

TCSAM2013 Model Results: Tables

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Input model cases

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## ModelC: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentMo
## ModelD: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentMo
## ModelE: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentMo
## ModelF: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentMo
## ModelG: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentMo
```

case	path
ModelC	Runs.ModelC/2016/best
ModelD	Runs.ModelD/2016/best
ModelE	Runs.ModelE/2016/best
ModelF	Runs.ModelF/2016/best
ModelG	Runs.ModelG/2016/best

Table 1. Model cases for comparison.

Objective function components

description	ModelC	ModelD	ModelE	ModelF	ModelG
maturity curve smoothness (females)	2.3	2.1	2.1	2.2	2.3
maturity curve smoothness (males)	0.79	0.86	0.94	0.91	0.97
natural mortality penalty (immature females)	36	37	35	44	43
natural mortality penalty (immatures)	0.59	0.62	0.45	0.74	0.45
natural mortality penalty (mature males)	5.6	7.6	9.1	5.5	5.3
penalty on F-devs in BBRKC fishery	0.13	0.45	0	145	0
penalty on F-devs in directed fishery	57	56	0	69	0
penalty on F-devs in groundfish fishery	13	12	0	18	0
penalty on F-devs in snow crab fishery	7.5	6.1	0	15	0
recruitment penalty	2.4	2.5	1.1	2.5	1.3
sex ratio penalty	0	0	0	0	0
z50 devs for male selectivity in TCF (AR1)	0	0	0	0	0

description	ModelC	ModelD	ModelE	ModelF	ModelG
z50 devs for male selectivity in TCF (norm2)	0	0	0	0	0

Table 2. Objective function penalty components.

description	ModelC	ModelD	ModelE	ModelF	ModelG
female growth parameter a	0.9	0.9	0.9	0.9	0.9
female growth parameter b	0.64	0.69	0.68	0.62	0.59
female survey q penalty	29	23	27	22	27
male growth parameter a	0.23	0.13	0.11	0	0.01
male growth parameter b	0.03	0.02	0.02	0.02	0.02
survey q penalty	5	2.8	4.3	1.5	4.2

Table 3. Objective function priors components.

description	ModelC	ModelD	ModelE	ModelF	ModelG
fishery: GTF males+females	463	459	461	465	464
fishery: RKC females	2.2	2.3	2.3	4.5	5.5
fishery: RKC males	27	27	30	32	32
fishery: SCF females	12	12	12	17	17
fishery: SCF males	53	51	48	49	49
fishery: TCF discarded females	9.7	9.1	9.4	9.2	9.5
fishery: TCF retained males	309	324	331	304	315
fishery: TCF total males	184	182	178	181	181
survey: immature females	281	286	279	294	290
survey: immature males	269	262	252	261	249
survey: mature females	129	120	113	131	114
survey: mature males	250	254	247	251	241

Table 4. Objective function likelihood: size comps components.

description	ModelC	ModelD	ModelE	ModelF	ModelG
fishery: GTF total catch biomass	2.4	2.5	1	0.89	1.4
fishery: RKF total catch biomass	13	13	5	136	88
fishery: SCF total catch biomass	6.2	5.6	4.5	95	95
fishery: TCF female catch biomass	5.1	6	4.7	209	208
fishery: TCF male total catch biomass	12	12	9.7	11	6.2
fishery: TCF retained males	18	20	17	29	27
survey: mature crab	199	191	199	190	195

Table 5. Objective function likelihood: catch biomass components.

	ModelD- ModelC	ModelE- ModelC	ModelF- ModelC	ModelG- ModelC
description				
maturity curve smoothness (females)	-0.25	-0.19	-0.13	-0.04
maturity curve smoothness (males)	0.08	0.15	0.13	0.19
natural mortality penalty (immature females)	0.48	-1.4	7.1	6.1
natural mortality penalty (immatures)	0.03	-0.14	0.15	-0.14
natural mortality penalty (mature males)	2	3.4	-0.06	-0.32
penalty on F-devs in BBRKC fishery	0.32	-0.13	145	-0.13
penalty on F-devs in directed fishery	-0.57	-57	12	-57
penalty on F-devs in groundfish fishery	-0.63	-13	4.5	-13
penalty on F-devs in snow crab fishery	-1.4	-7.5	7.8	-7.5
recruitment penalty	0.02	-1.3	0.09	-1.2
sex ratio penalty	0	0	0	0
z50 devs for male selectivity in TCF (AR1)	0	0	0	0
z50 devs for male selectivity in TCF (norm2)	0	0	0	0

Table 6. Objective function penalty component differences.

