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Estimates of Spotted Seatrout and Red Drum Bycatch in the Louisiana Menhaden Reduction Fishery

Louisiana Department of Wildlife and Fisheries

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Overview

The Gulf menhaden reduction fishery is the largest commercial fishery operating in the Gulf of America, with the majority of landings occurring in Louisiana (LA) waters. Estimates of Spotted Seatrout (SST) and Red Drum (RD) bycatch from the menhaden fishery are provided to allow for comparisons of menhaden fishery bycatch in LA waters relative to the removals of the directed LA fisheries for SST and RD.

Incidental catch has been characterized in the Gulf menhaden fishery from both at-sea and processing plant studies that were reviewed in SEDAR49-DW-04 (Sagarese et al. 2016). A more recent study, conducted by LGL Ecological Research Associates, characterized the incidental catch of the LA fishery in the 2024 fishing season (LGL 2025). This study monitored 3.2% of the total 2024 fishing effort and provides the most comprehensive assessment of bycatch from the LA menhaden reduction fishery to date.

Methods

Bycatch information from the Gulf menhaden fishery used in this analysis was limited to the most recent study conducted by LGL Ecological Research Associates, where per set catch rates of retained and released catches were estimated (Tables 1 and 2) along with the corresponding mean weights and discard mortalities of the catches.

Annual bycatch can be estimated by expanding the catch per set estimates from the annual LA menhaden fishery effort (number of purse-seine sets per year, Figure 1). Annual menhaden fishery effort observations in LA waters are currently available from 2000-2024. Fishery effort prior to 2000 (1982-1999) is estimated from a linear regression between the currently available annual effort observations and the corresponding landings in pounds (sets=1.261E-05*landings + 6.484E+03, r^2=0.402).

Time-series of SST and RD bycatch from the LA menhaden fishery (1982-2024, Table 3) are estimated by summing the product of the retained and released mean catch per set estimates, the estimated annual LA menhaden fishery effort, and the discard mortality rates of the released catches. Discard mortality rates of released RD were estimated in the LGL study from an onboard holding study (rollover bycatch=16% and chute bycatch=98%). Discard mortality rates of released SST were approximated by doubling the observed mortality of the released catches in the LGL study to account for delayed mortality

(rollover bycatch=0% and chute bycatch=40%). All retained fish are assumed to die. Bycatch in units of numbers are converted into weight using the mean weight of the catches observed in the LGL study.

Recreational landings estimates are taken from the LA Creel survey (2014-2024) and estimates hindcast to the historic MRIP time-series (1982-2013, West et al. 2022). Commercial landings are taken from the LDWF Trip Ticket program (1999-2024) and NOAA Fisheries commercial statistical records (1982-1998, NOAA Fisheries 2025).

Results

Louisiana bycatch estimates in units of weight are compared to the directed removals of SST and RD from the recreational and commercial LA fisheries (Tables 4 and 5).

Bycatch estimates of SST relative to the removals of the directed LA fisheries are minimal. Estimates of SST bycatch from the menhaden fishery in units of weight in the most recent decade accounted for 2.7% of the total fishery removals, while the directed fisheries accounted for 97.3% (recreational harvest= 93.4%, recreational dead discards=3.9%, commercial harvest=0.1%) of the total fishery removals (Figure 2).

Bycatch estimates of RD relative to the removals of the directed LA fisheries are also minimal, but of greater magnitude than the SST bycatch estimates. Estimates of RD bycatch from the menhaden fishery in units of weight in the most recent decade accounted for 9.9% of the total fishery removals, while the directed fishery accounted for 90.1% (recreational harvest=78.9%, recreational dead discards=11.2%) of the total fishery removals (Figure 3).

Literature Cited

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Sagarese, S.R., Matthew A. Nuttall, Joseph E. Serafy and Elizabeth Scott-Denton. 2016. Review of bycatch in the Gulf menhaden fishery with implications for the stock assessment of red drum. SEDAR49-DW-04. SEDAR, North Charleston, SC. 30 pp.

West, J., X. Zhang, T. Allgood, and J. Adriance. 2021. Assessment of spotted seatrout in Louisiana waters. 2021 Report of the Louisiana Department of Wildlife and Fisheries. 121 pp.

