

Tables

Table A1. Landings of tilefish in live metric tons from 1915-2008. Landings in 1915-1972 are from Freeman and Turner (1977), 1973-1989 are from the general canvas data, 1990-1993 are from the weighout system, 1994-2003 are from the dealer reported data, and 2004-2008 is from Dealer electronic reporting. - indicates missing data.

year	mt	year	mt	year	mt
1915	148	1960	1,064	2005	676
1916	4,501	1961	388	2006	907
1917	1,338	1962	291	2007	751
1918	157	1963	121	2008	736
1919	92	1964	596		
1920	5	1965	614		
1921	523	1966	438		
1922	525	1967	50		
1923	623	1968	32		
1924	682	1969	33		
1925	461	1970	61		
1926	904	1971	66		
1927	1,264	1972	122		
1928	1,076	1973	394		
1929	2,096	1974	586		
1930	1,858	1975	710		
1931	1,206	1976	1,010		
1932	961	1977	2,082		
1933	688	1978	3,257		
1934	-	1979	3,968		
1935	1,204	1980	3,889		
1936	-	1981	3,499		
1937	1,101	1982	1,990		
1938	533	1983	1,876		
1939	402	1984	2,009		
1940	269	1985	1,961		
1941	-	1986	1,950		
1942	62	1987	3,210		
1943	8	1988	1,361		
1944	22	1989	454		
1945	40	1990	874		
1946	129	1991	1,189		
1947	191	1992	1,653		
1948	465	1993	1,838		
1949	582	1994	786		
1950	1,089	1995	666		
1951	1,031	1996	1,121		
1952	964	1997	1,802		
1953	1,439	1998	1,334		
1954	1,582	1999	508		
1955	1,629	2000	504		
1956	707	2001	871		
1957	252	2002	843		
1958	672	2003	1,130		
1959	380	2004	1,215		

Table A2. Percent landings by statistical area. Landings before 1990 are taken from the general canvas data. Percent landings after 1993 are estimated from the AA tables.

year	unknown	626	622	616	537	526	525	other
1962	100%	0%	0%	0%	0%	0%	0%	0%
1963	65%	0%	0%	0%	4%	28%	0%	3%
1964	83%	0%	0%	0%	4%	14%	0%	0%
1965	83%	0%	0%	0%	1%	16%	0%	0%
1966	97%	0%	0%	0%	0%	1%	1%	0%
1967	96%	0%	0%	0%	0%	4%	0%	0%
1968	96%	0%	0%	0%	1%	0%	0%	3%
1969	93%	0%	0%	0%	2%	4%	0%	1%
1970	87%	0%	0%	0%	8%	5%	0%	0%
1971	99%	0%	0%	0%	0%	0%	0%	0%
1972	92%	0%	0%	1%	1%	0%	0%	6%
1973	0%	0%	0%	62%	16%	0%	0%	21%
1974	0%	0%	0%	51%	27%	0%	0%	22%
1975	0%	0%	0%	48%	34%	8%	0%	10%
1976	0%	0%	0%	58%	28%	13%	0%	1%
1977	1%	0%	0%	44%	32%	22%	0%	1%
1978	0%	0%	0%	29%	40%	31%	0%	0%
1979	0%	0%	0%	18%	37%	45%	0%	0%
1980	0%	0%	0%	22%	34%	44%	0%	0%
1981	0%	0%	0%	28%	37%	35%	0%	0%
1982	0%	0%	0%	19%	52%	27%	0%	2%
1983	0%	1%	0%	22%	54%	23%	0%	0%
1984	0%	1%	3%	9%	53%	34%	0%	1%
1985	0%	0%	2%	25%	33%	38%	2%	1%
1986	0%	0%	1%	28%	44%	25%	3%	1%
1987	0%	0%	0%	12%	53%	32%	1%	2%
1988	0%	1%	2%	21%	41%	32%	0%	2%
1989	0%	0%	1%	63%	9%	26%	1%	1%
1990	0%	2%	0%	15%	14%	36%	0%	33%
1991	0%	0%	1%	64%	25%	1%	0%	10%
1992	0%	0%	1%	22%	70%	5%	1%	1%
1993	0%	0%	2%	14%	72%	7%	3%	2%
1994	0%	1%	1%	11%	78%	1%	2%	6%
1995	0%	0%	2%	26%	53%	0%	1%	19%
1996	0%	0%	0%	29%	61%	5%	0%	4%
1997	0%	0%	0%	18%	67%	0%	0%	15%
1998	0%	0%	0%	11%	68%	3%	1%	18%
1999	0%	0%	0%	32%	48%	0%	1%	18%
2000	0%	0%	0%	41%	38%	1%	0%	20%
2001	0%	0%	0%	61%	26%	4%	0%	9%
2002	0%	0%	0%	36%	40%	7%	1%	17%
2003	0%	0%	0%	42%	34%	2%	1%	21%
2004	0%	0%	0%	25%	53%	5%	1%	16%
2005	0%	12%	0%	25%	47%	0%	0%	16%
2006	0%	8%	0%	28%	46%	1%	0%	16%
2007	0%	0%	2%	31%	47%	0%	0%	20%

Table A3. Landings of tilefish (mt, live) by gear. Landing before 1990 are from the general canvas data. Percent by gear per year are also given.

