

Biological Review of the 2019 Texas Closure

Report to the Gulf of Mexico Fisheries Management
Council

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Introduction

In 1981, the Gulf of Mexico Shrimp Fishery Management Plan (FMP) was implemented with the primary objective to increase the yield of brown shrimp harvested from Texas offshore waters. Since then, various aspects of the Texas closure management measure have been analyzed and reported on by scientists at the Southeast Fisheries Science Center (SEFSC). This report contains an overview of selected effects of the 2019 Texas closure and will be presented by the SEFSC to the Gulf of Mexico Fishery Management Council (GMFMC) at the March/April 2020 meetings.

Background

The Shrimp FMP regulates fishing for brown shrimp in the Exclusive Economic Zone (EEZ) off the coast of Texas. Provisions in the Shrimp FMP prohibited brown shrimp fishing from the coast line to 200-miles off Texas during the periods: May 22-July 15, 1981; May 26-July 14, 1982; May 27-July 15, 1983; May 16-July 6, 1984; and May 20-July 8, 1985. In 1986, 1987, and 1988 only the portion of the EEZ from 9 to 15-miles was closed to fishing. In 1986, the area was closed May 10-July 2, while in both 1987 and 1988, Texas offshore waters were closed from June 1-July 15. In 1989, the 200-mile closure again went into effect and has remained in effect each year since that time. Closure periods were: June 1-July 15, 1989; May 15-July 8, 1990; May 17-July 6, 1991; May 15-July 6, 1992; May 15-July 6, 1993; May 13-July 7, 1994; May 15-July 15, 1995; June 1-July 15, 1996; May 15-July 15, 1997; May 15-July 8, 1998; May 15-July 15, 1999; May 11-July 5, 2000; May 15-July 8, 2001; May 15-July 15, 2002, May 15-July 15, 2003, May 15-July 15, 2004, May 15-July 15, 2005, May 15-July 10, 2006. Since 2006, the Closure period has consistently occurred from May 15 to July 15 each year. State of Texas regulations, implemented in 1960, prohibited shrimp fishing in the territorial sea off Texas during these same periods, with the exception of allowing white shrimp fishing from the beach out to 4 fathoms. In 1990, however, state law prohibited all shrimping activities including the 4-fathom daytime fishery. This closure has been in effect during each of the subsequent closures (1991 through 2019).

The management objectives of the Texas closure regulation (as specified in the Shrimp FMP) are to increase the yield of brown shrimp and eliminate the waste of the resource caused by discarding undersized shrimp caught during a period in their life cycle when they are growing rapidly. The objective of the 1960 through 1980 Texas territorial sea closures was to ensure that a substantial portion (>50%) of the shrimp in Gulf waters had reached 65 tails/pound or 112 mm in length by the season's opening. Thus, this temporary closure of the offshore fishery from mid-May to mid-July each year results in larger shrimp to the fishery and subsequently a higher market value.

National Marine Fisheries Service (NMFS) port agents, as well as state trip ticket systems in Louisiana, Mississippi, Alabama, and Florida, collect shrimp statistics on the catch, effort, and fishing location of shrimp vessels operating in the Gulf of Mexico. These data provide information on the species, size and location of capture, as well as information on the catch rates and fishing effort of the vessels in the fleet. In addition, the electronic

logbook program collects detailed data on fishing location and effort for the offshore fishing fleet (Gallaway, et al., 2003).

Recruitment

Postlarval brown shrimp begin entering estuaries in Texas and western Louisiana in mid-February and continue through July, depending on environmental conditions. Several “waves” of post-larval stage shrimp may enter the estuaries throughout the spring however, peak recruitment usually occurs from February through early April. A wide array of environmental and biological factors affects the fate of these young shrimp. Research has identified salinity, temperature, and water height as important primary environmental factors affecting the survival, growth and abundance levels of subsequent offshore shrimp populations. The amount of usable nursery area for juvenile and subadult brown shrimp appears to be related to the distribution of favorable salinities (≥ 10 ppt) as well as to the tidal water height in interior marshes. Bay water temperatures exceeding 60° F in April and May are also favorable for above average shrimp production, with optimal growth occurring after 68° F.

