on these hypotheses (and their relative plausibility). These are: (1) a single stock scenario (the base case trial), (2) a 'two forms' scenario related to the second hypothesis, and (3) an intermediate scenario in which those island blocks from which mark-recapture and genetic samples were taken are allocated to the ordinary form.

In response to SC/50/RMP11, Perrin introduced Appendix 12 which raises several concerns with the assumption that the local form is not found around oceanic islands and that Southern Hemisphere Bryde's whales never migrate into the North Pacific. Kato noted that previous whaling operations around the Bonin Islands mainly occurred some 150-200 n.miles east of the islands. He further noted that although information from whalewatching can never be equivalent to a systematic survey, the whalewatching association of the Bonin Islands (OWA) has conducted seasonal surveys, which were organised more systematically than most whalewatching operations, in cooperation with the National Research Institute of Far Seas Fisheries. Whalewatching effort now extends to summer and autumn for sperm whales in addition to that in spring for humpback whales. However, no Bryde's whales had ever been seen around the coast of the Bonin Islands during surveys or whalewatching operations.

Appendix 13 summarises the existing information on sightings and sightings effort in the Western North Pacific and gives revised abundance estimates.

There was insufficient time to finalise discussion of the plausibility of the three hypotheses presented in SC/50/RMP11 or, therefore, to finalise agreement on how to model the structure of inshore and offshore Bryde's whales in and around major island groups.

The sub-committee then discussed plausible stock structure hypotheses for offshore Bryde's whales from a starting point of the stock area proposed by the Comprehensive Assessment and modified to exclude the area south of 10°N (Appendix 10, Adjunct 1).

Smith and Polacheck expressed a number of concerns based on the available information on catch distribution, and genetic and marking data. First, they queried why there was a gap in the catch distribution between 150° and 160°E. Second, they noted that there were large areas of ocean to the east of the proposed stock area in which there were no data. Third, having examined changes in catches over time in the

area of pelagic whaling, they pointed out that downward trends in catches had occurred at a small spatial scale (5° × 5° block) over short (up to 5 year) periods of time. This raised concerns about local depletion and the possible desirability of incorporating within-stock spatial structure in the trials.

Hatanaka responded to these three issues. First, he pointed out that the gap in catch distribution between 150° and 160°E was a result of catch regulations; the western boundary to pelagic whaling set by the Government of Japan at that time was 159°E and the eastern extent of coastal whaling was restricted by distance from the land station. Second, he noted that although there were no genetic or marking data in the area to the east of 170°E, there were large catches and analyses of biological data had indicated no difference between whales taken by coastal and pelagic whaling. Third, he believed that it was clear from all the available data that there was no within stock spatial structure latitudinally or longitudinally. Ohsumi added that the observed trends in catches identified by Smith and Polacheck were a result of operational factors such as changes in the range of pelagic whaling grounds and catch quotas.

After considerable discussion of the available data and the areas to which they pertained (summarised in Appendix 14), the sub-committee agreed that an appropriate boundary to the western stock of North Pacific Bryde's whales for the purposes of the RMP was as described in Appendix 14. This specifically excluded the area to the south of the Hawaiian Islands and east of 180° from which there were no data. The sub-committee further agreed that there should be two sub-areas in this stock area divided by 180° which would allow the testing of two alternative stock hypotheses:

- (1) there is only one stock of offshore Bryde's whales in the western stock area;
- (2) there are two offshore stocks present in the sub-area to the east (sub-area 2 in Appendix 14), the western stock and an eastern stock.

The sub-committee noted that it was planned for future sightings surveys to cover the entire western stock area as defined over a four year period.

Key questions concerning stock structure that remained include: how to model the interchange between inshore and offshore Bryde's whales in the areas around islands; whether or not operational factors can explain the observed trends in catches at small spatial scales, and if not whether within-stock spatial structure needed to be considered.

Concerning catch data, a key issue is resolution of the disagreement last year about how to treat Soviet catches in the trials (IWC, 1998b). This would need to be resolved after sub-areas had been fully defined.