Year	Gear			Total	Percent by Gear		
	longli	traw	other		longline	trawl	other
1962		167	2	169	0%	99%	1%
1963		121		121	0%	100%	0%
1964		596		596	0%	100%	0%
1965		614		614	0%	100%	0%
1966		437		437	0%	100%	0%
1967		51		51	0%	100%	0%
1968		30		30	0%	100%	0%
1969		30		30	0%	100%	0%
1970		57	1	58	0%	99%	1%
1971		62	1	62	0%	99%	1%
1972	93	26	2	121	77%	21%	2%
1973	370	24	1	394	94%	6%	0%
1974	531	33	22	586	91%	6%	4%
1975	588	111	11	710	83%	16%	2%
1976	950	58	1	1,010	94%	6%	0%
1977	1,772	309	1	2,082	85%	15%	0%
1978	2,938	309	10	3,257	90%	9%	0%
1979	3,362	449	156	3,968	85%	11%	4%
1980	3,794	94	0	3,889	98%	2%	0%
1981	3,366	128	5	3,499	96%	4%	0%
1982	1,935	49	6	1,990	97%	2%	0%
1983	1,857	8	11	1,876	99%	0%	1%
1984	2,003	6	1	2,009	100%	0%	0%
1985	1,929	31	0	1,961	98%	2%	0%
1986	1,874	76	0	1,950	96%	4%	0%
1987	3,029	180	0	3,210	94%	6%	0%
1988	1,319	42		1,361	97%	3%	0%
1989	421	33	0	454	93%	7%	0%
1990	850	22	0	871	98%	2%	0%
1991	1,164	25	0	1,189	98%	2%	0%
1992	1,497	155	0	1,653	91%	9%	0%
1993	1,597	241	0	1,838	87%	13%	0%
1994	764	22	0	786	97%	3%	0%
1995	618	47	1	666	93%	7%	0%
1996	1,005	111	4	1,121	90%	10%	0%
1997	1,716	79	7	1,802	95%	4%	0%
1998	1,193	134	7	1,334	89%	10%	1%
1999	470	28	10	508	93%	6%	2%
2000	460	38	7	504	91%	7%	1%
2001	819	52	0	871	94%	6%	0%
2002	759	83	1	843	90%	10%	0%
2003	1,004	124	2	1,130	89%	11%	0%
2004	905	211	99	1,215	75%	17%	8%
2005	495	20	161	676	73%	3%	24%
2006	717	32	158	907	79%	3%	17%
2007	711	8	32	751	95%	1%	4%
2008	557	11	167	736	76%	2%	23%

Table A4. Landings of tilefish (mt, live) by state. Number of length measurements are in parentheses. Landings before 1990 are from general canvas data. Percent by state per year are also given.

