# Consideration on pragmatic approach for improving the seabird bycatch management based on the findings from the CCSBT collaborative risk assessment results.

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**Summary:**

The first collaborative seabird bycatch risk assessment for CCSBT longline fisheries was conducted through an intersessional technical working group process. While enhancing collaboration and common understanding of the SEFRA methodology, the assessment results contained caveats regarding the reliability of some model assumptions and data inputs. Key concerns include the relative reliability of tracking data versus biological parameter estimates, the assumption of common catchability within species groups, and potential overestimation of catchability for some fleets lacking data. Japan agrees with the risk assessment conclusions for wandering and royal albatrosses but has reservations for smaller species due to data issues. Proposals are made for a target reference point for short-term bycatch management, designating several albatrosses as priority species, defining high-risk areas for enhanced monitoring, continuing the collaborative process under clear terms of reference, archiving all model components, and modifying reporting requirements to the lowest taxonomic level possible for observed bycatch.

**Introduction:**

Following the work plan agreed at the ERSWG14, Japan, together with New Zealand, worked to conduct and deliver the results of the first CCSBT collaborative analysis to the ERSWG15. The Technical Working Group was established with participation of Australia, Japan, New Zealand, South Africa and Taiwan in 2023, and through two hybrid meetings and additional series of on-line discussion, completed its exercised with the delivery of the agreed Report (CCSBT-ERS/2406/05).

While the process was highly useful and valuable of enhancing collaboration among institutions and colleagues with various expertise, e.g. birds conservation, fishery management, and mathematical modelling, and for establishing a common understanding on the SEFRA methodologies and required data and their importance, the final assessment results of longline bycatch risk to selected seabird population sustainability contained a strong caveat. On the other hand, the Technical Group agreed at the beginning to focus on technical aspects of development of the common assessment methodology and delivery of the results and to leave interpretation of results, in particular in terms of its implication to seabird bycatch management consideration, to the discussion at the ERSWG.

This document indicated the Japan's view on the obtained results, the interpretation in the context of seabird bycatch management, and proposals for the next step. In addition, the document described observations noted by Japan throughout the process for registering as the lessons learnt to guide the similar operation in the future.

**Observations on the process:**

The model utilized in the collaborative assessment was the model that New Zealand developed for its domestic risk assessment purpose only with minor modifications mainly in treatment of codes and parameters. While the process literally expanded to cover the whole intersessional period between ERSWG14 and ERSWG15, i.e. whole two years, the actual time that could be used for reviewing the model structure and its outputs was about a half year, the period after the completion of the New Zealand domestic project with the delivery of its final report in October 2023 (Edwards et al, 2023). Before that time, direct communication on relevant model developers was almost

completely blocked due to administrative reasons relating with the New Zealand contracts and only generic technical explanations were provided.

The original work plan assumed that at least preliminary assessment results using the new model using New Zealand and Japan data could be available and shared with interested participants, which allow adequate time to familiarize with the model structure and data requirements before discussing the model and data definition at the Data Preparatory meeting. The 1st Technical Group meeting was organized to cover the introduction of initial results and discussion to be held at the originally planned Data Preparatory meeting, though without having concrete results from initial assessment, the meeting leant the concept and structure of the new model that New Zealand developed and agreed a range of basic assumptions and catch and effort data requirements. At that time, Japan requested strongly to disconnect the subroutine updating biological parameters.

Git-hub shared area was set up for sharing the codes for the collaborative risk assessment. However, the most of components conducting actual parameter optimization and predictions were hidden in a form of operable package of subroutines. Input data set was not shared either. Therefore, the thing that the CPC other New Zealand could do was to predict catchability using its own input data. This would be much better than nothing shared but limit the capacity of non-New Zealand participants to evaluate details in model structure, source codes and behavior.

The program packages provided were not necessarily easy to use. Japan encountered the trouble to run the original model package which was resolved during the visit to New Zealand for the 1st Technical Group meeting in June 2023, thanks to the help of Dragonfly who conducted the 2019 Southern Hemisphere assessment (Abraham et al., 2019 [CCSBT-ERS/1905/17]). Taiwan became familiarized with the SEFRA and its package beforehand through the collaborative SEFRA analysis with Japan. Although the revised data preparation package should be much easier to install and utilize, though a slow progress in data preparation with additional CPCs may partially suggest remaining technical difficulties in installing and utilizing the package.

The first outputs of the model using the observed seabird catch and effort data of Japan, New Zealand and Taiwan were finally tabled to the 2nd meeting of the Technical Group in February 2024. Due to the constraints in time available and difficult in accessing to model details, the Technical Group took a pragmatic approach focusing on examination of model outputs behaviors and seeking for way to mitigate the issues with minor modifications. It was of deep regret that the large updates of biological parameters such as number of pair of adults and probability of breeding by the model was left behind without noticing until the later on-line discussion.

