4.3 Living Resource Abundance

The Texas Parks and Wildlife Department (TPWD) maintains the database on coastal fisheries resources for Galveston Bay. This database is independent of the commercial and recreational fisheries databases held by the agency. The coastal fisheries resource database dates back to 1975. It is based on a randomized sampling method and includes information on a host of aquatic plants and animals sampled by the agency using a wide variety of sampling techniques. The Status and Trends Project uses data from bag seine, shrimp trawl, gill net, and oyster dredge collections. Data were analyzed to determine finfish and shellfish abundance for West Bay, Christmas Bay, Upper and Lower Galveston Bay, East Bay, and Trinity Bay.

Data are reported as Catch Per Unit Effort (CPUE). CPUE standardizes catch data based on the amount of the effort (total time or area sampled). Bag seine CPUE is reported as number of individuals captured per area (hectares) sampled. Shrimp trawl, gill net, and oyster dredge are reported as number of individuals captured per hour sampled.

To aid the reader, each trend graph is annotated with the average, minimum, and maximum number of samples collected in a year. An R^2 value is also included in each graph to aid the reader in determining significance of the trend line. The Status and Trends Project does not consider a trend to be significant if $R^2 < 0.25$. In some instances a trend line may extend to the x-axis (zero CPUE). This is not meant to infer that the level of the fisheries resource will actually fall to the zero level at a given point in time. Rather, trend lines are meant to provide the reader with an idea of the general direction of a trend.

The TPWD uses standardized sampling methodologies (selection of sampling station, gear type and size, sampling time, etc.) when collecting fisheries resource data. TPWD sampling methodologies can be reviewed in the agency's Marine Resource Monitoring Operations Manual (TPWD, 2001).

4.3.1. Trends in Fisheries Populations Sampled with Bag Seine

Bag seines are deployed in areas near shorelines and marsh edges. The data from bag seine collections are used to describe the variation in abundance and size of smaller species and young of the year (juvenile individuals). Bag seine sample sizes in the TPWD data are good with annual average sample size (1976-2001) being 40 samples per year in West Bay, 17 samples per year in Christmas Bay, 21 samples per year in Upper and Lower Galveston Bay, 20 samples per year in East Bay, and 25 samples per year in Trinity Bay. Information describing minimum annual sample sizes and maximum annual sample sizes for each of the sub-bays is located on the trend graphs and in Appendix F.

Of the 136 trend analyses conducted by the Status and Trends Project on samples collected with bag seines, only 4% exhibited significant trends ($R^2 > 0.25$). Displayed in this section are those species for which a trend was found. Graphs for a few other species of interest are displayed as well.

Lesser Blue Crab

The lesser blue crab (*Callinectes similis*) is a close relative of the blue crab (*Callinectes sapidus*). Although the carapace size of the adult lesser blue crab is smaller than the blue crab, it is often confused with its larger cousin. Of the five sub-bays for which annual CPUEs were analyzed, lesser blue crab captured with bag seine exhibit no significant trends (R^2<0.25) in West Bay, East Bay or Trinity Bay (Table 4.3.1.1). However, as seen in Figure 4.3.1.1, lesser blue crab demonstrates an increasing trend in Upper and Lower Galveston Bay. CPUE is variable among years, but a dramatic shift is seen after 1987. An increasing trend is also seen in Christmas Bay (Figure 4.3.1.2). Although not as dramatic, the increase is evident after 1991. Increasing trends in this species are of interest and warrant further study as its closest relative, the blue crab, shows signs of decreasing trends in some areas.

Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.1.1. Summary of Annual Trends in Lesser Blue Crab CPUE (number captured per hectare with bag seine).

Study Area	Trend Direction	R^2 Value
Christmas Bay	Increasing	0.25 (p = 0.010)
West Bay	No Trend	0.01
Upper and Lower Galveston Bay	Increasing	0.32 (p = 0.002)
East Bay	No Trend	0.02
Trinity Bay	No Trend	0.05

Figure 4.3.1.1. Annual CPUE of Lesser Blue Crab Captured in Bag Seine in Upper and Lower Galveston Bay

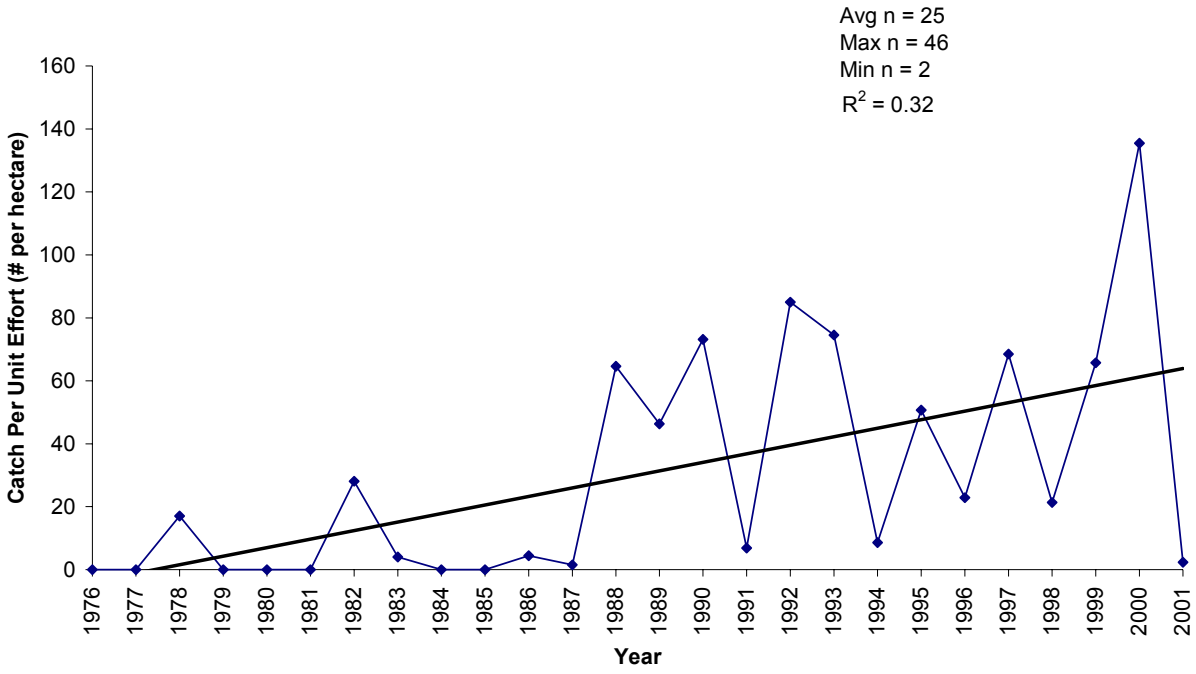
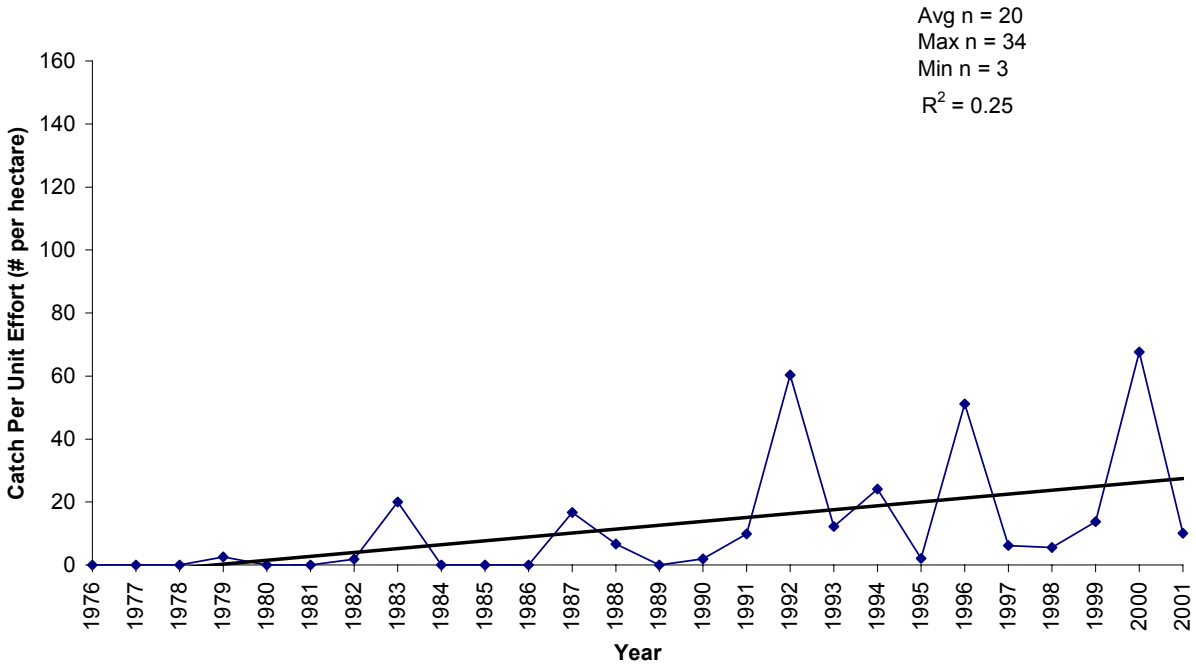