	ModelD- ModelC	ModelE- ModelC	ModelF- ModelC	ModelG- ModelC
description				
female growth parameter a	0	0	0	0
female growth parameter b	0.05	0.04	-0.02	-0.05
female survey q penalty	-5.8	-2.1	-7.4	-1.8
male growth parameter a	-0.11	-0.13	-0.23	-0.23
male growth parameter b	0	-0.01	-0.01	-0.01
survey q penalty	-2.2	-0.66	-3.4	-0.8

Table 7. Objective function priors component differences.

	ModelD- ModelC	ModelE- ModelC	ModelF- ModelC	ModelG- ModelC
description				
fishery: GTF males+females	-4.3	-2.2	1.7	0.63
fishery: RKC females	0.06	0.04	2.2	3.3
fishery: RKC males	0.59	3.3	5.7	5.4
fishery: SCF females	-0.8	-0.56	4.4	4.7

	ModelD- ModelC	ModelE- ModelC	ModelF- ModelC	ModelG- ModelC
description				
fishery: SCF males	-1.9	-4.1	-4	-4.1
fishery: TCF discarded females	-0.57	-0.27	-0.52	-0.23
fishery: TCF retained males	15	22	-4.8	6.1
fishery: TCF total males	-2.6	-6.6	-3.2	-3.5
survey: immature females	4.9	-2.1	13	9.1
survey: immature males	-7.8	-17	-8.2	-21
survey: mature females	-9	-16	2.5	-14
survey: mature males	3.8	-2.6	0.82	-9.3

Table 8. Objective function likelihood: size comps component differences.

	ModelD- ModelC	ModelE- ModelC	ModelF- ModelC	ModelG- ModelC
description				
fishery: GTF total catch biomass	0.01	-1.4	-1.5	-1
fishery: RKF total catch biomass	0.23	-7.8	123	76
fishery: SCF total catch biomass	-0.59	-1.7	88	88
fishery: TCF female catch biomass	0.93	-0.45	204	202
fishery: TCF male total catch biomass	0.73	-1.8	-0.07	-5.4
fishery: TCF retained males	1.5	-1.1	10	8.6
survey: mature crab	-8.2	-0.53	-9	-3.8

Table 9. Objective function likelihood: catch biomass component differences.

Parameter estimates

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
initial log-scale mean	pMnLnRecInit	5.527	5.533	6.182	5.452	6.215	0.4916	0.4897	0.6255	0.4816	0.6139	
log-scale mean	pMnLnRec	5	4.944	4.971	4.929	4.971	0.06606	0.06557	0.06774	0.06421	0.06613	
size distribution alpha parameter	pRecAlpha	11.5	11.5	11.5	11.5	11.5	0	0	0	0	0	

			value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-
description	param	index	elC	elD	elE	elF	elG	elC	elD	elE	elF	elG
size distribution beta parameter	pRecBeta		4	4	4	4	4	0	0	0	0	0

Table 10. Parameter estimates for population recruitment .

