

Mississippi's Shore Night Fishing Survey
Marine Recreational Fisheries Statistics Survey
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Introduction

Since 1979 data on recreational fisheries have been collected using the Marine Recreational Fishery Statistics Survey (MRFSS). The purpose of the MRFSS is to establish a reliable data base for estimating the impact of marine recreational fishing on marine resources. The MRFSS is comprised of 2 independent but complementary surveys. A telephone survey of households in coastal counties is used to collect effort data (number of angler trips) while a dockside intercept survey is used to collect catch information (catch per angler trip). Prior analysis of the telephone data has shown that anglers spend time fishing at night in certain states at different times of the year. This largest proportion of night fishing in the Gulf of Mexico was observed in Mississippi. Since 1997 less than 5% of the MRFSS intercept survey interviews in the Gulf of Mexico have been collected between the hours of 9pm and 3am with only 1.8% of the interviews in Mississippi collected between 9pm and 3am. Subsequently little catch data are available on night fishing activities. The MRFSS assumes that night fishing activities are similar to day fishing but this has never been tested in the past. The objectives of this research were to determine if catch and harvest rates of shore anglers fishing at night in Mississippi were different from day time catch and harvest rates; and to produce expanded estimates of catch and harvest using night survey data for comparison with estimates generated from day sampling only.

Methodology

In June 2000, the Mississippi Department of Marine Resources (MSDMR) sent field personnel to all of their shore fishing sites to evaluate the level of night fishing activity. A night fishing site register was developed. Each site was assigned pressure category for weekends and weekdays within each month. This allowed for the weighting of sites depending on the number of anglers expected to be night fishing on weekends or weekdays. Twelve new sites were added

to the site register that were not visited during day sampling because angling activity was low or non-existent during the day. Gulf States Marine Fisheries Commission (GSMFC) personnel provided monthly sampling schedules of night survey assignments starting in January 2001. MSDMR sent two field samplers on each night assignment for safety purposes. Samplers followed typical MRFSS methodology and used the same MRFSS forms as day sampling. Night samplers were instructed to probe anglers to ensure they interviewed anglers who spent the majority of their time fishing at night. Forms were delivered to GSMFC where they were entered into an electronic database for analysis. GSMFC ran error checking programs to check for problems with incorrect form coding or data entry mistakes. GSMFC provided reports detailing the fish recorded and measured by field samplers back to MSDMR for review on a monthly basis. All data corrections were processed by GSMFC and clean data were used for analysis purposes.

Catch and harvest rates were calculated using the dockside intercept data and are expressed as the number of fish per angler trip. Effort estimates are calculated using the raw telephone survey data and are expressed as the number of angler trips. The percentage of night trips were calculated by comparing the time the trip started and ended with the known sunrise and sunset times for each wave of 2001 and 2002. The telephone data only asks anglers to provide the time they completed their fishing trip so the average hours fished were used to estimate when each fishing trip started. If the majority ($> \frac{1}{2}$ of fishing time) was spent during night time (night time was defined as 1 hour after sunset and 1 hour before sunrise) then this was considered a night fishing trip. The percentage of night trips was applied to the estimate of total trips to produce an estimated number of night fishing trips. Revised total catch estimates for individual species were produced using the following equations:

- 1) Day Total Catch = Day Angler Trips * Day Catch Rate
- 2) Night Total Catch = Night Angler Trips * Night Catch Rate
- 3) Revised Total Catch = Day Total Catch + Night Total Catch.

These revised total catch estimates were compared with the official MRFSS estimates of total catch for sheepshead, spotted seatrout, sand seatrout, sand seatrout, southern kingfish, black drum, red drum, and southern flounder. These species were selected for further analyses because they are all important management species for MSDMR and they also provided the largest amount of data to work with. All data analyses were completed using SAS.

Results and Discussion

Table 1 shows the number of interviews collected by MSDMR field samplers during day and night sampling in 2001 and 2002. In 2001 samplers collected a total of 494 interviews during day sampling and 584 interviews while sampling at night. In 2002, 518 interviews were collected during day sampling and 266 interviews during night sampling. For both years, the largest numbers of interviews were collected during waves 3 (May/June) and 4 (July/August). The night fishery was not sampled in proportion to the amount of fishing that occurs at night compared to during the day. Day sampling was accomplished following MRFSS sampling quotas set by National Marine Fisheries Service. Samplers tried to collect as many interviews as possible during the night hours to provide more precise catch rate and revised total catch estimates for the night survey.

Table 2 shows average hours fished by anglers interviewed during day and night sampling. Overall anglers fished slightly longer at night than during the day in 2001 but in 2002 anglers fished slightly longer during the day. In most cases no significant differences were observed between night and day fishing hours within waves. Average hours fished at night in

wave 5 was significantly larger than average hours fished during the day.