Figure 4.3.1.2. Annual CPUE of Lesser Blue Crab Captured in Bag Seine in Christmas Bay



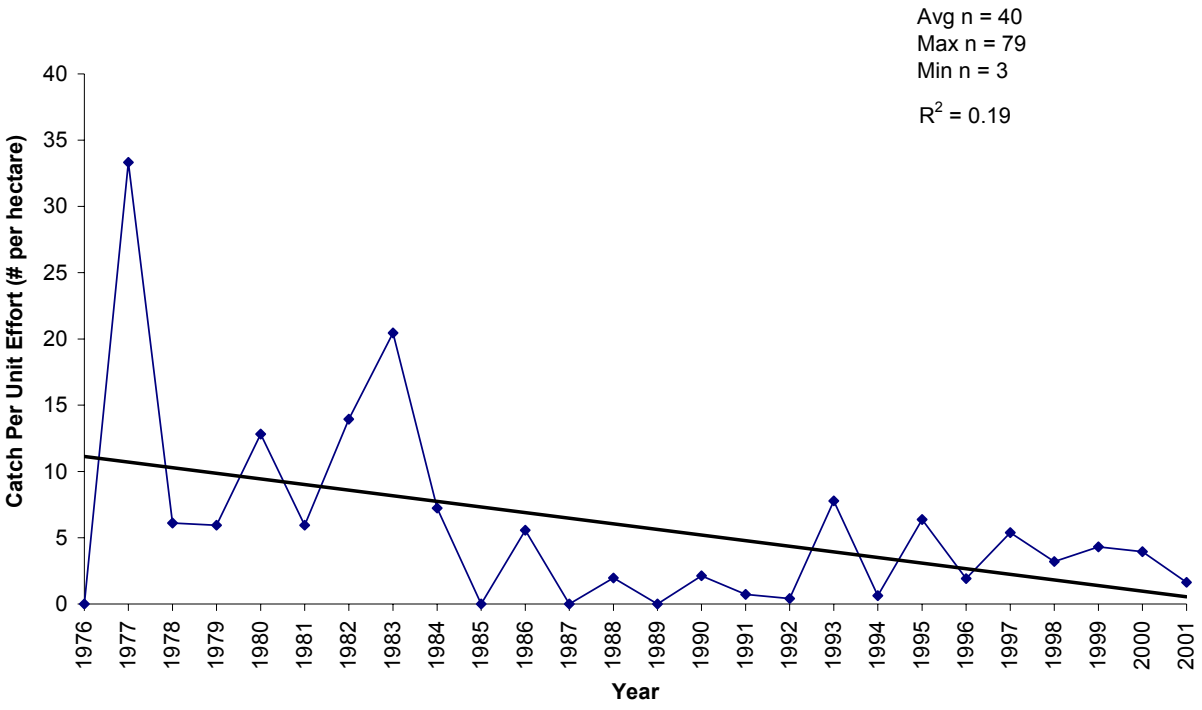
Atlantic Stingray

The Atlantic stingray is a cartilaginous fish common to the coasts of the Gulf of Mexico and Atlantic Ocean. Unlike other members of the Sub-class Elasmobranchii, the Atlantic stingray is tolerant of a range of salinities. It has been collected in bag seine samples from each of the five sub-bays of Galveston Bay since 1976. Of the five sub-bays analyzed, Atlantic stingray exhibit no trends (Table 4.3.1.2). However, as seen in Figure 4.3.1.3, it does appear that the catch in West Bay has decreased somewhat since 1983. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.1.2. Summary of Annual Trends in Atlantic Stingray CPUE (number captured per hectare with bag seine).

Study Area	Trend Direction	R^2 Value
Christmas Bay	No Trend	0.05
West Bay	No Trend	0.19 (p = 0.026)
Upper and Lower Galveston Bay	No Trend	0.01
East Bay	No Trend	0.06
Trinity Bay	No Trend	0.01

Figure 4.3.1.3. Annual CPUE of Atlantic Stingray Captured in Bag Seine in West Bay



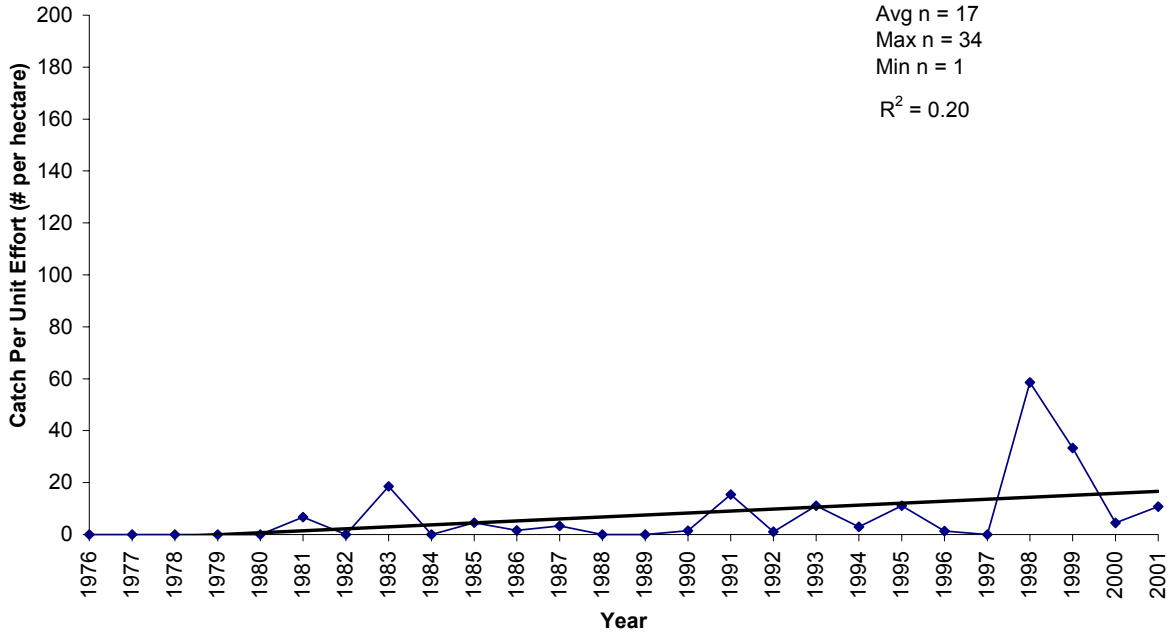
Bay Whiff

The bay whiff belongs to the Family of left-eye flounders and is a close relative of the Southern flounder and the fringed flounder. Of the five sub-bays analyzed, bay whiff exhibit no trends (Table 4.3.1.3). However, as seen in Figure 4.3.1.4, it does appear that the catch in Trinity Bay exhibited an increase in 1998. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.1.3. Summary of Annual Trends in Bay Whiff CPUE (number captured per hectare with bag seine).

Study Area	Trend Direction	R^2 Value
Christmas Bay	No Trend	0.01
West Bay	No Trend	0.20
Upper and Lower Galveston Bay	No Trend	7E-09
East Bay	No Trend	0.01
Trinity Bay	No Trend	0.20 (p = 0.023)

Figure 4.3.1.4. Annual CPUE of Bay Whiff Captured in Bag Seine in Trinity Bay



Gulf Killifish

The Gulf killifish (or mud minnow) is an inhabitant estuarine marsh and backwater areas. It serves an important ecological role in the estuary as a primary consumer and prey species that transfers energy from emergent marshes to predatory fishes and piscivorous birds (Patillo et al., 1997). It is also a popular bait species for anglers and is tolerant of a wide range of salinities. Of the five sub-bays analyzed, Gulf killifish captured with bag seine exhibit no significant trends (R^2<0.25) in Christmas Bay, East Bay or Trinity Bay (Table 4.3.1.4). However, as seen in Figure 4.3.1.5, Gulf killifish demonstrate a decreasing trend in West Bay. A decline is evident for the years after 1980. A decreasing trend is also seen in Upper and Lower Galveston Bay (Figure 4.3.1.6). Decreasing trends for this species are of interest and warrant further study due to this species' role in the food web. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.1.4. Summary of Annual Trends in Gulf Killifish CPUE (number captured per hectare with bag seine).

