

# Florida Highly Migratory Species Private Angler Telephone Survey Final Report

Prepared by:

MRIP Highly Migratory Species Work Group

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Florida Fish & Wildlife Conservation Commission

Fish & Wildlife Research Institute

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**Executive Summary only**

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## 1. Executive Summary

Florida's recreational fisheries have targeted Highly Migratory Species (HMS), including billfish, swordfish, tunas, and sharks, since the early 20<sup>th</sup> century. Widely distributed across the state from shallow nearshore waters out to cold, bottom depths exceeding 2000 ft in the Straits of Florida, these fisheries draw anglers from across the world and are relied upon on as a significant source of income for thousands of Floridians. The primary method for monitoring these fisheries since 1980 has been through the Marine Recreational Fishing Statistics Survey (MRFSS). Conducted by the state's Fish & Wildlife Research Institute for the past decade, the MRFSS has averaged over 40,000 field intercepts annually. HMS-targeted trips comprise a small portion of all recreational fishing trips combined, though, which makes them a "rare event" in any survey that is not directly targeting this specific segment of the recreational fishery. As a result, catch estimates for nearly all HMS species are highly imprecise due to typically low MRFSS intercept sample sizes.

A more directed sampling approach is required to adequately monitor HMS fisheries. Under the Marine Recreational Information Program (MRIP), this study was initiated to estimate the relative scope and magnitude of HMS recreational fishing by private anglers in Florida. The survey estimated fishing effort and total catches for private angler recreational HMS trips in Florida. It also characterized the extent of nighttime fishing activity, the use of private access sites, and tournament participation among private HMS anglers. Additional information was collected to identify access sites and characterize the spatial and temporal patterns of HMS fisheries. This study was conducted to guide the development and implementation of future data collection programs to more effectively monitor HMS recreational fisheries throughout the South Atlantic and Gulf of Mexico.

The HMS Angling permit and Atlantic Tunas General permit lists (6,019 and 244 vessels, respectively) were utilized as separate sample frames to collect recreational trip data via a telephone survey over a 12-month period. Despite being a commercial permit for Atlantic tunas only, General-permitted vessels were included in this study because the permit does allow these vessels to participate in recreational HMS tournaments for billfish, sharks, and swordfish. The Large Pelagic Survey (LPS), conducted from Maine through Virginia, currently includes General-permitted vessels due to many permit holders retaining their catches for personal consumption rather than to be sold. Since the extent of recreational fishing among General-permitted vessels in Florida was unknown, their inclusion in this study was deemed appropriate. Vessels possessing the HMS Charter/Headboat permit were excluded from this study because they were the focus of a separate MRIP pilot study conducted simultaneously in Florida.

The survey was comprised of two components: a biweekly survey of a randomly selected subset of each sample frame, and a one-time characterization census of all eligible permit holders. Florida was divided into five geographic subregions, based on the stratification used for the For-Hire Telephone Survey. The biweekly survey proportionally selected 10% (later decreased to 8% for the Angling permit frame) of the permitted vessels from each subregion to collect trip level data during a two-week sample period for any trip in which HMS were targeted or caught. Permit holders were immediately contacted by telephone samplers at the conclusion of the sample period. Sample periods ran concurrently with each other and were pooled into two-month waves. The characterization survey was conducted opportunistically while permit holders were contacted for the biweekly survey. Permit holders that were not selected for the biweekly survey, or did not have time to complete it during an initial contact, were later contacted after the conclusion of the 12-month survey.

