

# Biological Review of the 2015 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 a 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 2015 Texas closure and will be presented by the SEFSC to the Gulf of Mexico Fishery Management Council (GMFMC) at the April 2016 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, May 15-July 15, 2007, May 15-July 15, 2008, May 15-July 15, 2009, May 15-July 15, 2010, May 15-July 15, 2011, May 15-July 15, 2012, May 23-July 15, 2013, May 15-July 15, 2014, and May 15-July 15, 2015. State of Texas regulations, implemented in 1960, prohibited shrimp fishing in the territorial sea off Texas during these same periods, except for the white shrimp fishery 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 2015).

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.

## Methods

National Marine Fisheries Service (NMFS) port agents and state trip ticket systems in Louisiana, Alabama, and Florida collect shrimp statistics on the catch, effort, and fishing location of shrimp vessels operating in the Gulf of Mexico. These data provided information on the species, size and location of capture, as well as information on the catch rates and fishing efforts of the vessels in the fleet. An electronic logbook program, started in quantity in 2005, is also being used to collect detailed data on fishing location and effort for the offshore fishing fleet (Gallaway, et al., 2003).

## Results and Discussion

### 1. 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 postlarvae may enter; 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. Salinity, temperature, and water height have all been identified 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 ( $\geq 10$  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.

This year, Texas and Louisiana experienced several weather fronts during the spring with record high rainfall which led to large freshwater discharges

into the estuaries. These weather fronts and resulting flooding may have concentrated young shrimp near the mouths of bays and out of nursery habitats. These conditions were not conducive for optimal shrimp growth which occurs in water temperatures greater than 68° F.

Based on the Galveston Bay, Texas, postlarval and juvenile brown shrimp 2015 indices of abundance, the bait index-model (Berry and Baxter, 1969) predicted that the brown shrimp season, from July 2015 through June 2016, would yield approximately 18 million pounds off the Texas coast. This value is below the historical average of 25.8 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. The greatest contributing factor and key component, temperature during mid-April, was above average this year (72.3° F). Rainfall recorded during the monitoring period equaled 0.5 inches and was slightly below the historical average of 0.6 inches. Relatively high tidal heights during late April and early May were recorded at approximately 5.75 feet. Using these environmental parameters, our model suggests an above average production of brown shrimp from Texas waters as related to environmental conditions conducive for optimal shrimp growth and survival.

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 2015 May catch data in our Louisiana Model, we predict a harvest of 24.8 million pounds for Louisiana west of the Mississippi River for the 2015-2016 season. This is below the historical average of 30.7 million pounds.

The 2015 abundance indices point to a below year of brown shrimp production in offshore waters of the western Gulf of Mexico. The Galveston Bay bait index forecasts a below average year at 18 million pounds from offshore Texas waters. However, the 2015 Environmental Model predicts an above average production for Texas offshore waters. Louisiana indices also indicate a below average brown shrimp yield of 24.8 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 42.8 million pounds during the 2015-2016

season. This is below the 1960-2012 historical average of 56.5 million pounds for the two-state area.

## 2. Fishing Trends

### Texas

In Texas bays, from May through August 2015, only 0.5 million pounds of brown shrimp were landed. 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 2015 were not quite equally distributed across each of the four months. The middle two months accounted for all of the Texas inshore catch during the four-month period.

Offshore production during May through August 2015 was 10.3 million pounds, with 10 million pounds (95%) 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 2015 period, the size composition of landed shrimp was around 1.5% in the >67 count size category (Figure 1).

## 3. Shrimp Landings by Texas Ports

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.

The distribution of Texas landings by individual ports was examined. 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 (16.50%), Chambers (0.40%), Galveston (4.63%), Harris (1.96%), and Kemah (11.07%). The five middle Texas coast ports (with overall mean landing percentage) include Port Lavaca (2.70%), Brazoria (7.00%), Matagorda (0.56%), Palacios (14.06%), and Seadrift (1.85%). The four lower Texas

coast ports (with overall mean landing percentage) include Aransas (10.34%), Nueces (2.20%), Port Isabel (10.84%), and Brownsville (15.46%).

Two of the upper Texas coast ports, Jefferson and Kemah, experienced a slight decrease in landings during 2015. The other ports, Chambers, Galveston, and Harris, experienced small changes in landings relative to the other ports. Jefferson County had the highest percentage of landings for all ports in Texas again this year. For the middle Texas coast ports, landings at Brazoria, Matagorda, Seadrift, and Port Lavaca were stable this year compared to 2014, while Palacios showed a large increase. Two of the four Lower Texas coast ports, Brownsville and Port Isabel, experienced slight to moderate increases while Aransas and Nueces showed slight decreases in landings compared to the previous year.

#### 4. White Shrimp Catch off Texas

For the twenty-sixth consecutive year, the 0-4 fathom white shrimp fishery off Texas has been closed in conjunction with the Texas closure. Following the 2015 closure, most of the white shrimp landed in July were in the 16-20 and smaller count size range with a below average level of production (Figure 5). Production in August 2015 was slightly greater than August 2014. Most of the shrimp landed still in the 16-20 and smaller count size range (Figure 6).