Study Area	Trend Direction	R^2 Value
Christmas Bay	No Trend	0.05
West Bay	Decreasing	0.25 (p = 0.009)
Upper and Lower Galveston Bay	Decreasing	0.30 (p = 0.004)
East Bay	No Trend	0.05
Trinity Bay	No Trend	0.01

Figure 4.3.1.5. Annual CPUE of Gulf Killifish Captured in Bag Seine in West Bay

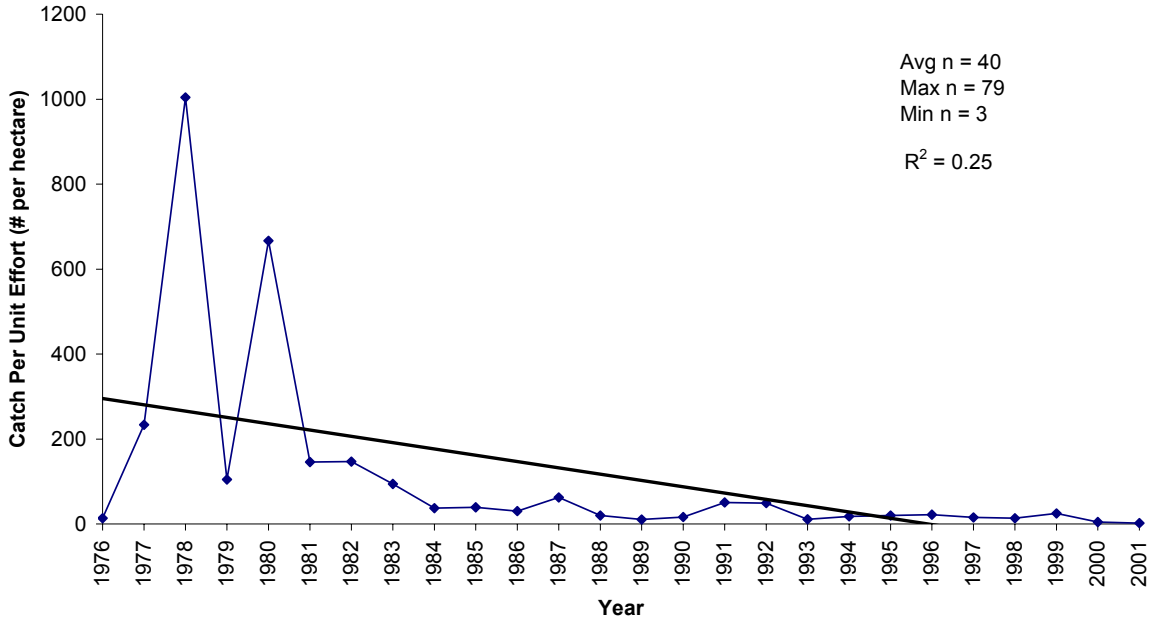
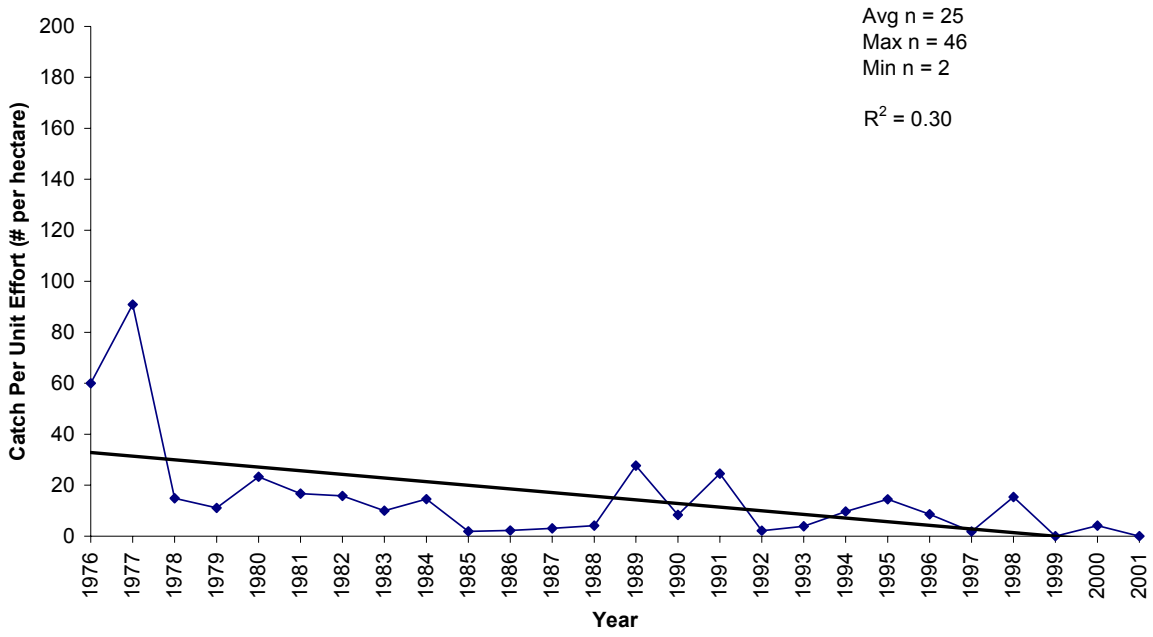


Figure 4.3.1.6. Annual CPUE of Gulf Killifish Captured in Bag Seine in Upper and Lower Galveston Bay



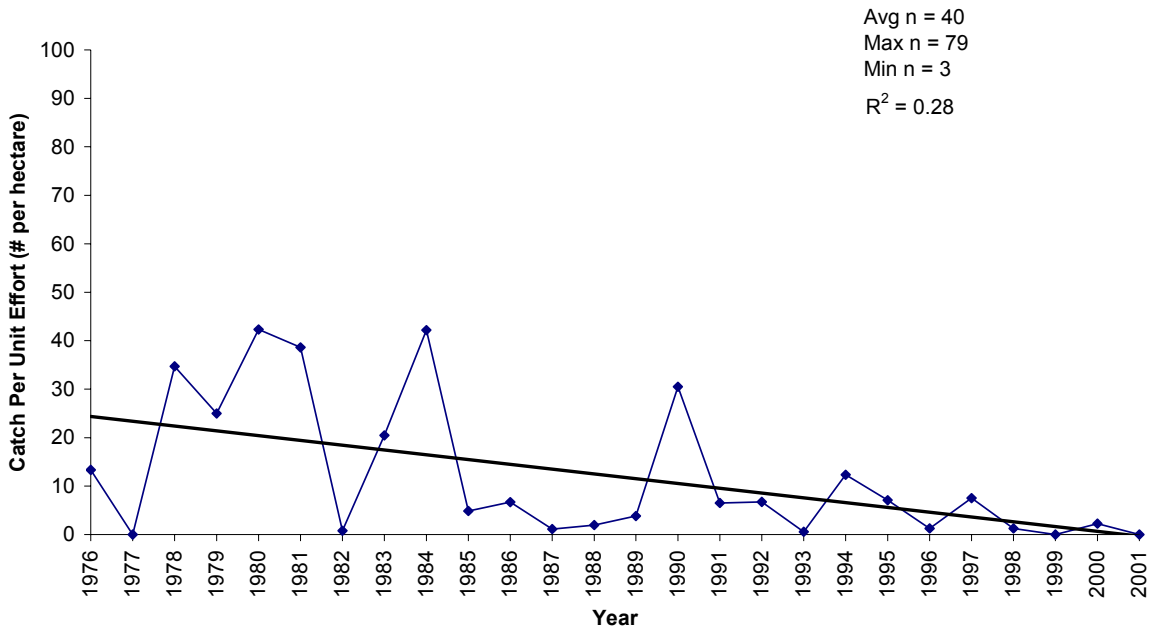
Least Puffer

The least puffer is a species common to estuaries along the Gulf Coast. Of the five sub-bays analyzed, least puffer captured with bag seine exhibit no significant trends (R^2<0.25) in Christmas Bay, Upper and Lower Galveston Bay, East Bay or Trinity Bay (Table 4.3.1.5). However, as seen in Figure 4.3.1.7, least puffer demonstrates a decreasing trend in West Bay. A decline is evident for the years after 1990. Although not meeting the trend criterion of this study, least puffer may be exhibiting declines in Christmas and East Bays as well. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.1.5. Summary of Annual Trends in Least Puffer CPUE (number captured per hectare with bag seine).

Study Area	Trend Direction	R^2 Value
Christmas Bay	No Trend	0.17
West Bay	Decreasing	0.28 (p = 0.006)
Upper and Lower Galveston Bay	No Trend	0.00
East Bay	No Trend	0.17
Trinity Bay	No Trend	0.07

Figure 4.3.1.7. Annual CPUE of Least Puffer Captured in Bag Seine in West Bay



4.3.2. Trends in Fisheries Populations Sampled with Shrimp Trawl

Shrimp trawls are deployed in open water areas of the bay. The data from shrimp trawl collections are used to describe the variation in abundance, size, and movement (through tagging efforts for finfish) of species that inhabit waters over open bay bottom. Sample sizes in the TPWD data are good with annual average sample size (1976-2001) being 36 samples per year in West Bay, 110 samples per year in Upper and Lower Galveston Bay, 24 samples per year in East Bay, and 62 samples per year in Trinity Bay. Christmas Bay was not analyzed due to low sample numbers. Christmas Bay's shallow depth and submerged aquatic vegetation habitats make trawl deployment difficult. Information describing minimum annual sample sizes and maximum annual sample sizes for each of the sub-bays is located on the trend graphs and in Appendix F.

The 2002 Status and Trends Project analyzed shrimp trawl collections for many recreationally and commercially important species in the five sub-bays of Galveston Bay. The 2003 Status and Trends Project focused mainly on the analysis of additional species. Due to the separation of West Bay and Christmas Bay sampling stations for the Status and Trends 2003 project, the analysis of annual average CPUE for those areas was re-calculated. Results are displayed here. For the remaining areas (Upper and Lower Galveston Bay, Trinity Bay, and East Bay), please refer to the graphs presented in 2002 Status and Trends Report.