To address these and other questions relating to the specification of the simulation trials, the intersessional Working Group from last year was re-established under Punt to work by e-mail and to report to next year's meeting. Hatanaka further proposed that to ensure good progress a workshop should be held before next year's meeting. This had been considered last year but no workshop had been held. The sub-committee agreed that the detailed work of specifying trials was best conducted at a separate meeting but recognised that the priority given to any such meeting would need to be decided by the Committee during plenary discussions.

#### 8.4.2 Sightings survey planning

Smith described the work of the North Pacific Sighting Survey Steering Group (NPSSSG), noting that nine tasks were identified (Appendix 8). The Steering Group was able

to address several of these, and additional material was presented to the sub-committee relative to the remaining tasks. One important task was the development of review comments on an initial draft of the sighting survey proposal (SC/50/RMP4). Although comments were generated within the group, there was insufficient time for members to discuss the points raised. These comments were available for further discussion during this meeting. Several documents were also available to the meeting that addressed the outstanding issues.

Miyashita presented SC/50/RMP5, the revised version of the four year sighting survey plan addressed by the NPSSSG. He noted that this document included text in italics for convenience in determining how the several recommendations of the NPSSSG were accommodated. He also outlined the key features proposed for the conduct of the survey, noting that there will be three vessels used and that the expected number of sightings was 30 per vessel. One of the vessels will have the capability of an independent observer platform, which will be used as a feasibility study to determine if  $g(0)$  is close to one or not.

In discussion, it was clarified that the data being collected are intended for use in both implementation simulation trials and implementation of the RMP for North Pacific Bryde's whales. It was suggested that the initial estimate of school size, at the time of sighting, be recorded as well as the actual estimate after closing in order to obtain data to correct school size estimates during passing mode. Although previous experience with this approach for Southern Hemisphere minke whales was noted to have been unsatisfactory, an attempt under these situations was suggested by some as being worthwhile. Covering an entire latitudinal band in one year was noted to be a good approach.

The sub-committee considered the requirements for participation of a member of the Scientific Committee in this survey, as decided by the Committee last year.

The sub-committee agreed that Scientific Committee representation on the planned survey should take the form of participation of a scientist with active experience of surveys of the type. The sub-committee noted that Shimada would participate in the survey.

The sub-committee **strongly recommends** that the surveys include waters within the EEZs of the Federated states of Micronesia, the Republic of the Marshall Islands and the USA in order to provide the necessary coverage. It **recommends** that the Commission requests the relevant authorities of the Federated States of Micronesia, the Republic of the Marshall Islands and the USA to grant permission for the vessels to operate in their EEZs.

## 9. LONGER TERM PRIORITIES AND DIRECTIONS

The sub-committee discussed priorities and directions under the following items: (a) issues relating to the RMP, (b) specifying, conditioning and conducting implementations and implementation reviews, and (c) reviewing and overseeing surveys plans and abundance estimates that are used in implementation trials and could be used in the implementation of the RMP.

- (a) Priorities related to the RMP include:
- (1) revise *CLA* program (see Item 3.2);
  - (2) tune the *CLA* to the accuracy needed (see Item 3.1).
- (b) Long-term priorities related to specifying implementation trials include:
- (1) finalise specification and conduct implementation trials for North Pacific minke whales;

- (2) specify and conduct implementation trials for North Pacific Bryde's whales;
- (3) review and, as appropriate, re-specify the currently agreed implementation for northeast Atlantic minke whales (see below).

- (c) There are long and short-term priorities related to reviewing and overseeing survey plans and abundance estimates.

Long-term high priority topics include:

- (1) review plans for surveys and, as appropriate, suggest ways to obtain better data so that complicated analytical methods are not needed;
- (2) review abundance estimates from surveys intended for use in the RMP, specifically estimates from surveys for North Pacific minke and Bryde's whales and northeast Atlantic minke whales;
- (3) create and maintain a sufficient number of replicates of simulated data sets that have a variety of characteristics, particularly those that are similar to sighting surveys that have recently or will be conducted in the near future, e.g. in addition to those already simulated, include characteristics such as animal movement, errors in measurement, and duplication identification (see below);
- (4) analyse the above simulated data sets using estimation methods that might be used in the above mentioned surveys;
- (5) test existing abundance estimators for situations where ship avoidance is manifested by animals changing their surfacing patterns in response to survey vessels (e.g. Cooke, 1992).

