

## **3.0 HISTORICAL DATA REVIEW**

### **3.1 Approach**

A computerized key word literature search was conducted to identify published works on recreational by-catch. Other reviews included the libraries of the TPWD Coastal Fisheries Branch in Austin and Rockport, Texas. In addition, letters were written to key fishery personnel throughout the Southeast to identify specific and general information relative to recreational by-catch. Interviews with various federal and state agency personnel, universities and others also were conducted. A list of individuals contacted is provided in Appendix A.

### **3.2 Available Information -- Finfish**

No published literature was found that specifically addressed the magnitude or composition of recreational by-catch in the Galveston Bay system. A current compilation of North American and international literature addressing fisheries by-catch supports our findings that information on recreational fisheries by-catch is currently not addressed in the published literature (Appendix B).

Data collected to monitor the landings of recreational fishermen in the Galveston Bay system have been routinely collected by both the TPWD and the National Marine Fisheries Service (NMFS). Both the TPWD and NMFS surveys were used to estimate landings and determine species composition of the catch for use in fisheries management at the State and regional (Gulf of Mexico) level. Techniques used to estimate landings and intensity of sampling in Texas differed between the agencies and conflicts between the TPWD and NMFS regarding the different estimates of landings developed. These conflicts were resolved in 1985 (Gulf States Marine Fisheries Commission 1985) when the NMFS stopped the intercept data collection portion of their program in Texas. Subsequent to 1985, the NMFS used data generated by the TPWD for making estimates for Texas and combined the Texas data with data from other states for making regional (e.g., Gulf of Mexico region) estimates. The respective monitoring programs are summarized below.

#### **3.2.1 Texas Parks and Wildlife Department -- Routine Monitoring**

The TPWD has conducted surveys of sport fishermen in Texas marine waters since 1974 (Heffernan et al. 1976; Breuer et al. 1977; Green et al. 1978; McEachron 1980a, 1980b, 1983, 1984; McEachron and Green 1981, 1982, 1983, 1984a; McEachron and Matlock 1983; McEachron et al. 1981, 1984a; Osburn and Ferguson 1985a, 1985b, 1986, 1987; Osburn et al. 1988; Maddux et al. 1989; Green et al. 1991a, 1991b; Campbell et al. 1991). These surveys monitored landings/unit effort and size of all species landed annually by sport-boat fishermen in the Galveston Bay system and other bay systems on the Texas coast as well as in the Gulf of Mexico off Texas.

The TPWD annually interviewed approximately 15,000 to 20,000 sport-boat fishermen coastwide, and approximately 2500 sport-boat fishermen in the Galveston Bay system (Table 1). Sport-boat fishermen exert between 1.6 to 2.2 million man-hours of fishing pressure annually in the Galveston Bay system (Table 2) to land an estimated 700,000 to 2,000,000 fish (Table 3). Annual landings, and mean sizes and weights of selected species and all species combined for the period 1974-1991 are presented in Campbell et al. (1991) and summarized for the Galveston Bay system in Appendix C.

The sampling design of the recreational fisheries harvest monitoring program provides for higher sampling intensity at access sites where the most fishing pressure occurs. This proportional sampling design provides estimates of total coastwide landings with known confidence and has been used since the late 1970s to make management decisions on Texas coastal fisheries. The interview process is standardized and focused on fish retained and available for inspection by trained interviewing professionals. During the routine monitoring of sport-boat fishermen, questions are not asked about the fish caught but not retained. Therefore it is not possible to estimate directly recreational by-catch based on TPWD routinely collected data.