Of the 85 trend analyses on samples collected with shrimp trawls by the Status and Trends Project, only 7% exhibited significant trends ($R^2 > 0.25$). Displayed in this section are those species for which a trend was found. Graphs for a few other species of interest are displayed as well.

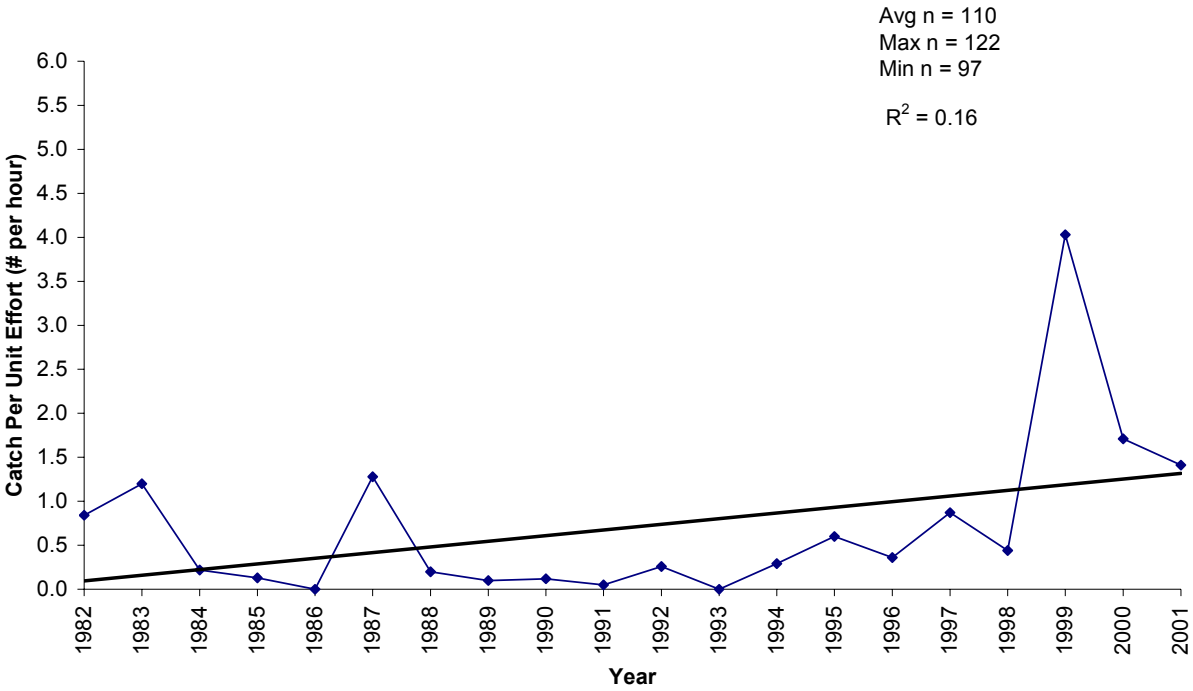
Cabbagehead

The cabbagehead is a species of jellyfish common to the Galveston Bay system in warm weather months. It lacks the long tentacles of other jellyfish and its stinging cells produce little to no effect in humans. Of the four sub-bays analyzed, cabbagehead exhibited no trends (Table 4.3.2.1). However, as seen in Figure 4.3.2.1, it does exhibit large increases in some years as seen in Upper and Lower Galveston Bay in 1999. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.2.1. Summary of Annual Trends in Cabbagehead CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	No Trend	0.06
Upper and Lower Galveston Bay	No Trend	0.16
East Bay	No Trend	0.01
Trinity Bay	No Trend	0.07

Figure 4.3.2.1. Annual CPUE of Cabbagehead Captured in Shrimp Trawl in Upper and Lower Galveston Bay



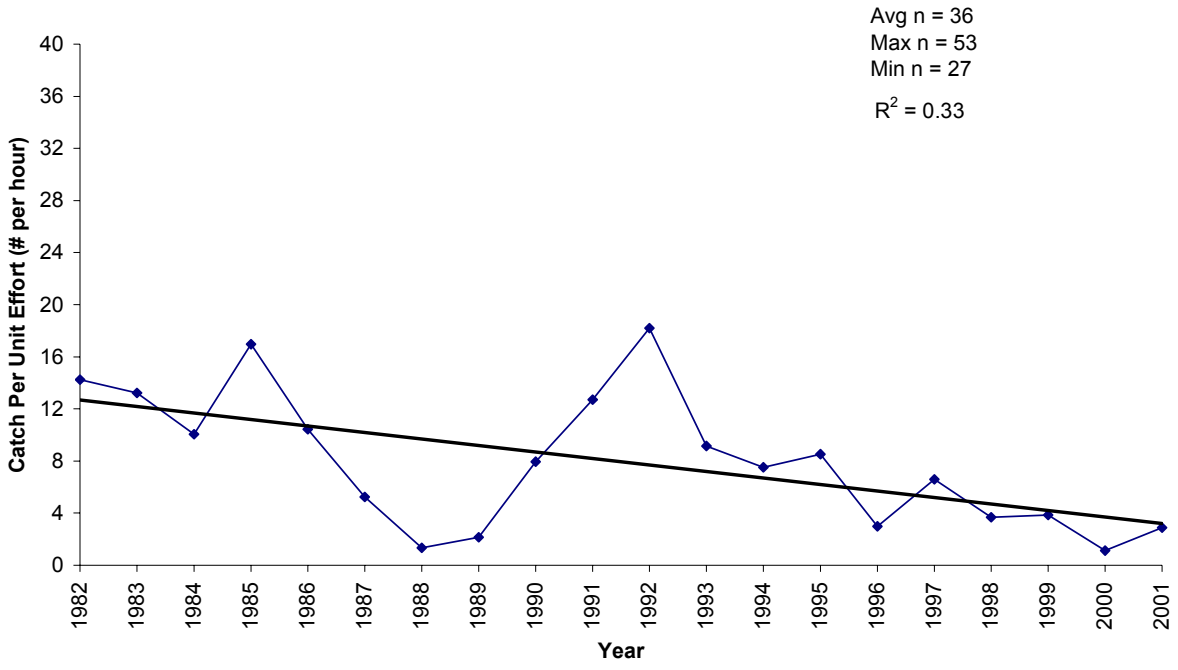
Blue Crab

Blue crab is the most common, edible species of crab along Gulf of Mexico and Atlantic coasts. Shrimp trawl collections in Christmas Bay were not analyzed due to small sample sizes. Trends in blue crab CPUE for other areas of Galveston Bay can be viewed in the 2002 Report. As seen in Figure 4.3.2.2, blue crab demonstrated a decreasing trend in West Bay. A decline is evident for the years after 1992. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.2.2. Summary of Annual Trends in Blue Crab CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	Decreasing	0.33 (p = 0.009)
Upper and Lower Galveston Bay	Refer to 2002 Report	--
East Bay	Refer to 2002 Report	--
Trinity Bay	Refer to 2002 Report	--