In 2019, during the peak recruitment period, air temperatures were near average except for higher temperatures in February. January through April exhibited average rainfall in coastal areas of Texas and Louisiana. However, rainfall and air temperature did not appear to affect the timing of recruitment of brown shrimp into the bay systems. Low salinities were observed in Galveston Bay, and salinity remained low during the months of May and June due to fresh water influx into the bay system. Given that the period of low salinity coincided with the peak recruitment period, it may have decreased favorable marsh habitat for juvenile brown shrimp in 2019.

This is reflected in the 2019 Galveston Bay, Texas, postlarval and juvenile brown shrimp indices of abundance, the bait index-model (Berry and Baxter, 1969). This model predicted that the brown shrimp season, from July 2018 through June 2019, would yield approximately 19.3 million pounds of Brown shrimp from offshore Texas waters. This value is below the historical average of 24.1 million pounds for 1960-2012. Our environmental model did not support this below average yield prediction, predicting an above average production for Texas offshore waters. The model uses Galveston air temperature during mid-April (the key component), rainfall during early March, and bay water height during late April and early May. These components are additive in the model, thus higher values indicate higher catch. However, the greatest contributing environmental factor and key component to brown shrimp productivity in 2019 was low salinity during late-April and May, which is not a variable considered in the environmental model. Therefore, the above average production forecasted from this model may be misleading.

Catch information from Louisiana inshore and offshore fisheries in May is used to estimate total production for the biological year from May through April. Using 2019 May catch data in our Louisiana Model, we predict a harvest of 21.3 million pounds for Louisiana west of the Mississippi River for the 2019-2020 season. This is below the historical average of 30.5 million pounds.

In summary, the 2019 abundance indices point to a below average year for the harvest of brown shrimp in offshore waters of the western Gulf of Mexico. The Galveston Bay bait index forecasts a slightly below average year at 24.1 million pounds from offshore Texas waters. However, the 2019 Environmental Model predicts a slightly above average production for Texas offshore waters. Louisiana indices also indicate a below average brown shrimp yield of 21.3 million pounds this season from west of the Mississippi River to the Texas-Louisiana border. Overall, the western Gulf of Mexico should expect an annual brown shrimp production of approximately 40.6 million pounds during the 2019-2020 season. This is below the 1960-2012 long-term historical average of 56.0 million pounds for the two-state area.

Texas Fishing Trends

In Texas bays, from May through August 2019, 57,955 pounds of brown shrimp were landed in inshore Texas waters. This represents a below average value relative to the historical inshore catches for this period since the closure began in 1981 (1981-2011 average was 4.2 millions pounds). Monthly catches in 2019 were not equally distributed across each of the four months. August accounted for most of the Texas inshore catch during the four-month period (at 65.5%).

Offshore production during May through August 2019 was 4.96 million pounds, with 4.5 million pounds (91.6%) of the catch produced in the July through August period. The total catch for this period represents a below average level when compared to catch values since EEZ closures were initiated in 1981 (1981-2011 average was 13.6 millions pounds). During the July through August 2019 period only about 1.4% of the landed shrimp were in the > 67 count size category (Figure 1).

Texas Ports Shrimp Landings

The distribution of shrimp landings in Texas ports was examined to determine if changes in shrimp landings at the various ports had occurred since the initial closure in 1981. May through August Gulf-wide shrimp catch was summarized by port of landing. Figure 2 shows landings of the five upper Texas coast ports, Figure 3 shows the landings of the five middle Texas coast ports, and Figure 4 shows the landings of the four lower Texas coast ports. The five upper Texas coast ports (with long term mean landing percentage) include Jefferson (18.5%), Chambers (0.3%), Galveston (5.2%), Harris (1.7%), and Kemah (11.7%). The five middle Texas coast ports (with overall mean landing percentage) include Port Lavaca (16.4%), Brazoria (5.9%), Matagorda (0.5%), Palacios (14.4%), and Seadrift (1.6%). The four lower Texas coast ports (with overall mean landing percentage) include Aransas (9.0%), Nueces (1.9%), Port Isabel (10.4%), and Brownsville (16.4%). Of all the ports, Jefferson County had the highest percentage of landings in Texas again this year. Though all of the Texas ports experienced a slight decrease in landings, relative to 2018.