### **3.2.2 National Marine Fisheries Service -- Marine Recreational Fishery Statistics Survey**

The NMFS routinely collected recreational fisheries harvest data in Texas during 1979-1985 as part of the national Marine Recreational Fishery Statistics Survey (MRFSS; U.S. Dept. of Commerce 1984, 1985a, 1985b, 1986). The design of the MRFSS provides regional (e.g., Gulf of Mexico region) estimates for making management decisions at the interstate, regional or federal level. Statistical resolution at the state level was considered inadequate to provide meaningful estimates for state use (Gulf States Marine Fisheries Commission 1985). These surveys monitored landings, size and weight of species landed in Texas by shore-based and boat fishermen. During the period 1979-1985, the number of fishermen annually interviewed and who identified the Galveston Bay system as the place they were fishing ranged from 15 to 739 (Table 4). The number of sport-boat fishermen interviews ranged from 411 in 1979 to zero in 1982, 1983 and 1984 (Table 4). Given the limited sample size for the Galveston Bay system, and the determination that estimates based on these data were not meaningful at the state level (Gulf States Marine Fisheries Commission 1985), no expansion of the data to estimate landings for Texas or Galveston Bay was made using the NMFS data.

In addition to landings, NMFS surveyors requested information on fishermen catch and the disposition of that catch. For example, an angler may catch 10 fish but only retain and bring to land two fish. Information on the entire catch, including the species not retained, and the disposition of the catch (e.g., was it used for bait, discarded alive, discarded dead, sold, etc.) was requested. Accuracy of information based on recall, including species identification, numbers of fish and disposition of catch could not be verified by the interviewer. Actual interview data were summarized to present the numbers of fish landed, and the numbers of fish discarded alive, dead or disposed of in other ways (e.g., used as bait, filleted, given away) by year, mode (shore-based fishermen, charter fishermen, or sport-boat fishermen) and species

Table 1. Number of days surveyed and number of private-boat fishermen interviewed (in parentheses) in the Galveston Bay system and coastwide by year (1974-1991). Data from Campbell et al. (1991).

Year	Galveston Bay	Coastwide
1974-76	34 (1,357)	255 (6,126)
1976-77	44 (776)	207 (4,490)
1977-78	65 (1,771)	255 (6,974)
1978-79	64 (2,349)	258 (7,633)
1979-80	55 (1,149)	336 (7,580)
1980-81	65 (1,638)	460 (9,285)
1981-82	124 (1,810)	847 (14,258)
1982-83	133 (2,727)	861 (17,193)
1983-84	131 (1,543)	888 (17,780)
1984-85	132 (2,907)	898 (15,573)
1985-86	133 (2,419)	906 (18,557)
1986-87	133 (2,702)	906 (19,843)
1987-88	131 (2,746)	1,008 (22,035)
1988-89	132 (2,216)	998 (21,384)
1989-90	131 (2,315)	1,009 (18,370)
1990-91	131 (1,993)	1,011 (14,904)

Table 2. Estimated sport-boat fishing pressure (man-h x 1000)  $\pm$  1SE, mean fishing-party size (No. of fishermen) and mean trip length (h) for private-boat fishermen in the Galveston Bay system and coastwide for Texas bays by year (1974-1991). Data from Campbell et al. (1991).

