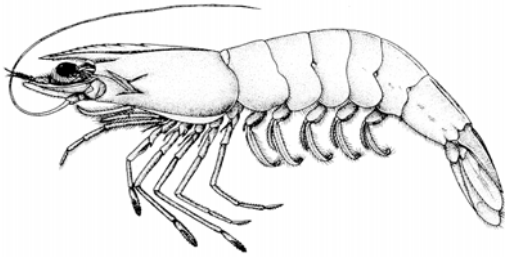
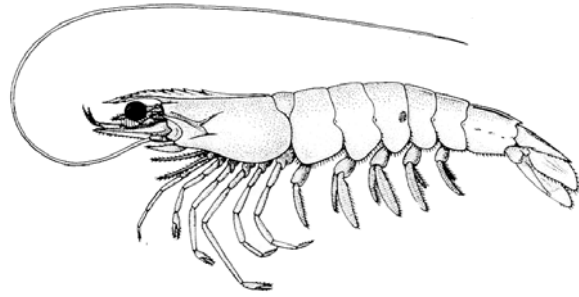


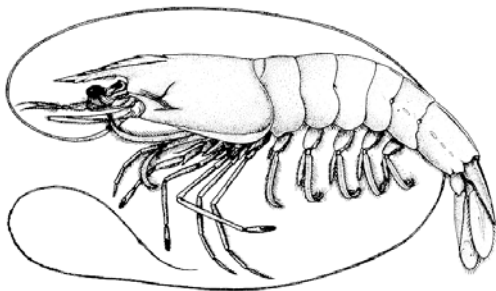
Penaeid shrimps



Brown shrimp, *Farfantepenaeus aztecus*



Pink shrimp, *Farfantepenaeus duorarum*



White shrimp, *Litopenaeus setiferus*

Three commercially important species of penaeoid shrimp occur on both coasts of Florida. The distribution of white shrimp, *Litopenaeus setiferus*, and brown shrimp, *Farfantepenaeus aztecus*, is intermittent in Florida waters. White shrimp do not occur from about St. Lucie Inlet on the Atlantic coast around the southern tip of Florida north to about the mouth of the Ochlockonee River. Brown shrimp do not occur on the gulf coast between Sanibel Island and Apalachicola Bay. All three shrimp species occur in nearshore waters and estuaries and use the estuaries as nursery areas. At various juvenile stages, penaeoid shrimp usually inhabit seagrass beds and algal mats within estuaries. Stable isotope studies show young pink shrimp that recruited to the southeastern Gulf of Mexico offshore fisheries are mostly migrants from seagrass meadows (Fry *et al.* 1999). Adult pink shrimp, *F. duorarum*, are most abundant at depths between 35' and 120'. White shrimp are most abundant in waters shallower than 90', and brown shrimp are most abundant in waters less than 180'. White shrimp are typically distributed in areas of low salinity over organic-rich, mud bottoms. Brown shrimp are found on similar bottoms but in higher salinities. Pink shrimp occur on more coarse sediments and in a wide variety of salinities (Steele unpublished ms.). White shrimp grow rapidly until about 6.3 inches total length (TL). Peak growth rates are 0.8 inches/month during summer. Brown shrimp can grow at peak rates of 1.8 inches/month during spring; pink shrimp peak growth rates have been reported to exceed 2.0 inches/month.

All three species mature during their first year. Sizes at maturity are about 5.5 inches TL for white and brown shrimp and about 3.3 inches TL for pink shrimp. Spawning occurs in relatively deep water for brown shrimp (49'–360') and pink shrimp (13'–160'), and in nearshore waters (20'–80') for white shrimp. White shrimp spawn during April–October. Pink and brown shrimp can spawn year-round, especially in deeper or more southern waters. Peak spawning

occurs during February and March for brown shrimp and during spring, summer, and fall for pink shrimp.

