

2024 Billfish Research Needs to Support Billfish Conservation for Guatemala sport fishing industries

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Problem Identification

In an analyses of the seasonal availability of sailfish resources to sport fisheries in Guatemala carried out by Ehrhardt (2023), it is shown that there is a significant historic depletion of the species throughout the Tropical Eastern Pacific Ocean (See figure 1). This situation is the result of intense longline fishing for tunas exerted in the region (See figure 2) where billfish are caught incidentally. At present, and because of the bycatch nature of the billfish exploitation, none of the billfish species are subjected to regional fishery management and conservation regulations by international fishery management agencies. Consequently, there are not formal assessments available on the status of exploitation of the billfish resources or a meaningful understanding of the temporal and spatial availability and vulnerability of the species to longline fishing operations.

The Ehrhardt (2023) report also found out that in spite of the considerable depletion of sailfish population abundance at the regional level, catch rates in Guatemala still are the highest in the region including an observed increasing trend in the number of sailfish caught and released per day fishing relative to the sport fisheries in Costa Rica (See figure 3). Additionally, in the last figure there appear to exist a multiple year abundance cycle that is evident both in the data from Guatemala as well as in Costa Rica, while there are important annual variabilities in the catch rates around to multi year cycles. None of these dynamic changes in availability and relative abundance of sailfish to sport fisheries in the two countries have been studied before; however, such trends and variances play a major long-range role on the future conservation strategies of the sport billfish fisheries in Guatemala. Therefore, the main focus of the works proposed here are to research the origins and consequences of the changes in availability and abundance of the sailfish resources in the region such that the sport fishing industries in Guatemala can develop sound and properly dimensioned plans for access to this extremely unique and important sport fishery resource.

Objectives

Based on the findings expressed above, it is of importance to billfish conservation to consider the implementation of scientific works:

1. To identify and assess environmental and ecosystem variables effecting the inter-annual cycles and variances on billfish resources available to sport fisheries in Guatemala, and

2. To establish possible regional links of the sources of variance driving sailfish catch rates observed in Guatemala with other regional billfish sport fisheries.

Methods and Data

The works will consider advanced scientific concepts and frameworks including advanced statistical, mathematical, biological and environmental integrated model developments and applications to quantify ecosystem wide responses generating overarching sailfish catch rates observed seasonally in Guatemala. By understanding the mechanisms that govern the sailfish availability supporting historically great sport fishing opportunities regionally and more specifically in Guatemala, it will be possible to secure better defined regulations that could be enforced by local governmental authorities.

The data that will be used in the analyses have been originated over 18 years of University of Miami billfish research efforts in the region under the leadership of Dr. Nelson Ehrhardt. Data on catch rates are from sport fisheries in the region, while oceanographic and environmental data were found in several institutional databases in the United States as well as at universities and fisheries institutions in the region. Significant information is also available from the sport fishing industries themselves.

Necessary Level of Funding

Most data needed for the proposed analyses will be made available at no cost by the author of this proposal and originated from his 18 years of scientific works on billfish in the Tropical Eastern Pacific Ocean. Other necessary information may be required as models for scientific discovery are developed, tested and implemented. Such data will be secured by the author of this proposal as part of his proposed works.

A total of 7 months of total scientific effort will need to be allocated to this project for a total of \$30,000. The personal works will include: data integration as required by the quantitative modeling efforts, development of conceptual frameworks to test scientific hypotheses, search for additional information and data that may be required in the scientific process of discovery, preparation of partial and final reports, oral presentations as required, and participation in the IGFA October 2024 International Billfish Symposium in San Diego, California. Preparation of scientific documents as required to participate in local and regional meetings concerning billfish conservation where results of this project could be used.

As a result of the proposed works a peer reviewed scientific publication will be prepared and submitted for publication to the respectable International Council for the Exploration of the Seas (ICES) through the International Game Fisheries Association (IGFA) with an approximate cost of \$5000 to be covered by the IGFA. An oral presentation based on the results of this project will be delivered at the 2024 International Billfish Symposium. Cost to attend the Symposium has been kindly offered by the Guy Harvey Foundation. The cost is approximately \$2,500.

Summary of Costs

Scientist responsible for carrying out all works	\$30,000. (BCP)
Scientific peer reviewed publication cost in the ICES Journal	\$5,000. (IGFA Symposium)
Costs of attending International Billfish Symposium	\$2,500. (GHF help offered)
Hardware and specialized software for analyses	\$1,500. (NE)
Project total	\$39,000.