Tables 3 and 4 show the list of species caught by anglers interviewed during day and night sampling in 2001 and 2002. In 2001, 26 species were recorded from anglers fishing during the day while 29 species were recorded during night sampling (Table 3). The species caught most often during the day were atlantic croaker, pinfish, southern kingfish, southern flounder, striped mullet, and hardhead catfish. Night sampling showed southern kingfish, hardhead catfish, atlantic croaker, sand seatrout, gafftopsail catfish, and spotted seatrout to be caught most often. In 2002 28 species were recorded during day sampling and 21 species were recorded while sampling at night (Table 4). The species most often caught during the day were atlantic croaker, hardhead catfish, southern kingfish, sand seatrout, pinfish, southern flounder, and spotted seatrout. The same species were most often caught while fishing at night. In 2001 small numbers of blacktip shark, Bonnethead, gulf toadfish, Crevalle jack, atlantic stingray and various eels were observed in the night survey results only. In 2002 no species were observed only in the night survey results. This is important because another aspect of this research was to determine if any species were caught exclusively during night fishing that were not being observed during the day survey sampling. The results show this is not a concern in Mississippi.

Table 5 shows the catch rates (number of fish per angler trip) for sheepshead, spotted seatrout, sand seatrout, southern kingfish, black drum, red drum, and southern flounder from day and night sampling in 2001 and 2002. Night survey catch rates of sheepshead were lower or non-existent when compared with day survey catch rates for both 2001 and 2002. Spotted seatrout catches were observed at night in waves 1 in 2001 but no spotted seatrout were recorded from day sampling during this wave. Sand seatrout night survey catch rates were higher in waves 1, 2, & 6 in 2001 than day survey catch rates. Southern kingfish night survey catch rates in 2001

were higher in waves 1, 2, and 6 than day survey catch rates. In waves 2 and 4 of 2002, night survey catch rates of southern kingfish were higher than day survey catch rates. Black drum and red drum were caught sporadically in both 2001 and 2002. In most waves night survey catch rates of red drum were lower than day survey catch rates. Southern flounder night survey and day survey catch rates were similar except for a large difference in waves 3 and 4 of 2001 and wave 6 of 2002. In all three cases day survey catch rates were higher than night survey catch rates.

Table 6 shows the harvest rates (number of fish per angler trip) for sheepshead, spotted seatrout, sand seatrout, southern kingfish, black drum, red drum, and southern flounder from day and night sampling in 2001 and 2002. No harvest of sheepshead was observed from night fishing in 2001 and 2002. Spotted seatrout were harvest in all waves of the night survey in 2001. Harvest of spotted seatrout was not observed in the day survey in waves 1, 5, and 6 of 2001. A large harvest rate of sand seatrout was observed in waves 1 and 6 of 2001 while no harvest was observed during day sampling. Sand seatrout night harvest rates in waves 3 and 4 of 2002 were much lower than day survey harvest rates. Overall southern kingfish harvest rates were similar between day and night sampling in 2001. Night harvest of southern kingfish was only observed in waves 3 and 4 in 2002 and it was lower than day survey harvest rates.

Table 7 shows the estimated number of total shore trips in Mississippi in 2001 and 2002, the calculated percentage of trips occurring at night, and the total number of trips broken into day and night fishing trips. In 2001, the total number of shore trips was 540,463 angler trips and the wave estimates ranged from 26,293 angler trips in wave 6 to 168,257 angler trips in wave 4. The percentage of trips at night ranged from 8% in wave 2 to 31% in wave 1. In 2002, the total number of estimated shore trips was 483,734 angler trips and the wave estimates ranged from

41,462 angler trips in wave 6 to 191,540 angler trips in wave 3.

Tables 8 and 9 shows the estimates of total catch, revised total catch, and the revised total catch split into day total catch and night total catch for the six selected species in 2001 and 2002. In 2001 sheepshead revised total catch was lower in all waves than the official MRFSS total catch estimates (Table 8). Spotted seatrout showed no difference in estimates of total catch and revised total catch for 2001. Sand seatrout and southern kingfish revised total catch was larger than the official MRFSS estimate for 2001. The larger night survey catch rates observed during waves 1 and 6 for these species contributed to a large increase in revised total catch during these waves. Black drum and red drum revised total catch estimates were both lower than the official total catch estimates for 2001. Southern flounder revised total catch for 2001 was lower than the official MRFSS estimate of total catch. In 2002, all species analyzed had revised total catches very similar to the official MRFSS total catch (Table 9). In most cases, night survey catch rates were not significantly different from day survey catch rates, hence total catch was not over or underestimated for night fishing trips.