Reported commercial penaeid shrimp landings totaled 17,862,545 pounds in Florida during 2005. Most landings (74%) were made on the gulf coast. The geographic distribution of landings for each species was different. The greatest landings of brown shrimp were reported in the Panhandle region and in Lee County on the gulf coast, and in Nassau County on the Atlantic coast (Fig. 1). Pink shrimp were landed mostly in Dade, Monroe, Lee, Bay, Gulf and Franklin Counties and in the Tampa Bay Region (Fig. 2). White shrimp were landed mostly in northwest, east-central, northeast and south Florida in areas adjacent to extensive saltwater marshes and high freshwater run-off. As with some of the brown shrimp reported there, white shrimp reported from Monroe County may actually be pink shrimp (Fig. 3).

The 2005 total landings of penaeid shrimp were 0.5% higher than the average landings in the previous five years (2000–2004) and were 6% lower than the 1986–2005 historical average landings (Fig. 4). Commercial landings of penaeid shrimp increased on the Atlantic coast from a low of about 2.5 million pounds in 1984 to a peak of about 5.4 million pounds in 1999. Recent commercial landings figures indicate that there were 4.8 million pounds landed in 2002, 5.3 million pounds in 2004 and 4.7 million pounds in 2005 (Fig. 4). Gulf coast landings increased dramatically, from about 10.6 million pounds in 1992 to 24.6 million pounds in 1996, and then dropped to 17.8 million pounds in 1997 before rebounding to 22.3 million pounds in 1998. Gulf landings declined after 1998 and have averaged 13.4 million pounds during the period 1999–2005.

Standardized annual catch rates for all three species generally increased or held steady on both the Atlantic and gulf coasts since 1999. Brown shrimp catch rates have fluctuated with an increasing trend on both coasts prior to 1996 (Fig. 5, 6). Catch rates for pink shrimp fluctuated on both coasts, but peaked in the mid 1990s, declined then until 2000 and exhibited an increasing trend during the last five years (Figs. 7, 8). White shrimp catch rates on the Atlantic coast fluctuated without a trend until 2003, and have since increased (Fig. 9). On the gulf coast, white shrimp catch rates increased from 1992 to 1997, declined between 1999 and 2001 and have since increased (Fig. 10).

Indices of juvenile shrimp abundance were available for pink shrimp. The index of relative abundance fluctuated without trend on the Atlantic coast; recruitment of gulf coast young-of-the-year pink shrimp shows a discrete declining trend since 2000 (Figs. 11, 12).

An assessment of the condition of U.S. gulf and South Atlantic penaeid shrimp stocks suggests that they are all harvested at or slightly in excess the fishing mortality rates associated with maximum yield-per-recruit (Steele unpubl. data). Increasing the size-at-entry to the fishery could increase the yield and value of the landings for all three shrimp species. Available data do not suggest a strong link between parent stock abundance and subsequent abundance of their progeny. Regardless, estimated spawning potential ratios were estimated to be 4%–12% for brown shrimp and 13%–39% for white shrimp during 1970–1987 (Nance *et al.* 1989).

Nance (1999) found that the parent stock levels for brown shrimp in the Gulf of Mexico were up in 1998 at over 300 million age-7⁺-month-old shrimp for November through February, well above the 125 million overfishing threshold and the highest level since 1994. For white shrimp, the parent stock number had been highly variable since the mid 1980s and the number dropped slightly in 1998 to around 800-million individuals age-7⁺ months for May through August. However, this level is still well above the 330 million individuals overfishing threshold. Pink shrimp parent stock numbers were up in 1999 following a slight decline in 1998 to nearly

250-million age-5⁺ -month-old individuals for July through June and were well above the 100 million overfishing threshold.

Both regional federal councils, the South Atlantic Fishery Management Council and the Gulf of Mexico Fishery Management Council, have established fishery management plans for shrimp (GMFMC 1981; SAFMC 1993). The main objectives of these plans were to delay harvest of shrimps through season and area closures, reduce bycatch, and minimize gear conflicts. The SAMFC's shrimp fishery management plan was instituted to protect the white shrimp stock from over-harvest after severe winter cold-kills. This plan allows for the closure of the Exclusive Economic Zone after severe winter kills and requires permits as a first step toward possible limited entry.