Bay system Year	Pressure	Mean fishing party size	Mean Trip Length
<b>Galveston</b>			
1974-76	2865.6 $\pm$ 719.4	2.5	4.8
1976-77	1031.8	2.5	4.7
1977-78	2176.8	2.6	5.5
1978-79	1972.0	2.6	6.1
1979-80	2002.0 $\pm$ 695.8	2.7	6.0
1980-81	2159.9 $\pm$ 387.2	2.4	5.9
1981-82	1884.1 $\pm$ 262.7	2.4	6.7
1982-83	1664.5 $\pm$ 159.3	2.6	5.7
1983-84	2087.9 $\pm$ 512.2	2.4	5.8
1984-85	1513.6 $\pm$ 164.3	2.5	5.6
1985-86	1922.4 $\pm$ 498.4	2.5	5.6
1986-87	2178.6 $\pm$ 266.0	2.4	5.6
1987-88	2076.9 $\pm$ 201.0	2.4	5.7
1988-89	2016.7 $\pm$ 195.7	2.4	5.6
1989-90	1661.3 $\pm$ 166.4	2.4	5.5
1990-91	1607.5 $\pm$ 199.2	2.3	5.3
<b>Coastwide</b>			
1974-76	6187.5 $\pm$ 516.9	2.5	5.3
1976-77	3415.7	2.6	5.4
1977-78	4486.0	2.6	6.4
1978-79	4383.2	2.7	6.5
1979-80	4146.8 $\pm$ 751.1	2.7	6.0
1980-81	5245.0 $\pm$ 514.7	2.6	7.1
1981-82	4550.5 $\pm$ 312.3	2.5	6.5
1982-83	4580.4 $\pm$ 205.7	2.6	6.7
1983-84	5646.0 $\pm$ 582.7	2.5	7.0
1984-85	4083.1 $\pm$ 219.6	2.6	5.9
1985-86	5477.9 $\pm$ 538.8	2.4	6.7
1986-87	6370.8 $\pm$ 341.6	2.5	6.8
1987-88	6021.4 $\pm$ 268.9	2.4	5.6
1988-89	5885.8 $\pm$ 257.8	2.4	5.5
1989-90	5110.1 $\pm$ 247.7	2.4	5.4
1990-91	4309.0 $\pm$ 244.6	2.4	5.2

Table 3. Estimated landings of all fishes by sport-boat anglers in the Galveston Bay system and coastwide in Texas bay systems. Data from Campbell et al. (1991).

Year	Galveston Bay	Coastwide
1974-76	2470.6 ± 763.4	5506.6 ± 590.7
1976-77	1487.6	3698.9
1977-78	2025.0	3504.0
1978-79	1837.1	3009.9
1979-80	1357.8 ± 507.6	2701.8 ± 537.0
1980-81	1904.4 ± 499.7	3933.5 ± 776.3
1981-82	947.9 ± 155.9	2504.8 ± 182.7
1982-83	1071.9 ± 129.3	2645.7 ± 153.2
1983-84	808.7 ± 114.0	2477.3 ± 154.6
1984-85	809.2 ± 119.9	1462.3 ± 133.1
1985-86	685.2 ± 88.5	1727.4 ± 107.4
1986-87	1128.9 ± 185.9	2439.2 ± 205.3
1987-88	1054.7 ± 152.2	2569.1 ± 176.3
1988-89	838.6 ± 149.0	2141.8 ± 169.9
1989-90	723.8 ± 112.0	1535.8 ± 122.6
1990-91	620.9 ± 122.8	1300.6 ± 136.5

Table 4. Number of saltwater fishermen interviews conducted in counties adjacent to the Galveston Bay system. Data from the National Marine Fisheries Service (NMFS) Marine Recreational Fishery Statistics Survey (1979-1985).

Year	Landed catch in Galveston Bay Counties	Bay Fishermen	Bay Sport-Boat Fisherman
1979	1,402	739	411
1980	895	351	231
1981	324	134	105
1982	752	15	0
1983	947	26	0
1984	804	268	0
1985	1,261	416	192

(Appendix D) and summarized over years in Table 5. A significant number of observations contained species codes that were not consistent with codes provided by the NMFS; those species were recoded as unidentified fish and grouped according to the other information available. Concerns over data quality and accuracy in the early years of the MRFSS (the program was initiated in 1979) were raised by the TPWD and others during the early 1980s (H. Osburn, TPWD, pers. comm.; A. Fedler, Sport Fishing Institute, pers. comm.).

### **3.2.3 Texas Parks and Wildlife -- Special Spotted Seatrout Tagging Study**

During 1981-1984 the TPWD conducted a special tagging study to estimate growth and survival of spotted seatrout in Texas' waters (Baker et al. 1986, Green et al. 1990). Approximately 300 spotted seatrout were caught by hook and line, tagged and released by TPWD professionals during each of three summer and three winter periods. The TPWD fishermen targeted spotted seatrout but recorded the catch of all species. Table 6 presents a summary of the effort (man-hours), catch of targeted spotted seatrout and other species (by-catch). Spotted seatrout which did not meet minimum size restrictions and all other species caught were considered by-catch. For the directed fishing effort for spotted seatrout, by-catch comprised from approximately 39-63 percent of the total catch in summer and 42-60 percent in winter. Therefore, for every fish (spotted seatrout) eligible for tagging, approximately one other fish was caught.