The biweekly survey was initiated in May 2008 and completed in April 2009. The one-time characterization survey was also initiated in May 2008 and completed in early August 2009. Over the course of the 12-month biweekly survey, 10,252 vessel samples were drawn from the Angling frame and 404 vessel samples were drawn from the General frame. Overall, 68.8% of selected Angling permit holders were contacted and cooperative, 27.6% were unable to be contacted, and only 3.6% were non-cooperative. If ineligible and inactive vessels were excluded from those that were contacted, 59.8% of all selected permit holders were successfully interviewed. Contact rates for the General frame were equally successful, as 76.1% of all selected permit holders were contacted and cooperative. Only 42.5% of all General permit holders were successfully interviewed, though, due to a large proportion of them being ineligible for the survey (25.7%), primarily because they were commercial fishermen that did not target HMS. Most of these permit holders obtained the permit in the rare event they caught a yellowfin tuna (YFT) incidentally while commercially fishing for non-HMS species. Due to the small frame size and ineligibility of one-fourth of the General permit holders, the survey collected a limited amount of data from this frame to produce catch and effort estimates.

Survey results for the Angling permit frame were sufficiently robust to produce catch and effort estimates as 1,086 HMS trips were reported over the course of the study. HMS trips were disproportionately concentrated in southeast Florida (SEFL), accounting for 67.9% of the estimated 19,047 total HMS trips (proportional standard error (PSE) 4.1%); despite only accounting for 56.8% of the 6,019 permitted vessels that comprised the Angling frame. The Florida Keys accounted for the second most trips (18.2%), followed by the Florida Panhandle (6.4%), northeast Florida (5.9%), and southwest Florida (1.6%). Like SEFL, the 18.2% of total fishing activity reported in the Keys was significantly higher compared to its proportion of the sample frame (8.2%); whereas the other three subregions reported lower proportions of fishing activity relative to their share of the frame.

HMS trips were classified into four HMS groups for the trip-level analysis: billfish, swordfish, tunas, and sharks. The survey results showed catches for all HMS groups occurred throughout the year, with seasonal shifts among the preferred target species. Given consideration that this was only a 12-month study, the pattern of higher directed fishing activity for each HMS group in Florida appears to be sailfish during the late fall and winter, marlin, tuna and shark during the spring and summer, and swordfish during the summer and fall.

The Characterization survey successfully interviewed 57.4% of the Angling permit holders. While over 77% of the General permit holders were contacted and cooperative, only 42.6% were successfully interviewed (32.0% ineligible, 2.9% inactive). Angling permit holders reported having conducted an average of 9.4 directed HMS trips within the past 12 months of the interview being completed, while General permit holders similarly averaged 9.2 HMS trips. If only the 68.1% of Angling and 70.4% of General permit holders that reported conducting at least one HMS trip in the past 12 months were considered, the average increased to 13.4 and 13.1 trips per year, respectively. Billfish were targeted an average of 14.7 and 12.6 trips per year by the 40.3% of Angling and 37.0% of General permit holders, respectively, that reported taking at least 1 directed billfish trip in the past 12 months. Likewise, 31.2% of Angling and 20.4% of General permit holders targeting swordfish on at least one trip averaged 6.3 and 4.5 swordfish trips per year, while those targeting tuna at least once (31.3% Angling and 41.6% General) averaged 8.8 tuna trips per year (same for both permit frames). Sharks were targeted by only 2.7% of Angling and 4.6% of General permit holders, averaging 8.3 and 9.4 shark trips per year, respectively. Despite the similar trip frequencies for each HMS group among both permit frames, the large proportion of commercial permit holders within the General frame suggests this permit list should be monitored separately from recreational HMS permitted vessels. Likewise, the significant number of General-

permitted anglers that were recreationally fishing in violation of the permit rules warrants increased education efforts to ensure recreational anglers obtain the appropriate permit for their fishing activities.

Billfish accounted for the largest proportion of HMS trips (55.5%) and catches (50.0%), of which sailfish was the dominant species. The sailfish total catch estimate of 16,936 fish (PSE 9.5%) accounted for approximately 98% of the total billfish catch and all of its estimated landings (51 sailfish, PSE 57.6%). Swordfish accounted for next highest proportion of HMS trips (20.8%), with an estimated 1,563 fish (PSE 16.4%) caught, of which 561 were landed (PSE 21.1%). Tuna were targeted or caught during 19.2% of all HMS trips, with an estimated 3,952 skipjack caught (PSE 25.5%) and 1,069 landed (PSE 21.9%) and 1,456 YFT caught (PSE 23.4%) and 906 landed (PSE 31.0%). Sharks accounted for only 14.9% of all HMS trips, but comprised 29.7% of the total estimated HMS catch (10,294 sharks, PSE 14.9%, 33 landed, PSE 57.6%). Shark catches were comprised of 16 individual species, plus 3 genera, 2 family, and 1 unidentified shark categories, but the precision of the species-level catch estimates was poor for all shark species (PSE >27.7%). Analysis of catch dispositions revealed more than 99% of billfish and shark catches were released, while significant proportions of swordfish and tunas were landed (35.6% and 35.8%, respectively).