			value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-
description	param	index	elC	elD	elE	elF	elG	elC	elD	elE	elF	elG
log-scale deviation	pRecD1975	1.407	1.417	1.259	1.54	1.399	0.1912	0.1986	0.2449	0.1792	0.2438	
log-scale deviation	pRecD1976	1.997	2.038	2.119	2.044	2.166	0.1238	0.1252	0.1295	0.125	0.1307	
log-scale deviation	pRecD1977	1.761	1.76	1.873	1.82	1.958	0.13	0.1321	0.1335	0.1294	0.1328	
log-scale deviation	pRecD1978	1.09	1.07	0.9868	1.17	1.046	0.1814	0.1853	0.1935	0.1794	0.192	
log-scale deviation	pRecD1979	0.1659	0.1437	-	0.2688	0.04745	0.2881	0.2949	0.3159	0.2786	0.3102	
				0.008322								
log-scale deviation	pRecD1980	-	-	-	-	-	0.3725	0.3695	0.3977	0.3399	0.3851	
		0.4659	0.4591	0.6166	0.3261	0.5628						
log-scale deviation	pRecD1981	-	-0.125	-	-	-	0.2158	0.2179	0.2278	0.2129	0.2268	
		0.09987		0.2291	0.08265	0.2242						

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecDe	1982	- 0.4922	- 0.5167	- 0.5678	- 0.4844	- 0.5487	0.257	0.2575	0.2587	0.2515	0.2528
log-scale deviation	pRecDe	1983	0.844	0.7888	0.7559	0.7659	0.7368	0.1013	0.1013	0.102	0.1013	0.1024
log-scale deviation	pRecDe	1984	0.7737	0.6924	0.6639	0.6688	0.6506	0.1286	0.1283	0.1279	0.1284	0.1282
log-scale deviation	pRecDe	1985	1.226	1.104	1.04	1.1	1.049	0.1092	0.1105	0.1124	0.1094	0.1106
log-scale deviation	pRecDe	1986	1.145	1.053	1.01	1.038	0.997	0.1195	0.12	0.1196	0.1198	0.1199
log-scale deviation	pRecDe	1987	1.111	1.068	1.05	1.089	1.065	0.1202	0.1189	0.1186	0.1142	0.1152
log-scale deviation	pRecDe	1988	1.086	1.004	0.9683	0.9795	0.9645	0.1098	0.113	0.1133	0.1108	0.1107
log-scale deviation	pRecDe	1989	0.2516	0.2285	0.2282	0.1064	0.1775	0.1522	0.1539	0.1527	0.1574	0.1526
log-scale deviation	pRecDe	1990	- 0.7003	- 0.7173	- 0.7722	- 0.9181	- 0.8757	0.2491	0.2551	0.2639	0.2903	0.2781

description	paramindex	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecDev1	-1.241	-1.222	-1.237	-0.8031	-1.008	0.2836	0.2866	0.288	0.2217	0.2467
log-scale deviation	pRecDev2	-1.515	-1.482	-1.46	-1.385	-1.429	0.2687	0.2709	0.2678	0.2721	0.2678
log-scale deviation	pRecDev3	-1.59	-1.565	-1.553	-1.519	-1.528	0.2478	0.2525	0.253	0.2483	0.246
log-scale deviation	pRecDev4	-1.364	-1.312	-1.292	-1.327	-1.339	0.2051	0.2055	0.2057	0.2033	0.2049
log-scale deviation	pRecDev5	-1.078	-1.025	-1.003	-1.09	-1.088	0.1733	0.1736	0.1741	0.1735	0.1752
log-scale deviation	pRecDev6	-1.055	-1.011	-0.9848	-1.082	-1.054	0.1889	0.1895	0.1898	0.1872	0.1879
log-scale deviation	pRecDev7	-0.151	-0.1212	-0.09724	-0.2105	-0.1665	0.1007	0.101	0.1019	0.1001	0.1008
log-scale deviation	pRecDev8	-1.042	-1.018	-0.9941	-1.114	-1.076	0.1802	0.1819	0.1828	0.1803	0.1815
log-scale deviation	pRecDev9	0.02836	0.0645	0.1009	-0.05159	0.003644	0.101	0.1007	0.1019	0.1009	0.1024

description	paramindex	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecD2000	- 0.4918	- 0.4657	- 0.4147	- 0.5879	- 0.5125	0.1734	0.1751	0.1755	0.1762	0.1762
log-scale deviation	pRecD2001	0.6223	0.6543	0.7033	0.5893	0.6576	0.09123	0.09067	0.09152	0.09284	0.0943
log-scale deviation	pRecD2002	- 0.3466	- 0.3399	- 0.3056	- 0.2616	-0.208	0.1917	0.1953	0.1973	0.1885	0.1908
log-scale deviation	pRecD2003	0.3437	0.3862	0.4429	0.5467	0.6288	0.1251	0.1237	0.1237	0.1188	0.1196
log-scale deviation	pRecD2004	0.7747	0.7875	0.8255	0.809	0.8771	0.08892	0.08956	0.09028	0.09097	0.09248