### **3.3 Available Information -- Shellfish**

In an addendum to the National Fishing and Hunting Survey conducted by the US Fish and Wildlife Service every 5 years, NOAA (1991) estimated that in 1985 378,771 recreational shellfish fishermen spent 2,159,000 days pursuing shellfish in Texas' waters. These fishermen pursued both molluscan (e.g., oysters, clams, mussels and scallops) and non-molluscan (e.g., crabs and shrimp) shellfishes. However, the quantity and disposition of catch are not available (NOAA 1991).

#### **3.3.1 Shrimp**

Current recreational landings of shrimp from Texas coastal waters are unknown, however they were estimated to be approximately 408,000 kg (1.1 percent of total shrimp harvest) in 1973 (King 1974) and 619,000 kg in 1980 (Brown 1981). Significant changes in the harvest regulations occurred in 1979 when the daily recreational limit was reduced from 45.5 kg to 6.8 kg. Since that time the number of licenses issued has decreased from a high of 10,349 to less than 2000 in 1990. (Table 7). Sport shrimpers harvest shrimp with a trawl < 6.1 m in width (King 1974, Warren and Bryan 1981, Krauthamer et al. 1984) with a mesh size of 8-3/4 inches over 5 stretched meshes (TPWD regulations). Because other types of gear, such as seines, cast nets, dip nets and bait traps may be used and do not require licensing, the extent of sport shrimping is unknown.

Although interviews of recreational shrimpers are conducted during routine monitoring of sport-boat fishermen, the frequency of occurrence of recreational shrimpers for all Texas bays is low

Table 5. Number of fishes landed, released alive, released dead or otherwise discarded by Galveston Bay sport fishermen summed over years by mode and species. Data from NMFS MRFSS (1979-1985).

Species	Landed	Released Alive	Released Dead	Other <sup>1</sup>
<b>SPORT-BOAT</b>				
unidentified Fish	9	116	8	16
unidentified Shark	-	9	-	-
requiem shark	-	2	-	-
Atlantic sharpnose shark	1	1	-	-
Hammerhead shark	-	6	-	-
bonnethead shark	4	19	-	-
dogfish sharks	-	2	-	-
spiny dogfish shark	-	7	-	-
stingrays	-	9	-	-
southern stingrays	-	3	-	-
Atlantic stingray	1	12	-	1
gars	-	1	-	-
ladyfish	1	17	-	-
conger eels	-	3	-	-
snake eels	-	2	-	-
menhaden, gulf	1	-	-	-
shad, gizzard	-	1	-	-
freshwater catfishes	-	-	-	25
catfish, blue	2	-	-	-
catfish, channel	1	-	-	-
catfish, blue	-	2	-	-
sea catfishes	-	17	-	-
catfish, gafftopsail	44	77	7	8
saltwater catfish	-	4	-	-
catfish, sea	29	2000	259	10
toadfish, gulf	-	8	-	-
toadfish, leopard	-	1	-	-
needlefish	-	5	-	-
needlefish, Atlantic	1	3	1	-
killifishes	-	-	-	36
killifish	-	24	-	-
searobin, bighead	-	1	-	-
graysby	4	2	-	-
warmouth	-	42	-	-
perches	-	1	-	-
bluefish	2	-	-	-
pompano, African	-	5	-	-
jack, yellow	1	-	-	-

Table 5. Continued.

