Commercial Landings of Gulf of Mexico Red Grouper (*Epinephelus morio*) from 1986-2022

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Commercial Landings of Gulf of Mexico Red Grouper (*Epinephelus morio*) from 1986 - 2022

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†Updated submission accounts for data processing errors that impacted Florida landings from 1986 – 1999, and non-Florida ALS landings from 1986 – until the implementation of State Trip Tickets. Additionally, the conversion from gutted weight to whole weight was updated from 1.18 to 1.048 to be consistent with recreational data processing.

Introduction

Commercial landings statistics are the quantities and value of seafood products caught by fishermen in the U.S. and sold to established (licensed) wholesale and retail seafood dealers. These data have been collected as early as the late 1890s. Currently, these data are collected by trip ticket programs (TTPs) managed by state agencies. In addition to the quantity and value, basic information on the gear used to catch the fish, the area where the fishing occurred and the county and state where the catch was landed are recorded (Gloeckner, 2014).

Commercial landings of Red Grouper for the Gulf of Mexico (hereafter referred to as the Gulf) are provided in gutted weight (in pounds) for the period 1986-2022.

Methods

Commercial landings for Gulf Red Grouper were compiled using several data sources. Most of the data were accessed from an Oracle database housed at the Southeast Fisheries Science Center (SEFSC) in Miami, Florida. All landings were converted to gutted weight using the conversion factor 1.048.

Data Sources

The Accumulated Landings System (ALS) is an Oracle database maintained by SEFSC. This database contains landings data from 1926 to present with data prior to 1962 considered historical. Historical landings are summarized annually. Beginning in 1977, landings were consistently provided as monthly summaries, while a few states for some species began reporting monthly in 1972. For more information on data collection of landings prior to the implementation of a state TTP (Trip Ticket Program) and ALS database structure, refer to Gloeckner (2014).

Data from state TTPs begin in various years, depending on the state (Donaldson, 2004). Trip ticket data for Texas, Louisiana, Mississippi, and Alabama were available through the Gulf of Mexico Fisheries Information Network (GulfFIN) housed at the Gulf States Marine Fisheries Commission (GSMFC). Florida trip ticket data were available through Atlantic Coastal Cooperative Statistics Program (ACCSP). Where data were available from state trip ticket programs, those data were used in lieu of data from ALS.

The Florida General Canvass dataset, within the ALS database, contains annual landings 1976-1996. These data were submitted by federal port agents responsible for a particular county within Florida (Gloeckner, 2014). The General Canvass data provides estimated proportions of the landings by gear and area. Those proportions are then used to apportion ALS or Trip Ticket landings by gear and area when gear or area information is missing for 1977-1996.

Stock Boundary

Commercial landings for Gulf of Mexico Red Grouper were compiled from Texas through West Florida. This boundary follows the Gulf of Mexico Fisheries Management Council (GMFMC) boundary which is a line from Riley's Hump, the Tortugas and US 1, where the North of US1 is assigned to the GMFMC and South of US 1 is considered outside of the GMFMC region and is assigned to the South Atlantic FMC region (Figure 1). All proportioning of unclassified grouper

landings and assignment of gear and area for missing data and logbook data were done at the subregion level (East 1-12 and West 13-21).

Gear Groups

Similar to the previous assessment (SEDAR 61), commercial landings were summarized into 3 main gears (Handline, Longline, and Trap). All other gears with reported Red Grouper landings were assigned to an other gear group. Table 1**Error! Reference source not found.** highlights the NMFS and FIN gear codes associated with each gear group.

