International Game Fish Association's Recommendations to the 29th Session of the Indian Ocean Tuna Commission:

The International Game Fish Association (IGFA) is a non-profit organization that represents recreational anglers throughout the world. The IGFA was established in 1939, has active members in over 100 countries, and provides rules for ethical angling practices. Many of the IGFA's members target the highly migratory species managed by the Indian Ocean Tuna Commission (IOTC), especially marlin, sailfish and spearfish (i.e., billfish) which are primarily caught and released, as well as other tuna and mackerel species. The social and economic contributions of these IGFA members, as well as the larger recreational fishing community who practice catch and release, represent the optimum utilization of recreationally targeted species.

Billfishes are apex predators that support economically vibrant catch and release fisheries in many regions. Of the four billfish stocks (black marlin, blue marlin, striped marlin, and sailfish) managed by the IOTC, two (blue marlin and striped marlin) are both overfished and subject to overfishing while the black marlin stock is subject to overfishing. The sailfish stock appears to be not overfished nor subject to overfishing.

The IGFA continues to have great concern about how highly migratory species are being managed on a global level. The lack of data and accurate reporting on billfish catch leading to highly uncertain stock estimates is of particular concern. Additionally, the lack of management action addressing the severe depletion of some billfish stocks under the IOTC's jurisdiction is concerning for future stock health especially in regard to striped and blue marlin. As an organization that is committed to the conservation of game fishes, the IGFA has deployed over 650 pop-up satellite archival tags on billfish around the world in the last fourteen years, some of which have been in waters under this organization's purview. Discussions have taken place to provide IOTC scientists with both the tagging data as well as billfish size data from IGFA's world record database and previous research projects. The information gained from both the extensive satellite tagging efforts and IGFA World Record database will continue to be available to your scientific committee at no cost.

On October 8-10, 2024, the IGFA and Wild Oceans held the 7th International Billfish Symposium in San Diego, California. The event garnered over 100 participants from nine countries, including several from the Indian Ocean region, demonstrating the devotion that our community of anglers, scientists, and managers have for these incredible species. We look forward to making the research that was presented available to the greater community by facilitating the publication of articles in a themed issue of *ICES Journal of Marine Science*, and we strongly urge the IOTC and Scientific Committee to consider this critical research in future management and regulatory decisions.

The following are IGFA's recommendations to the 29th Session of the Indian Ocean Tuna Commission:

Billfish

Striped Marlin

Based on the updated stock assessment (2024) for striped marlin, the stock is overfished and subject to overfishing, confirming the results of prior assessments since 2012. We are very concerned for the continuously depleted condition of the striped marlin stock in the Indian Ocean and implore the IOTC to substantially reduce catches if there is any hope for rebuilding this stock. The 2023 catch was higher than the average for 2019-2023, further increasing the probability that the current status of stock health will not

improve regardless of the fact that the 2023 catch level was below MSY. Although catch in 2023 was below MSY, it was still above the suggested catch level specified in Resolution 18/05 which is concerning. However, the limit set by Resolution 18/05 is not based on estimates of the most recent stock assessment and should be revised to incorporate limits that reflect the 2024 assessment and projections. The IGFA's recommendation is to adopt a precautionary approach to striped marlin management and significantly decrease the level of allowed catch. We also recommend implementing interim target and limit reference points as well as a decision framework for striped marlin similar to what was done for swordfish in Resolution 15/10. Although this species is mainly caught as bycatch in the gillnet and longline fisheries, the potential for a decrease in fishing mortality is possible through a movement toward releasing live fish in the longline fishery. The use of circle hooks has been proven to improve release mortality and implementation of non-offset circle hooks in the surface longline fisheries along with mandatory release of live striped marlin has the potential to significantly decrease reported and cryptic fishing mortality. Given the difficulty in decreasing the TAC to sustainable levels after decades of depletion and the bycatch nature of the fisheries, the adoption of circle hooks and longline release regulations for striped marlin could help offset sustained catch levels well above those necessary to recover the stock.

Black Marlin

The 2024 stock assessment for black marlin indicates that the stock is subject to overfishing but not currently overfished. The addition of improved historical catch data and model diagnostics resulted in a more reliable assessment of the black marlin stock compared to the 2021 assessment, however, we are extremely concerned with the continued overages of the catch limit (9,932 t) as stipulated in Resolution 18/05, including a reported catch of 27,872 t in 2023 and an average catch of 20,060 from 2019-2023. Because the CPUE indicators for the stock assessment come from industrial offshore fleets, and the majority of black marlin catches are from developing coastal countries from Iran, India, and Sri Lanka, we strongly suggest the IOTC begin developing CPUE indices for gillnet and coastal longline fleets to better inform stock assessment models. We also recommend substantial reductions and enforcement in total allowable catch (TAC) for black marlin to the level stipulated by Resolution 18/05 (9,932 t). Reductions in fishing mortality in longline fisheries can be decreased in longline fisheries through the implementation of mandatory circle hook use and live release.

Blue Marlin

The most recent (2022) stock assessment for blue marlin indicates the stock remains overfished and subjected to overfishing. Although average catch levels from 2019-2023 (7,049 t) remain below the MSY suggested level (8,740 t), a further decrease in catch is required to meet IOTC's objectives of recovering the stock. Based on the JABBA Kobe II Strategy Matrix and 2020 catch level of 7,126 t, a TAC of 5,700 t would result in a 79% chance of achieving the green quadrant by 2030. Based on this probability and the lack of certainty in catch reporting, the IGFA recommends implementing the precautionary approach by decreasing the TAC to a maximum of 5,700 t to attempt to meet Commission objectives. Similar to striped marlin, blue marlin fishing mortality could be decreased in longline fisheries through implementation of non-offset circle hooks and release of live fish. This could be especially important given F_{2020}/F_{MSY} remains above 1 despite the recent declining trend since 2015.