Table 10 and 11 shows the estimates of total catch, revised total catch, and the revised total catch split into day total catch and night total catch for the six selected species in 2001 and 2002. Revised total harvest estimates followed similar trends as revised total catch estimates. Sheepshead revised total harvest estimates were lower than the official total harvest estimates for 2001. Spotted seatrout and sand seatrout had similar revised total harvest numbers as the official total harvest numbers for 2001. Southern kingfish and southern flounder revised total harvest numbers were lower than the official MRFSS estimates of total harvest in 2001. Black drum and red drum had total harvest estimates very similar to the official MRFSS total harvest estimates for 2001. In 2002 revised total harvest estimates were lower than official MRFSS estimates for

all species. Night catch rates were lower or non-existent in all waves when compared with day survey catch rates.

Table 12 shows the percent the current MRFSS shore estimate over or under-estimated the total catch of the six selected species in 2001 and 2002. Total catch was overestimated by 17 percent for sheepshead, red drum, and southern flounder in 2001. Total catch was overestimated for all species in 2002 because night catch rates were extremely lower than day survey catch rates. Table 13 shows the percent the current MRFSS shore estimate over or under-estimated the total harvest of the six selected species in 2001 and 2002. Similar differences were observed with the harvest estimates as seen with the total catch estimates.

Table 14 and 15 show the impact of the revised shore total catch and harvest estimate on the overall annual estimate of total catch and harvest of the six species. For most species, the difference was 5 percent or less. The largest difference in total catch and harvest was observed for black drum in 2002.

The other aspect of this research was to analyze were comparing average lengths and weights of species collected during the night survey with measurements collected during the day survey. Unfortunately not enough measurements were obtained to make comparisons by species within waves.

Conclusions

Although some differences were observed between day survey and night survey results, most differences were not large enough to be significant from a fishery management standpoint. In most cases, differences in night survey catch rates produced revised total catch and harvest estimates that were less than 10% higher or lower than the official total catch and harvest estimates for shore mode. Overall annual estimates were changed by 5 percent or less in most

cases. MSDMR and GSMFC are confident that anglers fishing at night from shore in Mississippi are not catching fish at different rates than anglers fishing during the day. Therefore MRFSS assumptions that night fishing anglers activities are similar to day fishing anglers is true for this situation. Continuing the regular MRFSS day sampling activities in Mississippi should produce estimates of total catch that are fairly precise without collecting data from night anglers. Future research in other states and modes would be necessary to further evaluate the impact of night fishing activities. The cost of night sampling should be a consideration for future research plans. Mississippi hired one extra sampler that was specifically assigned to night surveys. Sending an additional sampler out on each night assignment for safety purposes also increases the cost for this research. For states with larger amounts of coastline and more sampling sites the costs would increase further because it would likely take more than one additional sampler to complete additional night survey assignments. If in the future increases in night fishing trips from the telephone survey data are observed, it may be necessary to evaluate angler catch rates at night in those states. However, if night trips remain low in other Gulf states, influences on total catch and harvest estimates would remain small and the increased cost of sampling would not produce a significant improvement in the precision of MRFSS total catch and harvest estimates.

Table 1. Number of Mississippi shore interviews obtained from day and night sampling in 2001 and 2002.

Wave	2001		2002	
	Day Interviews	Night Interviews	Day Interviews	Night Interviews
1	63	38	56	1
2	78	120	81	13
3	122	235	147	125
4	91	75	105	79
5	87	81	79	41
6	53	35	50	7

Table 2. Average hours fished from shore from day and night sampling. Confidence limits are shown in parenthesis.

	2001		2002	
Wave	Avg Hours (Day)	Avg Hours (Night)	Avg Hours (Day)	Avg Hours (Night)
1	1.57 (\pm .22)	1.89 (\pm .22)	1.87 (\pm .38)	1.00 (\pm)
2	2.24 (\pm .35)	2.44 (\pm .35)	2.49 (\pm .30)	2.73 (\pm .65)
3	2.48 (\pm .30)	2.64 (\pm .26)	3.00 (\pm .38)	2.67 (\pm .30)
4	2.92 (\pm .32)	2.53 (\pm .44)	2.38 (\pm .26)	2.45 (\pm .39)
5	2.35 ^a (\pm .35)	2.89 ^a (\pm .39)	2.02 (\pm .32)	1.81 (\pm .31)
6	2.17 (\pm .45)	2.67 (\pm .44)	2.54 ^a (\pm .55)	0.92 ^a (\pm .32)
All	2.57 (\pm .15)	2.35 (\pm .14)	2.47 (\pm .15)	2.42 (\pm .20)

^a Significantly different (ANOVA)

Table 3. Species caught by anglers interviewed by day and night field samplers in 2001.

