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**Reference points and harvest control rules for Pacific bluefin tuna:
the IATTC staff perspective**

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IATTC staff

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Background

The Inter-American Tropical Tuna Commission (IATTC) has enacted appropriate conservation measures to rebuild Pacific Bluefin tuna (PBF). IATTC resolution C-16-08 states “...shall implement a provisional rebuilding plan in part by adopting an initial (first) rebuilding target of $SSB_{med,1952-2014}$ (the median point estimate for 1952-2014) to be achieved by 2024 with at least 60% probability.” The resolution was implemented by adopting appropriate catch quotas. Simulation analysis by the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) determined that even under low recruitment scenarios, the management adopted by the IATTC, in conjunction with that adopted by the Western and Central Pacific Fisheries Commission (WCPFC), will achieve the rebuilding target.

The implementation of the Antigua Convention and the commitment to the precautionary approach implies the formal use of reference points and decision rules by the Inter-American Tropical Tuna Commission (IATTC) for management of tuna and associated species in the eastern Pacific Ocean (EPO).

Second rebuilding target

There is a desire to further rebuild the PBF stock and the development of a second rebuilding target has been requested. The details of the rebuilding target need to be defined including the rebuilding target level, the time to reach the rebuilding target, and the probability that the rebuilding target is reached. As noted in resolution C-16-03 these decisions should be made in coordination with WCPFC. Resolution C-16-08 states that the second rebuilding target should be “achieved by 2030”. It also states that the rebuilding target should be developed “No later than the IATTC meeting in 2018...”

Reference points

No reference points have been developed for PBF. Resolution C-16-08 states that reference points should be developed “No later than the IATTC meeting in 2018...” Appropriate target reference points for stocks managed by the IATTC should be consistent with the Antigua Convention that states “... maintain or restore the populations of harvested species at levels of abundance which can produce the maximum sustainable yield...”. The IATTC has adopted target and limit reference points in combination with a harvest control rule (HCR) for tropical tunas in the EPO. The target reference points are based on MSY . Resolution C-16-02 states that “ S_{MSY} and F_{MSY} were adopted by the 87th meeting of the IATTC as interim target reference points for tropical tunas in the EPO.”

Little guidance on limit reference points is given in the Antigua Convention except that the IATTC should "... apply the precautionary approach in accordance with the provisions of Article IV of this Convention". The adopted limit reference points for tropical tunas are based on reduction in recruitment. Resolution C-16-02 states that "... $F_{0.5R0}$ and $S_{0.5R0}$ assuming steepness $h = 0.75$ were adopted by the 87th meeting of the IATTC as interim limit reference points for tropical tunas in the EPO." The limit reference points are described in detail in Maunder and Deriso (2014).

Maunder and Deriso (2013) give prudent advice on constructing reference points "LRPs are often associated with management action, perhaps as part of a harvest control rule, and in this context are often referred to as trigger reference points. Care needs to be taken when using LRPs as trigger points. "Use of reference points should recognize that risk will not abruptly change at a reference point. This is especially important when identifying trigger reference points and the resulting management response, and when considering the consequences of uncertainty in the estimation of where a fishery currently is in relation to its reference points." (Sainsbury 2008). To paraphrase Punt and Smith (2001): if a limit reference point is triggered, this does not mean that the species has a high risk of biological extinction. An appropriate response to a limit reference point being triggered would be a reduction in fishing mortality rather than the closure of the whole fishery. If appropriately set, the probability of triggering a limit reference point should be low, but clearly not zero. There is also a difference between exceeding a limit and knowing you exceeded it, or a probability that you will versus the probability that you have." More information about reference points is contained in Valero et al. (2017).

The USA proposal

At the 92nd meeting of the IATTC the USA delegation provided a draft proposal on PBF management (<https://www.iattc.org/Meetings/Meetings2017/JUL/PDFs/Proposals/IATTC-92-PROP-D-1-USA-Pacific-bluefin-tuna.pdf>). Paragraph 3 the proposal states "the second rebuilding target shall be 20%SSBcurrent(F=0) by 2030 with a probability of at least 60 percent" The year 2030 is consistent with IATTC resolution C-16-08. The 60 percent probability is consistent with the current rebuilding target. The proposal commented that "20 percent of the unfished spawning stock biomass (SSB) has been recommended as a reasonable proxy for BMSY for stocks with at least average resilience" suggesting that the second rebuilding target is rebuilding to a target reference point based on MSY. 20%SSBcurrent(F=0) is substantially greater than SSBmed,1952-2014 and it is therefore consistent with the first rebuilding target. Simulation analysis predict that the target will be reached with current management if recruitment is average, but not under the low recruitment regime (Akita et al. 2017).