White Shrimp Catch off Texas

For the twenty-ninth consecutive year, the 0-4 fathom white shrimp fishery off Texas has been closed in conjunction with the Texas closure. Following the 2019 closure, most of the offshore white shrimp landed in July were in the 21-25 count size range (Figure 5), with a below average level of production compared to last year. Most of the offshore white shrimp landed in August were in the 15-20 count size range (Figure 6). The 2019 offshore white shrimp landings in July and August were lower than the average production for July and August between 1980 and 2018.

References

Berry, R. and K. Baxter. 1969. Predicting brown shrimp abundance in the northwestern Gulf of Mexico. *FAO Fish. Rep.* 57(3): 775-798.

Gallaway, B. J., J. G. Cole, L. R. Martin, J. M. Nance, and M. Longnecker. 2003. Description of a simple electronic logbook designed to measure effort in the Gulf of Mexico shrimp fishery. *North American Journal of Fishery Management*: 23: 581-589.

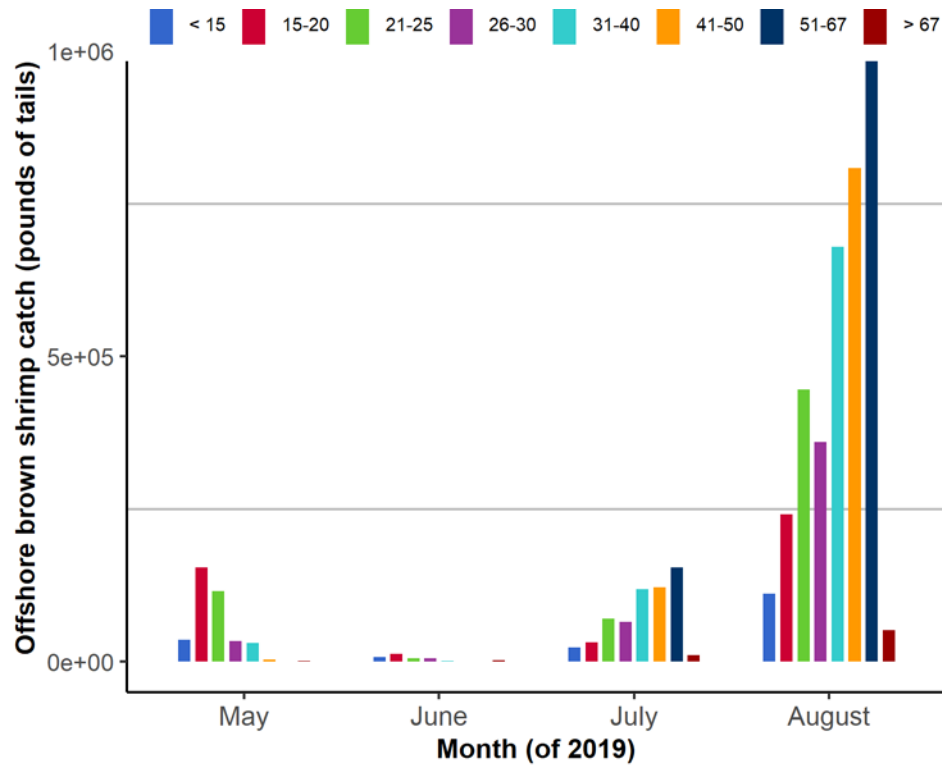


Figure 1. Size composition of brown shrimp catch from offshore Texas, May to August 2019