Short-term high priority topics include:

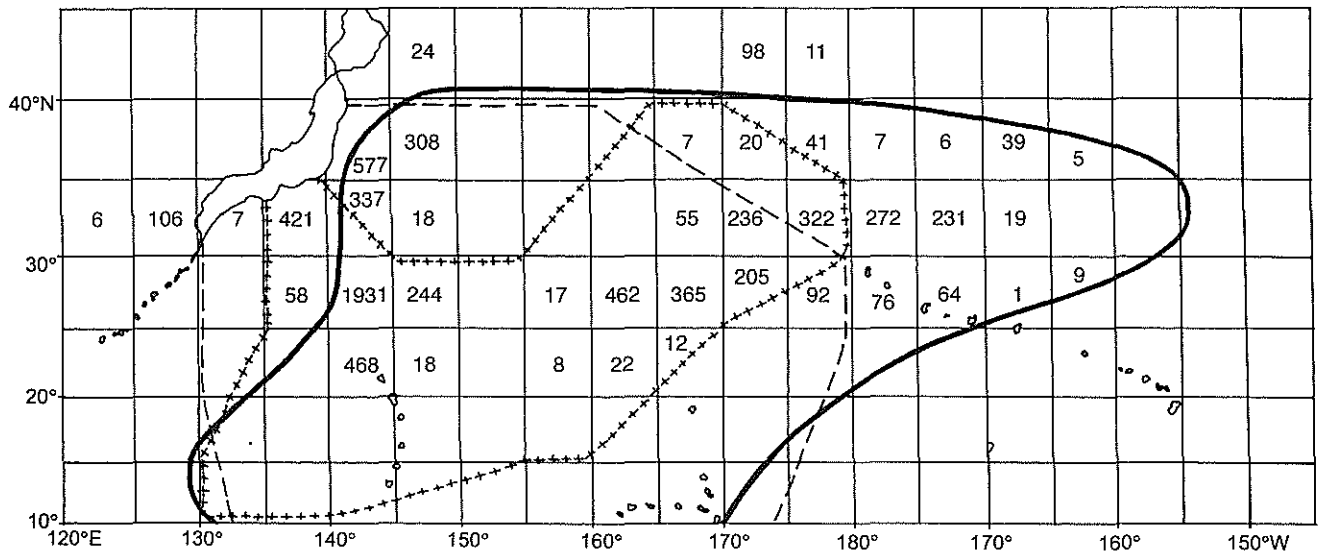
- (1) review of Clarke and Borcher's simulation study to test the properties of the GAM-based estimators of abundance, in general and as applied to JARPA data (SC/50/CAWS33) - this started during the meeting and will continue intersessionally;
- (2) test abundance estimation procedures that estimate abundance and trends from multi-year surveys (applicable to IDCR, Northeast Atlantic minke whales and North Pacific Bryde's and minke whale surveys);
- (3) test procedures that identify duplicates and correct for duplication identification errors (applicable to Northeast Atlantic minke whales and North Pacific minke whale surveys).

For North Atlantic minke whales, catches have been taken by Norway under objection and substantial new information is available on abundance estimates. In addition, the methods used for specifying implementation trials have improved significantly since 1992. The sub-committee noted, therefore, that it may be appropriate to consider an *Implementation Review* for minke whales in this region in the near future.

The project to create and maintain simulated data sets is important not only to the work of this sub-committee but also to all other sub-committees. The sub-committee agreed, therefore, that this project should continue for at least the next few years. There are two options available to accomplish this. The first is to award a contract to support a part-time position in CSIRO; the second is to spread out the work to a number of investigators but maintain the central data base of simulation files on a ftp site. These are not mutually exclusive. However, it was noted that a substantial sum would be required to accomplish this, significantly more than the few thousand pounds requested last year.

Appendix 14

**SUMMARY OF INFORMATION FOR DETERMINING STOCK BOUNDARIES FOR IMPLEMENTATION SIMULATION TRIALS FOR WESTERN NORTH PACIFIC BRYDE'S WHALES AND AGREED BOUNDARIES FOR THE WESTERN STOCK AND TWO SUB-AREAS**



- Approximate limit to sightings distribution
- - - Approximate limit to marking data
- ..... Approximate limit to genetic data
- 308 Numbers are catches by Japan