log-scale deviation	pRecD2005	- 0.4571	- 0.4505	- 0.4228	- 0.5689	- 0.5113	0.1948	0.1978	0.1996	0.2073	0.2092
log-scale deviation	pRecD2006	- 0.7169	- 0.7057	- 0.6744	- 0.7169	- 0.6516	0.2152	0.2181	0.2194	0.212	0.2124
log-scale deviation	pRecD2007	-1.118	-1.104	-1.072	-1.124	-1.068	0.2765	0.2803	0.2825	0.2788	0.2808
log-scale deviation	pRecD2008	- 0.8973	- 0.8576	- 0.8042	- 0.8644	-0.796	0.2538	0.2542	0.254	0.2524	0.2524

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecD	2009	0.9792	1.018	1.065	1.02	1.07	0.09907	0.09818	0.09873	0.09524	0.09612
log-scale deviation	pRecD	2010	1.199	1.217	1.245	1.159	1.18	0.0933	0.09326	0.09395	0.09371	0.09495
log-scale deviation	pRecD	2011	0.6586	0.6583	0.663	0.6414	0.6374	0.1296	0.1323	0.1346	0.1309	0.1338
log-scale deviation	pRecD	2012	-1.096	-1.109	-1.084	-1.154	-1.127	0.383	0.392	0.3927	0.3912	0.3905
log-scale deviation	pRecD	2013	- 0.1788	- 0.1748	- 0.1433	- 0.2094	- 0.1781	0.1749	0.1761	0.1766	0.1749	0.1756
log-scale deviation	pRecD	2014	- 0.4002	- 0.4028	- 0.3674	- 0.4307	- 0.3934	0.1993	0.2012	0.2014	0.1991	0.1993
log-scale deviation	pRecD	2015	- 0.7564	- 0.7581	- 0.7211	- 0.7899	- 0.7508	0.263	0.2647	0.265	0.2627	0.263
log-scale deviation	pRecD	2016	- 0.2124	- 0.2125	- 0.1741	- 0.2551	- 0.2151	0.2466	0.2474	0.2475	0.2467	0.247

Table 11. Parameter estimates for population recruitment devs .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecDev	1941t	-	-	-	-1.58	-	1.634	1.634	1.818	1.624	1.819
			1.511	1.527	0.352		0.3397					
log-scale deviation	pRecDev	1950t	-	-	-	-	-	1.491	1.492	1.688	1.481	1.688
			1.508	1.525	0.3516	1.577	0.3394					
log-scale deviation	pRecDev	1951t	-	-	-	-1.57	-	1.354	1.354	1.56	1.343	1.56
			1.502	1.519	0.3506		0.3386					
log-scale deviation	pRecDev	1952t	-	-	-	-	-	1.224	1.224	1.437	1.213	1.436
			1.491	1.508	0.3489	1.558	0.3374					
log-scale deviation	pRecDev	1953t	-	-1.49	-	-	-	1.103	1.102	1.318	1.093	1.316
			1.473		0.3463	1.539	0.3355					
log-scale deviation	pRecDev	1954t	-	-	-	-	-	0.9945	0.9929	1.205	0.9842	1.203
			1.445	1.462	0.3425	1.509	0.3326					
log-scale deviation	pRecDev	1955t	-	-	-	-	-	0.9007	0.8985	1.102	0.8912	1.099
			1.403	1.421	0.3372	1.464	0.3286					
log-scale deviation	pRecDev	1956t	-	-	-	-	-	0.8245	0.8218	1.01	0.8161	1.006
			1.341	1.359	0.3299	1.398	0.323					
log-scale deviation	pRecDev	1957t	-	-	-	-1.3	-	0.7677	0.7647	0.9336	0.7603	0.9293
			1.249	1.266	0.3201		0.3153					

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecDev	1958	-	-	-	-	-	0.73	0.727	0.8765	0.7237	0.8728
			1.113	1.128	0.307	1.156	0.3049					
log-scale deviation	pRecDev	1959	-	-	-	-	-	0.7094	0.7066	0.8428	0.7037	0.8409
			0.9055	0.9162	0.2898	0.935	0.2907					
log-scale deviation	pRecDev	1960	-	-	-	-	-	0.7035	0.7015	0.8351	0.6984	0.836
			0.5769	0.5777	0.2673	0.585	0.2715					
log-scale deviation	pRecDev	1961	-	-	-	-	-	0.7116	0.7099	0.8529	0.705	0.857
			0.03491	0.01746	0.2378	0.009697	0.2451					
log-scale deviation	pRecDev	1962	0.7601	0.7957	-	0.8201	-	0.7125	0.7099	0.8919	0.7005	0.8983
					0.1976		0.2074					
log-scale deviation	pRecDev	1963	1.544	1.577	-	1.608	-	0.6966	0.694	0.9427	0.6793	0.9495
					0.1399		0.1508					
log-scale deviation	pRecDev	1964	1.859	1.888	-	1.912	-	0.6698	0.6693	0.9901	0.6538	0.9953
					0.05291		0.06241					
log-scale deviation	pRecDev	1965	1.752	1.784	0.08521	1.804	0.08117	0.6674	0.6691	1.011	0.6556	1.012