Year	ME	MA	RI	NY	NJ	other	Total	Percent by State					
								ME	MA	RI	NY	NJ	other
1962	0	28	31	57	42	12	169	0%	16%	18%	34%	25%	7%
1963	0	42	46	13	14	6	121	0%	35%	38%	10%	12%	5%
1964	0	102	424	37	30	2	596	0%	17%	71%	6%	5%	0%
1965	0	106	478	20	9	2	614	0%	17%	78%	3%	1%	0%
1966	0	13	366	55	3	2	437	0%	3%	84%	13%	1%	0%
1967	0	2	27	8	8	5	51	0%	4%	54%	16%	17%	9%
1968	0	1	23	3	3	0	30	0%	4%	76%	9%	11%	0%
1969	0	2	13	4	10	0	30	0%	7%	44%	15%	35%	0%
1970	0	8	36	3	10	1	58	0%	13%	62%	5%	17%	2%
1971	0	0	21	25	15	1	62	0%	1%	34%	40%	24%	2%
1972	0	2	3	6	111	0	121	0%	1%	2%	5%	92%	0%
1973	0	51	17	3	323	0	394	0%	13%	4%	1%	82%	0%
1974	0	163	21	22	380	0	586	0%	28%	4%	4%	65%	0%
1975	0	174	101	2	434	0	710	0%	24%	14%	0%	61%	0%
1976	0	212	56	23	718	0	1,010	0%	21%	6%	2%	71%	0%
1977	0	84	354	314	1,331	0	2,082	0%	4%	17%	15%	64%	0%
1978	0	95	292	969	1,900	0	3,257	0%	3%	9%	30%	58%	0%
1979	0	22	432	1,365	2,148	0	3,968	0%	1%	11%	34%	54%	0%
1980	0	1	87 (37)	1,451	2,348	2	3,889 (37)	0%	0%	2%	37%	60%	0%
1981	0	6	126	1,284 (25)	2,083	1	3,499	0%	0%	4%	37%	60%	0%
1982	6	5	42 (87)	643	1,288	6	1,990 (87)	0%	0%	2%	32%	65%	0%
1983	0	12	7	844 (158)	1,001	12	1,876	0%	1%	0%	45%	53%	1%
1984	0	1	5	1,094	898 (116)	11	2,009 (116)	0%	0%	0%	54%	45%	1%
1985	2	10	207 (247)	958	777 (163)	6	1,961 (410)	0%	0%	11%	49%	40%	0%
1986	3	1	183 (70)	1,076 (107)	687	1	1,950 (177)	0%	0%	9%	55%	35%	0%
1987	0	7	269 (380)	1,996	924 (203)	13	3,210 (583)	0%	0%	8%	62%	29%	0%
1988	0	33	100 (98)	868	353	6	1,361 (98)	0%	2%	7%	64%	26%	0%
1989	0	1	28	249	174	1	454	0%	0%	6%	55%	38%	0%
1990	7	7	19	606	232	3	874	1%	1%	2%	69%	27%	0%
1991	4	1	19	720	444	1	1,189	0%	0%	2%	61%	37%	0%
1992	8	3	146	963 (36)	530	3	1,653 (36)	0%	0%	9%	58%	32%	0%
1993	59	14	276 (100)	1,003	485	1	1,838 (100)	3%	1%	15%	55%	26%	0%
1994	25	3	51	580	127	0	786	3%	0%	6%	74%	16%	0%
1995	8	1	20	560 (432)	76	1	666 (432)	1%	0%	3%	84%	11%	0%
1996	6 (108)	0	88 (219)	924	98 (328)	5	1,121 (655)	1%	0%	8%	82%	9%	0%
1997	13 (244)	0	54 (422)	1,577 (159)	82 (1,154)	74	1,802 (1,979)	1%	0%	3%	88%	5%	4%
1998	15	4	82 (320)	1,073 (74)	123 (606)	38	1,334 (1,000)	1%	0%	6%	80%	9%	3%
1999	3	2	75 (212)	377	40 (161)	12	508 (373)	1%	0%	15%	74%	8%	2%
2000	7	0	57	423 (143)	14	3	504 (143)	1%	0%	11%	84%	3%	1%
2001	0	0	33 (103)	833 (217)	4	1	871 (320)	0%	0%	4%	96%	0%	0%
2002	4	9	59 (482)	740 (850)	23	8	843 (1,332)	0%	1%	7%	88%	3%	1%
2003	2 (343)	12	104 (168)	848 (1,862)	157 (1,205)	6	1,130 (3,578)	0%	1%	9%	75%	14%	1%
2004	0 (31)	117 (19)	142 (388)	596 (789)	323 (2,159)	37	1,215 (3,386)	0%	10%	12%	49%	27%	3%
2005	0 (9)	3	12 (27)	454 (1,123)	122 (2,307)	85	676 (3,466)	0%	0%	2%	67%	18%	13%
2006	0 (14)	52 (446)	8 (55)	524 (2,176)	226 (3,076)	96	907 (5,767)	0%	6%	1%	58%	25%	11%
2007	1 (6)	0 (5)	7 (133)	632 (5,257)	108 (2,018)	2	751 (7,419)	0%	0%	1%	84%	14%	0%
2008	2	0	32 (607)	544 (3,316)	154 (1,271)	4	736 (5,194)	0%	0%	4%	74%	21%	1%

Table A5. Landings of tilefish (mt, live) by quarter. General canvas data are not included. Percent by quarter per year are also given.

Year	Quarter				Total	1	2	3	4
	1	2	3	4					
1977	1,017	961	93	12	2,082	49%	46%	4%	1%
1978	905	1,128	432	793	3,257	28%	35%	13%	24%
1979	1,351	1,055	538	1,024	3,968	34%	27%	14%	26%
1980	1,524	1,263	505	596	3,889	39%	32%	13%	15%
1981	1,352	1,091	474	581	3,499	39%	31%	14%	17%
1982	1,028	433	239	289	1,990	52%	22%	12%	15%
1983	577	726	289	284	1,876	31%	39%	15%	15%
1984	1,032	491	293	193	2,009	51%	24%	15%	10%
1985	551	632	496	281	1,961	28%	32%	25%	14%
1986	542	597	437	374	1,950	28%	31%	22%	19%
1987	1,048	873	723	565	3,210	33%	27%	23%	18%
1988	737	292	160	172	1,361	54%	21%	12%	13%
1989	147	61	78	167	454	32%	13%	17%	37%
1990	258	240	184	189	871	30%	28%	21%	22%
1991	326	437	182	244	1,189	27%	37%	15%	21%
1992	426	433	401	393	1,653	26%	26%	24%	24%
1993	634	664	267	273	1,838	34%	36%	15%	15%
1994	301	275	72	138	786	38%	35%	9%	18%
1995	214	148	108	195	666	32%	22%	16%	29%
1996	366	215	231	308	1,121	33%	19%	21%	28%
1997	442	571	370	419	1,802	25%	32%	21%	23%
1998	537	361	228	209	1,334	40%	27%	17%	16%
1999	162	135	116	96	508	32%	27%	23%	19%
2000	143	141	76	144	504	28%	28%	15%	29%
2001	190	235	222	223	871	22%	27%	26%	26%
2002	287	197	172	188	843	34%	23%	20%	22%
2003	314	314	242	260	1,130	28%	28%	21%	23%
2004	530	272	187	226	1,215	44%	22%	15%	19%
2005	178	119	170	209	676	26%	18%	25%	31%
2006	281	200	188	238	907	31%	22%	21%	26%
2007	196	175	177	203	751	26%	23%	24%	27%
2008	292	191	116	137	736	40%	26%	16%	19%

Table A6. Observer trawl trips which either kept and/or discarded tilefish in kgs. Discard to kept ratio, the number of trips and observed hauls are also shown.