Data Compilation

The SEFSC maintained materialized view in ORACLE appropriately joins all data sources based on best practices (MV Landings). All data housed within ALS are in the NMFS coding system, whereas TTP data are provided in the Fisheries Information Network (FIN) standard. All gear, area, county, state, and species information are translated to the common FIN coding standard. The following data were used for each respective state:

Texas

- ALS from 1986-2013
- Trip ticket from 2014-2022

Louisiana

- ALS from 1986-1999
- Trip ticket from 2000-2022

Mississippi

- ALS from 1986-2014
- Trip ticket from 2015-2022

Alabama

- ALS from 1986-2001
- Trip ticket from 2002-2022

Florida

- Trip ticket from 1986-2022
- General Canvass to proportion landings by gear and area from 1986-1996

Area fished, county landed, and state landed are used to filter the data to the stock boundary (Figure 1). With just county or state landed information, one cannot assume landings are a part of Gulf of Mexico, South Atlantic, or foreign catch (Gloeckner, 2014). Therefore, area of capture is preferred when assigning catch to the appropriate region. However, when area information is missing, then the recorded county and/or state landed is used to assign landings to the Gulf of

Mexico to account for these removals from the stock biomass. When area information is missing, Monroe County, Florida is considered as part the Gulf of Mexico landings.

Coastal Logbook Proportioning to Assign Gear and Area to the Landings

For landings reported during 1990 and after, gear and area information from the SEFSC Coastal Fisheries Logbook Program (CFLP) were used to assign gear and area to the landings. This decision was based on the general acceptance that records regarding gear(s) used and area(s) fished were probably more accurately reported on the fishermen's coastal logbook, which are completed by the fishing boat captains or designees rather than on the dealer reported trip tickets, often reported online by secretarial staff. For a general description of the logbook data please review Atkinson et al. (2021) and Poffenberger (2003).

This method involves calculating the proportion of logbook landings by year, state, gear (e.g., Handline, Longline, Trap, and Other) and fishing area. These proportions are applied to the annual landings by month and state.

Unclassified Groupers

Prior to 1986 nearly all groupers except two species, goliath and warsaw, were landed as 'grouper' in the Gulf of Mexico. After this change in 1986 grouper landings began to be identified by species and the amount of unclassified groupers declined sharply. However, for the remaining unclassified groupers reported after 1986, annual species composition of grouper species (except warsaw and goliath) were used to assign a proportion of unclassified grouper landings to Red Grouper. Following SEDAR 61 methods, for the years where trip ticket data were used, unclassified grouper landings were not included if that trip also landed Red Grouper.

IFQ Program

In 2010, the Gulf of Mexico Fisheries Council started a program whereby fishermen own a portion of the annually allocated Red Grouper quota which is also tradeable from one permit holder to another. The Program is administered by the NOAA Fisheries Southeast Regional Office (SERO). The IFQ landings data does not have gear information which is needed for the assessment process. In order to assure that the landings in the SEFSC Oracle databases are matching what is reported to SERO and which is deemed the most accurate data, Red Grouper landings are corrected to match the IFQ landings data (Wrege and Orhun 2019). Annual IFQ correction factors are calculated from the difference between the SEFSC landings to SERO landings and applied to the SEFSC landings from 2010-2022.

Results

The calculated annual proportions of Red Grouper landings to classified grouper total landings (except Warsaw and Goliath) are summarized in Table 2. These proportions were used to assign unclassified grouper landings to Red Grouper. Table 3 highlights the annual correction factors used to adjust total Red Grouper landings to match SERO reported landings. Annual calculated Red Grouper landings totals are summarized by gear group (Handline, Longline, Trap, and Other) in Table 4, landings uncertainty estimates are summarized in Table 5. Almost all of the landings were caught in the Eastern Gulf of Mexico region. Figure 2 depicts annual landings by gear group, with the majority of landings coming from the longline fisheries. Landings peaked in

1989, and have slowly decreased through time. The handline fishery was largest during the late 1980s, after which it has declined somewhat and remained relatively stable throughout the time series. The trap fishery was a relatively small component of the overall fishery up through 2006 when it ended. In all years, other gears made up a very small proportion of total landings. SEDAR 88 landings were compared to SEDAR 61 annual landings by gear group in Figure 3.

Changes from SEDAR 61

- Between SEDAR 61 and SEDAR 88 there have been updates to the standard gear groupings which resulted in some of the landings being shifted between gear groups. Changes in gear groups are detailed below.