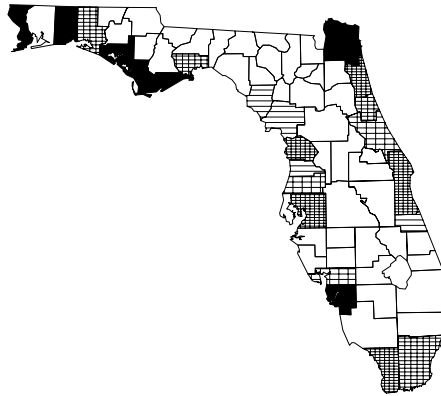


Figure 1. Geographic distribution of commercial landings of brown shrimp during 2005

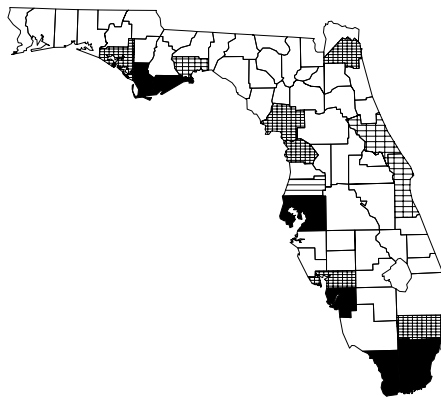


Figure 2. Geographic distribution of commercial landings of pink shrimp during 2005

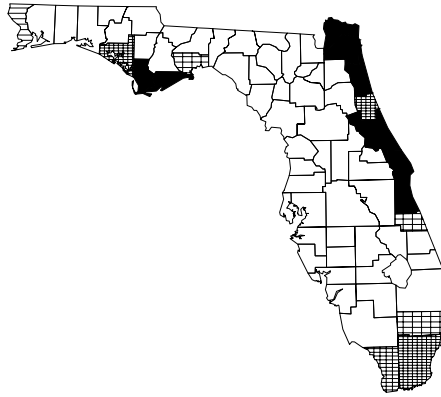


Figure 3. Geographic distribution of commercial landings of white shrimp during 2005

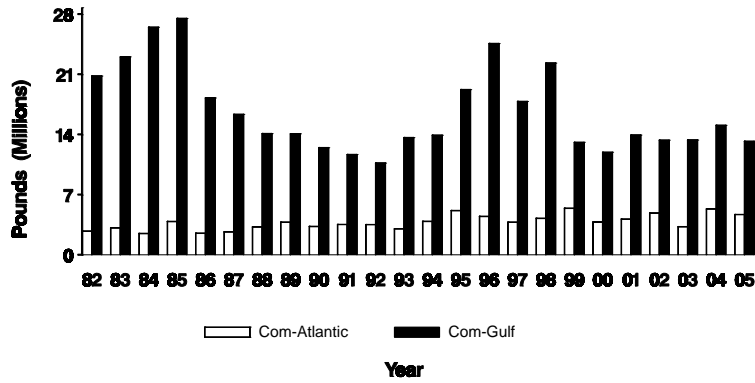


Figure 4. Total annual commercial landings of penaeid shrimp on the Atlantic and gulf coasts of Florida, 1982–2005

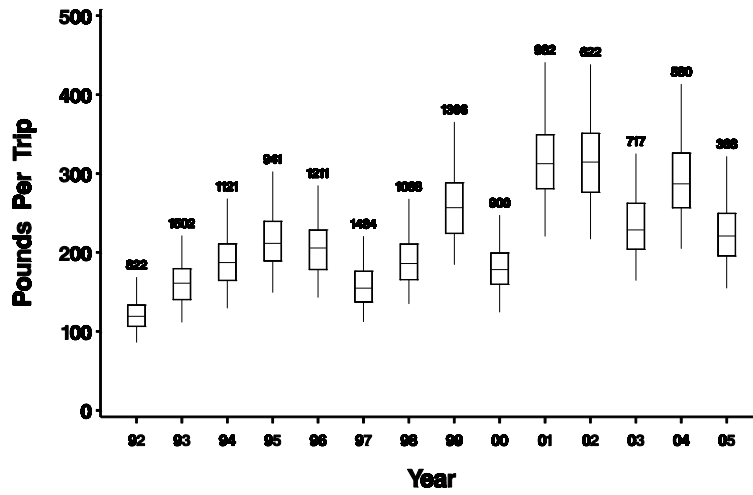


Figure 5. Standardized annual commercial catch rates (pounds) for brown shrimp on the Atlantic coast of Florida, 1992–2005