#### 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.

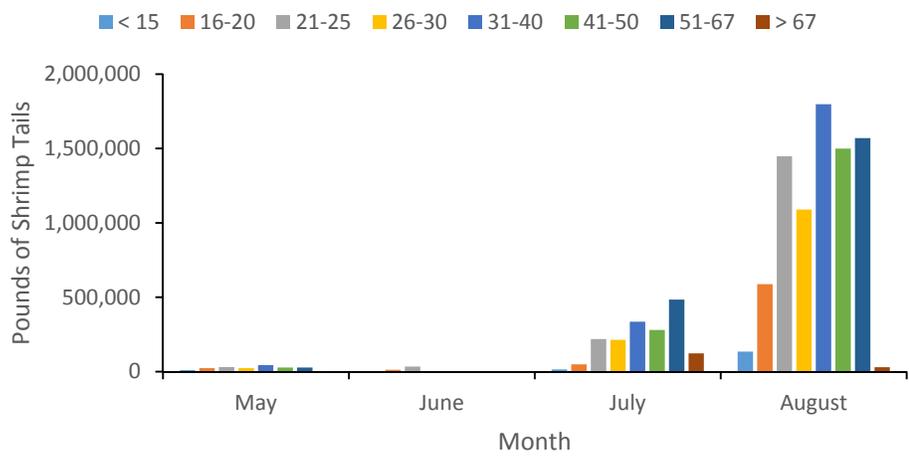


Figure 1. Size composition of brown shrimp catch from offshore Texas, May through August, 2015.

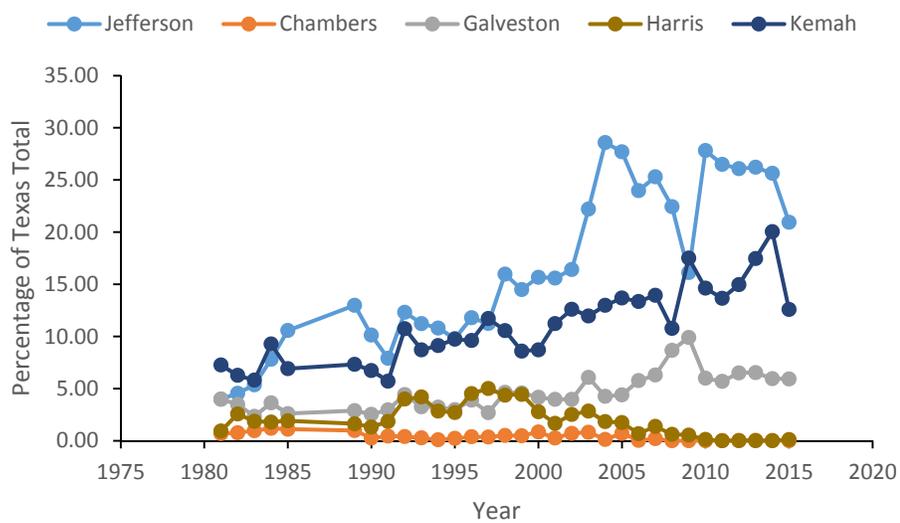


Figure 2. Distribution of landings by Upper Texas coast ports, May through August 1981-2015.

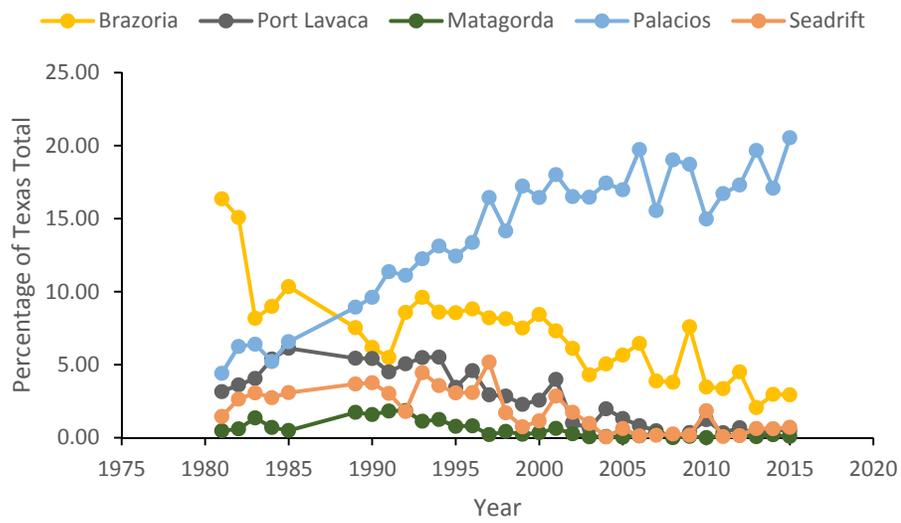


Figure 3. Distribution of landings by Middle Texas coast ports, May through August 1981-2015.

