Florida Stone Crab, *Menippe mercenaria* (Say, 1818), and Gulf Stone Crab, *M. adina* (Williams and Felder, 1986)

Stone Crabs are found from North Carolina south around peninsular Florida to the Yucatan Peninsula and Belize and throughout the Bahamas and Greater Antilles. Adults are benthic and live in burrows that can be found from the shoreline out to depths of 200’. In the northern and western Gulf of Mexico (northwest Florida to Tamaulipas, Mexico), Gulf Stone Crabs replace Florida Stone Crabs. Florida Stone Crab growth is highly variable but growth to 0.4” carapace width (CW) can occur in as little as 6 months to as long as one year (Tweedale et al. 1993). Transition points in crusher-claw propodus length (PL): CW analysis indicated that 50% morphological maturity (CW50) occurred at approximately 2.76” CW for males and 2.36” CW for females (Gerhart and Bert 2008). Most female Florida Stone Crabs spawn when they reach 2.25”–2.75” carapace width or approximately age 2. Recruitment to the commercial fishery is estimated to begin at age 3 for males and age 4 for females (Gerhart and Bert 2008). Although some spawning occurs all year, Florida Stone Crabs spawn principally from April through September.

The Stone Crab fishery is unusual in that only the claws are harvested and the crab is returned to the water alive, ostensibly to generate new claws. Approximately 20% of the claws measured in fish houses were regenerated, providing evidence that some crabs survive the de-clawing process.

The Stone Crab fishery operates from October 15 through May 15. Since the operating season spans two calendar years, Stone Crab landings are reported by the calendar year in which the season begins. In calendar year 2016, commercial Stone Crab landings were 3,026,094 pounds of claws. The highest landings were reported in Monroe, Collier, Lee, Manatee, Pinellas, and north of Pasco to Wakulla County on the Gulf coast and in Dade and Brevard Counties on the Atlantic coast of Florida in 2016 (Fig. 1). Overall, landings of Stone Crab increased between 1986 and 1992 and stabilized to an average of 3 million pounds through 2004. Landings have since fluctuated between 2 and 3 million pounds with lows in 2005/2006 and 2013/2014, but have rebounded quickly in 2015/2016 (Fig. 2). The 2016 total landings of Stone Crab were 23% higher than the average landings in the previous five years (2011-2015) and were 8% higher than the 1982–2015 historical average landings (Fig. 2).

The Stone Crab fishery has been managed by the State of Florida since October 2011. Analysis of the fishery between 1981 and 1985 indicated that the resource was fully used at that time and had begun to show a decline in catch per unit effort and landings (Phares 1992). Commercial catch per trip on the Atlantic coast averaged 25 pounds between 1993 and 1996 before increasing to about 39 pounds per trip in 1997. Landings rates have since stabilized to around 33 pounds/trip between 1997 and 2006, and increased to about 47 pounds/trip in 2007. Rates then dropped to an average of 36 pounds/trip from 2008-2013 but increased to 44 pounds/trip in 2014/2015. Rates fell slightly in 2016 to 39 pounds/trip (Fig. 3a). Commercial catch per trip on the Gulf coast fluctuated around 56 pounds before increasing steadily through 2001. Landings rates then declined during 2002-2006 but increased to over 110 pounds/trip in 2008. A steady decline to about 60 pounds per trip occurred through 2014, however rates rebounded to about 95 pounds per trip in 2016 (Fig 3b).
Stone Crabs captured in fishery-independent-monitoring were separated into young-of-the-year (YOY) and post-YOY based on a carapace width of 25mm. Young-of-the-year Stone Crabs were extremely rare in sets on the Atlantic coast but there is some evidence of a stronger year class in 2000, 2011, 2013, and 2015 (Fig. 4a). The Gulf coast relative abundance of YOY Stone Crabs has remained somewhat stable aside from poor years in 1997 and 2001; strong year classes were detected in 2006-2007 and 2011, and high abundances remained stable through 2015. Abundances in 2016 declined to a 10-year low (Fig. 4b). Post-YOY relative abundance on the Atlantic coast increased from 1999 to a peak in 2003 and showed a general decreasing trend through 2008. Relative abundance remained low through 2013 with a large peak in 2011 and subsequent increases in 2014/2015 (Fig. 4c). Post-YOY relative abundance on the Gulf coast showed a similar increasing trend from 1999 to 2003 but this was followed by a dip in 2004 and a subsequent increase that peaked in 2008. Since 2008, relative abundance has shown a declining trend (Fig. 4d). No Stone Crabs were observed with gross external abnormalities in 2016.

Despite the three-fold increase in the number of traps used in the fishery since 1989-90 the level of landings has remained fairly stable over time. Muller et al. (2006) found that the recent (through 2004-2005) landings levels are probably all that can be harvested under current environmental conditions, regulations, and fishery practices. Overfishing was clearly occurring because of the excessive number of traps used in the fishery. Recruitment does not show any decline over the time series (1986/87 through 2004/05). Muller et al. (2006) suggested that Stone Crabs were resilient to continued overfishing because most female Stone Crabs spawn one or more times before their claws reach legal size, because some crabs survive declawing, and because the fishing season is closed during the principal spawning season. The fishery continues to have too many traps in the water as evidenced by the low catch-per-trap level over a very wide range of recent numbers of deployed traps.

The 2011 stock assessment update for the Stone Crab fishery in Florida used two models to evaluate stock condition, a surplus production model and a modified DeLury model (Muller et al. 2011). The surplus production model indicated that the fishing mortality was too high due to having more traps in the fishery than were necessary which is the same conclusion as was made in the 1997, 2001, and 2006 assessments. However, the DeLury model estimated that recruitment varied without trend from 1985-2010. A major source of uncertainty that remains for the Stone Crab assessment process is the total lack of recreational data (Muller et al. 2011). The status of Stone Crab is best indicated by the lack of an increase in landings when the number of traps more than doubled. A possible scenario is that, given the current fishing practices, there are only so many claws that can be harvested each fishing year from the nearshore crabbing grounds and harvesters merely compete with each other for those claws. If the decline in the issuance of trap certificates continues at the present rate (2.57% per year), it will take 37 years for the fishery to reach the Commission’s goal of 600,000 traps in the fishery. Florida Stone Crab is currently scheduled for another stock assessment update beginning in Fall 2018.
a. Commercial landings (pounds)

Figure 1. Geographic distribution of the commercial landings (pounds) of Stone Crab claws during 2016.

Figure 2. Commercial annual landings (pounds) of Stone Crab claws on the Atlantic and Gulf coasts of Florida, 1982–2016.
a. Atlantic Coast, commercial landings rates (pounds/trip)

b. Gulf Coast, commercial landings rates (pounds/trip)

Figure 3 (a)-(b). Annual standardized catch rates for Stone Crabs in Florida. Commercial landings rates (pounds/trip), 1992-2016: (a) Atlantic Coast; (b) Gulf Coast.
Figure 4(a)-(d). Proportion of fishery-independent-monitoring sets that captured Stone Crab from 1997-2016. Young-of-the-year (YOY): (a) Atlantic coast; (b) Gulf coast. Post-YOY: (c) Atlantic coast; (d) Gulf coast.