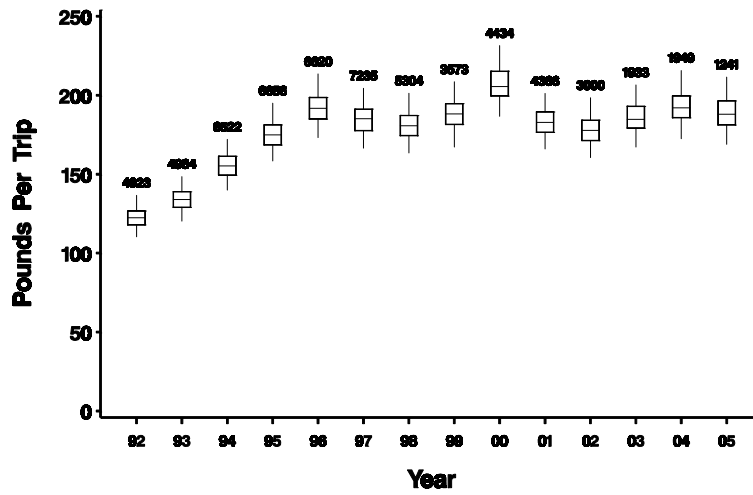


Figure 6. Standardized annual commercial catch rates (pounds) for brown shrimp on the gulf coast of Florida, 1992–2005

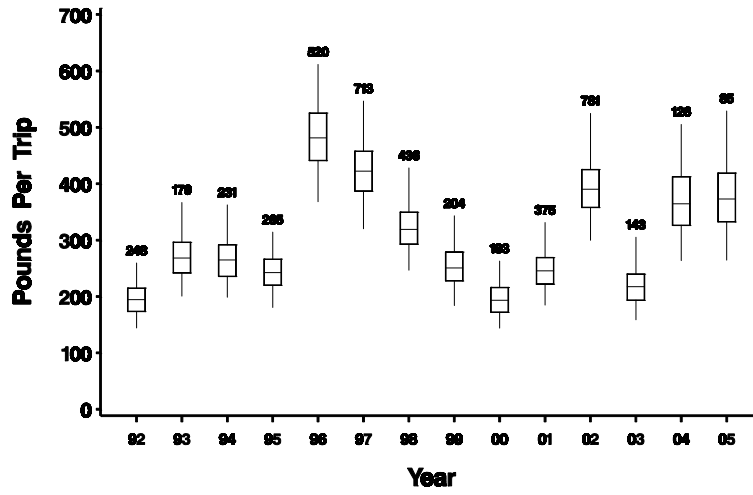


Figure 7. Annual standardized commercial catch rates (pounds) for pink shrimp on the Atlantic coast of Florida, 1992–2005

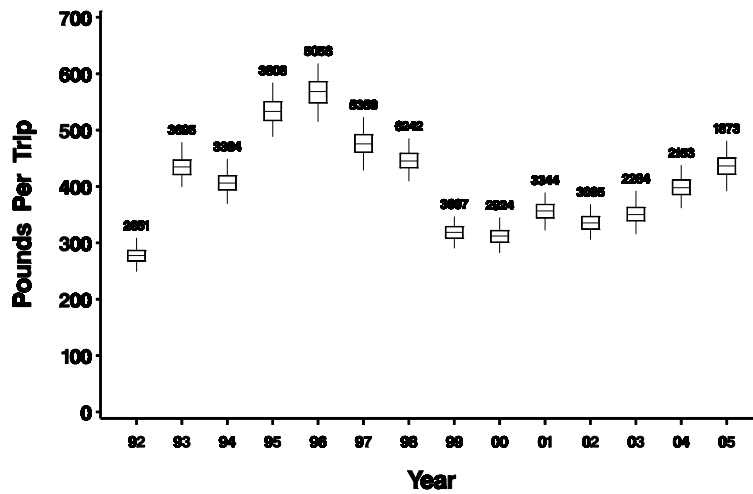


Figure 8. Annual standardized commercial catch rates (pounds) for pink shrimp on the Gulf coast of Florida, 1992–2005