Figure 4.3.2.2. Annual CPUE of Blue Crab Captured in Shrimp Trawl in West Bay



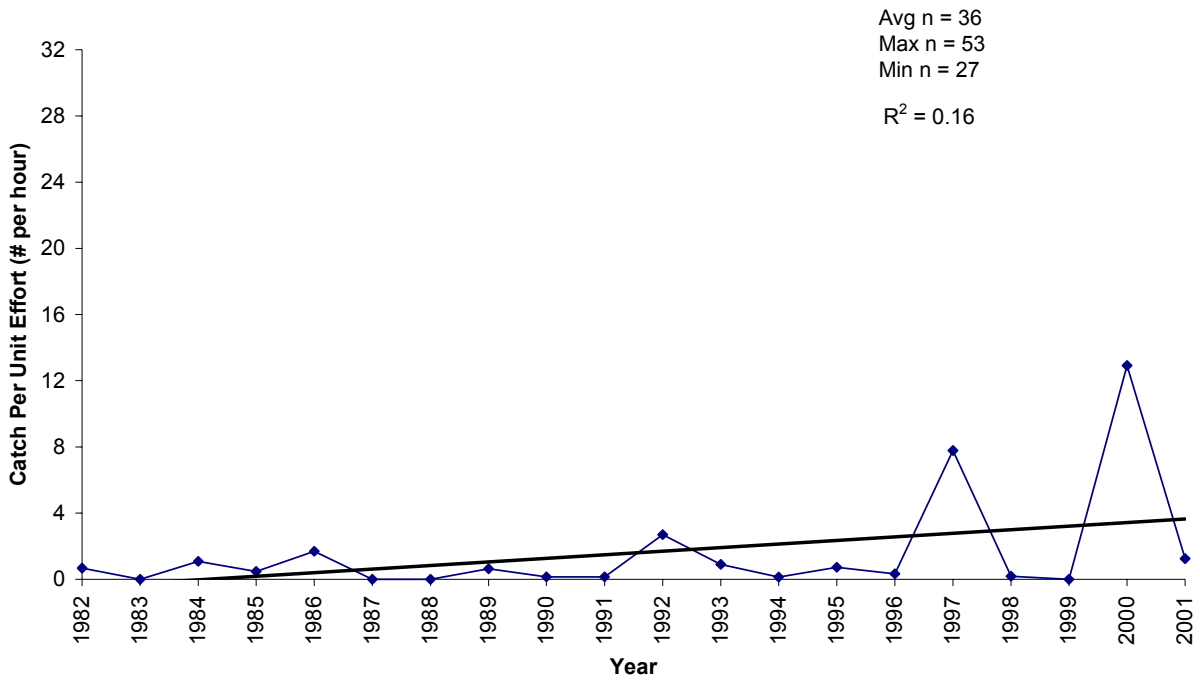
Lesser Blue Crab

Unlike the increasing annual average CPUEs associated with bag collections lesser blue crab exhibits no trends in shrimp trawl CPUE in the four sub-bays analyzed (Table 4.3.2.3). However, as seen in Figure 4.3.2.3, the catch can change dramatically from year to year as the CPUE in West Bay demonstrates with increases in 1997 and 2000. Catches for lesser blue crab also exhibit an increase in the year 2000 in East Bay. Trend graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.2.3. Summary of Annual Trends in Lesser Blue Crab CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	No Trend	0.16
Upper and Lower Galveston Bay	No Trend	0.16
East Bay	No Trend	0.14
Trinity Bay	No Trend	0.06

Figure 4.3.2.3. Annual CPUE of Lesser Blue Crab Captured in Shrimp Trawl in West Bay



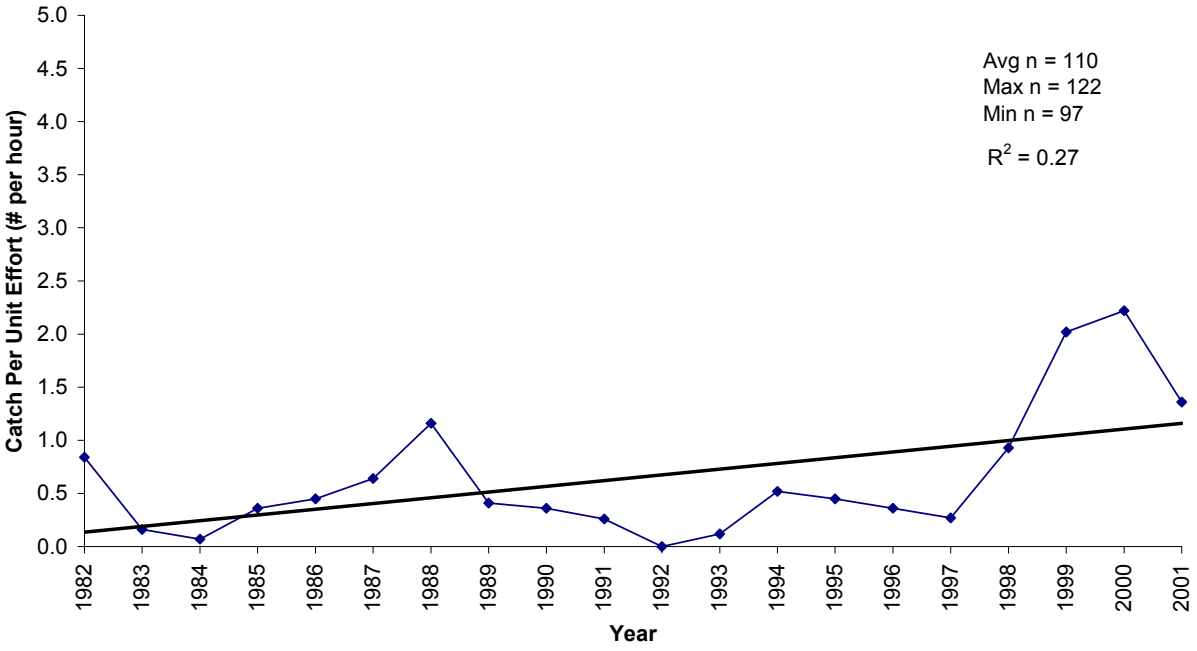
Seabob

The seabob is a marine species of shrimp generally not considered to be estuarine dependent. Of the four sub-bays analyzed, seabob captured with shrimp trawl exhibits no significant trends (R^2<0.25) in Christmas Bay, West Bay, East Bay or Trinity Bay (Table 4.3.2.4). However, as seen in Figure 4.3.2.4, seabob demonstrates an increasing trend in Upper and Lower Galveston Bay. Trend graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.2.4. Summary of Annual Trends in Seabob CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	No Trend	0.24 (p = 0.030)
Upper and Lower Galveston Bay	Increasing	0.27 (p = 0.019)
East Bay	No Trend	0.05
Trinity Bay	No Trend	0.18

Figure 4.3.2.4. Annual CPUE of Seabob Captured in Shrimp Trawl in Upper and Lower Galveston Bay



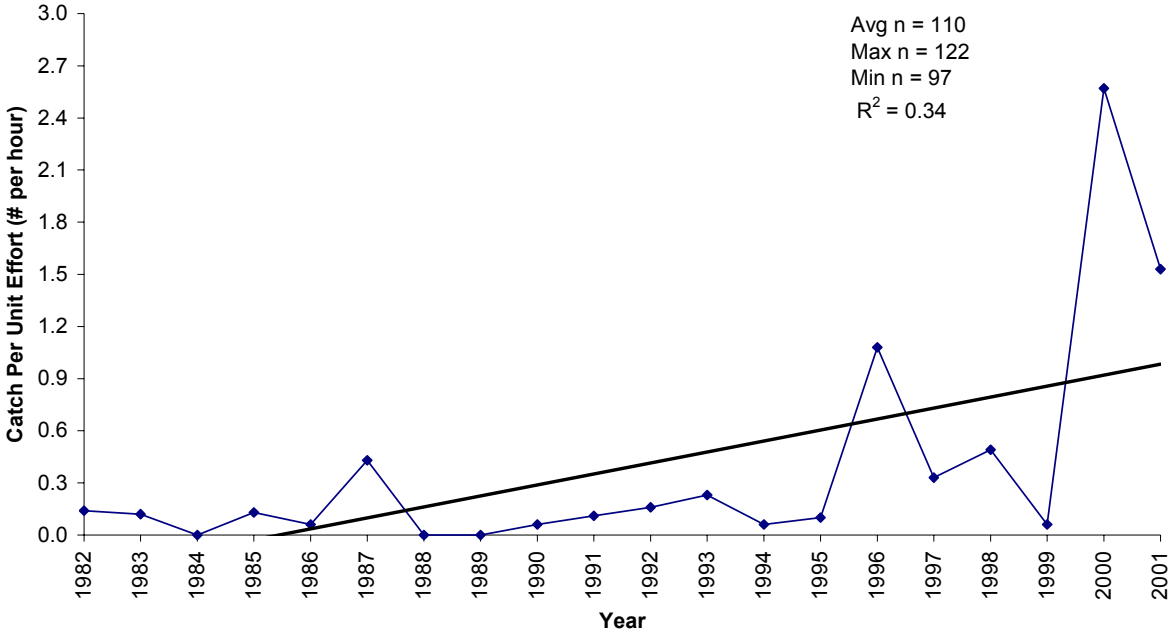
Pink Shrimp

Pink shrimp are found in Galveston Bay, but tend to be more abundant in the higher salinity estuaries of the lower Texas Coast. Of the four sub-bays analyzed, pink shrimp captured with shrimp trawl exhibit no significant trends (R^2<0.25) in Christmas Bay, West Bay, East Bay or Trinity Bay (Table 4.3.2.5). However, as seen in Figure 4.3.2.5, pink shrimp exhibited an increasing trend in Upper and Lower Galveston Bay. Peak abundances appear in the years 1996, 2000 and 2001. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.2.5. Summary of Annual Trends in Pink Shrimp CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	No Trend	0.00
Upper and Lower Galveston Bay	Increasing	0.34 (p = 0.007)
East Bay	No Trend	0.08
Trinity Bay	No Trend	0.01

Figure 4.3.2.5. Annual CPUE of Pink Shrimp Captured in Shrimp Trawl in Upper and Lower Galveston Bay