log-scale deviation	pRecDev	1966	1.493	1.538	0.3095	1.561	0.3153	0.6755	0.6764	0.9732	0.6667	0.9679

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
log-scale deviation	pRecDev	1967	1.291	1.345	0.6379	1.381	0.6534	0.6735	0.6723	0.8726	0.6653	0.8596
log-scale deviation	pRecDev	1968	1.233	1.283	1.069	1.337	1.082	0.6577	0.6558	0.7694	0.6488	0.7614
log-scale deviation	pRecDev	1969	1.325	1.35	1.276	1.418	1.261	0.6379	0.6388	0.6938	0.631	0.6825
log-scale deviation	pRecDev	1970	1.424	1.396	0.9534	1.451	0.8958	0.61	0.6118	0.6964	0.6057	0.6884
log-scale deviation	pRecDev	1971	1.261	1.226	0.5397	1.249	0.4734	0.5646	0.5625	0.6811	0.5574	0.6722
log-scale deviation	pRecDev	1972	0.9553	0.9197	0.2048	0.9643	0.1619	0.5423	0.5416	0.6684	0.5342	0.6572
log-scale deviation	pRecDev	1973	0.47	0.429	- 0.3007	0.4607	- 0.3725	0.5477	0.5475	0.6778	0.5421	0.6695
log-scale deviation	pRecDev	1974	0.1865	0.1851	- 0.2032	0.2146	- 0.0285	0.5771	0.5761	0.6857	0.5801	0.6706

Table 12. Parameter estimates for population initial recruitment devs .

description	param index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
multiplier for 1980-1984	pMfac_Big	1.329	1.464	1.345	1.521	1.353	0.1094	0.1065	0.1076	0.105	0.1051
multiplier for 1980-1984	pMfac_Big	2.823	2.929	2.473	3.452	2.655	0.3356	0.3435	0.3058	0.3451	0.3288
multiplier for immature crab	pMfac_Imm	1.054	1.056	1.048	1.061	1.047	0.04957	0.04903	0.04904	0.04942	0.04891
multiplier for mature female crab	pMfac_MatF	1.427	1.429	1.419	1.466	1.461	0.03686	0.03598	0.03643	0.03546	0.03613
multiplier for mature male crab	pMfac_MatM	1.168	1.195	1.213	1.167	1.163	0.04104	0.04005	0.03993	0.04077	0.04113

Table 13. Parameter estimates for population natural mortality multipliers .

description	param index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female	pPrM2MF	-15	-15	-15	-15	-15	0.001669	0.001692	0.001701	0.001661	0.00169
female	pPrM2MF	-	-0.303	-	-	-	0.09239	0.0905	0.09057	0.09095	0.08982
		0.3237		0.3542	0.2335	0.2931					
female	pPrM2MF	0.3518	0.3884	0.3286	0.4623	0.3876	0.09791	0.0918	0.09163	0.09261	0.09131
female	pPrM2MF	0.6246	0.6758	0.6218	0.7984	0.7305	0.112	0.1072	0.1062	0.1133	0.1128
female	pPrM2MF	1.568	1.572	1.555	1.842	1.822	0.2016	0.1896	0.1902	0.2177	0.2198
female	pPrM2MF	3.36	3.228	3.283	3.643	3.715	0.4349	0.397	0.4071	0.4541	0.4678
female	pPrM2MF	5.297	5.011	5.137	5.566	5.733	0.9121	0.8397	0.8658	0.9504	0.981
female	pPrM2MF	7.251	6.81	7.004	7.505	7.765	1.673	1.576	1.616	1.727	1.771
female	pPrM2MF	-13.76	-13.75	-13.75	-13.76	-13.75	0.784	0.7839	0.7826	0.7858	0.784
female	pPrM2MF	-12.47	-12.45	-12.44	-12.46	-12.44	1.186	1.185	1.183	1.19	1.186
female	pPrM2MF	-11.06	-11.04	-11.03	-11.06	-11.03	1.288	1.288	1.283	1.294	1.288
female	pPrM2MF	-9.495	-9.471	-9.454	-9.489	-9.455	1.152	1.151	1.146	1.159	1.152

descripti	paramindex	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female	pPrM20MF	-7.715	-7.688	-7.671	-7.705	-7.669	0.8623	0.8619	0.8563	0.8698	0.8619
female	pPrM27MF	-5.695	-5.668	-5.654	-5.68	-5.647	0.5246	0.5244	0.5202	0.5293	0.5231
female	pPrM28MF	-3.519	-3.493	-3.491	-3.488	-3.47	0.2412	0.2411	0.2381	0.2435	0.2388
female	pPrM29MF	-1.685	-1.664	-1.695	-1.614	-1.641	0.1137	0.1129	0.1125	0.1145	0.1134

Table 14. Parameter estimates for population molt-to-maturity: females .