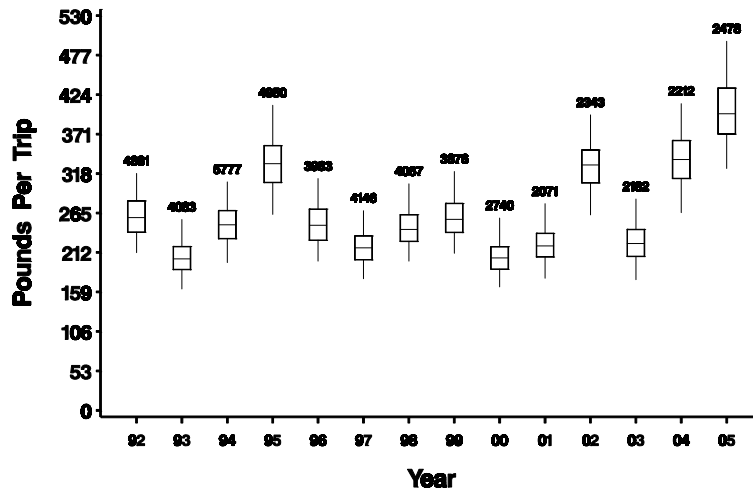


Figure 9. Annual standardized commercial catch rates (pounds) for white shrimp on the Atlantic coast of Florida, 1992–2005

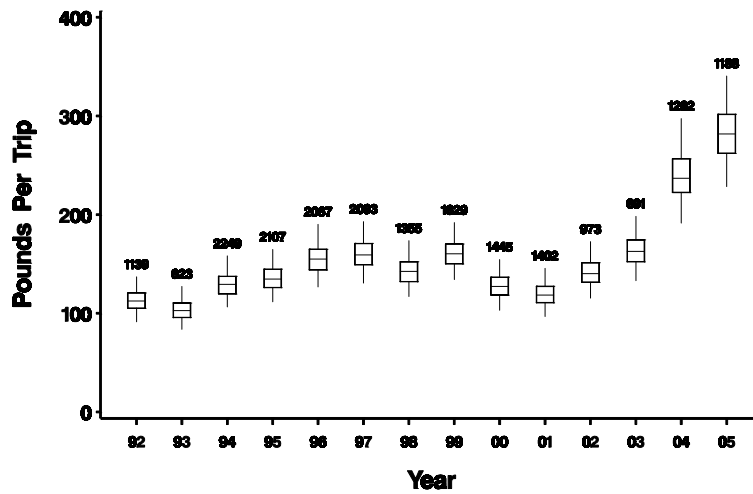


Figure 10. Annual standardized commercial catch rates (pounds) for white shrimp on the gulf coast of Florida, 1992–2005

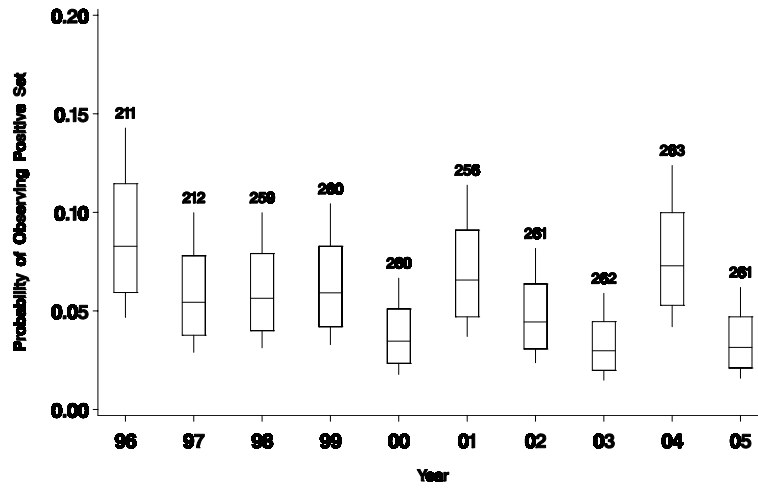


Figure 11. Proportion of fishery-independent-monitoring sets made on the Atlantic coast that captured young-of-the-year pink shrimp, 1996-2005