2001	
Day	Night
Atlantic Croaker	Southern Kingfish
Pinfish	Hardhead Catfish
Southern Kingfish	Atlantic Croaker
Southern Flounder	Sand Seatrout
Striped Mullet	Gafftopsail Catfish
Hardhead Catfish	Spotted Seatrout
Sheepshead	Black Drum
Spotted Seatrout	Pinfish
Sand Seatrout	Stingray Family
Black Drum	Southern Flounder
Gulf Toadfish	Striped Mullet
Red Drum	Unidentified Eel
Unidentified Eel	Gulf Toadfish
Stingray Family	Red Drum
Silver Perch	Spot
Gafftopsail Catfish	Snake Eel Family
Spot	Unidentified Skate or Ray
Bull Shark	Gulf Menhaden
Searobin Genus	Pigfish
Atlantic Spadefish	Sheepshead
Ladyfish	White Mullet
Atlantic Cutlassfish	American Eel
Blue Runner	Atlantic Cutlassfish
Gulf Butterfish	Atlantic Stingray
Pigfish	Blacktip Shark
Toadfish Genus	Crevalle Jack
	Requiem Shark Family
	Stingray Genus
	Toadfish Genus

Table 4. Species caught by anglers interviewed by day and night field samplers in 2002.

2002	
Day	Night
Atlantic Croaker	Hardhead Catfish
Hardhead Catfish	Atlantic Croaker
Southern Kingfish	Sand Seatrout
Sand Seatrout	Southern Kingfish
Pinfish	Stingray Family
Southern Flounder	Southern Flounder
Spotted Seatrout	Gafftopsail Catfish
Sheepshead	Pinfish
Stingray Family	Gulf Toadfish
Red Drum	Unidentified Eel
Black Drum	Red Drum
Gulf Toadfish	Requiem Shark Family
Gafftopsail Catfish	Striped Mullet
Unidentified Eel	American Eel
Requiem Shark Family	Spotted Seatrout
Silver Perch	Black Drum
Striped Mullet	Snake Eel Family
Seatrout Genus	Alligator Gar
Stingray Genus	Atlantic Spadefish
Toadfish Genus	Ladyfish
Gulf Menhaden	Pigfish
Pigfish	
Spanish Mackerel	
Bull Shark	
Gray Snapper	
Mullet Genus	
Searobin Genus	
Spot	

Table 5. Catch rates of selected species from day and night sampling. Catch rates are expressed as number of fish per angler trip.

Sheepshead				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	0.11	0.05	0.02	.
2	0.33	.	0.01	.
3	0.16	.	0.03	.
4	0.05	0.01	0.01	.
5	0.08	.	0.24	.
6	0.17	.	.	.
Spotted Seatrout				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	.	0.34	.	.
2	0.24	0.23	0.01	.
3	0.02	0.07	0.13	0.02
4	0.33	0.13	0.04	0.04
5	0.11	0.10	0.01	0.02
6	0.02	0.03	0.18	.
Sand Seatrout				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	0.10	0.45	.	.
2	0.01	0.31	0.04	.
3	0.01	0.07	0.33	0.32
4	0.20	0.08	0.15	0.63
5	0.60	0.68	0.14	.
6	.	0.35	0.02	.
Southern Kingfish				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	0.08	0.21	.	.
2	0.18	0.40	0.14	0.46
3	0.41	0.44	0.46	0.38
4	0.41	0.47	0.17	0.28
5	0.38	0.30	0.06	.
6	0.06	1.00	0.02	.
Black Drum				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	0.16	.	.	.
2	.	0.27	0.01	.

3	.	0.06	.	0.02
4	.	.	.	.
5	0.11	.	0.05	.
6	0.04	.	0.08	.
Red Drum				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	.	.	.	.
2	.	0.01	.	.
3	0.05	0.03	0.01	0.02
4	0.10	0.01	0.05	0.04
5	0.11	0.04	0.01	.
6	0.03	.	0.02	.
Southern Flounder				
	2001		2002	
Wave	Day Catch Rate	Night Catch Rate	Day Catch Rate	Night Catch Rate
1	0.05	0.03	.	.
2	0.05	0.02	0.05	.
3	0.20	.	0.12	0.14
4	0.25	0.03	0.06	0.05
5	0.06	0.05	0.04	0.02
6	0.11	0.09	0.16	.

Table 6. Harvest rates of selected species from day and night sampling. Harvest rates are expressed as number of fish per angler trip.

Sheepshead				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	0.05	.	.	.
2	0.14	.	0.01	.
3	0.16	.	0.03	.
4	0.01	.	0.01	.
5	0.01	.	0.18	.
6	0.17	.	.	.
Spotted Seatrout				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	.	0.03	.	.
2	0.08	0.04	.	.
3	0.01	0.01	0.06	.
4	0.03	0.04	0.01	.
5	.	0.01	.	.
6	.	0.03	0.06	.
Sand Seatrout				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	.	0.29	.	.
2	0.01	0.08	0.04	.
3	0.01	0.01	0.29	0.01
4	0.10	0.01	0.16	0.03
5	0.14	0.09	0.11	.
6	.	0.09	.	.
Southern Kingfish				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	0.03	0.05	.	.
2	0.15	0.26	0.08	.
3	0.30	0.16	0.22	0.01
4	0.27	0.17	0.16	0.04
5	0.32	0.10	0.04	.
6	.	0.50	.	.
Black Drum				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	0.03	.	.	.
2	.	0.08	.	.