The catch estimates generated by the PATS represented a marked improvement in precision from the MRFSS, especially for swordfish and yellowfin tuna. MRFSS estimates for yellowfin tuna, swordfish, blue and white marlin over the past five years varied from 62.9 to 100% PSE, whereas the PATS estimates varied from 16.4 to 40.2% PSE. The improved precision for these and other species does not automatically equate to greater accuracy, though. Sailfish and skipjack tuna PATS estimates had similar levels of precision with the MRFSS, but the estimates themselves were substantially lower. The PATS estimate of 16,936 sailfish (PSE 9.5%) was a fraction of the MRFSS May 2008 to April 2009 estimate of 42,243 sailfish (PSE 14.5%), while the MRFSS 2004-2008 annual average of 62,870 sailfish (PSE 13.5%) was even greater. The differences between the PATS skipjack catch estimate of 3,952 fish (PSE 25.5%) and the MRFSS estimates for the same time period and the 5-yr average (37,682 fish, PSE 23.4% and 13,474 fish, PSE 35.0%, respectively) were even greater. The blacktip shark PATS total catch estimate (2,205 sharks, PSE 35.1%) had lower precision and was a fraction of the MRFSS May 2008 – April 2009 estimate (111,608 sharks, PSE 12.2%) and MRFSS 5-yr average (150,343 sharks, PSE 13.6%).

The differences between the PATS and MRFSS estimates can be attributed to both coverage gaps in the PATS sample frame and design limitations and coverage biases in the MRFSS. Exemptions to the HMS permit for vessels operating in State waters (< 3 miles Atlantic, <10 miles Gulf of Mexico) result in a significant coverage gap for the HMS fishing activity of some species in the PATS. HMS permit holders reported 45.6% of billfish trips and 29.3% of shark trips occurred primarily in State waters. Additionally, HMS bycatch during non-HMS targeted trips constituted 70.4% of total shark trips overall, and accounted for 90.5% of trips that targeted other HMS groups that resulted in shark bycatch. Although this study was only 12 months in duration, there were some indications of seasonal trends for other HMS groups. There were seasonal increases in which HMS bycatch on non-HMS targeted trips comprised a significant proportion of total the number of HMS trips, including 42.5% of winter (January-February) tuna trips and 30.8% of late summer (July-August) billfish trips. If HMS catches in State waters and HMS bycatch make up such large proportions of HMS-permitted fishing activity, then it reasonable to assume the same would be true for non-HMS-permitted vessels employing similar targeting practices. The unknown proportion of the fishery that conducts HMS-targeted trips in Federal waters or lands HMS bycatch without a permit must also be considered. This suggests the PATS may have missed a substantial proportion of the private angler fishery for sailfish, sharks, and skipjack tunas by solely relying on the HMS Angling permit as its sample frame.

At the same time, the localized distribution of some HMS fisheries within Florida's two regions (Gulf and Atlantic) makes it difficult to efficiently or precisely monitor HMS catches using the current MRFSS design. For example, sailfish are a rare event in the Gulf coast sample, despite being locally common throughout the Keys, because the Keys only account for 2.7% of all MRFSS private boat intercepts in the region. In contrast, sailfish CPUEs collected in southeast Florida, where 73.1% of all Florida billfish trips occurred, are expanded out to the Florida Atlantic coast region's total effort estimate, despite the fishery being disproportionately smaller and more seasonal in northeast Florida (accounting for only 4.8% of all billfish trips).