year	discard kgs	kept kgs	d/k ratio	No. trips	No. hauls
1989	114	131	0.88	8	43
1990	9	85	0.11	4	11
1991	252	449	0.56	19	69
1992	182	856	0.21	22	84
1993	21	4,625	0.00	13	77
1994	14	119	0.11	7	23
1995	20	23	0.90	6	13
1996	57	1,515	0.04	11	53
1997	196	1,082	0.18	13	71
1998	45	522	0.09	11	92
1999	31	153	0.20	14	47
2000	116	112	1.04	8	25
2001	654	456	1.44	10	54
2002	5	58	0.08	3	6
2003	278	1,276	0.22	16	69
2004	420	1,777	0.24	50	205
2005	1,099	1,367	0.80	98	237
2006	439	472	0.93	44	143
2007	84	145	0.58	21	49
2008	275	451	0.61	24	57

Table A7. Total commercial and vessel trip report (VTR) landings in live mt and the commercial catch-per-unit effort (CPUE) data used for tilefish. Dealer landings before 1990 are from the general canvas data. CPUE data from 1979 to the first half of 1994 are from the NEFSC weighout database, while data in the second half of 1994 to 2004 are from the vtr system (below the dotted line). Effort data are limited to longline trips which targeted tilefish (= or >75% of the landings were tilefish) and where data existed for the days absent. Nominal CPUE series are calculated using landed weight per days absent minus one day steam time per trip. Da represents days absent.

year	Weighout & Dealer landings	vtr landings	Commerical CPUE data subset								
			interview landings	No. interviews	% interview trips	No. vessels	subset landings	days absent	No. trips	da per trip	nominal cpue
1979	3,968		0.0	0	0.0%	20	1,807	1,187	330	3.6	1.93
1980	3,889		0.8	1	0.3%	18	2,153	1,390	396	3.5	1.99
1981	3,499		35.0	4	1.2%	21	1,971	1,262	333	3.8	1.95
1982	1,990		90.7	13	5.7%	18	1,267	1,282	229	5.6	1.10
1983	1,876		85.8	16	8.9%	21	1,013	1,451	179	8.1	0.73
1984	2,009		140.1	25	18.2%	20	878	1,252	138	9.1	0.72
1985	1,961		297.1	64	30.6%	25	933	1,671	209	8.0	0.59
1986	1,950		120.7	31	16.5%	23	767	1,186	188	6.3	0.71
1987	3,210		198.5	38	18.5%	30	1,014	1,343	206	6.5	0.82
1988	1,361		148.2	30	19.4%	23	422	846	154	5.5	0.56
1989	454		92.8	11	15.7%	11	165	399	70	5.7	0.46
1990	874		32.4	8	11.9%	11	241	556	68	8.2	0.45
1991	1,189		0.8	3	2.8%	7	444	961	107	9.0	0.48
1992	1,653		58.0	9	8.6%	13	587	969	105	9.2	0.62
1993	1,838		71.9	11	10.5%	10	571	959	105	9.1	0.61
1994	-		0	0	0.0%	7	127	385	42	9.2	0.34
1994	786	30				4	26	76	9	8.4	0.36
1995	666	547				5	470	964	100	9.6	0.50
1996	1,121	865				8	822	1,318	134	9.8	0.64
1997	1,810	1,439				6	1,427	1,332	133	10.0	1.09
1998	1,342	1,068				9	1,034	1,517	158	9.6	0.70
1999	525	527				10	516	1,185	133	8.9	0.45
2000	506	446				11	427	942	110	8.6	0.47
2001	874	705				8	691	1,046	116	9.0	0.68
2002	851	724				8	712	951	114	8.3	0.78
2003	1,130	790				7	788	691	101	6.8	1.22
2004	1,215	1,153				12	1,136	811	134	6.1	1.54
2005	676	808				11	802	470	93	5.1	1.95
2006	907	870				12	852	682	105	6.5	1.35
2007	751	710				12	691	727	101	7.2	1.01
2008	736	622				12	620	1,034	113	9.2	0.62

Table A8. Dealer, VTR, and IVR tilefish total landings (live metric tons) compared to the total landings from the five dominant tilefish vessels. Percent of five dominant vessels to the total are also shown.

year	Dealer total (live mt)	Dealer top 5 vessels	Dealer % landing of top 5 vessels to total	VTR total (live mt)	VTR top 5 vessels	VTR % landing of top 5 vessels to total	IVR total (live mt)	IVR top 5 vessels	IVR % landing of top 5 vessels to total
1994	786	485	62%	31	17	57%	-	-	-
1995	666	522	78%	549	538	98%	-	-	-
1996	1,121	803	72%	865	799	92%	-	-	-
1997	1,810	1,292	71%	1,439	1,416	98%	-	-	-
1998	1,342	948	71%	1,068	1,003	94%	-	-	-
1999	508	399	79%	527	486	92%	-	-	-
2000	504	459	91%	446	428	96%	-	-	-
2001	871	817	94%	705	684	97%	-	-	-
2002	843	733	87%	724	687	95%	766	727	95%
2003	1,130	784	69%	790	732	93%	894	779	87%
2004	1,215	561	46%	1,153	688	60%	944	687	73%
2005	676	473	70%	808	596	74%	868	670	77%
2006	907	555	61%	870	569	65%	901	595	66%
2007	751	609	81%	710	601	85%	762	651	85%
2008	736	535	73%	622	466	75%	709	542	76%