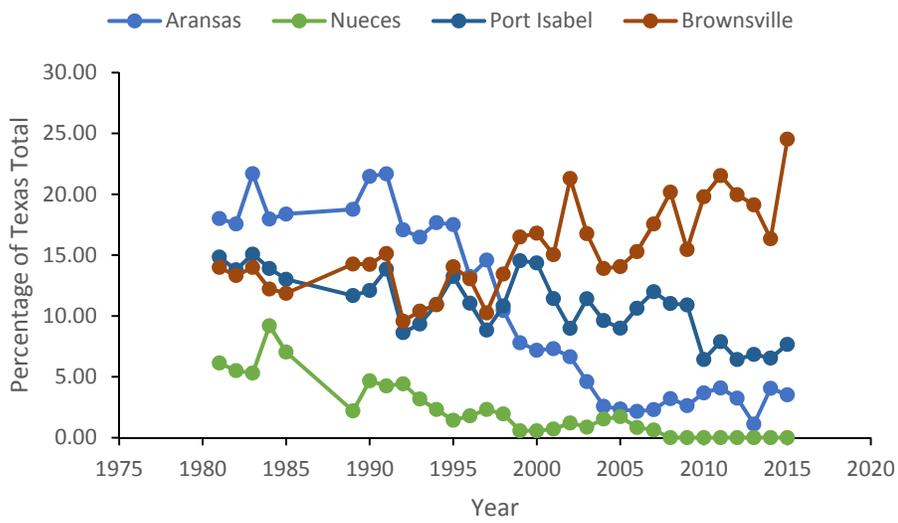


Figure 4. Distribution of landings by Lower Texas coast ports, May through August 1981-2015.

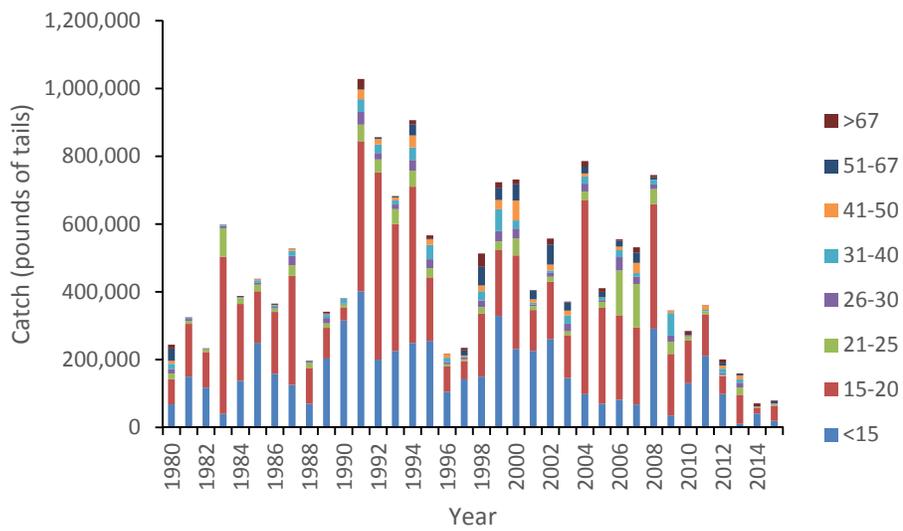


Figure 5. Size composition of Texas July offshore white shrimp catch, 1981-2015.

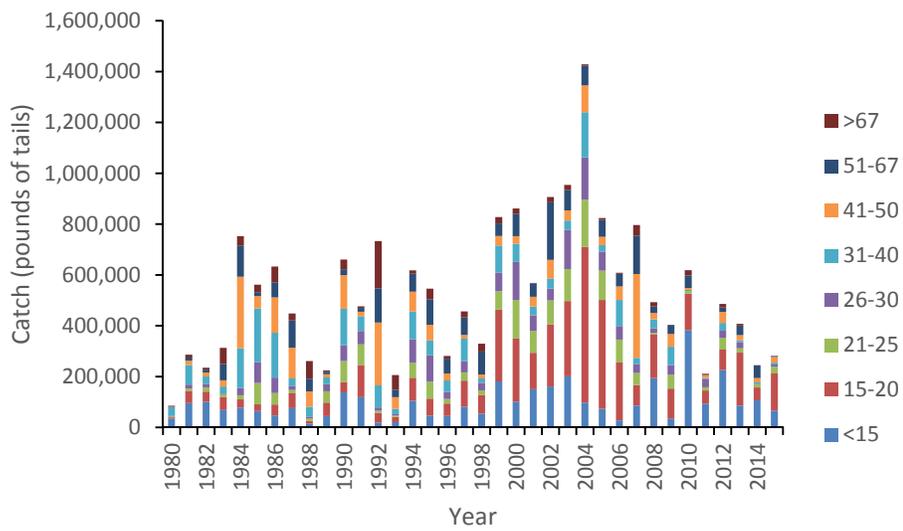


Figure 6. Size composition of Texas August offshore white shrimp catch, 1981-2015.