Species	Landed	Released Alive	Released Dead	Other <sup>1</sup>
jack, crevalle	-	5	-	-
jack horse eye	-	3	-	-
bumper, Atlantic	-	1	-	-
pompano, Florida	2	-	-	-
snapper, red	33	13	-	-
mojarra, yellowfin	-	2	-	-
grunts	16	-	-	-
tomtate	-	18	-	-
grunt, French	1	-	-	-
pigfish	1	80	-	-
porgies	-	3	-	-
pinfish	41	77	-	8
sheepshead	154	206	1	12
drums	18	13	-	-
seatrout, spotted	509	333	9	337
seatrout, silver	2	-	-	-
seatrout, sand	730	406	3	161
perch, silver	10	95	-	12
croaker, blue	-	2	-	-
spot	3	4	-	6
drum, banded	1	-	-	1
kingfish	5	40	-	5
kingfish, southern	125	35	-	6
kingfish, gulf	90	74	-	19
kingfish, northern	20	-	-	-
croaker, Atlantic	628	968	4	202
drum, black	155	136	-	4
drum, red	151	535	7	48
chub, bermuda	1	-	-	-
spadefish, Atlantic	19	8	-	-
cherubfish	-	9	-	-
mullet	-	3	-	16
mullet, striped	-	9	-	1
tang, blue	1	-	-	-
cutlassfish, Atlantic	1	6	-	-
bonito, Atlantic	-	1	-	-
tuna, yellowfin	-	30	-	-
mackerel, king	-	1	-	1
mackerel, Spanish	5	12	-	15
flounders	42	27	-	32
left-eye flounder	28	4	-	8
flounder, summer	1	-	-	-

Table 5. Continued.

Species	Landed	Released Alive	Released Dead	Other <sup>1</sup>
flounder, gulf	6	-	-	-
flounder, southern	291	31	-	19
flounder, three-eye	1	-	-	-
triggerfish, gray	-	6	-	-
black durgon	-	2	-	-
puffers	-	2	-	-
CHARTER				
catfish, sea	-	4	-	-
pinfish	-	6	-	-
seatrout, sand	4	1	-	-
perch, silver	-	-	-	1
croaker, Atlantic	38	5	-	1
SHORE				
Unidentified fish	1	31	1	17
Atlantic sharpnose shark	-	-	-	3
Unidentified shark	4	1	1	-
hammerhead shark	-	-	-	-
bonnethead shark	-	-	2	1
ladyfish	-	5	-	1
American eel	-	-	-	1
snake eels	-	4	-	-
menhaden, gulf	1	-	-	10
trouts	-	-	-	3
catfish, blue	-	12	6	-
catfish, channel	-	-	1	-
catfish, blue	2	3	7	1
sea catfishes	2	70	-	-
catfish, gafftopsail	3	49	2	2
catfish, sea	43	905	146	50
toadfishes	-	1	-	-
toadfish, gulf	-	2	1	-
toadfish, leopard	-	1	-	-
needlefish, Atlantic	1	-	-	-
killifishes	-	-	-	50
killifish	-	-	-	6
ribbonfishes	-	2	11	2
grouper, Nassau	5	-	-	-

Table 5. Continued.

Species	Landed	Released Alive	Released Dead	Other <sup>1</sup>
perches	-	2	-	-
bluefish	9	95	1	28
cobia	-	1	-	-
jacks	2	2	-	-
jack	-	2	-	-
jack, yellow	1	2	-	-
jack, crevalle	-	3	-	-
jack, horse eye	1	5	-	-
pompano, Florida	2	-	-	-
snapper, red	49	16	-	-
snapper, lane	5	-	-	-
grunts	9	3	-	-
pigfish	-	66	7	2
pinfish	19	100	6	7
sheepshead	47	13	-	10
drums	4	15	-	9
seatrout, spotted	137	13	3	5
seatrout, silver	2	-	-	-
seatrout, sand	116	27	-	28
perch, silver	15	6	-	-
spot	4	1	-	-
kingfish	4	27	-	22
kingfish, southern	26	51	-	31
kingfish, gulf	80	44	-	43
croaker, Atlantic	256	423	25	117
drum, black	47	26	-	3
drum, red	258	67	-	2
spadefish, Atlantic	105	2	-	-
mullet, striped	-	16	-	183
cutlassfish, Atlantic	-	-	20	-
mackerels & tunas	-	1	-	1
mackerel, chub	-	3	-	-
mackerel, Spanish	7	2	-	2
flounders	3	4	-	2
left-eye flounder	3	-	-	1
flounder, gulf	2	5	-	10
flounder, southern	100	6	-	8
triggerfishes & filefishes	12	-	-	-
puffer, least	1	10	-	-