Tables

Table 1: Spotted Seatrout catch rate estimates (mean and upper/lower 95% confidence intervals), per net set, from the 2024 LGL bycatch characterization of the LA menhaden reduction fishery.

species	catch type	fish per net set		
		mean	L95%CI	U95%CI
Spotted Seatrout	released (rollover)	0.00867	0	0.0182
Spotted Seatrout	released (chute)	0.0221	0.00708	0.0373
Spotted Seatrout	retained	18.3	9.13	31.4

Table 2: Red Drum catch rate estimates (mean and upper/lower 95% confidence intervals), per net set, from the 2024 LGL bycatch characterization of the LA menhaden reduction fishery.

species	catch type	fish per net set		
		mean	L95%CI	U95%CI
Red Drum	released (rollover)	2.04	1.49	2.58
Red Drum	released (chute)	1.36	0.937	1.78
Red Drum	retained	0.636	0	1.70

Table 3: Time-series of LA Spotted Seatrout and Red Drum total bycatch estimates (numbers of dead fish) for 1982-2024 from the mean and upper/lower 95% confidence interval catch per set estimates.

	SST Bycatch			RD Bycatch		
Year	U95%CI	mean	L95%CI	U95%CL	mean	L95%CL
1982	830,349	483,157	241,072	101,877	60,559	30,580
1983	899,197	523,218	261,061	110,324	65,581	33,116
1984	900,179	523,790	261,346	110,445	65,652	33,152
1985	809,726	471,157	235,085	99,347	59,055	29,821
1986	782,378	455,244	227,145	95,991	57,061	28,813
1987	842,075	489,980	244,477	103,316	61,415	31,012
1988	646,587	376,231	187,721	79,331	47,157	23,812
1989	607,940	353,743	176,501	74,589	44,339	22,389
1990	564,495	328,464	163,888	69,259	41,170	20,789
1991	604,184	351,558	175,411	74,128	44,065	22,251
1992	515,854	300,161	149,766	63,291	37,623	18,998
1993	623,493	362,794	181,017	76,497	45,473	22,962
1994	800,176	465,600	232,312	98,175	58,359	29,469
1995	569,067	331,125	165,215	69,820	41,504	20,958
1996	578,822	336,801	168,047	71,017	42,215	21,317
1997	686,124	399,237	199,200	84,182	50,041	25,269
1998	563,894	328,114	163,713	69,185	41,126	20,767
1999	759,639	442,013	220,543	93,201	55,402	27,976
2000	691,161	402,167	200,662	84,800	50,408	25,454
2001	580,385	337,710	168,501	71,208	42,329	21,374
2002	645,819	375,784	187,498	79,237	47,101	23,784
2003	663,490	386,067	192,629	81,405	48,390	24,435
2004	667,043	388,134	193,660	81,841	48,649	24,566
2005	480,520	279,602	139,508	58,956	35,046	17,697
2006	635,851	369,984	184,605	78,014	46,374	23,417
2007	571,235	332,386	165,845	70,086	41,662	21,037
2008	451,435	262,678	131,064	55,387	32,924	16,625
2009	533,723	310,559	154,954	65,483	38,926	19,656
2010	407,414	237,063	118,283	49,986	29,714	15,004
2011	540,515	314,511	156,926	66,317	39,421	19,906
2012	600,760	349,566	174,417	73,708	43,815	22,125
2013	586,108	341,040	170,163	71,911	42,746	21,585
2014	526,931	306,607	152,982	64,650	38,430	19,406
2015	499,795	290,817	145,104	61,321	36,451	18,406
2016	443,102	257,829	128,644	54,365	32,317	16,319
2017	456,057	265,367	132,405	55,954	33,261	16,796
2018	493,003	286,865	143,132	60,487	35,956	18,156
2019	486,243	282,931	141,169	59,658	35,463	17,907
2020	380,153	221,200	110,368	46,642	27,725	14,000
2021	419,048	243,833	121,661	51,414	30,562	15,433
2022	542,181	315,480	157,410	66,521	39,543	19,967
2023	484,860	282,126	140,768	59,488	35,362	17,856
2024	412,571	240,064	119,780	50,619	30,090	15,194

Table 4: Comparisons of LA Spotted Seatrout directed fishery removals (recreational/commercial landings, and dead recreational discards) and bycatch estimates, in pounds, for 1982-2024 from the mean and upper/lower 95% confidence interval catch per set estimates. Confidential commercial landings records (***) are not presented.