3	.	0.05	.	.
4	.	.	.	.
5	0.08	.	0.05	.
6	0.03	.	0.04	.
Red Drum				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	.	.	.	.
2	.	0.01	.	.
3	0.01	0.01	0.01	.
4	.	0.01	0.03	.
5	0.01	.	.	.
6	.	.	0.04	.
Southern Flounder				
	2001		2002	
Wave	Day Harvest Rate	Night Harvest Rate	Day Harvest Rate	Night Harvest Rate
1	0.03	0.03	.	.
2	0.05	0.02	0.02	.
3	0.16	.	0.07	0.07
4	0.22	0.01	0.05	0.01
5	0.06	0.07	0.01	.
6	0.09	0.09	0.16	.

Table 7. Estimated number of total trips, day trips, and night fishing trips from shore anglers in Mississippi in 2001 and 2002.

2001				
Wave	% of Trips at Night	Total Trips	Day Trips	Night Trips
1	31	50,001	34,501	15,500
2	8	64,649	59,477	5,171
3	20	151,490	121,192	30,298
4	15	168,257	143,019	25,238
5	20	79,773	63,819	15,954
6	21	26,293	20,772	5,521
Total	18	540,463	442,780	97,682
2002				
Wave	% of Trips at Night	Total Trips	Day Trips	Night Trips
1	15	49,275	41,884	7,391
2	42	55,564	32,227	23,337
3	18	191,540	157,063	34,477
4	20	80,683	64,547	16,136
5	32	65,048	44,233	20,815
6	33	41,624	27,888	13,736
Total	24	483,734	367,842	115,892

Table 8. Estimates of total catch and revised total catch with associated day and night total catch estimates for 2001. Total catch is the official MRFSS estimate in numbers of fish, revised total catch is the new estimate using night survey catch rates and effort estimates.

Sheepshead				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	5,555.76	4,649.30	3,833.48	815.82
2	21,549.70	19,825.72	19,825.72	0
3	24,834.49	19,867.59	19,867.59	0
4	9,244.98	8,194.75	7,858.23	336.52
5	6,418.59	5,134.87	5,134.87	0
6	4,465.10	3,527.43	3,527.43	0
Total	72,068.62	61,199.66	60,047.32	1,152.34
Spotted Seatrout				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	5,302.83	0	5,302.83
2	15,747.86	15,694.81	14,488.03	1,206.78
3	3,725.17	3,495.85	2,980.14	515.17
4	55,469.89	50,514.58	47,149.41	3,365.17
5	9,169.42	8,911.32	7,335.53	1,575.78
6	496.12	554.34	391.94	162.41
Total	84,608.46	84,473.73	72,345.04	12,128.69
Sand Seatrout				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	4,762.08	10,220.31	3,285.84	6,934.47
2	828.83	2,357.21	762.53	1,594.68
3	1,241.72	3,185.16	993.38	2,191.78
4	33,281.93	30,308.75	28,289.64	2,019.10
5	47,680.97	48,978.28	38,144.78	10,833.50
6	0	1,948.88	0	1,948.88
Total	87,795.55	96,998.57	71,476.17	25,522.41
Southern Kingfish				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	3,968.40	6,001.48	2,738.20	3,263.28
2	11,603.68	12,744.16	10,675.39	2,068.77
3	62,086.23	63,077.49	49,668.98	13,408.51
4	68,412.86	69,929.04	58,150.93	11,778.11
5	30,259.08	28,934.61	24,207.26	4,727.34
6	1,488.37	6,697.64	1,175.81	5,521.84
Total	177,818.62	187,384.42	146,616.57	40,767.85
Black Drum				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	7,936.80	5,476.39	5,476.39	0

2	0	1,379.18	0	1,379.18
3	0	1,933.92	0	1,933.92
4	0	0	0	0
5	9,169.42	7,335.53	7,335.53	0
6	992.24	783.87	783.87	0
Total	18,098.47	16,908.90	13,595.80	3,313.10
Red Drum				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0
2	0	43.10	0	43.10
3	7,450.35	6,733.85	5,960.28	773.57
4	16,640.97	14,481.34	14,144.82	336.52
5	9,169.42	7,926.45	7,335.53	590.92
6	992.24	783.87	783.87	0
Total	34,252.98	29,968.61	28,224.51	1,744.10
Southern Flounder				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	2,381.04	2,050.83	1,642.92	407.91
2	3,315.34	3,136.31	3,050.11	86.20
3	31,043.11	24,963.42	24,834.49	128.93
4	42,526.92	36,820.91	36,147.88	673.03
5	4,584.71	4,455.66	3,667.77	787.89
6	2,976.73	2,838.84	2,351.62	487.22
Total	86,827.85	74,265.96	71,694.78	2,571.18

Table 9. Estimates of total catch and revised total catch with associated day and night total catch estimates for 2002. Total catch is the official MRFSS estimate in numbers of fish, revised total catch is the new estimate using night survey catch rates and effort estimates.