In addition, analysis of the PATS results confirm the existence of under coverage biases in the MRFSS intercept survey related to trips returning at night, trips made from private access sites, and tournament fishing in many of Florida's HMS fisheries. A majority of swordfish trips (58.7%) returned between 8 pm and 8 am the following morning. Comparison of catch rates from these trips with daytime swordfish trips did not detect any significant differences, despite the use of different fishing techniques for each time period. Nighttime trips primarily involved drift fishing at varied depths throughout the water column while daytime trips primarily involved deep-drop bottom fishing. A potential bias was detected in the harvest rates, though, with daytime trips landing 43.1% of all swordfish caught compared to only 28.2% landed during night trips. While the CPUE comparison was not statistically significant ( $P=0.08$ ), it should not be dismissed considering the sample size consisted of only 32 landed fish (19 day versus 13 night).

HMS trip return times were also compared with the start and end times of Florida MRFSS field intercept assignments to assess the MRFSS sampling coverage for daytime trips. The comparison suggested long-range HMS trips for YFT and marlin were being missed due to their late afternoon and evening return times. Favorable weather conditions are usually required to conduct these specialized trips that often travel more than 50 miles offshore. MRFSS assignments conducted on those same "good weather" days at busy access sites near inlets or passes were more likely to end earlier because the sampler would have reached the 30-interview maximum limit for vessels returning earlier in the day, thus increasing the coverage bias for these long-range trips.

The use of access sites not accessible to MRFSS samplers by HMS anglers was extensive, including at least 47% of Angling and 51% of General permit holders. With such a large proportion of the fishery being excluded from field sampling efforts, the concern has been whether or not catch rates on these trips differ from those on trips returning to public access sites. The survey results clearly indicate these concerns are warranted because significant differences in catch rates were detected for billfish and tuna trips between vessels using public and private access sites. Angling permit holders reported catching significantly more billfish and YFT during trips that returned to public access sites, while catch rates for skipjack tunas were significantly higher for trips returning to private access sites.

The study also confirmed that tournament fishing results in significantly higher HMS catch rates compared to non-tournament trips. Catch rates for billfish tournament trips were more than double those of non-tournament trips. Tournament trips accounted for nearly 10% of all billfish trips and 20% of the total sailfish catch, yet they are not included in MRFSS sampling. Reliance upon the Recreational Billfish Survey (RBS) to monitor tournament catches is inadequate because only half (51.3%) of the HMS tournaments identified during this study had registered with NOAA Fisheries' HMS Management Division as required. This does not include HMS bycatch caught by non-permitted anglers fishing in the hundreds of non-HMS tournaments targeting king mackerel, dolphin, wahoo, blackfin tuna, and other species that take place every year throughout Florida and the rest of the southeastern U.S. Although

swordfish tournament catches were not significantly different from non-tournament catches, the fishery needs further investigation due to the small sample size of tournament trips; especially considering the average tournament catch rate was 1.5x greater than for non-tournament trips.

### **1.1 Management Recommendations**

Florida's HMS fisheries are highly diversified, requiring different approaches to adequately monitor each segment. The following recommendations address identified deficiencies and data gaps and are aimed at improving future monitoring efforts:

1. The study reaffirms the need for significant modifications to the MRFSS that should be incorporated into the new MRIP. Adoption of these specific MRIP improvements, in addition to other design changes currently being evaluated by the MRIP Design and Analysis work group, should result in improved coverage and accuracy of estimates for sailfish, skipjack tuna, sharks, and possibly YFT. These changes should include:
  - Increasing the spatial stratification of Florida into smaller subregions from the current two (Florida Gulf coast and Florida Atlantic coast) to improve geographic resolution of catch and effort estimates relative to the distribution of HMS fisheries. This should reduce variability in measured catch rates and the overestimation of effort for fisheries disproportionately concentrated in one subregion of the state, such as sailfish in SEFL for which catches are expanded to effort collected over a much larger area where the fishery is significantly smaller and more seasonal.
  - Instituting proportional stratification to the temporal distribution of access point survey assignment start and end times to provide adequate coverage to trips returning in the late afternoon and evening. This is especially important for long-range trips targeting YFT and marlin that are typically absent from the MRFSS.
  - Classifying vessels as either public or private access during field intercepts. This will provide some coverage to private access fishing, facilitating long-term CPUE comparisons and possible catch adjustments.
  - Addressing the exclusion of tournament fishing, either by fully including tournament fishing in the survey or by a separate tournament monitoring program.
  
