



IUCN Red List Tuna and Billfish Assessments: Avoidance of the “Ski Jump” Effect

The text below is an extract from the supporting online material (SOM) for Collette *et al.* 2011.

It is considered optimal by many fishery biologists for a virgin population to be fished down to MSY or about 40 to 50% of its original adult biomass. It is acknowledged that these targets can conflict with other criteria for population assessment [e.g., IUCN, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)]. Others have also suggested that the biological reference points related to maximum sustainable yield, B_{msy} and F_{msy} , should be treated as limit reference points rather than target reference points for species under Regional Fisheries Management Organization management. Regardless, direct comparisons of stock assessments with Red List assessments often show a similar degree of accuracy in reflecting predictability of adverse effects of fishing practices. However, if population declines are measured relatively soon after a fishery begins, the resulting ski jump in population trend could lead to an evaluation of Critically Endangered or another threatened category under Red List criteria—when in fact the population may be under a careful management strategy that may drive down the population to perhaps 50% of virgin biomass (B_{msy}), and therefore, the population might not be under an immediate threat of collapse. If the same population has been well managed at maximum sustainable yield and has remained relatively stable over time (e.g., three generation lengths) although at much lower levels than the virgin population, it will be assessed as Least Concern.

However, a population that has been heavily overfished for a long time (longer than three generation lengths) and is severely depleted or well below the biomass that would provide B_{msy} would also be assessed as Least Concern because the rate of decline would be too low to qualify for a threatened category under criterion A. The exception would be if the resulting population was so small that it could qualify for a threatened category under a different criterion, such as criterion B, which has thresholds based on a small range size (e.g., <20,000 km²), or criterion C, which has thresholds based on a small population size (e.g., <10,000 mature individuals). In sum, it is important to note that all scombrids and billfishes were assessed several decades after the start of their respective fisheries (generally in the 1950–1970s), and therefore, the ski jump effect of overestimating species risk was not an issue. Rather a discussion on how to more appropriately assess species whose populations have been severely depleted for longer

than three generation lengths has been recommended to the Standards and Petitions Committee of the *IUCN Red List of Threatened Species*.

Full Reference: Collette, B.B., Carpenter, K.E., Polidoro, B.A., Juan-Jorda, M.J., Boustany, A., Die, D.J., Elfes, C., Fox, W., Graves, J., Harrison, L., McManus, R., Minte-Vera, C.V., Nelson, R., Restrepo, V., Schratwieser, J., Sun, C.L., Amorim, A., Brick Peres, M., Canales, C., Cardenas, G., Chang, S.K., Chiang, W.C., de Oliveira Leite, Jr., N., Harwell, H., Lessa, R., Fredou, F.L., Oxenford, H.A., Serra, R., Shao, K.T., Sumalia, R., Wang, S.P., Watson, R., Yáñez, E. 2011. High Value and Long Life—Double Jeopardy for Tunas and Billfishes. *Science* 333: 291-192.

See the *Science* web site for the full SOM
(<http://www.sciencemag.org/content/333/6040/291/suppl/DC1>)