Sheepshead				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	879.92	747.93	747.93	0
2	661.48	383.66	383.66	0
3	5211.99	4273.83	4273.83	0
4	768.42	614.74	614.74	0
5	15,644.69	10,638.39	10,638.39	0
6	0	0	0	0
Total	23,166.51	16,658.55	16,658.55	0
Spotted Seatrout				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0
2	661.48	383.66	383.66	0
3	24,756.95	21,128.15	20,300.70	827.46
4	3,073.68	3,071.74	2,458.95	612.79
5	823.40	1,067.61	559.93	507.70
6	7,492.37	5,019.89	5,019.89	0
Total	36,807.89	30,671.05	28,723.11	1,947.95
Sand Seatrout				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0
2	1,984.44	1,150.98	1,150.98	0
3	72,967.84	71,142.18	59,833.63	11,308.56
4	16,136.84	23,122.66	12,909.47	10,213.19
5	11,527.67	10,377.31	7,838.82	2,538.50
6	832.49	557.77	557.77	0
Total	103,449.28	106,350.90	82,290.66	24,060.24
Southern Kingfish				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0
2	8,599.26	15,758.53	4,987.57	10,770.96
3	105,542.77	99,508.54	86,545.07	12,963.47
4	25,357.89	24,780.12	20,286.31	4,493.80
5	5,763.83	3,919.41	3,919.41	0
6	832.49	557.77	557.77	0
Total	146,096.24	144,524.35	116,296.13	28,228.23
Black Drum				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0

2	661.48	383.66	383.66	0
3	0	551.64	0	551.64
4	0	0	0	0
5	3,293.62	2,239.66	2,239.66	0
6	3,329.94	2,231.06	2,231.06	0
Total	7,285.05	5,406.02	4,854.38	551.64
Red Drum				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0
2	0	0	0	0
3	2,605.99	2,688.55	2,136.91	551.64
4	3,842.10	3,686.48	3,073.68	612.79
5	823.40	559.92	559.92	0
6	1,664.97	1,115.53	1,115.53	0
Total	8,936.48	8,050.47	6,886.05	1,164.43
Southern Flounder				
Wave	Total Catch	Revised Total Catch	Day Catch	Night Catch
1	0	0	0	0
2	2,645.93	1,534.64	1,534.64	0
3	23,453.95	23,921.15	19,232.24	4,688.91
4	6,147.37	5,734.95	4,917.89	817.06
5	2,470.21	2,187.45	1,679.75	507.70
6	7,492.37	5,019.89	5,019.89	0
Total	42,209.83	38,398.07	32,384.41	6,013.67

Table 10. Estimates of total harvest and revised total harvest with associated day and night total catch estimates for 2001. Total harvest is the official MRFSS estimate in numbers of fish, revised total harvest is the new estimate using night survey harvest rates and effort estimates.

Sheepshead				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	2,381.04	1,642.92	1,642.92	0
2	9,117.18	8,387.81	8,387.81	0
3	24,834.49	19,867.59	19,867.59	0
4	1,849.00	1,571.65	1,571.65	0
5	916.94	733.55	733.55	0
6	4,465.10	3,527.43	3,527.43	0
Total	43,563.75	35,730.94	35,730.94	0
Spotted Seatrout				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	407.91	0	407.91
2	4,973.01	4,790.66	4,575.17	212.50
3	1,241.72	1,122.31	993.38	128.93
4	5,546.99	5,724.49	4,714.94	1009.55
5	0	196.97	0	196.97
6	0	162.41	0	162.41
Total	11,761.72	12,404.75	10,283.49	2,121.27
Sand Seatrout				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	4,487.01	0	4,487.01
2	828.83	1,193.52	762.53	430.99
3	1,241.72	1,251.24	993.38	257.86
4	16,640.97	14,481.34	14,144.82	336.52
5	11,003.30	10,181.45	8,802.64	1,378.81
6	0	487.22	0	487.22
Total	29,714.83	32,081.78	24,703.37	7,378.41
Southern Kingfish				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	1,587.36	1,911.10	1,095.28	815.82
2	9,946.01	10,486.41	9,150.33	1,336.08
3	44,702.08	40,532.00	35,761.67	4,770.34
4	46,224.91	43,665.90	39,291.17	4,374.73
5	25,674.37	22,115.28	20,539.50	1,575.78
6	0	2,760.92	0	2,760.92
Total	128,134.74	121,471.61	105,837.95	15,633.66
Black Drum				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	1,587.36	1,095.28	1,095.28	0