Table A9. Landing (metric tons) by market category. Small kitten market category was added to kittens.

year	small	kittens	medium	large	xl	unclassified	total
1990	24	14	103	45	0	687	871
1991	43	16	154	85	0	891	1,189
1992	193	136	88	86	0	1,149	1,653
1993	237	131	206	66	4	1,193	1,838
1994	8	11	89	54	7	617	786
1995	26	73	88	91	2	386	666
1996	169	423	149	156	2	221	1,121
1997	249	878	257	110	2	306	1,802
1998	97	375	699	103	6	54	1,334
1999	37	143	197	106	8	17	508
2000	17	193	153	114	8	19	504
2001	11	553	160	124	6	18	871
2002	26	341	311	128	3	34	843
2003	132	644	170	144	5	34	1,130
2004	169	248	523	129	9	137	1,215
2005	6	12	335	149	1	173	676
2006	8	9	233	369	1	287	907
2007	17	81	148	397	4	105	751
2008	68	99	194	297	18	60	736

Table A10. Number of lengths (1995-2008), samples (2002-2008), and metric tons landed per sample (2002-2008) for Golden tilefish. Number of lengths includes borrowing across years in bold.

Trawl lengths were not used in the expansion. Large lengths used from 1995 to 1999 were taken from years 1996, 1997, and 1998. Large lengths in 2002 also used large lengths from 2003. Unclassified were redistributed according to mkt and qtr proportions.

Number of lengths.							
year	half	sm	ki	med	lg	xl	total
1995	1		244	208	332		784
	2						
1996	1		312	100	332		744
	2						
1997	1		958	688	332		1978
	2						
1998	1		202	407	332		941
	2						
1999	1		211	155	332		698
	2						

Number of lengths.								Number of samples						mt/samples							
year	half	sm	ki	med	lg	xl	total	half	sm	ki	med	lg	xl	total	half	sm	ki	med	lg	xl	total
2002	1		353	206	492		1051	1		6	2	8		16	1		61	156	19		54
	2							2								2					
2003	1	735	385	396	467	32	3495	1	5	4	3	7	2	32	1	26	98	22	21	3	34
	2		522	958				2		6	5					2		42	21		
2004	1	788	115	882	432		2947	1	4	1	6	7		25	1	37	209	50	20		43
	2	106	197	427				2	1	2	4					2	23	20	55		
2005	1		393	1378	825		3359	1		6	10	12		36	1		3	19	12		14
	2			763				2			8					2			18		
2006	1	112	346	1856	1284		5647	1	3	6	14	11		55	1	2	1	9	19		11
	2	218		1079	752			2	2		11	8				2	2		9	21	
2007	1	396	379	1128	898	25	7385	1	4	4	12	12	1	56	1	1	6	6	18	4	12
	2	220	1152	1871	1316			2	1	5	9	8				2	12	11	8	23	
2008	1	93	719	1356	1506	20	4402	1	1	9	16	28	3	67	1	49	8	7	11	6	10
	2		369	339				2		4	6					2		12	13		

Table A11. Recreational Golden tilefish data from the Marine Recreational Fishery Statistics Survey (MRFSS).

year	number fish measured	landed no. A and B1	Released B2	A and B1 kg
1982	0	984	0	98
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	608	0	0
1995	0	0	0	0
1996	0	10,167	0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	0	148	0	0
2002	0	20,068	1,338	0
2003	18	722	0	2,126
2004	3	112	0	317
2005	0	0	0	0
2006	0	1,208	0	0
2007	2	1,515	0	6,720
2008	0	0	0	0

Table A12. Number of tilefish reported in the Party/charater vessel trip reports.

year	ME	MD	NH	NJ	NY	NC	RI	VA	other	total
1994	275	0	636	0	0	0	0	0	0	911
1995	0	0	0	0	176	0	541	0	0	717
1996	0	0	0	0	81	0	0	0	0	81
1997	0	0	0	0	380	0	0	0	20	400
1998	0	0	0	0	121	52	102	0	20	295
1999	0	6	0	0	88	34	1	0	0	129
2000	0	0	0	39	108	139	0	0	0	286
2001	0	0	0	100	122	1,164	0	0	0	1,386
2002	0	0	0	383	425	0	0	0	0	808
2003	0	0	0	905	71	0	3	0	15	994
2004	0	0	0	624	12	0	0	254	0	898
2005	0	0	0	364	82	25	72	16	14	573
2006	0	133	0	66	265	30	0	12	2	508
2007	0	5	0	457	447	313	0	138	88	1,448
2008	0	30	0	140	383	60	2	10	22	647

Table A13. ASPIC surplus production model run comparison and sensitivity.