Bay Anchovy

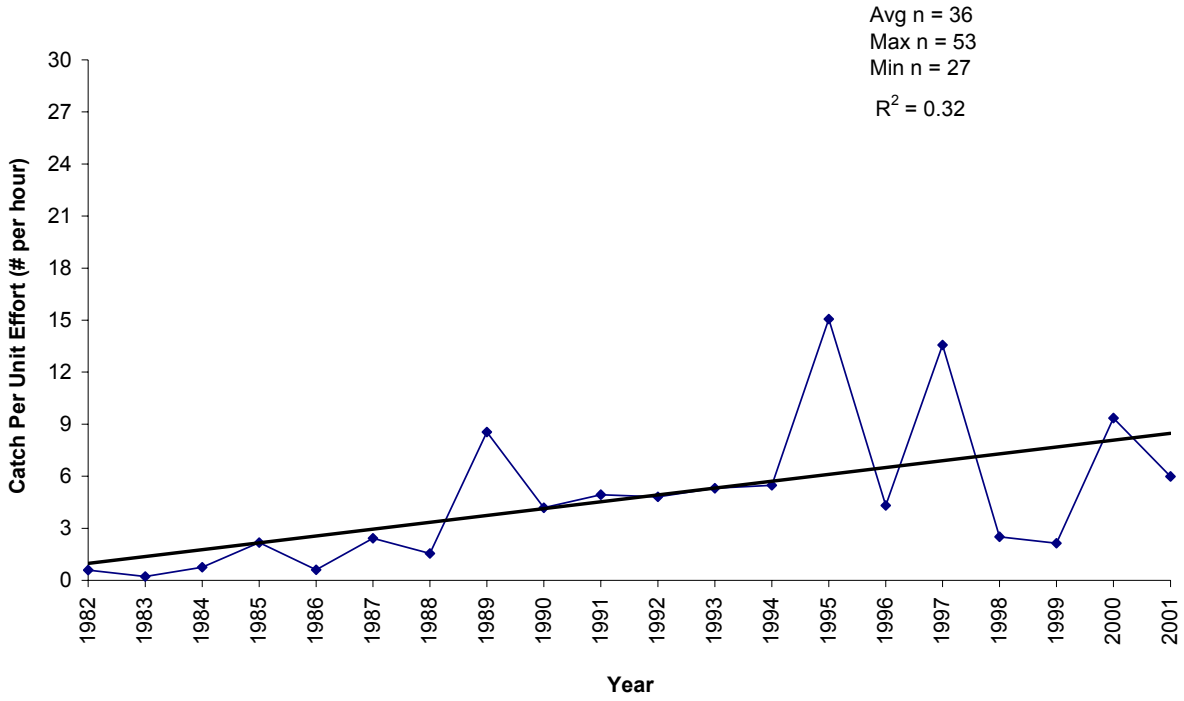
The bay anchovy is a common inhabitant of Galveston Bay and is important due to its status as a prey species for larger, predatory fish. The bay anchovy is a secondary consumer feeding on zooplankton. It can tolerate a wide range of salinity and habitat types (Patillo et al., 1997). As seen in Figure 4.3.2.6, bay anchovy demonstrates an increasing trend in West Bay. Elevated annual average CPUEs are evident in 1995 and 1997.

Shrimp trawl collections in Christmas Bay were not analyzed due to small sample sizes. Trends for other areas of Galveston Bay can be viewed in the 2002 Report. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.2.6. Summary of Annual Trends in Bay Anchovy CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	Increasing	0.32 (p = 0.010)
Upper and Lower Galveston Bay	Refer to 2002 Report	--
East Bay	Refer to 2002 Report	--
Trinity Bay	Refer to 2002 Report	--

Figure 4.3.2.6. Annual CPUE of Bay Anchovy Captured in Shrimp Trawl in West Bay



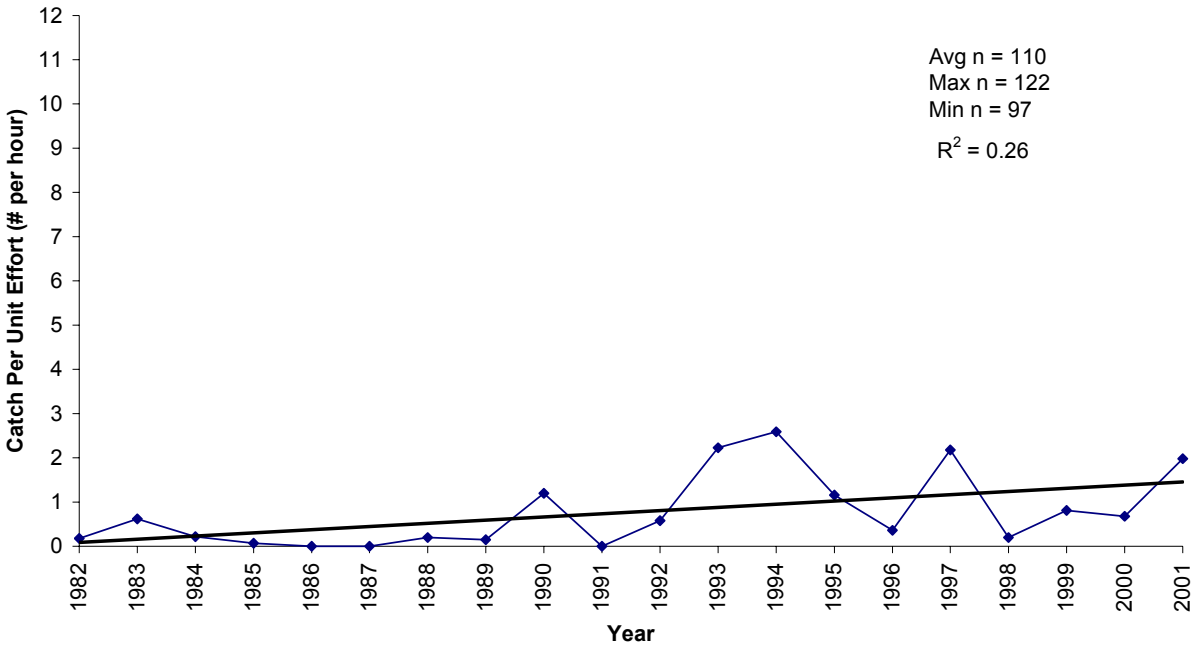
Gafftopsail Catfish

The gafftopsail catfish is a common inhabitant of Texas coastal waters and is known for its venomous dorsal spines. This species feeds at all levels of the water column and consumes a wide variety of food, including blue crab. Of the four sub-bays analyzed, gafftopsail catfish captured with shrimp trawl exhibited no significant trends (R^2<0.25) in Christmas Bay, West Bay, East Bay or Trinity Bay (Table 4.3.2.7). However, as seen in Figure 4.3.2.7, gafftopsail catfish demonstrated an increasing trend in Upper and Lower Galveston Bay. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.2.7. Summary of Annual Trends in Gafftopsail Catfish CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	No Trend	0.03
Upper and Lower Galveston Bay	Increasing	0.26 (p = 0.023)
East Bay	No Trend	0.07
Trinity Bay	No Trend	0.06

Figure 4.3.2.7. Annual CPUE of Gafftopsail Catfish Captured in Shrimp Trawl in Upper and Lower Galveston Bay



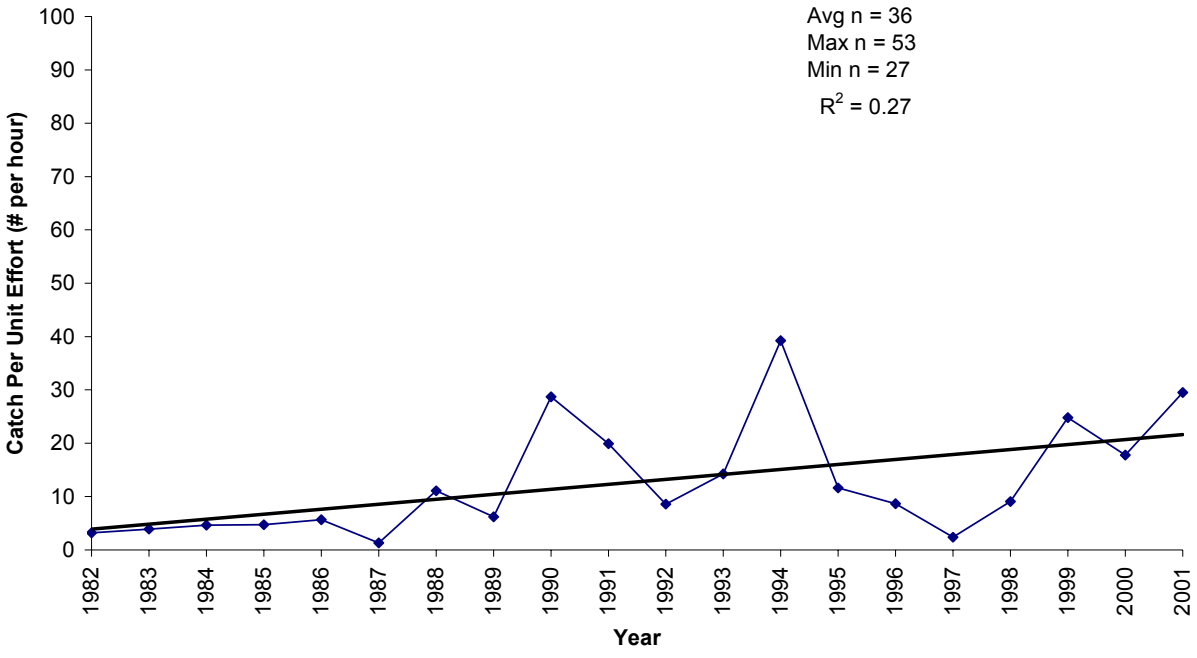
Pinfish

The pinfish is a very common species recognized by anglers because of its tendency to be incidentally captured. According to Patillo et al. (1997), the pinfish is an estuarine dependent species so abundant and predaceous it has the ability to alter the composition of estuarine epifaunal communities. Shrimp trawl collections in Christmas Bay were not analyzed due to small sample sizes. Trends for other areas of Galveston Bay can be viewed in the 2002 Report. As seen in Figure 4.3.2.8, pinfish demonstrate an increasing trend in West Bay with elevated CPUEs in 1990, 1994, 1999, and 2001. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.2.8. Summary of Annual Trends in Pinfish CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	Increasing	0.27 (p = 0.019)
Upper and Lower Galveston Bay	Refer to 2002 Report	--
East Bay	Refer to 2002 Report	--
Trinity Bay	Refer to 2002 Report	--