FIN Gear Code	FIN Gear Name	SEDAR 61 Gear Group	SEDAR 88 Gear Group
130	POTS AND TRAPS	Other	Trap
132	POTS AND TRAPS, BLUE CRAB	Other	Trap
145	POTS AND TRAPS, STONE CRAB	Other	Trap
164	POTS AND TRAPS, COLLAPSIBLE CRAB	Other	Trap
180	POTS AND TRAPS, OTHER	Other	Trap
320	TROLL LINES	Other	Handline
321	TROLL LINE, MANUAL	Other	Handline
322	TROLL LINE, ELECTRIC	Other	Handline
408	BUOY GEAR	Handline	Longline

- Pounds landed in whole weight were converted to gutted weight using the conversion factor 1.048. It is believed SEDAR 61 used the conversion factor 1.18. Since most Red Grouper are landed in gutted weight, this change made less than a 0.03% difference across all years.

Literature Cited

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Tables

Table 1. Gears observed in the Red Grouper (*Epinephelus morio*) and Unclassified Groupers datasets, and their respective gear groupings used to aggregate the data.

FIN Gear Code	Gear Name	SEDAR Gear Group
300	HOOK AND LINE	HANDLINE
301	HOOK AND LINE, MANUAL	HANDLINE
302	HOOK AND LINE, ELECTRIC	HANDLINE
303	ELECTRIC/HYDRAULIC, BANDIT REELS	HANDLINE
320	TROLL LINES	HANDLINE
321	TROLL LINE, MANUAL	HANDLINE
322	TROLL LINE, ELECTRIC	HANDLINE
700	HAND LINE	HANDLINE
701	TROLL AND HAND LINES CMB	HANDLINE
400	LONG LINES	LONGLINE
403	LONG LINES, BOTTOM	LONGLINE
404	LONG LINES, SURFACE, MIDWATER	LONGLINE
408	BUOY GEAR	LONGLINE
130	POTS AND TRAPS	TRAP
132	POTS AND TRAPS, BLUE CRAB	TRAP
139	POTS AND TRAPS, FISH	TRAP
140	POTS AND TRAPS, SPINY LOBSTER	TRAP
145	POTS AND TRAPS, STONE CRAB	TRAP
164	POTS AND TRAPS, COLLAPSIBLE CRAB	TRAP
180	POTS AND TRAPS, OTHER	TRAP
010	HAUL SEINES	OTHER
030	PURSE SEINE	OTHER
080	BEAM TRAWLS	OTHER
095	OTTER TRAWL BOTTOM, SHRIMP	OTHER
110	OTHER TRAWLS	OTHER
200	GILL NETS	OTHER
205	GILL NETS, RUNAROUND	OTHER
210	TRAMMEL NETS	OTHER
216	TRAMMEL NETS, OTHER	OTHER
551	CAST NETS	OTHER
660	SPEARS	OTHER
661	SPEARS, DIVING	OTHER
671	SPONGE HOOKS	OTHER

FIN Gear Code	Gear Name	SEDAR Gear Group
750	BY HAND, DIVING GEAR	OTHER
760	BY HAND, NO DIVING GEAR	OTHER

Table 2. The annual proportion of Red Grouper landings to all classified grouper landings (except Warsaw and Goliath) by subregion and gear group. These proportions were used to assign unclassified grouper landings to Red Grouper for each gear from 1986 - 2022.