2	0	387.89	0	387.89
3	0	1,418.21	0	1,418.21
4	0	0	0	0
5	6,418.59	5,134.87	5,134.87	0
6	992.24	783.87	783.87	0
Total	8,998.20	8,820.13	7,014.03	1,806.10
Red Drum				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	0	43.10	0	43.10
3	2,483.45	2,115.69	1,986.76	128.93
4	0	336.52	0	336.52
5	916.94	733.55	733.55	0
6	0	0	0	0
Total	3,400.39	3,228.86	2,720.31	508.54
Southern Flounder				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	1,587.36	1,503.19	1,095.28	407.91
2	3,315.34	3,136.31	3,050.11	86.20
3	24,834.49	19,867.59	19,867.59	0
4	36,979.93	31,769.45	31,432.94	336.52
5	4,584.71	4,849.60	3,667.77	1,181.84
6	2,480.61	2,446.90	1,959.68	487.22
Total	73,782.43	63,573.05	61,073.37	2,499.68

Table 11. Estimates of total harvest and revised total harvest with associated day and night total catch estimates for 2002. Total harvest is the official MRFSS estimate in numbers of fish, revised total harvest is the new estimate using night survey harvest rates and effort estimates.

Sheepshead				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	769.63	446.39	446.39	0
3	4,122.19	3,380.19	3,380.19	0
4	1,602.46	1,281.97	1,281.97	0
5	14,137.15	9,613.26	9,613.26	0
6	0	0	0	0
Total	20,631.44	14,721.82	14,721.82	0
Spotted Seatrout				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	0	0	0	0
3	9,274.92	7,605.44	7,605.44	0
4	1,602.46	1,281.97	1,281.97	0
5	0	0	0	0
6	1,577.67	1,057.04	1,057.04	0
Total	12,455.05	9,944.44	9,944.44	0
Sand Seatrout				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	2,308.90	1,339.16	1,339.16	0
3	44,313.52	36,555.23	36,337.08	218.15
4	27,241.88	22,645.45	21,793.50	851.94
5	9,088.17	6,179.96	6,179.96	0
6	0	0	0	0
Total	82,952.46	66,719.79	65,649.70	1,070.09
Southern Kingfish				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	5,387.42	3,124.71	3,124.71	0
3	32,977.50	27,259.70	27,041.55	218.55
4	27,241.88	23,071.42	21,793.50	1,277.91
5	3,029.39	2,059.99	2,059.99	0
6	0	0	0	0
Total	68,636.19	55,515.80	54,019.74	1,496.06
Black Drum				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0

2	0	0	0	0
3	0	218.55	0	218.55
4	0	0	0	0
5	4,039.19	2,746.65	2,746.65	0
6	1,051.78	704.69	704.69	0
Total	5,090.96	3,669.48	3,451.34	218.15
Red Drum				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	0	0	0	0
3	2,061.09	1,690.10	1,690.10	0
4	4,807.39	3,845.91	3,845.91	0
5	0	0	0	0
6	1,051.78	704.69	704.69	0
Total	7,920.26	6,240.70	6,240.70	0
Southern Flounder				
Wave	Total Harvest	Revised Total Harvest	Day Harvest	Night Harvest
1	0	0	0	0
2	1,539.26	892.77	892.77	0
3	11,336.02	11,258.85	9,295.53	1,963.32
4	8,012.32	6,835.83	6,409.85	425.97
5	1,009.80	686.66	686.66	0
6	4,207.11	2,818.77	2,818.77	0
Total	26,104.51	22,492.87	20,103.59	2,389.29

Table 12. Annual estimates of total catch and revised total catch. Total catch is the official MRFSS estimate in numbers of fish, revised total catch is the new estimate using night survey catch rates and effort estimates. Percent over/under shows the amount the official MRFSS estimate over or underestimated the revised total catch.

Species	Total Catch	Revised Total Catch	Percent Over/Under
2001			
Sheepshead	72,068.62	61,199.66	17 over
Spotted seatrout	84,608.46	84,473.73	0
Sand seatrout	87,795.55	96,998.57	9 under
Southern kingfish	177,818.62	187,384.42	5 under
Black drum	18,098.47	16,908.90	7 over
Red drum	35,252.98	29,968.61	17 over
Southern flounder	86,827.85	74,265.96	17 over
2002			
Sheepshead	23,166.51	16,658.55	39 over
Spotted seatrout	36,807.89	30,671.05	20 over
Sand seatrout	103,449.28	106,350.90	3 under
Southern kingfish	146,096.24	144,524.35	1 over
Black drum	7,285.05	5,406.02	34 over
Red drum	8,936.48	8,050.47	11 over
Southern flounder	42,209.83	38,398.07	10 over

Table 13. Annual estimates of total harvest and revised total harvest. Total harvest is the official MRFSS estimate in numbers of fish, revised total harvest is the new estimate using night survey harvest rates and effort estimates. Percent over/under shows the amount the official MRFSS estimate over or underestimated the revised total harvest.