Figure 4.3.2.8. Annual CPUE of Pinfish Captured in Shrimp Trawl in West Bay



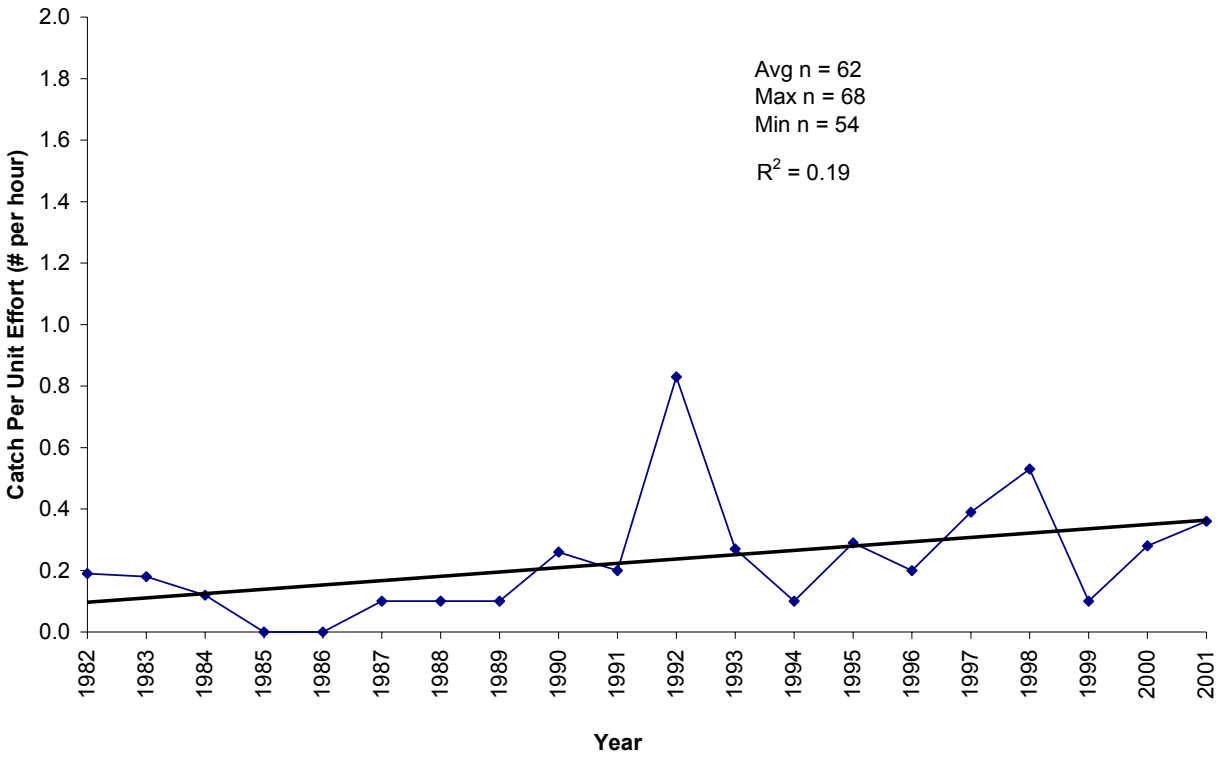
Sheepshead

The sheepshead is a common inhabitant of Galveston Bay waters and is recognizable by its dark vertical bars and pronounced incisor-like teeth. It is tolerant of a wide range of salinities. It is a demersal (bottom-dwelling) predator that may be important in controlling the structure of sessile invertebrate and epifaunal communities (Patillo et al., 1997). Of the four sub-bays analyzed, sheepshead exhibits no trends (Table 4.3.2.9). However, as seen in Figure 4.3.2.9, it does appear that the catch in Trinity Bay demonstrates an increase in 1992 and 1998. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.2.9. Summary of Annual Trends in Sheepshead CPUE (number captured per hour using shrimp trawl). Christmas Bay was not analyzed due to low sample sizes.)

Study Area	Trend Direction	R^2 Value
Christmas Bay	N/A	N/A
West Bay	No Trend	0.02
Upper and Lower Galveston Bay	No Trend	0.09
East Bay	No Trend	0.23 (p = 0.033)
Trinity Bay	No Trend	0.19

Figure 4.3.2.9. Annual CPUE of Pinfish Captured in Shrimp Trawl in Trinity Bay



4.3.3. Trends in Fisheries Populations Sampled with Gill Net

Gill nets are deployed near and perpendicular to the shoreline. The data from gill net collections are used to describe the variation in abundance, size, and movement (through tagging efforts) of sub-adult and adult finfish and crustaceans (e.g. blue crab). Sample sizes in the TPWD data were somewhat smaller than those associated with other gear types.

The 2002 Status and Trends Project analyzed gill net collections for many recreationally and commercially important species in the five sub-bays of Galveston Bay. Due to the separation of West Bay and Christmas Bay sampling stations for the 2003 project, the analysis of annual average CPUE for those areas was re-calculated and is presented here. For the remaining areas (Upper and Lower Galveston Bay, Trinity Bay, and East Bay), please refer to the graphs presented in 2002 Status and Trends Report.

Annual average sample size (1976-2001) was 24 samples per year in West Bay and eight samples per year in Christmas Bay. Information describing minimum annual sample sizes and maximum annual sample sizes for each of the sub-bays is located on the trend graphs and in Appendix F.

Of the 12 trend analyses on samples collected with gill nets run by the Status and Trends Project, 25% exhibited significant trends ($R^2 > 0.25$). Displayed in this section are those species for which a trend was found.

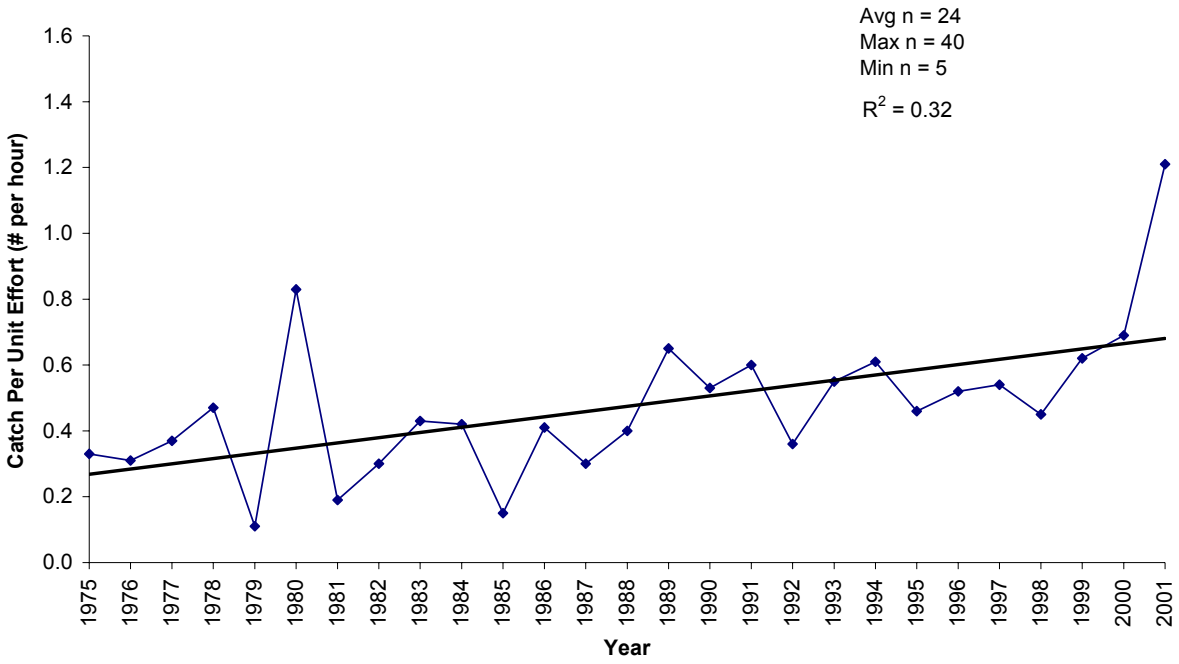
Black Drum

The black drum is a commercially and recreationally important finfish species that is estuarine dependent for a large portion of its life cycle. The black drum is a demersal species that feeds on benthic organisms, primarily bivalve molluscs (Patillo et al., 1997). As seen in Figure 4.3.3.1, black drum demonstrates a steadily increasing trend in West Bay, but no trend in Christmas Bay. Trends for other areas of Galveston Bay can be viewed in the 2002 Report. The trends graph for Christmas Bay can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.3.1. Summary of Annual Trends in Black Drum CPUE (number captured per hour using gill net).