	SST Directed Fishery			SST Bycatch		
Year	rec. landings	rec. discards	com. landings	U95%CI	mean	L95%CI
1982	4,869,061	45,927	727,606	349,877	203,588	101,548
1983	4,173,565	61,506	1,340,625	378,887	220,468	109,968
1984	1,362,509	4,064	973,250	379,301	220,709	110,088
1985	2,903,358	22,250	1,161,598	341,187	198,531	99,026
1986	6,140,234	54,543	1,978,038	329,664	191,826	95,682
1987	4,854,132	66,439	1,801,874	354,818	206,463	102,982
1988	5,313,332	99,403	1,433,408	272,447	158,532	79,075
1989	4,553,228	88,966	1,488,878	256,163	149,057	74,349
1990	2,246,316	67,595	648,645	237,856	138,405	69,035
1991	6,131,699	211,205	1,220,231	254,580	148,136	73,889
1992	4,047,596	146,743	971,481	217,361	126,479	63,087
1993	3,680,464	122,689	1,138,070	262,716	152,870	76,251
1994	5,287,571	136,537	1,023,687	337,164	196,190	97,858
1995	5,897,013	138,281	658,084	239,783	139,526	69,595
1996	5,633,898	162,068	774,474	243,893	141,917	70,788
1997	5,429,323	181,261	549,505	289,106	168,226	83,910
1998	5,177,850	178,492	111,979	237,603	138,257	68,962
1999	7,323,715	215,710	76,262	320,083	186,251	92,901
2000	8,118,153	210,146	40,283	291,229	169,461	84,526
2001	7,185,774	139,362	109,467	244,552	142,301	70,979
2002	5,012,133	115,810	71,547	272,123	158,344	78,981
2003	5,186,776	171,539	19,402	279,569	162,677	81,142
2004	4,332,901	155,801	19,874	281,067	163,548	81,577
2005	4,564,983	180,856	16,948	202,473	117,815	58,766
2006	6,745,371	218,556	2,042	267,923	155,900	77,762
2007	5,530,280	167,595	11,050	240,697	140,057	69,860
2008	7,164,674	244,936	10,232	190,217	110,684	55,209
2009	7,817,443	231,974	999	224,890	130,860	65,272
2010	6,184,412	151,171	***	171,669	99,891	49,825
2011	8,525,814	168,073	***	227,752	132,525	66,103
2012	8,163,839	215,385	98.28	253,137	147,296	73,470
2013	5,622,064	221,577	3,711	246,963	143,704	71,679
2014	3,357,602	132,923	6,877	222,029	129,195	64,441
2015	4,736,420	181,925	4,035	210,595	122,541	61,123
2016	5,505,395	228,988	2,462	186,706	108,641	54,190
2017	5,671,649	192,169	3,571	192,165	111,818	55,774
2018	3,090,198	66,040	4,009	207,733	120,876	60,292
2019	3,832,146	170,591	***	204,884	119,219	59,465
2020	4,054,897	179,421	***	160,182	93,207	46,491
2021	3,196,389	113,686	***	176,571	102,744	51,248
2022	3,136,650	99,667	***	228,454	132,934	66,306
2023	3,114,661	112,618	***	204,301	118,879	59,296
2024	3,296,570	304,507	***	173,842	101,155	50,456

Table 5: Comparisons of LA Red Drum directed fishery removals (recreational/commercial landings, and dead recreational discards) and bycatch estimates, in pounds, for 1982-2024 from the mean and upper/lower 95% confidence interval catch per set estimates.