Species	Total Harvest	Revised Total Harvest	Percent Over/Under
2001			
Sheepshead	43,563.75	35,730.94	22 over
Spotted seatrout	11,761.72	12,040.75	2 under
Sand seatrout	29,714.83	32,081.78	7 under
Southern kingfish	128,134.74	121,471.61	5 over
Black drum	8,998.20	8,820.13	2 over
Red drum	3,400.39	3,228.86	5 over
Southern flounder	73,782.43	63,573.05	16 over
2002			
Sheepshead	20,631.44	14,721.82	40 over
Spotted seatrout	12,455.05	9,944.44	25 over
Sand seatrout	82,952.46	66,719.79	24 over
Southern kingfish	68,636.19	55,515.80	24 over
Black drum	5,090.96	3,669.48	38 over
Red drum	7,920.26	6,240.70	27 over
Southern flounder	26,104.51	22,492.87	16 over

Table 14. Annual estimates of total catch and revised total catch by mode. Total catch is the official MRFSS estimate in numbers of fish, revised total catch is the new estimate using night survey catch rates and effort estimates. Percent over/under shows the amount the official MRFSS estimate over or underestimated the revised total catch.

Species	Shore		Charter	Private	Total		% Over/Under
	Total Catch	Revised Total Catch	Total Catch	Total Catch	Total Catch	Revised Total Catch	
2001							
Sheepshead	72,068	61,199	7,245	140,570	219,883	209,014	5 over
Spotted seatrout	84,608	84,473	1,142	856,486	942,236	942,101	0
Sand seatrout	87,795	96,998	11,443	1,336,536	1,435,774	1,444,977	<1 under
Southern kingfish	177,818	187,384	3,083	456,411	637,312	646,878	1 under
Black drum	18,098	16,908	1,088	37,188	56,374	55,184	2 over
Red drum	35,252	29,968	14,378	142,215	191,845	186,561	3 over
Southern flounder	86,827	74,265	275	235,114	322,216	309,654	4 over
2002							
Sheepshead	23,166	16,658	1,138	104,904	129,208	122,700	5 over
Spotted seatrout	36,807	30,671	0	881,694	918,501	912,365	<1 over
Sand seatrout	103,449	106,350	23,578	832,251	959,278	962,179	<1 under
Southern kingfish	146,096	144,524	836	239,333	386,265	384,693	<1 over
Black drum	7,285	5,406	162	14,785	22,232	20,353	9 over
Red drum	8,936	8,050	4,857	162,269	176,062	175,176	<1 over
Southern flounder	42,209	38,398	0	139,741	181,950	178,139	2 over

Table 15. Annual estimates of total harvest and revised total harvest by mode. Total harvest is the official MRFSS estimate in numbers of fish, revised total harvest is the new estimate using night survey harvest rates and effort estimates. Percent over/under shows the amount the official MRFSS estimate over or underestimated the revised total harvest.

Species	Shore		Charter Total Harvest	Private Total Harvest	Total		% Over/Under
	Total Harvest	Revised Total Harvest			Total Harvest	Revised Total Harvest	
2001							
Sheepshead	43,563	35,730	3,797	46,451	93,811	85,978	9 over
Spotted seatrout	11,761	12,040	853	294,903	307,517	307,796	<1 under
Sand seatrout	29,714	32,081	8,802	1,110,749	1,149,265	1,151,632	<1 under
Southern kingfish	128,134	121,471	3,033	354,090	485,257	478,594	1 over
Black drum	8,998	8,820	1,010	28,113	38,121	37,943	<1 over
Red drum	3,400	3,228	11,691	45,191	60,282	60,110	<1 over
Southern flounder	73,782	63,573	203	197,928	271,913	261,704	4 over
2002							
Sheepshead	20,631	14,721	771	49,190	70,592	64,682	9 over
Spotted seatrout	12,455	9,944	0	351,868	364,323	361,812	1 over
Sand seatrout	82,952	66,719	18,035	755,338	856,325	840,092	2 over
Southern kingfish	68,636	55,515	836	210,965	280,437	267,316	5 over
Black drum	5,090	3,669	112	5,621	10,823	9,402	15 over
Red drum	7,920	6,240	4,059	48,698	60,677	58,997	3 over
Southern flounder	26,104	22,492	0	107,751	133,855	130,243	3 over