Study Area	Trend Direction	R^2 Value
Christmas Bay	No Trend	0.00
West Bay	Increasing	0.32 (p = 0.002)

Figure 4.3.3.1. Annual CPUE of Black Drum Captured in Gill Net in West Bay



Spotted Seatrout

The spotted seatrout is a close relative of the Atlantic croaker, red drum, black drum and sand seatrout. The spotted seatrout is a top predator in estuarine communities and is one of the most sought after recreational finfish species along the Texas coast. This species is the subject of a TPWD stocking program which introduces hatchery-reared fingerlings into estuarine areas along the Texas coast. As seen in Figures 4.3.3.2 and 4.3.3.3, spotted seatrout demonstrates an increasing trend in West Bay and Christmas Bay. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be viewed in Appendix F.

Table 4.3.3.2. Summary of Annual Trends in Spotted Seatrout CPUE (number captured per hour using gill net).

Study Area	Trend Direction	R^2 Value
Christmas Bay	Increasing	0.38 ($p < 0.001$)
West Bay	Increasing	0.58 ($p < 0.001$)

Figure 4.3.3.2. Annual CPUE of Spotted Seatrout Captured in Gill Net in West Bay

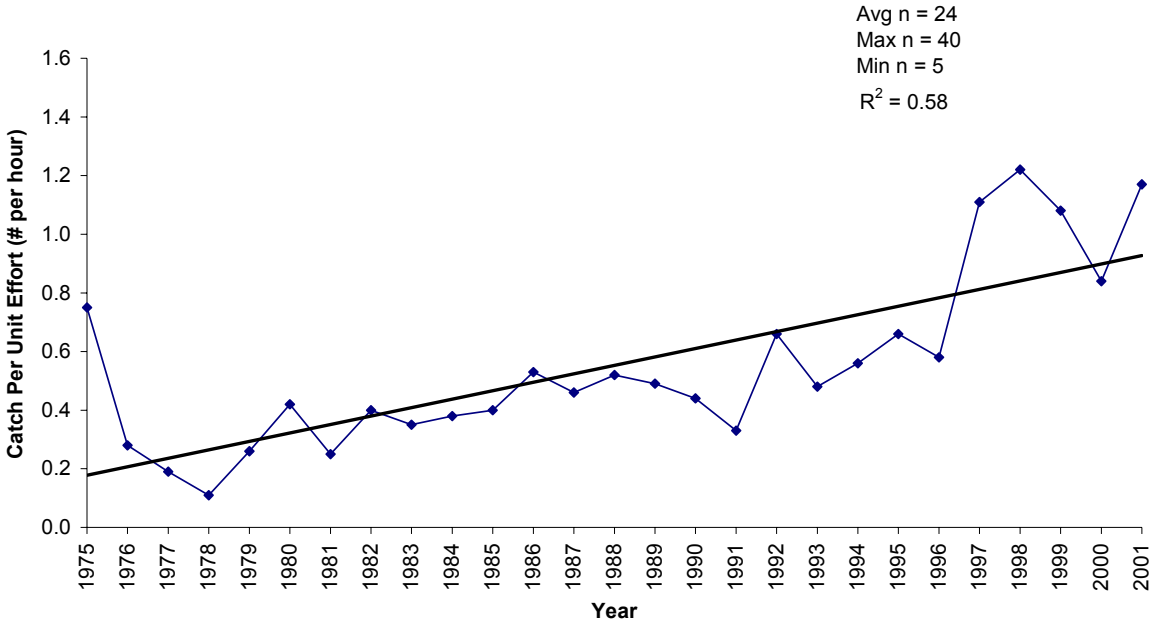
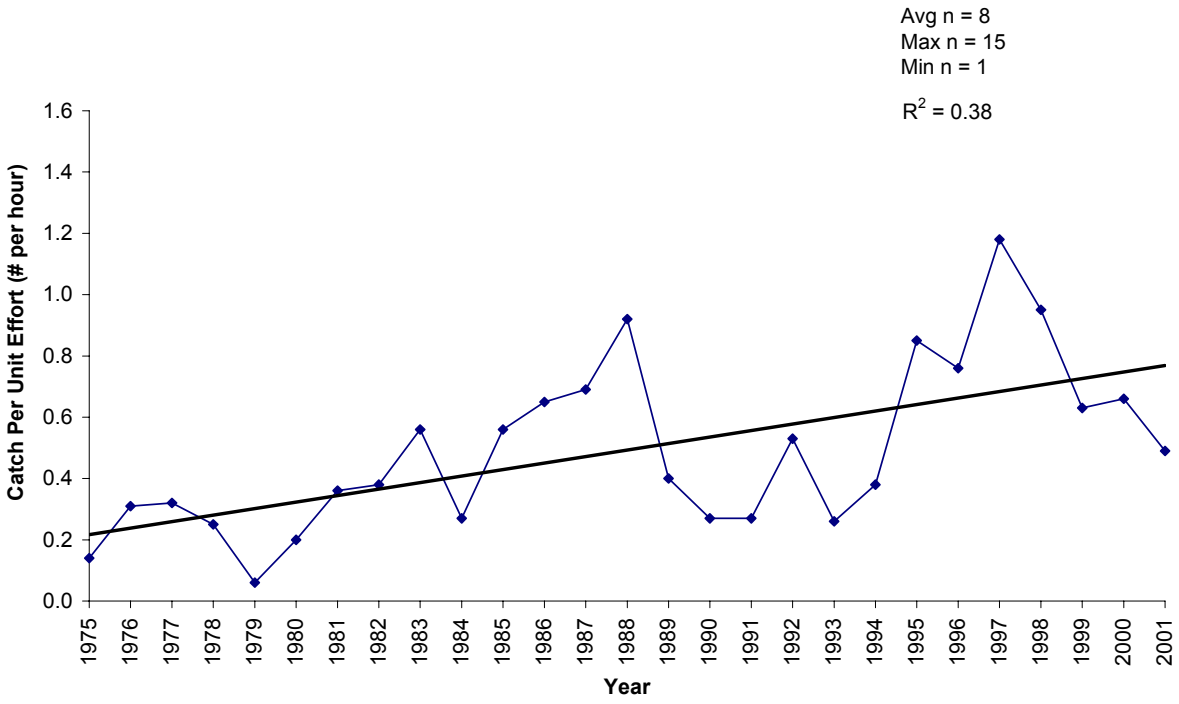


Figure 4.3.3.3. Annual CPUE of Spotted Seatrout Captured in Gill Net in Christmas Bay



4.3.4. Trends in Oyster Populations Sampled with Oyster Dredge

Oyster dredges are deployed on bay bottom containing oyster shell. The data from oyster dredge collections are used to describe the variation in abundance and size of juvenile and adult oysters. In the TPWD data, annual average sample size (1976-2001) is 41 samples per year in West Bay, 17 samples per year in Christmas Bay, 279 samples per year in Upper and Lower Galveston Bay, 84 samples per year in East Bay, and 47 samples per year in Trinity Bay. Information describing minimum annual sample sizes and maximum annual sample sizes for each of the sub-bays is located on the trend graphs and in Appendix F. Of the 5 trend analyses on samples collected with oyster dredges run by the Status and Trends Project, none exhibited significant trends ($R^2 > 0.25$).

Eastern Oyster

The Eastern oyster is one of the most commercially important shellfish species of Galveston Bay. Oysters are reef-building organisms that require hard substrate for settlement of spat. Oyster reef distribution is related to water depth and circulation patterns. Oyster reefs are an ecologically important habitat of the Galveston Bay estuary, providing foraging areas for a number of finfish and invertebrate species. Oysters are suspension feeders that act as a natural control against the adverse effects of eutrophication by filtering large quantities of organic and inorganic matter from the water column (Patillo et al., 1997). Oyster harvest areas are designated by the Texas Department of Health because oyster can filter and sequester pathogens from the water. Of the five sub-bays analyzed, Eastern Oyster exhibits no trends. However, the trend graph for Upper and Lower Galveston Bay demonstrates the highest R^2 of 0.20. Trends graphs not shown here can be seen in Appendix D. A summary table of all trends can be seen in Appendix F.

Table 4.3.4.1. Summary of Annual Trends in Eastern Oyster CPUE (number captured per hour using oyster dredge).

Study Area	Trend Direction	R^2 Value
Christmas Bay	No Trend	0.03
West Bay	No Trend	0.09
Upper and Lower Galveston Bay	No Trend	0.20
East Bay	No Trend	0.02
Trinity Bay	No Trend	0.03

Figure 4.3.4.1. Annual CPUE of Eastern Oyster Captured in Oyster Dredge in Upper and Lower Galveston Bay