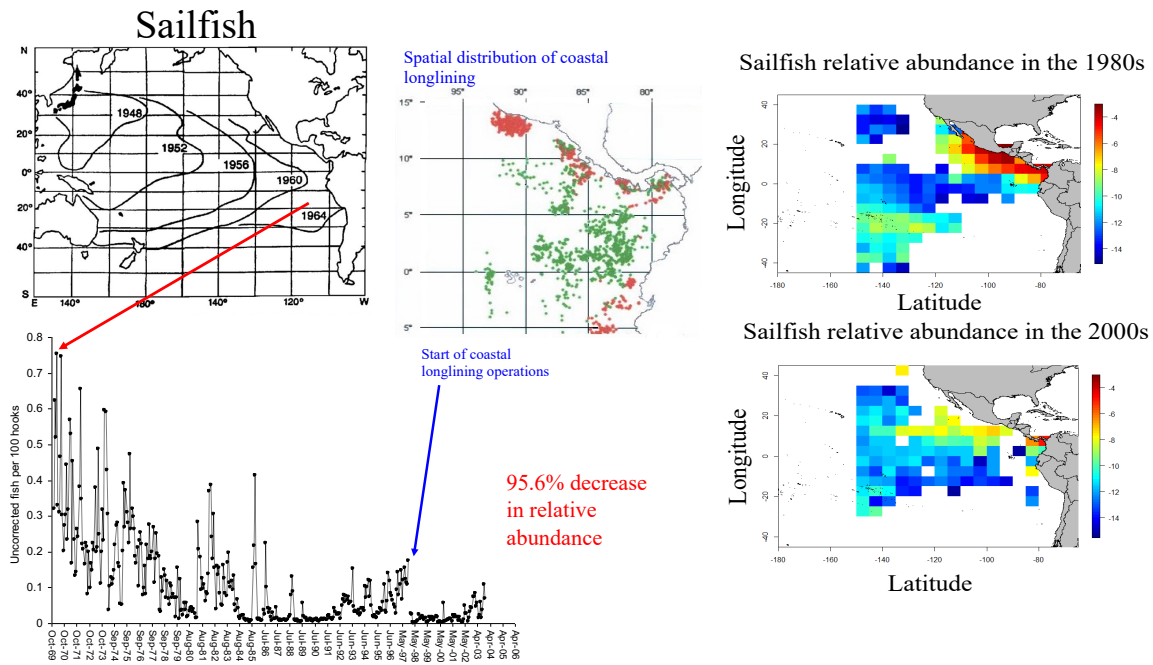


Figure 1. Historic development of longline tuna fisheries in the Tropical Eastern Pacific Ocean and sailfish depletion trend due to bycatch in tuna fisheries (From Ehrhardt 2023).

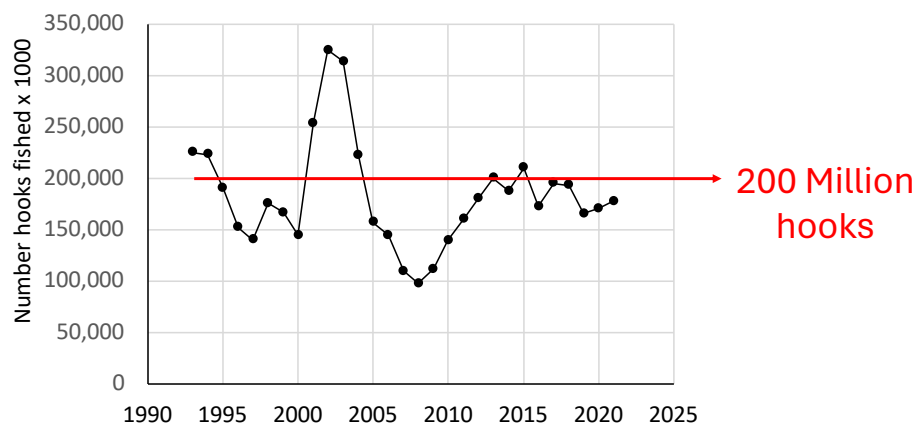


Figure 2. Trend of longline fishing intensity (millions of hooks fished per year) for all international longline fleets operating in the Tropical Eastern Pacific Ocean (From Ehrhardt 2023).

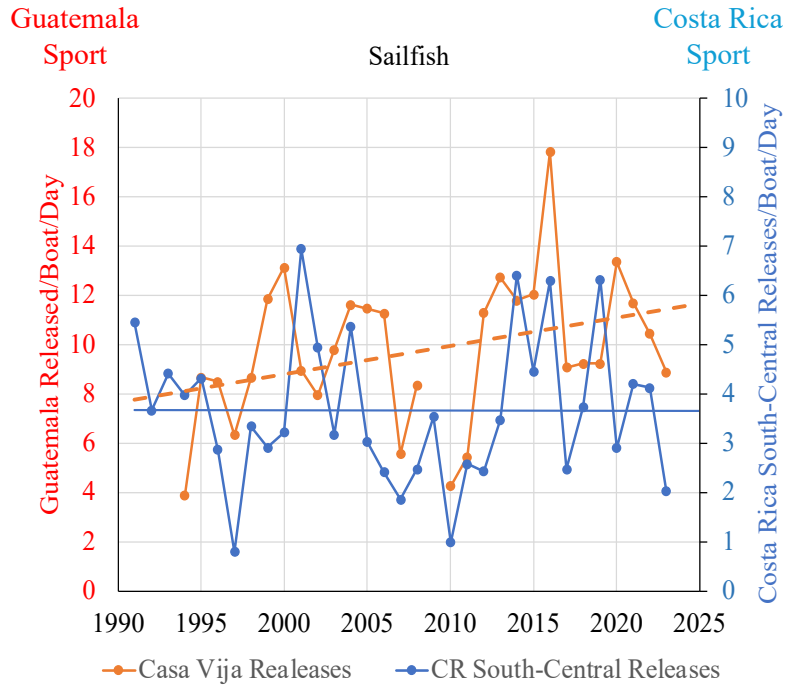


Figure 3. Sailfish inter-annual cycle trends and annual variability about the trends for catch and release data in sport fisheries in Guatemala and Costa Rica (From Ehrhardt 2023).

Reference

Ehrhardt, N. 2023. Seasonal availability of sailfish in sport fisheries in Guatemala contrasts significantly with sport billfish catch rate trends in other countries in the region. Report to the Billfish Conservation Project, December 2023. 20 pages.