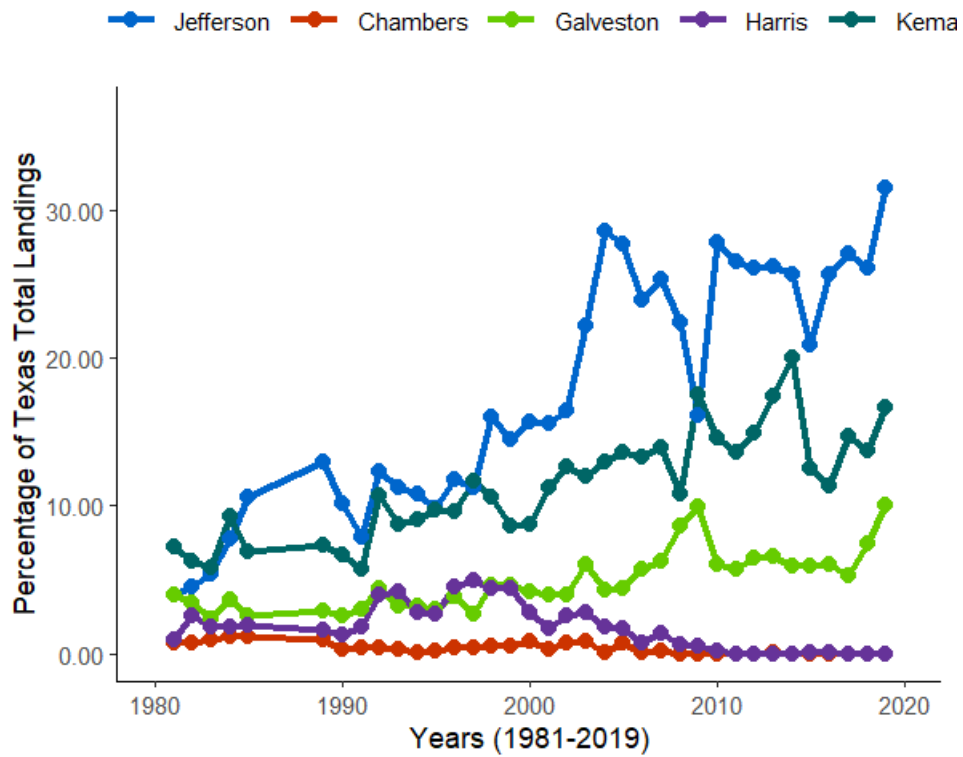


Figure 2. Distribution of landings by upper Texas coast ports, May to August 2019