1. **Other** Consists of fishes reported as used for bait, filleted, given away, sold or otherwise not available for inspection by interviewer.

Table 6. Summary of effort exerted, catch of spotted seatrout, and by-catch in TPWD spotted seatrout tagging study in Galveston Bay system. Data from TPWD (1981-1983).

Season/ Year	Effort (man-h)	No. Spotted Seatrout Tagged (Caught) <sup>1</sup>	Total Fish (No. Species)	Percent By-catch
Summer				
1981	285	318 (401)	524 (13)	39.3
1982	568	301 (304)	817 (20)	63.2
1983	218	316 (336)	827 (14)	59.4
Winter				
1982	348	260 (271)	488 (13)	46.7
1983	371	338 (338)	588 (9)	42.5
1984	408	125 (149)	316 (9)	60.4

1. Only fish of taggable size included in this category. Total number caught in parenthesis. Taggable size changed in 1984 to 12"; prior to 1984 the taggable size was 10".

Table 7. Total number of sport oyster dredge licenses and sport shrimp trawl licenses. Sold in Texas by fiscal year (1959-1990).

Fiscal Year (1 Sep-31 Aug)	Sport oyster dredge license	Sport shrimp trawl license
1959	60	
1960	17	8,837
1961	58	7,399
1962	93	6,249
1963	45	7,003
1964	52	6,367
1965	80	7,034
1966	66	7,144
1967	42	7,324
1968	44	7,508
1969	35	8,553
1970	38	9,662
1971	35	9,947
1972	28	9,296
1973	25	9,537
1974	24	10,521
1975	31	9,281
1976	48	8,866
1977	68	9,707
1978	91	9,982
1979	136	10,349
1980	178	8,926
1981	235	8,729
1982	218	7,433
1983	402	6,110

Table 7. Continued.

Fiscal Year (1 Sep-31 Aug)	Sport oyster dredge license	Sport shrimp trawl license
1984	323	5,339
1985	265	4,547
1986	243	4,147
1987	201	3,597
1988	163	2,945
1989	57	2,303
1990	0	1,904

(Cody et al. 1989). Table 8 indicates that the sport shrimping activities are highest in May through September and very little activity occurs during winter (TPWD Unpublished data).

Species composition of by-catch by recreational shrimpers has not been determined, however, catches in TPWD monitoring trawls can be used to provide an indication of the diversity of organisms captured in the Galveston Bay system (Spaw and Smith 1990, Loeffler and Walton 1992). Otter trawls have been used by the TPWD since 1958 to monitor population trends of commercially valuable shrimp (Benefield and Baker 1980). Summarizing otter trawl data for the years 1977-1980, Spaw and Smith (1990) found 50 species of finfish in TPWD samples taken in the Galveston Bay system. Atlantic croaker (*Micropogonias undulatus*) comprised almost 58 percent of the total number of fish caught. Appendix E presents the species and catch rates in TPWD trawls for the Galveston Bay system. No studies are currently available on the magnitude of incidental catch discarded by recreational shrimpers (Cody et al. 1989). However, Cody et al. (1989) speculates that recreational shrimpers along the entire Texas coast may catch 60-100 million finfish per year based on TPWD finfish to shrimp catch ratios (Meador et al. 1988). The proportion of the total recreational shrimp by-catch attributable to Galveston Bay is unknown.

