

Shrimp Data Analytical Requirements and Reporting Options

Four types of data are needed to meet the requirements of various Federal regulations and requests from the Council and industry:

1. Effort data are required for
 - Turtle BiOp (Shrimp Biological Opinion, NMFS 2014) and Red Snapper Bycatch (Gulf Shrimp Amendment 14): Tow-hours by month, stat zone (13-21 & 1-12), depth zone (inshore, 0-10 fm, >10 fm), and gear type
 - Shrimp fishery effort index and bycatch estimation for protected species, Red Snapper and other fish stock assessments: tow-hours by trimester, stat zone (13-21 & 1-12), depth zone (inshore, 0-10 fm, >10 fm) and gear type
2. Bycatch rate data are required for
 - Biological opinions and fish assessments: bycatch per unit effort by month, stat zone (13-21 & 1-12), depth zone (inshore, 0-10 fm, >10 fm), and gear type
3. Landings data are required for
 - Texas Closure analysis (Gulf Shrimp FMP): Pink, White and Brown landings by port code (and/or FIPS county code), shore (inshore, offshore), month, landings by size category, catch by stat zone
 - Royal Red Index: total annual lbs tails landed for royal red
 - Pink, Brown and White shrimp assessments: landings by species (Brown, white and pink), month, size category, stat and depth zone, waterbody code
4. Additional data are required for economic and regulatory analyses
 - Ex-vessel landings, ex-vessel price per pound, and ex-vessel value for all Gulf shrimp and other landed species, gear type (otter trawl, skimmer, butterfly net, etc.), number and size of nets, crew size, cost of hired captain/crew, trip expenses (fuel price, gallons of fuel used, grocery expense, ice expense, miscellaneous expenses), vessel ID (USCG doc # if vessel is documented, else state registration #), dealer ID, and fisherman/fishing business ID, departure date, landing (return) date and/or days at sea.
 - Annual vessel reporting: type of TED, TED specifications, BRD, and BRD position if a fisheye BRD

Bycatch information is currently acquired through an observer program administered by the Southeast Fishery Science Center that is intended to provide a representative estimate of the average catch per tow of sea turtles, red snapper, and other selected

species. Currently, funding levels permit only about two percent of the offshore trips to be covered, leading to imprecise estimates of the take for most species. Nevertheless, observer data remain the best way to characterize bycatch in this fishery and will not be further discussed here.

Data for items 3 and 4 in the tiered list above are currently collected through dealer reported state Trip Tickets and/or Annual Vessel/Gear and Annual Landings Surveys by NMFS. The Gear and Landings surveys are paper surveys that are mailed to the permit holders, making it an inefficient method for collecting this data. More complete and timely information could be obtained through a combination of Dealer permits and real-time reports of landings information.

Dealer Permitting

A Gulf shrimp dealer is a person who purchases shrimp from a vessel, or person, that fishes for shrimp in the Gulf EEZ or in adjoining state waters, or that lands shrimp in an adjoining state. Currently, shrimp dealers must provide the following information when requested by the Science and Research Director:

1. Name and official number of the vessel from which shrimp were received or the name of the person from whom shrimp were received, if received from other than a vessel.
2. Amount of shrimp received by species and size category for each receipt.
3. Ex-vessel value, by species and size category, for each receipt

Shrimp landings are currently required to be submitted monthly on state Trip Tickets (as opposed to species like Gulf reef fish, Red Drum and Spiny Lobster, which get submitted weekly and electronically). Requiring federal shrimp dealer permits and all permitted shrimp dealers to submit weekly, electronic reports would ensure NMFS receives timely and accurate shrimp data (e.g. blank market size category fields has increased in state reporting) and that SERO could enforce the reporting requirements. Shrimp vessels are already required to be permitted. The federal dealer permit would be included with the other Gulf and South Atlantic Dealer permits.

Vessel Reporting

Currently, tow-by-tow effort is derived from GPS coordinates using 3G cellular electronic logbooks (cELBs), as well as from Port Agent interviews. However, 3G cELB coverage is less than 40% of the federally permitted Gulf shrimp fleet and most of those vessels fish largely offshore. Port agent interviews have become insufficient in recent years and 3G cellular technology is terminating at the end of 2020. Therefore, a new shrimp effort data collection method and new reporting requirements are warranted. The remainder

of this document discusses four possible options for vessel reporting and their potential for meeting the regulatory and analytical requirements outlined above.

1. No vessel reporting: require no effort data through vessel reporting and conduct analyses for items 1-4 using only state Trip Ticket data.

Eliminating vessel reporting requirements would require effort to be estimated as the total days of a trip based on Trip Ticket fields: the date the vessel leaves the dock and the date the vessel offloads the catch. Therefore, effort estimates derived from state Trip Tickets would be incomparable to the historic effort estimates used as the basis for previously conducted assessments and analyses, including analyses conducted for Gulf Council Amendments and NMFS rules (e.g., rules to protect listed sea turtles). Further, the state of LA submits a transaction date, not an offload date, so the offload date may not be the trip end date. Effort measures based on start date and offload/transaction date may introduce additional error. Given effort data reported on state Trip Tickets is inconsistent across states, any estimates would be in different units than were used for the regulations. They would also likely be less accurate than current methods (since trip ticket information is reported by dealers rather than directly from vessel captains).