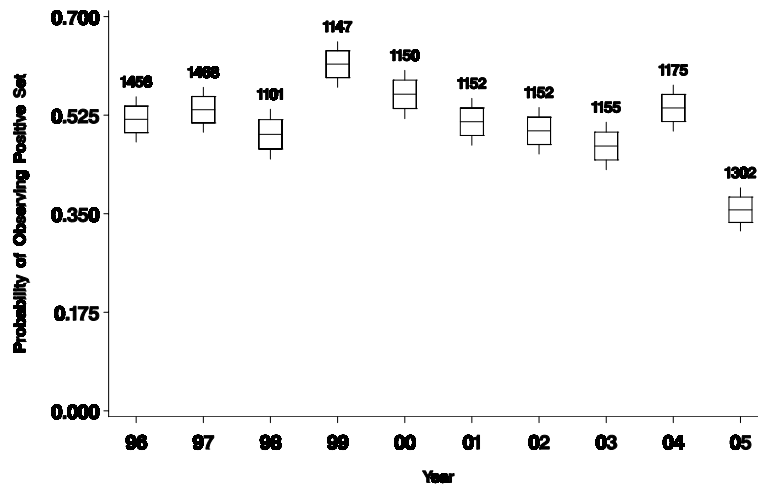


Figure 12. Proportion of fishery-independent-monitoring sets made on the gulf coast that captured young-of-the-year pink shrimp, 1996-2005

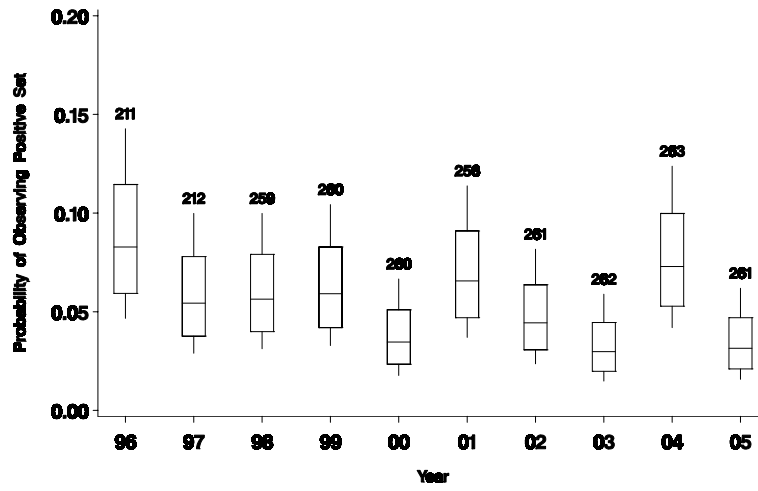


Figure 11. Proportion of fishery-independent-monitoring sets made on the Atlantic coast that captured young-of-the-year pink shrimp, 1996-2005

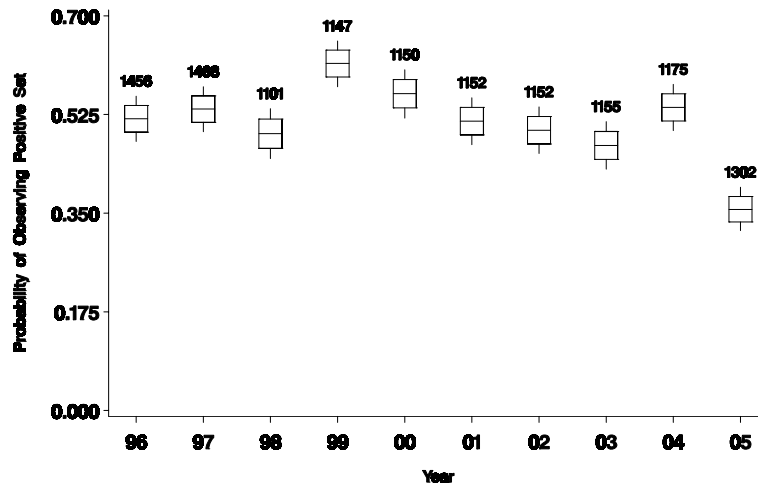


Figure 12. Proportion of fishery-independent-monitoring sets made on the gulf coast that captured young-of-the-year pink shrimp, 1996-2005