	RD Directed Fishery			RD Bycatch		
Year	rec. landings	rec. discards	com. landings	U95%CI	mean	L95%CI
1982	2,855,725	76,827	1,454,503	1,919,645	1,149,450	587,972
1983	2,952,651	141,603	1,938,615	2,078,813	1,244,757	636,724
1984	2,367,474	62,636	2,608,383	2,081,083	1,246,116	637,419
1985	2,174,399	42,295	2,933,573	1,871,968	1,120,902	573,369
1986	1,993,626	68,722	7,817,694	1,808,743	1,083,043	554,004
1987	2,306,832	324,025	4,571,177	1,946,755	1,165,682	596,276
1988	2,424,843	437,655	245,365	1,494,815	895,069	457,850
1989	3,251,530	455,344	24,811	1,405,468	841,570	430,484
1990	2,977,243	292,764	0	1,305,029	781,429	399,720
1991	2,804,216	878,060	0	1,396,785	836,370	427,824
1992	4,072,597	599,707	0	1,192,578	714,095	365,277
1993	5,087,621	509,255	1,884	1,441,425	863,100	441,497
1994	4,610,560	481,312	2,957	1,849,890	1,107,682	566,607
1995	7,502,450	577,697	0	1,315,600	787,758	402,958
1996	7,157,264	537,592	1,925	1,338,152	801,262	409,865
1997	7,128,952	870,206	0	1,586,219	949,800	485,846
1998	5,442,578	988,947	4,769	1,303,639	780,596	399,294
1999	6,642,380	975,900	0	1,756,173	1,051,566	537,902
2000	8,288,060	1,078,719	0	1,597,862	956,772	489,413
2001	7,417,608	1,069,080	0	1,341,765	803,425	410,972
2002	7,196,064	1,204,874	0	1,493,039	894,006	457,306
2003	6,592,330	1,043,525	0	1,533,893	918,468	469,819
2004	5,778,575	793,462	0	1,542,107	923,387	472,335
2005	4,733,062	732,602	0	1,110,893	665,183	340,258
2006	5,098,331	818,067	0	1,469,996	880,208	450,248
2007	6,061,853	846,735	0	1,320,612	790,759	404,493
2008	6,672,823	993,483	0	1,043,652	624,920	319,662
2009	7,355,418	1,147,552	0	1,233,889	738,831	377,930
2010	8,346,255	1,321,783	0	941,882	563,982	288,491
2011	8,304,959	942,153	0	1,249,591	748,233	382,740
2012	6,044,853	939,683	0	1,388,870	831,631	425,400
2013	7,928,973	1,312,175	0	1,354,995	811,347	415,024
2014	6,641,525	1,268,614	0	1,218,187	729,429	373,121
2015	5,867,597	1,201,522	0	1,155,453	691,865	353,906
2016	4,869,206	753,104	0	1,024,388	613,386	313,762
2017	6,555,157	996,904	0	1,054,338	631,319	322,935
2018	8,282,850	1,244,409	0	1,139,752	682,463	349,097
2019	5,275,105	865,690	0	1,124,123	673,105	344,310
2020	4,762,212	725,376	0	878,857	526,244	269,187
2021	3,541,562	347,687	0	968,778	580,087	296,729
2022	4,237,176	383,488	0	1,253,443	750,540	383,920
2023	4,463,555	401,195	0	1,120,924	671,190	343,330
2024	3,216,849	358,070	0	953,803	571,121	292,142

Figures

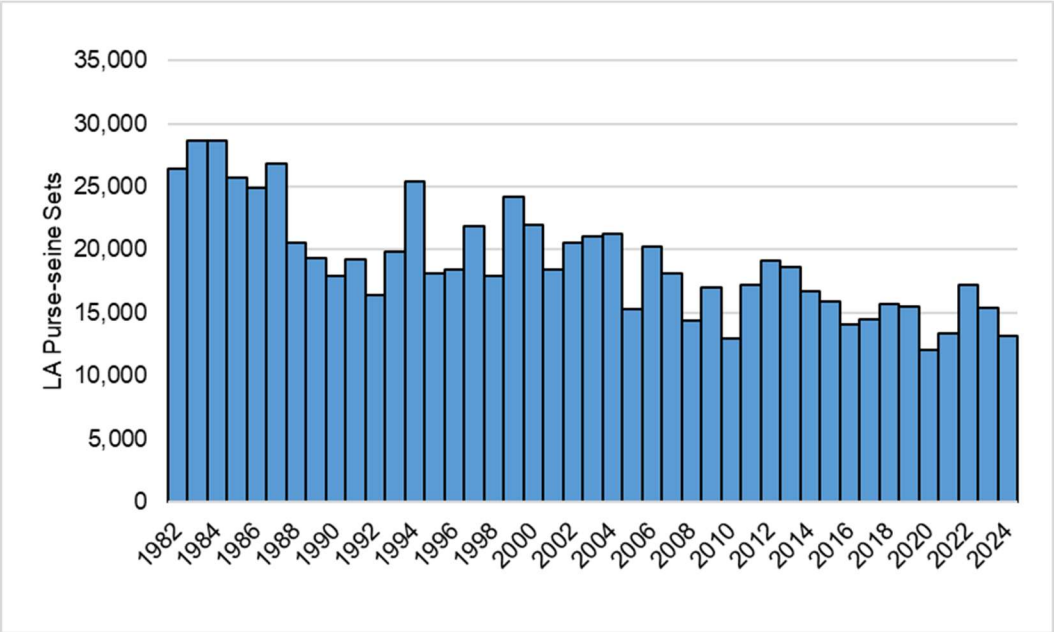

Figure 1: Time-series of observed (2000-2024) and estimated (1982-1999) LA menhaden fishery effort (annual number of purse-seine sets).