2. GPS vessel reporting (2A & 2B); in general, requires “status quo” reporting, where permitted Gulf shrimp fishing vessels would continue to transmit time-stamped GPS data at 10 minute intervals (or less), including a trip start/stop date and time via electronic transmission, upon returning to port.

Currently, effort is estimated in days fished, where a day fished represents 24 hours of towing time, using an algorithm developed by LGL Ecological Research Associates. The LGL algorithm relies on the signal received by the cellular electronic logbook (cELB) to initiate a ‘trip’ start and end date. Specifically, when the vessel returns to port (within cellular range) the recorded GPS data is transmitted via cellular signal to NMFS - at which point a cELB effort ‘trip’ is established. The LGL algorithm then attempts to ‘match’ that cELB trip to a dealer reported Trip Ticket, in order to validate the vessel was in fact fishing and to pull in landings data for CPUE estimation. However, any data falling outside the algorithm’s established criteria (e.g. falling outside a 24 hr ‘match’ window, tows exceeding a predefined length of time) are not incorporated in the CPUE estimation and, therefore, nor are they incorporated in the effort estimation (recall: effort is currently being estimated as $\text{Effort} = \text{catch}/\text{CPUE}$, where CPUE is derived using tow duration acquired from cELB GPS transmissions).

In order to derive effort in historic units and for validation/calibration of new data collection methods, both option 2A and 2B require time-stamped GPS coordinates at 10

min intervals (or less). This is needed to estimate vessel speed. A 'start/stop' time and date for each trip is needed in the LGL algorithm, as it is used to match to Trip Ticket (landings data) using a 24 hour match window. The transmission of vessel effort data following the conclusion of a trip is needed to establish a trip occurred.

Under option 2B, a census level of reporting (i.e., complete coverage) would be required. With census-level reporting NMFS would have data on all shrimping activity, including inshore fishing, and would no longer need to run a complex algorithm to estimate effort for the remaining 60% of the fleet (i.e., currently cELBs cover less than 40%, adding uncertainty to the effort estimates). Further, requiring vessels to transmit the associated Trip Ticket number (from the receipt supplied by the dealer) would compensate for noncompliance and misreporting.

Under option 2A, if a census level could not be achieved, it would be possible to maintain survey-level reporting (e.g. 40% coverage) if the logged trip effort data was transmitted with the Trip Ticket number (creating a link between the two). Option 2A would require continuing the use of an algorithm approach to estimate effort for the remaining (currently 60%) of the fishing activity (adding uncertainty). Further, survey-level coverage may still poorly represent inshore fishing activity.

NMFS acknowledges that electronic transmission of trip data may not be immediately possible. Therefore, initially, this GPS data could be logged onto a USB chip and mailed in for data processing immediately after the vessel returns to port. The industry would need to collate the vessel reported data into ACCSP database format and submit the collated data to ACCSP at weekly intervals, at their expense. NMFS cannot accept chips from vessels, as it is against current IT security protocols. Regardless, chip collection and hand processing of vessel data should be considered a short term solution, while a means for electronic submission of vessel reports is developed. To collect chips by mail and hand-process data is extremely costly and inefficient.

3. Enhanced vessel reporting; in addition to the requirements in #2, would require vessels to electronically report the gear information necessary to complete analyses in #4 upon returning to port (i.e., at the end of a trip).

This gear information is currently obtained annually via a 12 page, paper survey, which is mailed to permit holders. The electronic reporting application could be developed such that gear information could be saved - eliminating the need to update gear fields unless any of the gear information changes (among trips), and transmitted with the GPS and landings data upon returning to port. This could alleviate the need for the 12-paged,

paper version, which is required by permit holders to be submitted annually for each vessel.

4. Tow-by-tow vessel reporting; in addition to the requirements in #2-3, would require vessels to electronically report haul level landings in weight by shrimp species following each trawl.

Currently, the LGL algorithm has established methods for distributing trip level landings (coming from state Trip Tickets) to area/statistical zone using the tow-by-tow GPS effort coordinates. However, this method adds uncertainty to the effort estimates. With tow-by-tow landings, the effort could be estimated directly - an exact measure of effort for each tow, and eliminate the uncertainty added by the current approach. Tow-by-tow shrimp landings would improve the accuracy of effort estimates used in the Turtle BiOp and Red Snapper Bycatch analyses.

NMFS has presented four options for vessel reporting, with the caveat that option #1 would produce effort in different units than current regulations use and those Trip Ticket based estimates would be coarse and unrealistic. Option #2 achieves status quo reporting with refinement (under 2A and 2B) - to improve match efficiency of the LGL algorithm. Requiring shrimp dealer permits and weekly, electronic reporting would improve data accuracy and enforcement. NMFS acknowledges that current technology may not provide such detailed reporting outputs as is proposed by options #2-4. However, ideally any proposed technological developments would be capable of capturing the specified parameter fields established under these vessel reporting options. The Council will need to pursue an Amendment if it chooses to make changes to vessel reporting and/or dealer permitting requirements.