descripti	paramindex	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
male	pPrM21MM	-12.57	-12.51	-12.51	-12.59	-12.66	7.658	7.636	7.613	7.69	7.693
male	pPrM22MM	-3.669	-3.607	-3.605	-3.674	-3.708	0.2484	0.2469	0.2464	0.2489	0.2492
male	pPrM23MM	-3.078	-3.015	-2.996	-3.026	-3.042	0.19	0.189	0.1881	0.1891	0.1886
male	pPrM24MM	-2.616	-2.585	-2.574	-2.511	-2.531	0.1547	0.1545	0.1538	0.1532	0.1526
male	pPrM25MM	-2.157	-2.157	-2.158	-2.101	-2.132	0.1313	0.132	0.131	0.1301	0.1295
male	pPrM26MM	-1.58	-1.594	-1.6	-1.627	-1.658	0.1109	0.112	0.1116	0.1097	0.1094
male	pPrM27MM	-1.044	-1.054	-1.051	-1.175	-1.188	0.1008	0.1021	0.1028	0.1017	0.1024
male	pPrM28MM	-	-	-	-	-	0.09545	0.09566	0.09563	0.09655	0.09721
		0.6823	0.6846	0.6536	0.7711	0.7467					
male	pPrM29MM	-	-	-	-	-	0.0915	0.09113	0.09112	0.09247	0.09243
		0.4916	0.5425	0.5145	0.4881	0.4445					
male	pPrM210MM	-	-	-	-	0.01657	0.1025	0.1013	0.101	0.1032	0.1024
		0.01116	0.1181	0.1138	0.003541						
male	pPrM211MM	0.6144	0.4865	0.4841	0.5712	0.5708	0.1261	0.1241	0.1234	0.12	0.1197
male	pPrM212MM	-11.35	-11.29	-11.28	-11.34	-11.41	5.804	5.784	5.763	5.827	5.83
male	pPrM213MM	1.469	1.302	1.28	1.323	1.304	0.1821	0.178	0.1752	0.1689	0.1695
male	pPrM214MM	2.806	2.535	2.499	2.564	2.546	0.3254	0.3271	0.3341	0.325	0.3381
male	pPrM215MM	4.836	4.565	4.575	4.663	4.683	0.5877	0.5762	0.5803	0.5758	0.5863

description	paramindex	value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
		Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
male	pPrM2MM	6.833	6.615	6.666	6.744	6.79	1.042	0.9963	0.9945	1.012	1.02
male	pPrM2MM	8.574	8.411	8.488	8.548	8.61	1.637	1.571	1.571	1.606	1.614
male	pPrM2MM	10.03	9.913	10	10.05	10.12	2.258	2.189	2.191	2.233	2.241
male	pPrM2MM	11.23	11.15	11.24	11.27	11.35	2.786	2.721	2.725	2.767	2.774
male	pPrM2MM	12.2	12.15	12.24	12.26	12.33	3.126	3.071	3.075	3.112	3.118
male	pPrM2MM	12.99	12.95	13.03	13.05	13.11	3.207	3.164	3.168	3.197	3.203
male	pPrM2MM	13.62	13.6	13.67	13.68	13.72	2.977	2.946	2.949	2.97	2.974
male	pPrM2MM	-10.12	-10.06	-10.06	-10.1	-10.16	4.179	4.161	4.143	4.191	4.194
male	pPrM2MM	14.14	14.13	14.18	14.18	14.22	2.393	2.374	2.376	2.389	2.391
male	pPrM2MM	14.59	14.59	14.61	14.61	14.63	1.425	1.417	1.417	1.423	1.424
male	pPrM2MM	15	15	15	15	15	0.004866	0.004677	0.004521	0.004579	0.004477
male	pPrM2MM	-8.9	-8.842	-8.836	-8.861	-8.918	2.821	2.807	2.791	2.82	2.823
male	pPrM2MM	-7.682	-7.626	-7.619	-7.626	-7.678	1.77	1.759	1.748	1.749	1.754
male	pPrM2MM	-6.493	-6.439	-6.431	-6.417	-6.464	1.055	1.049	1.044	1.016	1.025
male	pPrM2MM	-5.415	-5.366	-5.36	-5.311	-5.354	0.6557	0.6516	0.6532	0.623	0.6344
male	pPrM2MM	-4.732	-4.691	-4.695	-4.621	-4.667	0.4245	0.4213	0.4226	0.4123	0.4185
male	pPrM2MM	-4.298	-4.252	-4.263	-4.252	-4.3	0.3213	0.3198	0.32	0.3186	0.3208

Table 15. Parameter estimates for population molt-to-maturity: males .