2. Implement a specialized HMS survey to monitor the total catch for marlin, swordfish, and YFT.
  - The survey would utilize the HMS permit list as a sample frame for effort estimation and the collection of self-reported catch data. A dual-frame approach may be appropriate, possibly with a saltwater fishing license frame, to minimize off-frame adjustments.
  - E-mail or other electronic communication formats should be employed in conjunction with follow-up telephone sampling to lessen the reporting burden for permit holders. This is especially important considering 80% of Angling and 74% of General permit holders expressed support for this format.
  - Due to the reliance upon self-reported catches for catch estimation, new catch and effort validation methodologies will be necessary to assess the accuracy of the survey. MRIP should authorize a pilot study to evaluate the effectiveness and costs of various approaches that quantify the proportion of the fishery covered by the survey and validate self-reported catches and trip reports.

- Include trips in the Bahamas within the scope of the survey. Permit holders reported frequently fishing in or just north of Bahamian waters for YFT (and marlin) prior to returning to U.S. ports along the east coast of Florida. Inclusion of these trips, as well as multiday trips within the Bahamas, should be included in the data collection to provide additional information on distribution of the fishery.
3. The monitoring of HMS landings for billfish, swordfish, and some shark species should be primarily conducted by a census program due to the limitations of any survey to accurately estimate limited harvests. Improvements to the existing NOAA Fisheries census programs (Automated Landings Reporting System and HMS non-tournament reporting hotline and website) that may aid in improving the reporting rate include:
- Elimination of the 24-hour grace period allotted to anglers to report landed billfish, swordfish, and bluefin tuna upon returning from a trip because the grace period makes enforcement of the reporting requirement nearly impossible. Landed catches will have to be reported prior to the removal of the fish from the vessel.
  - Provide additional reporting options to anglers to reduce reporting burden and facilitate timelier reporting. These include text messaging, e-mail, and smart phone applications.
  - The addition of five shark species to the HMS reporting requirement is strongly recommended. These include species of concern (great hammerhead, scalloped hammerhead, and tiger), as well as more common species (bull and shortfin mako).

The proposed HMS Survey catch estimates would be used to evaluate the effectiveness of these proposed modifications.

4. Increased education and outreach efforts to better inform anglers about the need and methods for reporting HMS landings. The efforts should focus on the following issues:
- Increasing awareness of the permit requirements for the HMS fishery and better explain the differences between permit types. The latter would primarily focus on reducing the number of recreational anglers that mistakenly (or deliberately) obtain a commercial Atlantic Tunas General permit when the HMS Angling permit is more appropriate.
  - Emphasizing the conservation and management benefits of reporting landed HMS catches, registering HMS tournaments, and participating in monitoring programs.
  - Providing timely information regarding HMS management changes and stock assessment updates.

In the spirit of this recommendation, a summary of this report will be emailed to all permit holders that provided email addresses during the course of this study. They will also be provided a link to the MRIP website where they can download the complete report, while also being able to learn more about other MRIP studies conducted as part of this effort.

These recommendations are not exclusively for Florida's recreational HMS fisheries. A characterization study of HMS permit holders throughout the Gulf of Mexico and South Atlantic also revealed widespread participation in HMS fisheries, but identified similar monitoring challenges in most states. These included vessels returning late in the evening after MRFSS sampling was completed, private access fishing, and tournament fishing. A comprehensive, specialized HMS data collection program that covers the full range of HMS stocks throughout the U.S. would greatly improve the ability of managers to effectively monitor these valuable fisheries.