### 3.3.2 Recreational oyster fishery

Recreational oystermen generally harvest nearshore reefs that are not easily harvested by commercial oyster boats (Quast et al. 1988). Recreational gears used are sport oyster dredge (license required), tonging and hand picking. The relative importance of each method is unknown.

The estimated average annual landings of sport-landed oysters was 5,300 kg for 1983 through 1986, none of which was monitored from the Galveston Bay system (Quast et al. 1988). The limited number of recreational oyster fisherman intercepts at sport-boat creel sites indicates that recreational oystering by boat fishermen is uncommon relative to finfish fishermen. However, effort and landings other than at sport-boat creel sites are not monitored and, therefore, total effort and landings are not known.

Recreational oystering represents a small portion of the total fishing effort (TPWD unpublished data). License sales for sport dredges increased through 1983 but have declined since 1983 (Table 7). No estimate of composition of by-catch landings is available from harvest data. However, catch rates and composition of catch in TPWD research dredges is provided in Appendix E.

### 3.3.3 Recreational Blue Crab Fishery

Data on recreational catch of crabs are sparse. The sport fishery is thought to contribute significantly to total fishing pressure, but estimates of the impact of recreational fishing on the resource vary widely (Cody et al. in press). Crab traps and hand lines are the most utilized

Table 8. Galveston Bay sport-shrimping intercepts by year and month. Data from TPWD (unpublished).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1983					1	1		1	1			
1984					1	3	1	9	7	1		
1985				1	4	3		7	1			
1986					2			2	3			
1987									4	1	1	
1988					1	1		1		2		
1989												
1990					2	1	1					
1991						1						
Total	0	0	0	1	11	10	2	20	16	4	1	0

gears although drop nets, fold-up traps and dip nets also are used to harvest crabs. In 1968 the recreational harvest from Galveston Bay was estimated at about 6 percent of the commercial harvest.

From May 1990-May 1991 sport crabbing comprised 0.3 percent of all fishing activities at Texas boat access sites (ramps and docks), 0.8 percent of the interviews on lighted piers and 1.7 percent of the activity during wade/bank surveys. Overall, 0.7 percent of sport fishing trips targeted blue crabs; 99.1 percent of all trips were made by finfishermen. Percent of all trips from boat access sites for blue crabs has remained 0.3 percent since 1989. Most sport crabbing activity from boats, lighted piers or wade/bank areas was along the upper Texas coast (Cody et al. in press).

Over 68 percent of all trips for crabs were successful (at least one crab retained) from May 1990-May 1991. TPWD surveys reveal 91 percent of boat crab trips, 77 percent of lighted pier crab trips and 53 percent of wade/bank crab trips were successful. Catch rates were highest along the upper Texas coast (Cody et al. in press).

No data or literature were found to estimate by-catch by sport fishermen when fishing for blue crabs, however, only the use of unattended crab traps are expected to produce by-catch that could contribute to mortality of by-catch species. Other gears, such as hand lines, dip nets, drop nets and fold-up traps which are actively fished, typically do not retain by-catch.

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From May 1990-May 1991 sport crabbing comprised 0.3 percent of all fishing activities at Texas boat access sites (ramps and docks), 0.8 percent of the interviews on lighted piers and 1.7 percent of the activity during wade/bank surveys. Overall, 0.7 percent of sport fishing trips targeted blue crabs; 99.1 percent of all trips were made by finfishermen. Percent of all trips from boat access sites for blue crabs has remained 0.3 percent since 1989. Most sport crabbing activity from boats, lighted piers or wade/bank areas was along the upper Texas coast (Cody et al. in press).

Over 68 percent of all trips for crabs were successful (at least one crab retained) from May 1990-May 1991. TPWD surveys reveal 91 percent of boat crab trips, 77 percent of lighted pier crab trips and 53 percent of wade/bank crab trips were successful. Catch rates were highest along the upper Texas coast (Cody et al. in press).

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