Sailfish

Although the most recent (2022) stock assessment for sailfish concludes that fishing mortality and biomass are near healthy levels (not overfished nor subject to overfishing), the IGFA believes this outcome should be further examined as it may represent an overly optimistic view of the current stock status and mortality level. The high catches reported from 2019 to 2023 (average of 32,386 t) are very concerning and the IGFA recommends significant efforts be made to address the uncertainty of this assessment result, especially regarding lack of information from coastal gillnet and longline fisheries. With catch limits from Resolution 18/05 exceeded since 2020 and catch levels exceeding the MSY

estimate (25,905) since 2013, additional management measures must be taken to limit fishing mortality for sailfish in the Indian Ocean.

Tunas and Mackerels

Yellowfin Tuna

Given the revisions made to the 2021 stock assessment for yellowfin tuna, the updated assessment (2024) reported that the yellowfin tuna stock is not overfished and not subject to overfishing. The revisions addressed many of the recommendations from the independent review of the stock assessment carried out in 2023 and we commend the IOTC for pursuing improvements for both the stock assessment and stock status of yellowfin tuna. The new abundance index (derived from the joint CPUE estimates for longline fleets) suggested an increase in abundance for yellowfin in the last three years (2021-2023), including considerable increases in spawning biomass after 2021 following recent strong recruitment, which may lead to a continued increase in projected biomass in the forthcoming years. We urge the IOTC to ensure yellowfin catches remain within the estimated recent (20 year average) MSY (402,000-427,000 t) and in the face of recent high recruitment, not increase catch limits to allow the stock to rebuild and maintain high recruitment trends.

Bigeye Tuna

The 2022 stock assessment indicates the stock is both overfished and subject to overfishing with a high probability. With 2021 estimates of spawning biomass being 25% of unfished levels, and a fishing mortality level at 1.43, it is reassuring that the IOTC agreed to the bigeye management procedure (Resolution 22/03 and Resolution 23/04) that will reduce the TAC for 2024 and 2025. Catch increased from 2021 (94,803t) to 2023 (105,369), further straining the already depleted stock. Although the suggested TAC for 2024 and 2025 remains relatively high at 80,583 t, it is a step in the right direction, but only if properly implemented and enforced. The IGFA recommends maintaining a management decision making framework based on permanent reference points to ensure biomass is at or below MSY levels. The IGFA looks forward to the updated TAC advice for 2026-2028.

Kawakawa

The status of kawakawa remains highly uncertain and the 2023 assessment highlights the need for more and better information as catches continue to increase. The assessment categorizes kawakawa as overfished but not experiencing overfishing while the information used to make that categorization is highly uncertain and possibly biased based on assumptions. With current estimated catch, which again is highly uncertain, nearing MSY levels, now is the time to limit increasing catch of kawakawa before the situation worsens. The IGFA recommends taking the precautionary approach and limit catch to the lower end of the MSY range at 122,000 t. Additionally, there is a clear need for improvement in the data collection and reporting process for this species to allow for more traditional assessment methods that would represent a significant improvement over the data poor methods implemented in the 2023 assessment.

Longtail Tuna

Based on the 2023 assessment, longtail tuna is both overfished and subject to overfishing with the 2023 catch level in excess of estimated MSY and an increasing trend in exploitation rates. Regardless of the high uncertainty in catch implemented in the assessment methodology, this stock is highly vulnerable to exploitation compared to other tuna and mackerel species due to their fidelity to specific locales. Additionally, the implementation of data-poor techniques such as Optimized Catch-Only Methods is not preferable and the IGFA recommends the IOTC improve data collection to ensure more appropriate assessment methodologies can be employed in the future. The IGFA also recommends maintaining catch

levels below MSY estimates, preferably on the lower end of the MSY range closer to 108,000 t, in the absence of limit reference points for neritic tunas.

Narrow-Barred Spanish Mackerel
The 2023 assessment highlights the concerning trend in catch for narrow-barred Spanish mackerel with a 2023 catch level of 165,295 t, significantly higher than the 5-year average of 162,610 t. The stock is both overfished and subject to overfishing and although much uncertainty exists in the assessment, there is a clear need to reduce catch and improve data collection for this species. Given the high uncertainty in the assessment, effort should be made to address data gaps to allow for more traditional integrated assessment techniques. The IGFA recommends decreasing catch to below estimated MSY levels, ensuring current MSY estimates are accurate, and addressing the continued increased in narrow-barred Spanish mackerel catches seen over the last decade.

Sharks

Shortfin Mako Shark
The 2024 stock assessment for shortfin mako sharks indicates that the stock is overfished and subject to overfishing. Catches in the terminal year of the assessment (2022) were higher than MSY (1,930 t) and if high catch rates continue, the biomass will continue to decline and fishing mortality will continue to increase over time. We support the annual recommended TAC of 1,217.2 t to recover the stock to the green quadrant of the Kobe plot with at least 50% probability in 10 years. Given the species' vulnerability to longline and purse seine gear, we also suggest the IOTC strengthen reporting measures for discarded or non-retained sharks to better estimate catches.