Paragraph 5 of the USA proposal states that "The limit reference point for the stock size (B-limit) shall be 15%SSBcurrent,F=0." No rationale was given for the limit reference point and it is not consistent with the limit reference points and HCR currently adopted for tropical tunas in the EPO. Limit reference points should be developed in consideration of the actions taken under the HCR with respect to the limit reference points

Emergency recruitment rule

To ensure that the new rebuilding target is reached even if the recruitment is low, an emergency rule has been requested to initiate additional management when recruitment is low. One approach is every year to take the most updated estimates of recruitment and re-evaluate the projections of the rebuilding target and adjust management so that the target will be reached. The best approach would be to conduct a stock assessment each year to provide the best scientific information on recruitment. However, this may not be practical due to staff time and the availability of data. In addition, the assessments are usually conducted with data that does not include the most recent years and therefore does not provide information on the most recent recruitments. However, a good correlation has been found between the recruitment estimated from the stock assessment and the index of recruitment derived from the Japanese troll fishery (Yamada et al. 2006; Fukuda, and Sakai 2017). Therefore, this information, while accounting for its uncertainty and appropriately scaling to absolute levels of recruitment, could be used in the projection analysis in years when a stock assessment is not conducted.

Discussion

The IATTC has resolved to develop a second rebuilding target in 2018. The target must be reached in 2030. The proposal by the United States of a second rebuilding target of “20%SSBcurrent(F=0) by 2030 with a probability of at least 60 percent” is generally consistent with the IATTC resolutions and the previous rebuilding target, and is predicted to be reached under current management and average recruitment. However, the management needs to be modified to ensure that rebuilding occurs under low recruitment, if so desired, and this could be achieved using an emergency low recruitment rule.

References

- Akita, T., Fukuda, H., and Nakatsuka, S. 2017. Preliminary analysis of additional future projections for Pacific bluefin tuna requested by WCPFC NC and IATTC. SC/17/PBFWG-1/06. http://isc.fra.go.jp/pdf/PBF/ISC17_PBF_1/ISC_17_PBFWG_06_Akita.pdf
- Fukuda, Y., Sakai, O. 2017. Updated standardized CPUE for 0-age Pacific bluefin tuna caught by Japanese troll fisheries: Updated up to 2015 fishing year. ISC/17/PBFWG-1/03. http://isc.fra.go.jp/pdf/PBF/ISC17_PBF_1/ISC_17_PBFWG_03_Fukuda.pdf
- Maunder, M.N. and Deriso, R.B. 2014. Proposal for biomass and fishing mortality limit reference points based on reduction in recruitment. IATTC Stock Assessment Report 15, 193–206. <https://www.iattc.org/PDFFiles2/StockAssessmentReports/SAR15/11-Proposal-for-limit-reference-points.pdf>
- Maunder, M.N., and Deriso, R.B. 2013. Reference points and harvest rate control rules. IATTC SAC-04-09. <http://www.iattc.org/Meetings/Meetings2013/MaySAC/Pdfs/SAC-04-09-Reference-points-and-harvest-control-rules.pdf>
- Resolution C-16-03. <https://www.iattc.org/PDFFiles2/Resolutions/C-16-03-Pacific-bluefin-tuna.pdf>

Resolution C-16-08. <https://www.iattc.org/PDFFiles2/Resolutions/C-16-08-Conservation-and-management-of-Pacific-bluefin-tuna.pdf>

Sainsbury, K. 2008. Best Practice Reference Points for Australian Fisheries. A Report to Australian Fisheries Management Authority and the Department of the Environment and Heritage. R2001/0999. 159p.

Valero, J.L., Maunder, M.N., Aires-da-Silva, A.M., Minte-Vera, C., Zhu, J-F. 2017. Limit reference points in marine resource management and their application for tuna and billfish stocks. IATTC DOCUMENT SAC-08-05e(ii). [https://www.iattc.org/Meetings/Meetings2017/SAC08/PDFs/SAC-08-05e\(ii\)-Review-of-limit-reference-points-DRAFT.pdf](https://www.iattc.org/Meetings/Meetings2017/SAC08/PDFs/SAC-08-05e(ii)-Review-of-limit-reference-points-DRAFT.pdf)

Yamada, H., Takagi, N., Nishimura, D. 2006. Recruitment abundance index of Pacific bluefin tuna using fisheries data on juveniles. Fisheries Science 72: 333–341.