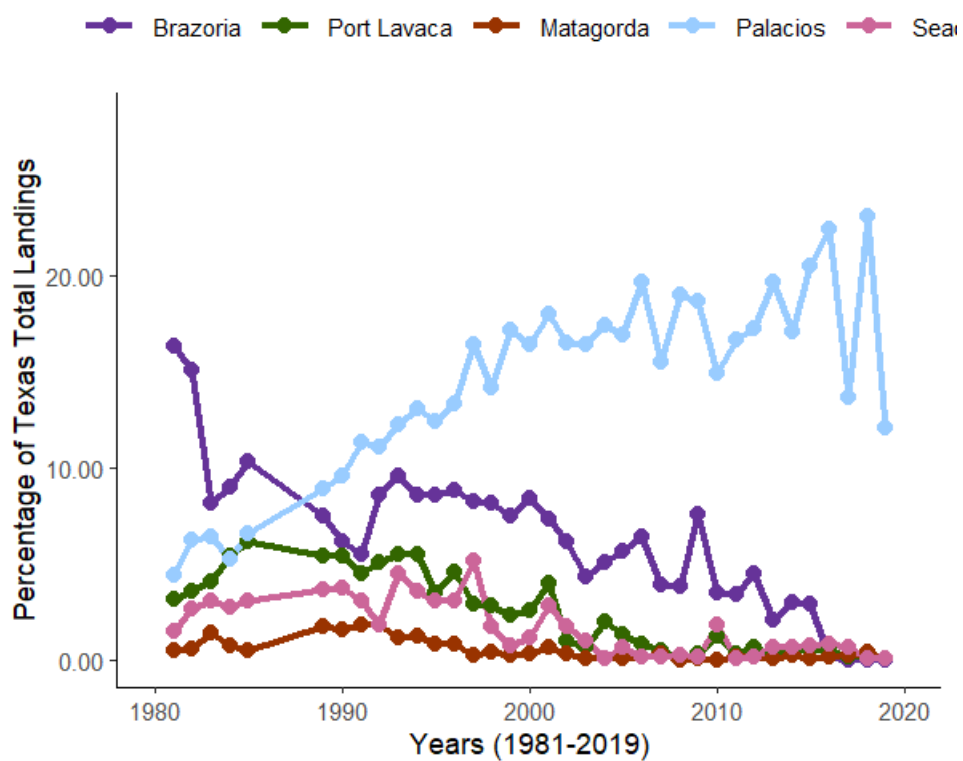


Figure 3. Distribution of landings by middle Texas coast ports, May to August 2019

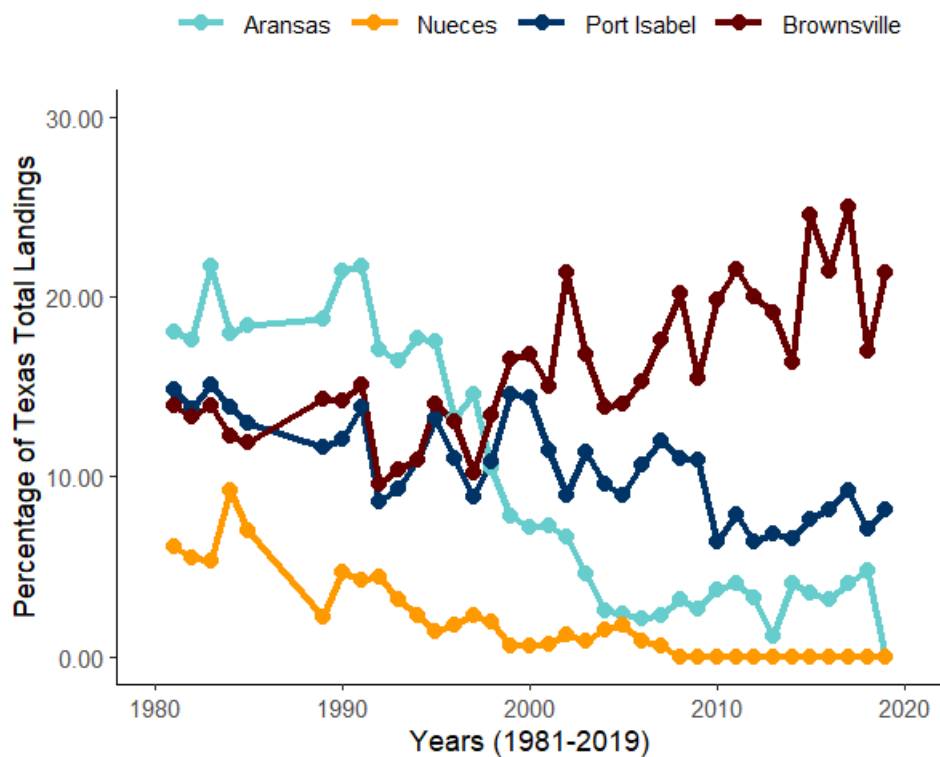


Figure 4. Distribution of landings by lower Texas coast ports, May to August 2019