description	paramindex	value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
		Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
female mean growth a parameter	pGrAF1	0.7	0.7	0.7	0.7	0.7	6.982e- 05	8.711e- 05	9.676e- 05	5.602e- 05	5.936e- 05
female mean growth b parameter	pGrBF1	0.885	0.8839	0.8842	0.8853	0.886	0.001135	0.001113	0.001134	0.001176	0.001201

		value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
	paramindex	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
description											
male mean growth a parameter	pGrAM1	0.4208	0.4252	0.4263	0.4397	0.4352	0.02185	0.02223	0.0225	0.02237	0.02238
male mean growth b parameter	pGrBM1	0.9727	0.9706	0.9698	0.9668	0.9674	0.005172	0.005326	0.005399	0.005296	0.005313
size transition beta parameter	pGrBeta_x	0.75	0.75	0.75	0.75	0.75	0	0	0	0	0
size transition beta parameter	pGrBeta_x	0.75	0.75	0.75	0.75	0.75	0	0	0	0	0

Table 16. Parameter estimates for population growth .

		value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
description	param index	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
females [-1981]	pSrv1_QF	0.5	0.5	0.5	0.5	0.5	4.938e-05	3.817e-05	5.397e-05	3.861e-05	5.461e-05
females [1982+]	pSrv2_QF	0.4985	0.5387	0.5123	0.5504	0.5107	0.03225	0.03373	0.034	0.03281	0.03244
male offset to 95%-selected [-1981]	pSrv1M_dz50	22.13	22.04	22.95	21.9	23.83	3.262	3.268	3.452	3.191	3.65
male offset to 95%-selected [1982+]	pSrv2M_dz50	62.92	62.92	63.69	63.5	63.52	8.292	8.152	8.446	8.307	8.65
male size at 50%-selected [-1981]	pSrv1M_z50	50.22	49.93	50.88	50.13	51.77	1.919	1.904	2.041	1.884	2.143
male size at 50%-selected [1982+]	pSrv2M_z50	32.01	32.1	32.1	31.98	31.51	3.201	3.207	3.266	3.249	3.291
males [-1981]	pSrv1_QM	0.5	0.5	0.5	0.5	0.5	1.953e-05	2.842e-05	0.0005547	7.702e-05	0.0001299
males [1982+]	pSrv2_QM	0.7223	0.7625	0.7331	0.7925	0.7355	0.03642	0.0376	0.03876	0.03656	0.03674

Table 17. Parameter estimates for surveys surveys .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female offset to 95%- selected [-1981]	pSrv1F_dz5093	100	38.34	40.77	43.37	35.87	42.43	6.138	6.743	6.6	5.983	6.388
female offset to 95%- selected [1982+]	pSrv2F_dz5095	100	100	100	100	100	100	0.0011950	0.0009937	0.0010970	0.00127	0.001429
female size at 50%- selected [-1981]	pSrv1F_z50	54.2	54.52	56.22	53.21	56.47	2.79	2.896	3.009	2.735	3.03	
female size at 50%- selected [1982+]	pSrv2F_z50	-	-	-	-	-	-	15.07	13.49	14.29	14.92	15.87
		9.243	4.114	6.858	9.508	13.01						

Table 18. Parameter estimates for surveys survey selectivity .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
GTF effort extrapo- lation	pLnEffXtr_GTF	1	-1	-1	-1	-1	-1	0	0	0	0	0