Run ID	2005 SAW 41 ASPIC v3.93	2005 SAW 41 ASPIC v5.33	2009 SAW 48 ASPIC v5.33 BASE; B1/K = 0.5	2009 SAW 48 ASPIC v5.33 B1/K = 0.1	2009 SAW 48 ASPIC v5.33 B1/K = 1.0	2009 SAW 48 ASPIC v5.33 EST B1/K = 1.19
Diagnostics						
RMSE	0.3069	0.3069	0.3496	0.5362	0.3357	0.3401
turner r2	0.180	0.180	0.224	-0.715	0.545	0.593
Weighout r2	0.703	0.703	0.652	-0.129	0.680	0.684
vtr r2	0.538	0.538	0.201	-0.058	0.230	0.232
Turner q	0.0133	0.0133	0.0088	0.0108	0.0076	0.0074
Weighout q	0.2246	0.2246	0.1754	0.1046	0.1771	0.1762
VTR q	0.3921	0.3921	0.2604	0.1684	0.2622	0.2632
Results						
B1:K ratio	0.50	0.50	0.50	0.10	1.00	1.19
MSY (mt)	1,988	1,988	1,868	11,220	1,706	1,680
r	0.4236	0.4238	0.3278	4.0000	0.3502	0.3514
FMSY	0.2118	0.2119	0.1639	2.0000	0.1751	0.1757
K (mt)	18,770	18,766	22,790	11,220	19,490	19,130
BMSY (mt)	9,384	9,383	11,400	5,608	9,745	9,565
B2004/BMSY	0.65	0.65	0.78	1.95	0.86	0.87
F2004/FMSY	0.87	0.87	0.56	0.05	0.81	0.81
B2008/BMSY	n/a	n/a	1.04	1.97	1.17	1.18
F2008/FMSY	n/a	n/a	0.38	0.03	0.35	0.36

Table A14. 2009 BASE run retrospective estimated parameters.

	Turner	Qs Weighout	VTR		Turner	Qs Weighout	VTR
1999	0.0079	0.1584	0.3333	1998	0.0025	0.0478	0.1479
2002	0.0085	0.1721	0.3408	2000	0.0025	0.0480	0.1503
2003	0.0094	0.1983	0.3572	2001	0.0024	0.0438	0.1319
2004	0.0104	0.2254	0.3925				
2005	0.0111	0.2487	0.4427				
2006	0.0192	0.2430	0.4272				
2007	0.0101	0.2134	0.3484				
2008	0.0088	0.1754	0.2604				
Mean	0.0107	0.2043	0.3628	Mean	0.0024	0.0465	0.1434
Max	0.0192	0.2487	0.4427	Max	0.0025	0.0480	0.1503
Min	0.0079	0.1584	0.2604	Min	0.0024	0.0438	0.1319
	MSY	K	RMSE		MSY	K	RMSE
1999	1,780	26,030	0.3022	1998	38	103,900	0.3086
2002	1,831	23,980	0.2915	2000	38	103,700	0.2968
2003	1,916	20,940	0.2990	2001	38	107,100	0.3023
2004	1,990	18,710	0.3073				
2005	2,048	17,230	0.3111				
2006	2,034	17,560	0.3067				
2007	1,963	19,510	0.3173				
2008	1,868	22,790	0.3496				
Mean	1,929	20,844	0.3106	Mean	38	104,900	0.3026
Max	2,048	26,030	0.3496	Max	38	107,100	0.3086
Min	1,780	17,230	0.2915	Min	38	103,700	0.2968

Table A16. Empirical mean lengths at age and sample size from Turner et. al. (1983).

Age	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
female empirical mean length	-	-	38	47	52	58	64	65	66	68	90	-	-	84	77	-	84	82	-	-	-	-	-	-	-	-	-	-	92	89	91	89	95	-	88
female n	-	-	14	47	61	40	65	52	11	1	1	-	-	1	1	-	1	1	-	-	-	-	-	-	-	-	-	1	1	1	3	1	-	2	
male empirical mean length	-	-	40	50	53	60	71	74	79	86	89	93	-	-	99	102	104	-	96	109	-	108	-	-	108	96	-	-	-	-	-	-	-	-	-
male n	-	-	4	51	55	17	44	41	23	5	1	1	-	-	5	1	1	-	2	2	-	1	-	-	1	1	-	-	-	-	-	-	-	-	

Table A17. Oldest fish aged from Turner’s PHD dissertation (1986) and Vidal’s MS (2009).

Dissertation 1986 S Turner	Year	Number of females younger than 31	Number of females older than 31
oldest male: 39	1978	234	7
oldest female: 46	1979	87	4
	1980	177	3
	1982	194	21

	Year	Number of males younger than 31	Number of males older than 31
	1978	216	0
	1979	148	1
	1980	91	0
	1982	187	1

T. Vidal (2008)
oldest male: 23
oldest female: 21

Table A18. Six SCALE sensitivity runs. Natural mortality was assumed to be 0.1 in combined sex runs and for females in the separate sex runs. The assumed natural mortality rate for males was 0.15 in the separate sex runs. TV = T. Vidal, ST = S. Turner, vb = von Bertalanffy, sel bl = selectivity blocks, var = variation, resid = residuals, par = parameters.