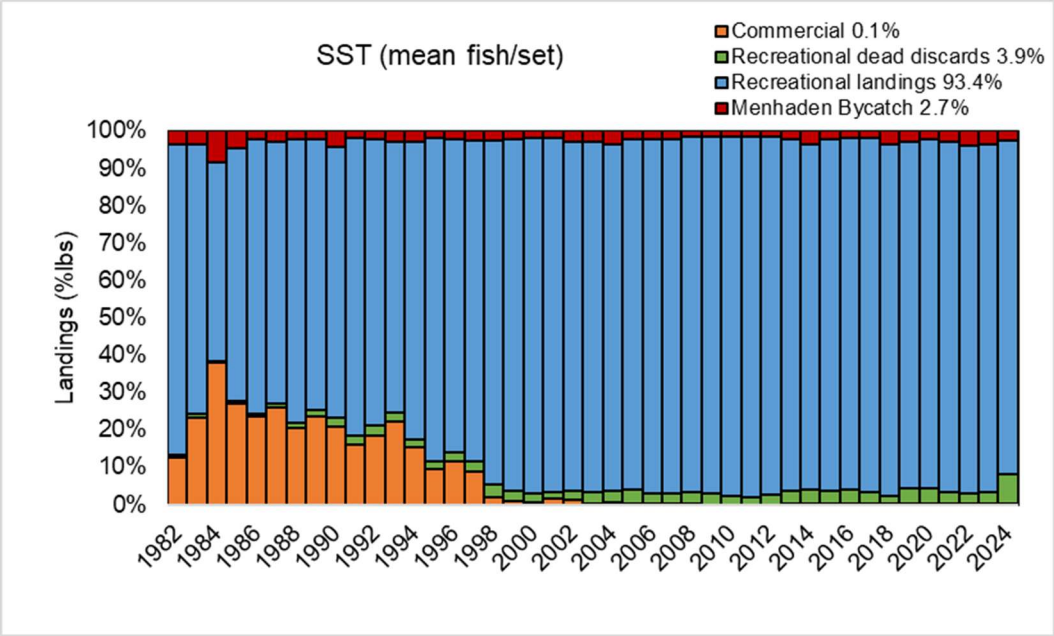

Figure 2: Comparison of LA Spotted Seatrout directed fishery removals (recreational/commercial landings, and dead recreational discards) and LA menhaden fishery bycatch estimates, in pounds, calculated from the mean catch per set estimates. Values in legends represent the mean landings percentages from 2015-2024.

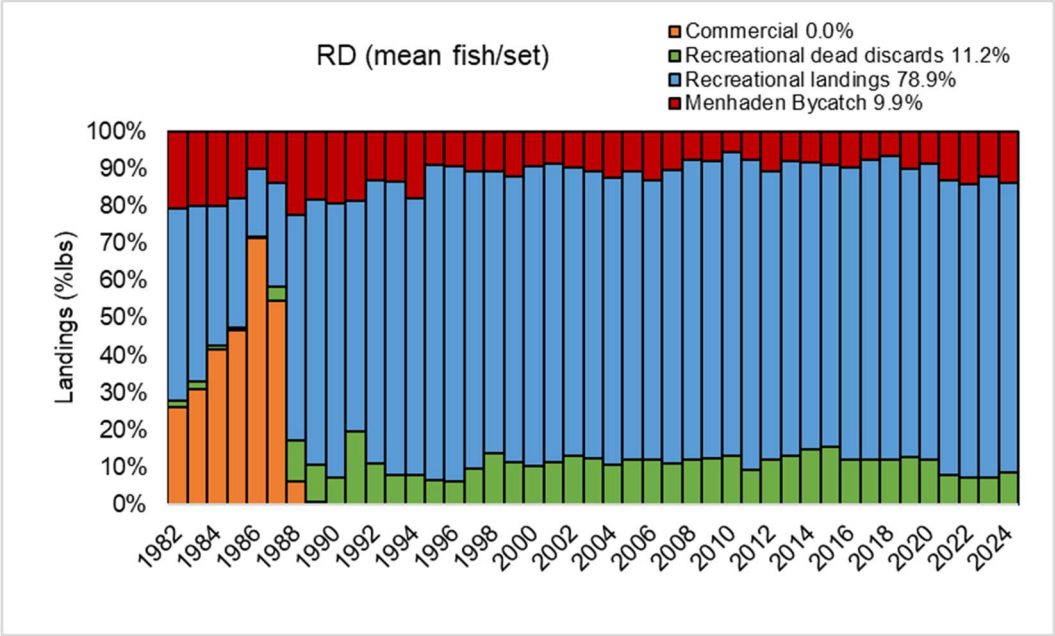

Figure 3: Comparison of LA Red Drum directed fishery removals (recreational/commercial landings, and dead recreational discards) and LA menhaden bycatch estimates, in pounds, calculated from the mean catch per set estimates. Values in legends represent the mean landings percentages from 2015-2024.