	East				West			
Year	Handline	Longline	Other	Trap	Handline	Longline	Other	Trap
1986	0.642	0.703	0.475	0.955	0.011	0.005	0.182	
1987	0.635	0.763	0.477	0.919	0.006			
1988	0.632	0.664	0.404	0.944	0.001			
1989	0.722	0.790	0.587	0.938	0.001	0.001		
1990	0.629	0.638	0.316	0.859	0.127	0.017		
1991	0.607	0.703	0.647	0.881	0.001	0.001		
1992	0.523	0.656	0.308	0.897				
1993	0.478	0.810	0.436	0.891	0.676	0.959		1
1994	0.510	0.732	0.407	0.939	0.007	0.016		
1995	0.503	0.732	0.355	0.949	0.008	0.001		
1996	0.454	0.788	0.113	0.945	0.004			
1997	0.473	0.730	0.226	0.963				
1998	0.328	0.695	0.135	0.936				
1999	0.477	0.766	0.409	0.947		0.002		
2000	0.520	0.652	0.265	0.966	0.000	0.012		
2001	0.441	0.659	0.293	0.941	0.011	0.101		
2002	0.480	0.656	0.320	0.950	0.002	0.022		
2003	0.444	0.592	0.164	0.961	0.008	0.030		
2004	0.456	0.632	0.188	0.969	0.003	0.023		
2005	0.468	0.659	0.157	0.976	0.016			
2006	0.609	0.716	0.221	0.987	0.002			
2007	0.639	0.588	0.255	0.968	0.006	0.000		
2008	0.647	0.697	0.374	0.275	0.003			
2009	0.771	0.579	0.472	0.611	0.006	0.000		
2010	0.740	0.758	0.381	0.653	0.004	0.006		
2011	0.842	0.846	0.464	0.994	0.044			

	East				West			
Year	Handline	Longline	Other	Trap	Handline	Longline	Other	Trap
2012	0.788	0.789	0.353	1.000	0.002	0.078		
2013	0.739	0.790	0.349	0.356	0.001	0.186		
2014	0.808	0.786	0.352	0.996	0.028			
2015	0.836	0.767	0.334	1.000	0.002			
2016	0.656	0.759	0.193		0.001	0.000		
2017	0.731	0.747	0.217	1.000	0.000	0.000		
2018	0.640	0.669	0.136		0.000	0.006		
2019	0.576	0.620	0.237		0.000			
2020	0.689	0.664	0.219		0.001	0.000		
2021	0.716	0.674	0.251		0.001	0.068		
2022	0.627	0.677	0.231	0.898				

Table 3. Annual IFQ correction factors used to adjust trip ticket total landings to match the reported total IFQ landings from 2010-2022.

Year	Correction Factor
2010	0.990
2011	1.006
2012	1.005
2013	0.997
2014	1.009
2015	1.010
2016	1.009
2017	1.010
2018	1.008
2019	1.014
2020	1.001
2021	1.001
2022	1.003

Table 4. The annual calculated Red Grouper landings by gear grouping for each Subregion from1986 - 2022. The (*) cells indicate confidential data.

Year	Handline	Longline	Other	Trap
1986	3,149,753	2,542,236	12,518	712,377
1987	2,526,301	3,788,024	11,857	446,531
1988	2,076,071	2,164,568	6,190	531,628
1989	3,754,391	3,182,101	11,211	579,660
1990	2,480,249	2,025,936	5,213	331,287
1991	1,871,555	2,725,568	29,782	476,890
1992	1,629,398	2,282,322	10,920	562,957
1993	1,320,750	4,347,284	40,305	737,368
1994	1,217,422	2,694,948	38,517	926,407
1995	1,160,771	2,412,714	15,638	1,062,303
1996	866,320	2,908,343	10,181	541,712
1997	955,817	3,032,069	6,855	683,867
1998	739,749	2,660,742	5,034	300,213
1999	1,215,384	3,826,371	17,419	748,380
2000	1,726,414	2,915,186	30,428	1,025,932
2001	1,556,420	3,410,371	21,223	742,169
2002	1,625,557	3,139,847	18,446	978,268
2003	1,125,929	2,974,439	12,384	704,797
2004	1,409,043	3,450,220	14,466	763,873
2005	1,441,590	3,295,574	12,727	628,745
2006	1,375,457	3,011,529	8,956	585,510
2007	1,563,444	1,981,901	13,084	24,451
2008	1,878,535	2,808,018	24,699	
2009	2,452,976	1,116,786	122,297	
2010	1,337,451	1,300,783	272,736	
2011	1,686,581	3,046,593	50,479	*
2012	2,228,053	2,967,957	23,123	
2013	1,523,793	3,057,076	18,132	
2014	1,908,845	3,658,405	34,655	
2015	1,857,097	2,921,942	18,120	
2016	1,198,293	3,283,188	16,100	
2017	1,001,246	2,315,552	11,473	
2018	660,198	1,695,218	7,864	
2019	581,519	1,443,473	12,054	
2020	737,121	1,616,146	15,055	