Run Description	1 (Base run) (TV vb, 2 sex, 2 Sel bl)			2 (TV vb, 1 sex, 2 Sel bl)			3 (TV vb, 2 sex, 1 Sel bl)			4 (ST vb, 2 sex, 2 Sel bl)			5 (Base + high mean len@age var)			6 (Base + rec index)		
	weight	qs	resid or par	weight	qs	resid or par	weight	qs	resid or par	weight	qs	resid or par	weight	qs	resid or par	weight	qs	resid or par
Total Objective function			68.23			70.96			76.70			68.34			69.77			63.27
total catch	4		0.23	4		0.23	4		0.23	4		0.25	4		0.24	4		0.15
catch len freq 1+	400		45.31	400		48.21	400		52.36	400		45.22	400		46.84	400		44.05
Variation in recruit penalty (Vrec)	0.05		7.79	0.05		8.75	0.05		5.92	0.05		8.41	0.05		8.29	0.05		12.58
Age 5	1	3.0E-06	6.01	1	3.3E-06	5.72	1	3.1E-06	5.92	1	3.0E-06	6.67	1	3.0E-06	6.36	1	4.1E-06	2.31
Turner 47+ (1973-1982)	2	4.1E-07	0.21	2	4.5E-07	0.24	2	3.8E-07	0.26	2	3.5E-07	0.18	2	4.2E-07	0.21	2	4.1E-07	0.31
Weighout 37+ (1979-1993)	2	8.9E-07	0.22	2	9.7E-07	0.22	2	9.3E-07	0.23	2	8.2E-07	0.24	2	9.2E-07	0.22	2	8.8E-07	0.28
VTR 37+ (1995-2008)	4	1.7E-06	0.79	4	1.8E-06	0.72	4	1.7E-06	0.79	4	1.6E-06	0.68	4	1.7E-06	0.72	4	1.8E-06	0.88
survey/catch len freq 65+	100		11.56	100		11.83	100		13.03	100		11.46	100		11.44	100		11.00
Fstart			0.20			0.26			0.13			0.10			0.20			0.18
Recruitment year 1 (1971, 000s)			783			624			946			787			765			721
Selectivity Alpha (L50) 71-81			53.97			53.74			41.80			53.70			53.94			54.27
Selectivity Beta (slope) 71-81			0.35			0.35			0.69			0.35			0.36			0.33
Selectivity Alpha (L50) 82-08			41.38			41.49			-			41.35			41.11			41.40
Selectivity Beta (slope) 82-08			0.81			0.80			-			0.58			0.75			0.81
2008 F			0.19			0.20			0.20			0.18			0.19			0.21
2008 Biomass (000s mt)			4950			4518			4784			5200			4867			4422

Table A19. Biological reference point estimates from the 2000 SSC committee review, 2005 SARC 41 assessment, and the 2009 BASE run.

	SSC 2000 1999	SARC 41 2004	SARC 48 2008
BMSY			
Point	8,448	9,384	11,400
Boot mean	-	9,764	10,336
Boot sd	-	5,152	2,089
Boot median	-	9,193	10,135
Boot 25%ile	-	8,379	8,974
Boot 75%ile	-	10,263	11,436
Boot bias	-	4%	-9%
FMSY			
Point	0.22	0.21	0.16
Boot mean	-	0.24	0.2
Boot sd	-	0.21	0.06
Boot median	-	0.22	0.19
Boot 25%ile	-	0.19	0.16
Boot 75%ile	-	0.25	0.23
Boot bias	-	15%	21%
MSY			
MSY	1,858	1,988	1,868
r	0.45	0.42	0.33
Turner Q	0.009	0.010	0.009
Weighout	0.222	0.225	0.175
VTR Q	-	0.392	0.260

Table A20. Stock status and biological reference points using F40% and Fmax from both the SCALE model and the age based YPR model. A female only BRP can not be done with run 1 using the age based YPR model.

SCALE run Description YPR model	1 Base (Vidal growth, 2 sex, 2 Sel block)		2 (Vidal growth, 1 sex, 2 Sel block)			
	SCALE	SCALE	AGE based	AGE based	SCALE	SCALE
F _{MSY} proxy	F _{40%}	F _{max}	F _{40%}	F _{max}	F _{40%}	F _{max}
F _{MSY}	0.085	0.128	0.079	0.121	0.082	0.121
YPR	1.37	1.45	1.83	1.92	1.85	1.92
SSB per Recruit	9.07	6.82	23.20	15.83	24.22	17.30
Initial Recruits (000s)	783	783	624	624	624	624
MSY (mt)	1,072	1,137	1,142	1,200	1,153	1,200
SSB _{MSY} (mt)	7,100	5,335	14,473	9,878	15,108	10,794
SSB ₀₉ (mt)	2,520	2,520	4,399	4,399	4,399	4,399
F ₀₈	0.188	0.188	0.205	0.205	0.205	0.205
SSB ₀₉ /SSB _{MSY}	35%	47%	30%	45%	29%	41%
F ₀₈ /F _{MSY}	221%	147%	260%	170%	250%	169%

Table A21. Converted input (selectivity, maturity from Vidal, population and catch mean weights) to the age based YPR model from the SCALE run 2. Terminal year + 1 stock size at age is also shown.