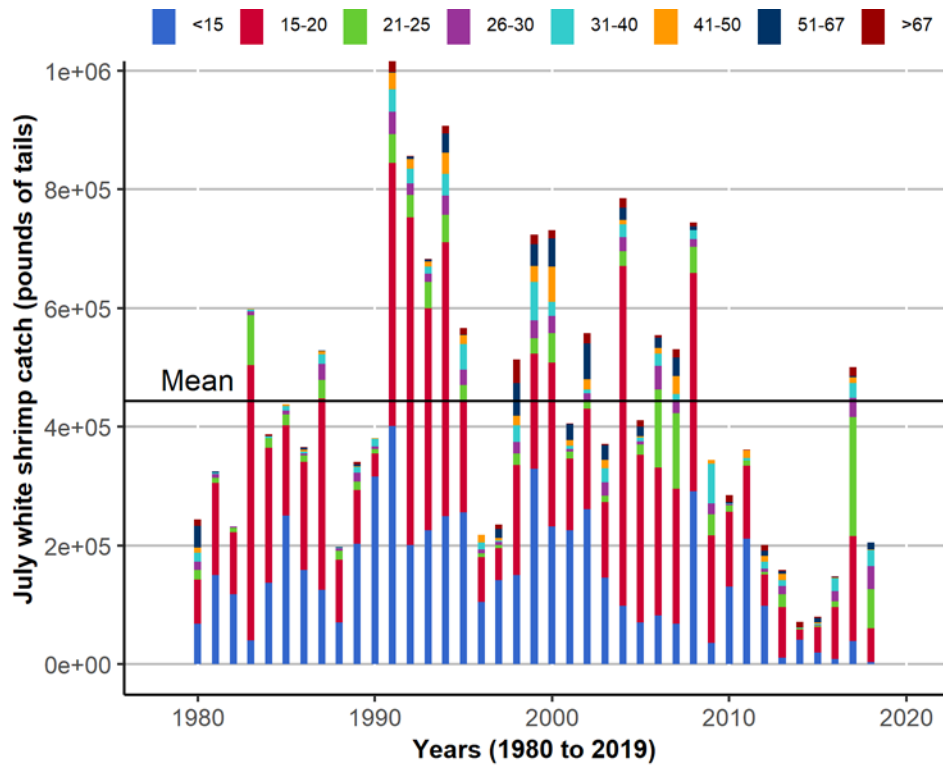


Figure 5. Size composition of Texas July offshore white shrimp catch, 1980-2019

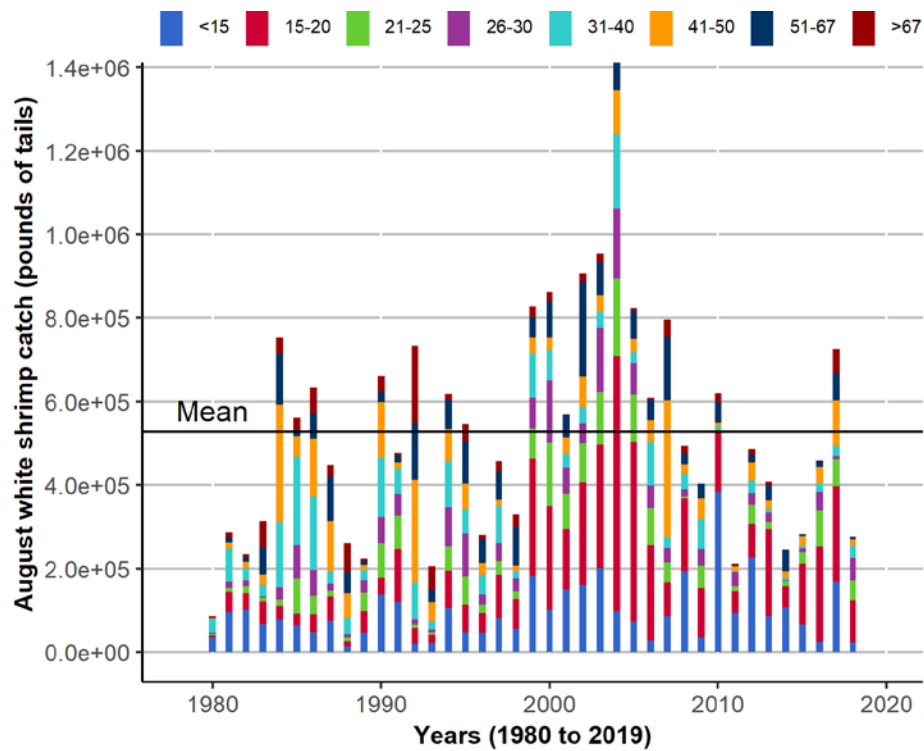


Figure 6. Size composition of Texas August offshore white shrimp catch, 1980-2018