Year	Handline	Longline	Other	Trap
2021	1,070,904	1,862,046	17,742	
2022	798,448	1,621,027	9,463	

Table 5. Uncertainty estimates by state and time block for the Red Grouper commercial landings

Year	TX	LA	MS	AL	FL	Comments
1962-1976	0.2	0.2	0.2	0.2	0.2	Annual state summaries
1977-1985	0.1	0.1	0.1	0.1	0.1	Monthly state summaries
1986-1999	0.1	0.1	0.1	0.1	0.05	FL starts state trip ticket in 1985; used starting in 1986
2000-2001	0.1	0.05	0.1	0.1	0.05	LA starts state trip ticket in 1997; used starting in 2000
2002-2013	0.1	0.05	0.1	0.05	0.05	AL starts state trip ticket and used starting in 2002
2014	0.05	0.05	0.1	0.05	0.05	TX starts state trip ticket in 2008; used starting in 2014
2015-Present	0.05	0.05	0.05	0.05	0.05	MS starts state trip ticket in 2012; used starting in 2015

Figures

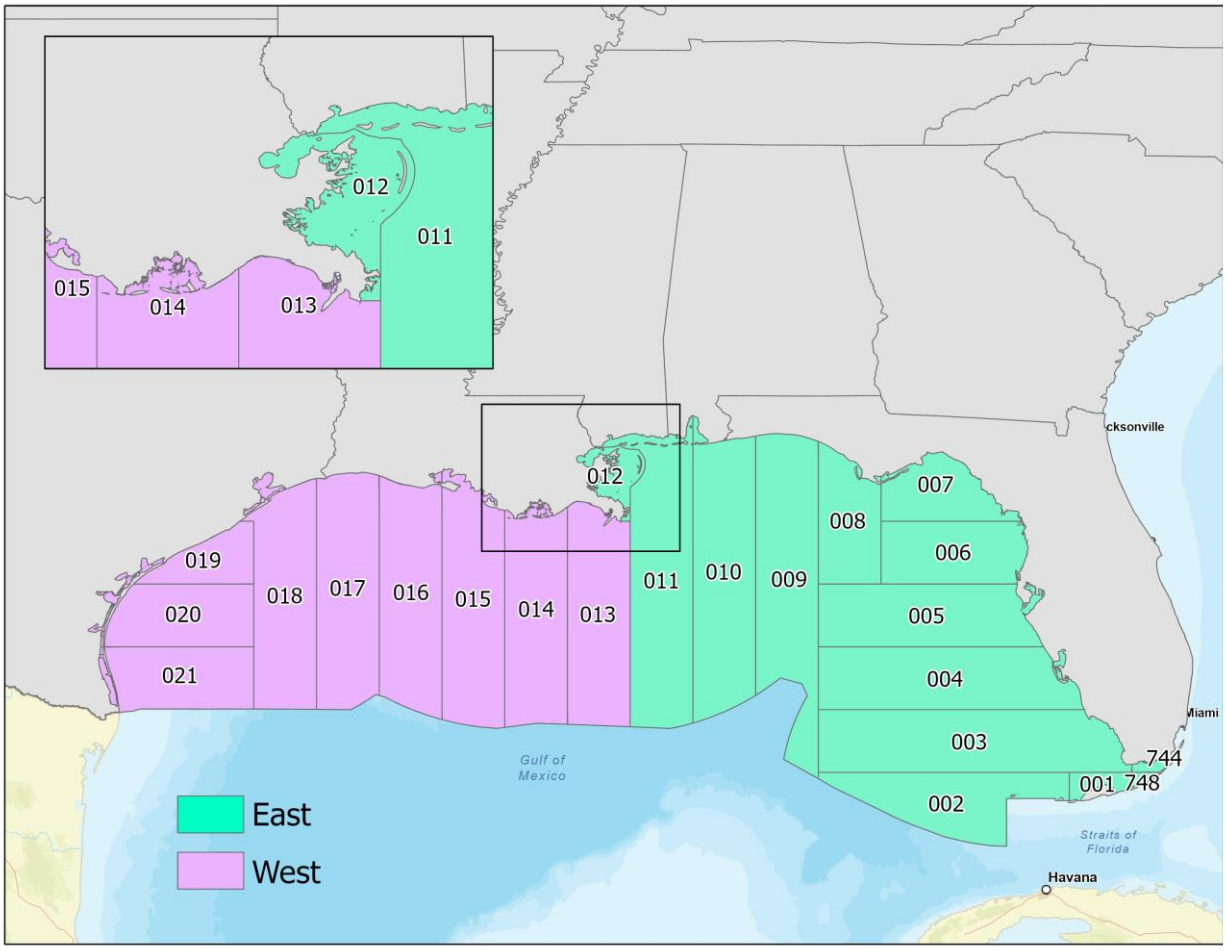

Figure 1. Gulf of Mexico commercial fishing areas.

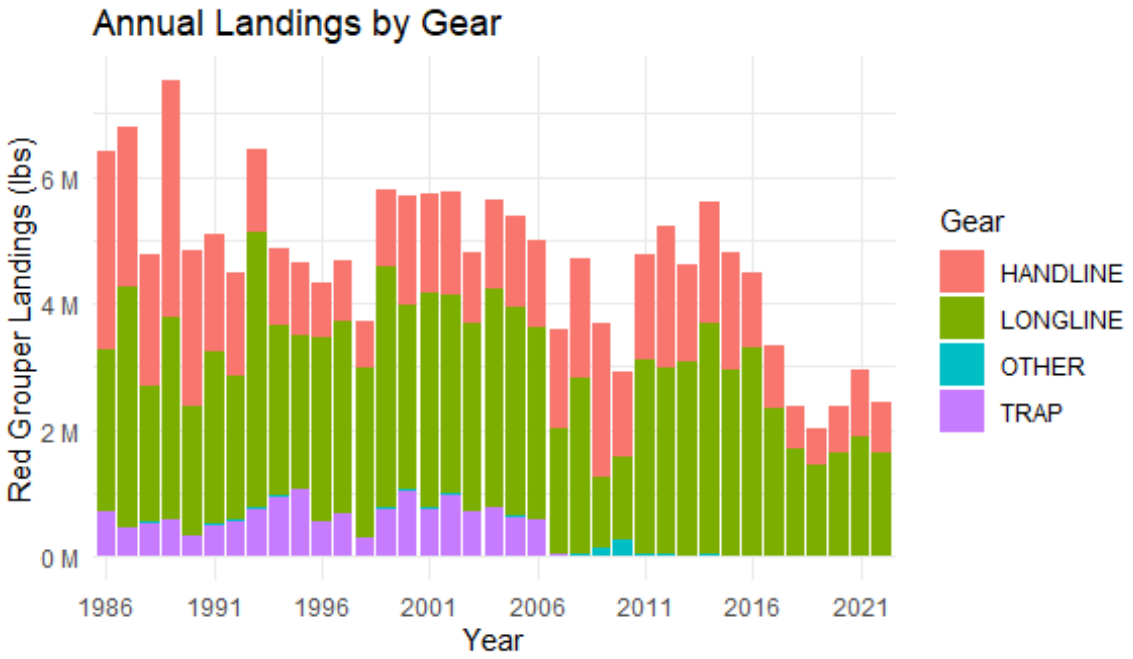

Figure 2. Annual calculated Red Grouper commercial landings for Handline, Longline, Trap, and Other gears. Confidential landings have been excluded.