Through the 2nd meeting of the Technical Group and follow-up on-line communications, the correspondences against the request of additional model outputs, e.g. tabular outputs of prediction not in Log10 plots, were not as smooth as desired. Often the subcontractor in the modeling team assisted the whole process by providing the requested information promptly and Japan would like to express special appreciation to him.

The whole process of this collaborative risk assessment was conducted based on voluntary contribution of all CPCs participated. In particular, New Zealand secured the fund to support the cost of model developers and hosted two meetings and additional bilateral preparatory consultations. While appreciating greatly the commitment and contribution made by New Zealand, Japan also felt frustration sometimes on its almost unilateral control on the modeling team and its products, noting potential administrative constraints regarding the national governmental project. Accepting this as inevitable temporal form when initiating something new, Japan considered it preferable to secure an independent modeling team directly under the Secretariat for securing full transparency and equitability among all participants, in the case of next iteration of the similar exercise.

**Overall reliability of model outputs:**

The model utilized in the collaborative risk assessment contained many assumptions. This section speculated potential impacts of key assumptions, in contrast with those used in the 2019 assessment in some cases, to evaluate overall reliability of final model outputs.

Relative reliability between biological parameters and bird spatial distribution data:

The Technical Group final report pointed out many drawbacks and limitation of bird spatial distribution solely relying on the tracking data. However, the model assumed no errors in bird spatial distribution, and in the case of mismatch, forced to modify the available bird population by updating biological parameters such as number of breeding pairs and probability of breeding even to unrealistic level.

On the other hand, the biological parameters were the results of accumulated efforts including visual observations and counting that was considered much more reliable than probably any information available on fish abundance and distribution that are totally invisible, even uncertainty and biased coverage of colonies frequently pointed. Describing in the parameter distribution format did not give any rationale to allow free update. Japan strongly against to update biological parameter to force a model fit into the spatial distribution data obtained from solely tracking data.

Updating biological parameters also caused the change in estimates of population growth. In order to avoid changing the goal shift according to model output, the original risk estimates were expressed against the productivity calculated with the prior biological parameters, which caused in consistency between population utilized in catchability estimates and that for relative mortality calculation. This does not make sense.

The future iteration should explore various possibility to resolve the issue, including but not limited to 1) modify bird spatial distribution maps combining other source data including general distribution range and location of colonies, 2) allowing update of spatial distribution data, including potential update with occurrence of observed catch, and 3) limit analysis only to those species with adequate confidence in spatial distribution information based on tracking data.

It was also noted that substantial amount of observed catch and effort data were removed from the model, probably due to the occurrences outside the range defined by seabird spatial distribution data. The Technical Group concluded not to include giant petrels in the model based on large gap in tracking data availability within a known distribution and occurrence of observed catch. This mismatch pushed the corresponding catchability estimates notably upward. Similar thing could happen to those species whose observed catch and effort data substantially removed, though there was no way to evaluate its potential impacts with currently accessible model outputs.

Common catchability within species group:

The model assumed the common species-specific vulnerability within species group, while the 2019 assessment estimated species-specific vulnerability per species. This assumption may work again to update the biological parameters, if some species respond differently from most of other species in the species group. The impacts of this assumption could not evaluate at this moment.

Although the need to limit the number of parameters for model stability and effectiveness, Japan maintains its concern on utilizing the species group.

Proxy in fleet-specific catchability:

The model applied the proxy for those fleet that did not have any observed catch and effort information, in the end based on either coastal fleet or high-sea operation fleet. The 2019 assessment indicated much lower catchability for Australia and South Africa fleets than that of New Zealand, used as a proxy in 2024 assessment, while the 2019 assessment applied Japan's catchability estimate to Taiwan fleet that showed much lower catchability than Japan in 2024 assessment. Both cases the approximated components were considered to over-estimated in terms of bycatch mortality. Although this was inevitable to predict the bycatch mortality at whole CCSBT, this emphasizes the importance for all CPCs to provide their observed catch and effort information

for accurately reflecting the real situation.

As a conclusion, Japan considered that the fleet-specific catchability would be reasonably reliable considering multiple runs with different assumptions, model setting and inputs data delivering consistent pattern, though the reliability on its absolute estimated value still required further investigation.

Japan agreed the general conclusion on general reliability of risk assessment of wandering and royal albatrosses and identification of high-risk species, but considered it not appropriate to discuss any on small albatrosses and petrels due to the issues relating with bird spatial distribution data and updated biological parameters.