age	Stock Size on 1 Jan 2009	Selectivity	Proportion Mature	Mean Weights Spawning Stock	Mean Weights Catch
1	623,830	0.000	0.000	0.002	0.003
2	564,465	0.000	0.000	0.053	0.085
3	510,749	0.001	0.005	0.253	0.417
4	442,060	0.376	0.129	0.662	0.783
5	425,544	0.978	0.672	1.295	1.303
6	421,569	1.000	0.956	2.130	2.130
7	169,889	1.000	0.995	3.131	3.131
8	102,072	1.000	0.999	4.251	4.251
9	100,136	1.000	1.000	5.446	5.446
10	138,090	1.000	1.000	6.675	6.675
11	71,028	1.000	1.000	7.904	7.904
12	6,162	1.000	1.000	9.100	9.100
13	2,870	1.000	1.000	10.249	10.249
14	1,144	1.000	1.000	11.336	11.336
15	267	1.000	1.000	12.354	12.354
16	190	1.000	1.000	13.296	13.296
17	43	1.000	1.000	14.161	14.161
18	7	1.000	1.000	14.951	14.951
19	2	1.000	1.000	15.668	15.668
20	1	1.000	1.000	16.314	16.314
21	1	1.000	1.000	16.896	16.896
22	0	1.000	1.000	17.417	17.417
23	0	1.000	1.000	17.881	17.881
24	0	1.000	1.000	18.295	18.295
25	0	1.000	1.000	18.663	18.663
26	0	1.000	1.000	18.988	18.988
27	0	1.000	1.000	19.277	19.277
28	0	1.000	1.000	19.532	19.532
29	0	1.000	1.000	19.757	19.757
30	0	1.000	1.000	19.955	19.955
31	0	1.000	1.000	20.130	20.130
32	0	1.000	1.000	20.284	20.284
33	0	1.000	1.000	20.418	20.418
34	0	1.000	1.000	20.537	20.537
35	0	1.000	1.000	20.642	20.642

Table A22. Projection results using the standard ASPIC projection model (conditioned on yield or F).
Catch and biomass in metric tons (mt).

A) C = 2008 TAC = 905 mt

Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.07	0.06	0.08	0%	13,030	10,480	14,210	35%	<1%
2010	905	0.06	0.06	0.08	0%	13,930	11,420	14,720	25%	0%
2011	905	0.06	0.06	0.07	0%	14,760	12,200	15,260	15%	0%

B) C = MSY = 1,868 mt

Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	1,868	0.14	0.13	0.18	36%	13,030	10,480	14,210	35%	<1%
2010	1,868	0.14	0.14	0.18	38%	12,990	10,480	13,810	37%	<1%
2011	1,868	0.14	0.14	0.18	40%	12,950	10,470	13,590	39%	<1%

C) F = FMSY = 0.16

Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	2,112	0.16	0.15	0.21	50%	13,030	10,480	14,210	35%	<1%
2010	2,071	0.16	0.15	0.21	50%	12,750	10,230	13,660	39%	<1%
2011	2,038	0.16	0.15	0.21	50%	12,530	9,995	13,290	45%	<1%

Table A23. Projection results incorporating assumptions about future values of the VTR CPUE index of abundance. Catch in metric tons and biomass in 000s metric tons. Scenario F was CPUE was rounded to one decimal place.

A) CPUE = 1995-2008 FMSY = 0.165 BMSY = 9,853 mt MSY = 1,627 mt										
Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.070	0.065	0.079	0%	12,836	11,259	13,844	16%	<1%
2010	905	0.069	0.064	0.077	0%	13,082	11,595	14,134	13%	<1%
2011	905	0.067	0.062	0.075	0%	13,322	11,896	14,349	10%	0%
B) CPUE = 2001-2008 FMSY = 0.168 BMSY = 9,759 mt MSY = 1,643 mt										
Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.071	0.066	0.082	0%	12,496	10,768	13,502	17%	<1%
2010	905	0.069	0.065	0.077	0%	12,874	11,412	13,843	13%	<1%
2011	905	0.068	0.063	0.075	0%	13,210	11,913	14,142	9%	0%
C) CPUE = +25% FMSY = 0.158 BMSY = 10,070 mt MSY = 1,590 mt										
Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.071	0.065	0.082	0%	12,598	10,751	13,820	20%	0%
2010	905	0.069	0.064	0.078	0%	12,936	11,348	14,087	15%	0%
2011	905	0.067	0.063	0.075	0%	13,255	11,780	14,342	12%	0%
D) CPUE = -25% FMSY = 0.060 BMSY = 15,000 mt MSY = 897 mt										
Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.139	0.084	0.213	84%	6,620	4,357	10,981	84%	57%
2010	905	0.143	0.085	0.223	85%	6,440	4,157	10,741	84%	59%
2011	905	0.148	0.087	0.238	86%	6,211	3,924	10,523	85%	60%
E) CPUE = 2008 FMSY = 0.197 BMSY = 8,989 mt MSY = 1,774 mt										
Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.069	0.064	0.075	0%	12,980	12,022	14,038	<1%	6%
2010	905	0.068	0.063	0.074	0%	13,081	12,074	14,233	<1%	0%
2011	905	0.068	0.063	0.074	0%	13,174	12,124	14,398	<1%	0%
F) CPUE = 2008 round FMSY = 0.104 BMSY = 12,060 mt MSY = 1,254 mt										
Year	C (mt)	F	F25%ile	F75%ile	P > FMSY	B (mt)	B25%ile	B75%ile	P < BMSY	P < 1/2 BMSY
2009	905	0.088	0.066	0.130	38%	10,125	6,789	13,436	64%	18%
2010	905	0.084	0.065	0.125	36%	10,505	7,115	13,840	63%	15%
2011	905	0.083	0.063	0.119	34%	10,844	7,454	14,156	61%	12%