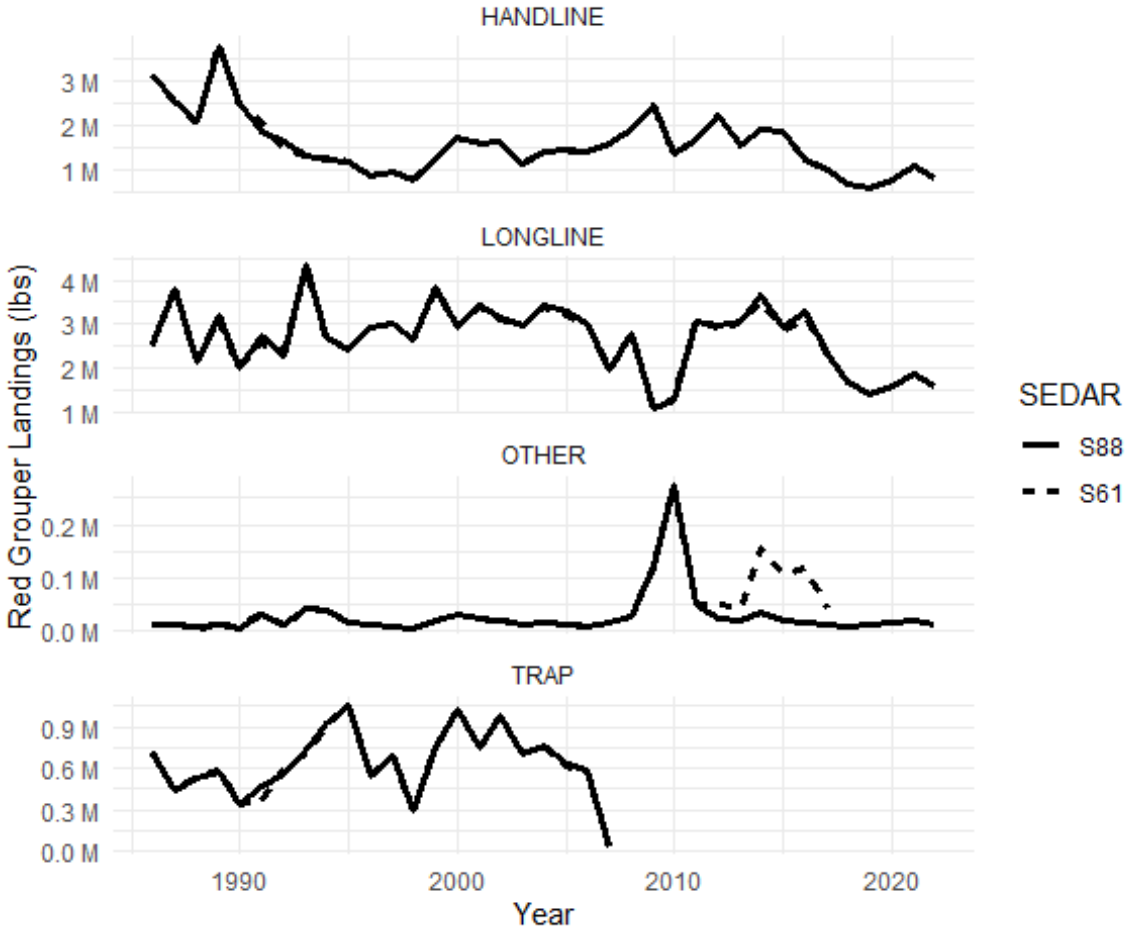

Figure 3. Annual calculated Red Grouper commercial landings (in gutted weight pounds) by gear for the current SEDAR 88 compared to the previous assessment SEDAR 61 from 1986 - 2022. Confidential landings have been excluded.