**Responses raised in the Multi-Year Seabird Strategy action:**

Management target [1A]:

Multi-year Seabird Strategy required to agree on the SBT bycatch target at the ERSWG15. SEFRA seems to be able to provide reliable estimates on relative catchability by fleet, in either comparison with other fleet and/or with different periods, though their reliability in the absolute term requires further investigation. On the other hand, the fleet-specific catchability can provide a direct measurement on overall bycatch mitigation performance. Consequently, it is proposed to include a "continued reduction of fleet-specific catchability" as monitoring short-term target. Inclusion of SEFRA-based target would also be important for ensuring the regular assessment to continue in the future.

Considering that the longline operations under the existing mitigation requirements historically achieved the overall seabird bycatch lower than 0.05 birds/'000hooks in joint-venture operation within the New Zealand and South Africa EEZs, this could consider as a long-term target for the overall catch rate. Those operating areas are known with heavy birds occurrence and the target is considered as achievable with careful implementation of agreed mitigation measures together with good monitoring and surveillance. The data used in the 2019 assessment indicated that both Australian and South African domestic fleets also satisfied this criterion. It is important to understand that overall bycatch number per 1000 hooks would be subject to local bird concentration and increase when the bird population increase.

Priority species [1D]:

The 2019 and 2004 assessment commonly indicated the high risks for Tristan, Gibson's, Amsterdam and Sooty albatrosses. Considering the identification difficulties in some of wondering albatross group, it is considered that all wondering albatross group and Sooth albatross would be appropriate as initial candidates of priority species. Large increase of catchability for Sooty albatross by Japan's fleet needs further investigation.

Progress since 2019 assessment [1E]:

The fleet-specific catchability obtained from the assessment indicated that Taiwan, and New Zealand with lesser extent, improve their seabird bycatch mitigation performance since the period covered by the 2019 assessment, but that Japan worsen the overall mitigation performance. The increase of Japan's fleet catchability could be driven partially by large increase of catchability of sooth albatrosses, but even without that, the assessment results showed no improvement at most.

High risk area [1E]:

Since the immediate reduction of bycatch mortality of priority species should be the first priority, the high risk should also be defined based on the priority species distribution. Two criteria would be needed 1) predicted occurrence of priority species themselves, and 2) proportion of priority species expected occur in total bird assemblage. Potential resolution for high-risk area could be 5 x 10 quarterly and it is important to keep the number of high-risk areas within relatively small manageable size, e.g. up to 5.

Even though this would be the areas with higher risk to capture the seabird species that longline bycatch could cause substantial impacts on their population sustainability, at this moment we do not have any definitive evidence to the level of proposing any modification of SBT fishery operations. Therefore, as the first step, Japan suggest placing an enhanced monitoring requirement, e.g. obligatory EMS in combination with seabird sampling requirement, for any vessels who would intend to operate within the high-risk areas. Ideally, the seabird related information collected within the high-risk areas should be shared to utilize in the future iteration of assessment.

**Recommendations to be considered at the ERSWG15:**

1. Archiving the model source codes, inputs and outputs:

It was understood that the New Zealand project that hired the modeling team would complete with the delivery of the results to the ERSWG. In order to ensure the continuity and comparability with future iteration of assessments, it would be essentially important to archive all source codes (not in a form of operable package) and inputs data used together under the CCSBT in the areas accessible with relevant experts.

At the same time, Japan contributed its observed seabird catch and effort data to the CCSBT collaborative assessment exercise and would like to ask not to utilize in any analyses without an agreement from Japan, until the time the proper archive of source codes to be established.

2. Continuation of collaborative assessment.

The CPC's general understandings on the model and commitment toward active participations was accelerated toward the end of intersessional period. Data preparation of two CPCs was suspended in a middle of development and several substantial modeling issues were left unresolved. This risk assessment was expected to expand to include all relevant surface longline fleets operating in the southern hemisphere under FAO-GEF ABNJ-II framework. It would be desirable for the CCSBT to table the well-established base-model together with the best available inputs data as the CCSBT.

Therefore, Japan would like to request a continuation of the collaborative risk assessment Technical Group activity for one more intersessional period, however with clear agreed Terms of Reference.

When and where possible, Japan prefers to hire independent model developer(s) as the case of development of operational model in management procedure development in the past. Otherwise, it should allow the CPC scientists to conduct assessment on the shared inputs data, including a catch and effort data, common biological and distributional data sets.

3. Modification of reporting obligation of observed seabird catch and effort data.

The collaborative exercise revealed the importance to estimate the fleet-specific catchability based on its own data. At the same time, it noted the difficulty and existing confusion of seabird identification even for the CPCs who vigorously applied genetic analyses to mitigate the species identification problems. Multi-year Seabird Strategy already agreed to incorporate species specific consideration. Accordingly, Japan proposes to modify the current reporting obligation of observed seabird catch and effort from bird as a whole to "by the lowest taxonomic level available".

Also, it suggests to call for historical information as much as possible.

**References:**

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