GTF ln-scale female offset	pAvgLnF_GTFF	-	-	-	-	-	-	0.06681	0.06342	0.06637	0.06811	0.06867
		1.024	0.9796	0.9862	0.9569	0.9767						
GTF ln-scale mean [1973+]	pAvgLnF_GTF	-	-	-	-	-	-	0.07218	0.07219	0.09426	0.05502	0.05779
		4.116	4.076	4.178	4.129	4.177						
RKF effort extrapo- lation	pLnEffXtr_RKF	1	-	-	-	-	-	0	848.7	874.7	984	923.9
			18.46	19.78	19.28	19.77						
RKF ln-scale female offset	pAvgLnF_RKFF	-	-	-	-	-	-	1.314	0.0099610	0.01027	1.833	1.377
		1.339	5	5	-	-	-	1.726	2.463			

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
RKF ln-scale mean [1992+]	pAvgLnF_RKF	-	-3.08	-	-	-	-	0.92	0.3696	0.6534	0.09314	157.6
			4.297		3.234	5.044	5.853					
SCF effort extrapo- lation	pLnEffXtr_SCF	1	-	-	-	-	-	0	713.9	738.6	325	734.8
			17.82	19.83	19.94	19.82						
SCF ln-scale female offset	pAvgLnF_SCFF	-	-	-	-	-1.64	-	0.2129	0.2331	0.3349	0.2195	0.2084
			1.484	1.448	1.556		1.685					
SCF ln-scale mean [1992+]	pAvgLnF_SCF	2.56	-	-3.29	-	-	-	0.1239	0.1559	115.8	0.1247	0.1179
			2.331		2.557	2.704						
TCF effort extrapo- lation	pLnEffXtr_TCF	1	-1	-1	-1	-1	-1	0	0	0	0	0
TCF ln-scale female offset	pAvgLnF_TCFF	-	-	-	-	-	-	0.3415	0.3137	0.3366	0.1975	0.1803
			1.611	1.345	2.148	2.339	2.559					
TCF ln-scale mean [1965+]	pAvgLnF_TCF	-	-	-	-	-	-	0.08658	0.08711	0.1947	0.08771	0.1724
			1.326	1.287	0.4259	0.9559	0.1532					

Table 19. Parameter estimates for fisheries mortality/capture rate .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1965+]	pF_DevsTCF	-	-	-	-	-	-	0.4999	0.5007	0.8834	0.4983	0.8691
			0.5121	0.5151	2.008	0.5171	2.102					
ln-scale devs [1965+]	pF_DevsTCF	-	-	-	-	-	-	0.1435	0.1423	0.2232	0.1581	0.2316
			0.1265	0.2096	0.2676	0.2329	0.2752					
ln-scale devs [1965+]	pF_DevsTCF	0.05576	-	-	-	-	-	0.105	0.105	0.1677	0.1208	0.1753
				0.008512	0.1933	0.03111	0.1863					
ln-scale devs [1965+]	pF_DevsTCF	0.8105	0.7545	0.6078	0.7401	0.6456		0.09597	0.09703	0.1622	0.1162	0.1712

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1965+]	pF_De13TCF	1.601	1.539	1.568	1.59	1.75	0.1092	0.1092	0.1992	0.1448	0.2235	
ln-scale devs [1965+]	pF_De14TCF	1.981	1.9	2.17	2.149	2.752	0.1505	0.1457	0.2949	0.2545	0.4322	
ln-scale devs [1965+]	pF_De15TCF	2.807	2.778	3.712	2.787	3.573	0.1968	0.2007	0.239	0.2315	0.2409	
ln-scale devs [1965+]	pF_De16TCF	2.343	2.524	4.238	2.179	4.311	0.2776	0.3795	0.2487	0.2573	0.217	
ln-scale devs [1965+]	pF_De17TCF	0.3044	0.3585	0.7677	0.1419	0.8936	0.1457	0.1809	0.2533	0.1265	0.2614	
ln-scale devs [1965+]	pF_De18TCF	-	-	-	-	-	0.1271	0.1286	0.1772	0.1044	0.1594	
ln-scale devs [1965+]	pF_De19TCF	-1.69	-	-	-2.08	-	0.2479	0.2485	0.4084	0.1066	0.1525	
ln-scale devs [1965+]	pF_De20TCF	-	-	-	-	-1.86	0.3872	0.3878	0.7318	0.3831	0.7211	
ln-scale devs [1965+]	pF_De21TCF	-	-	-	-	-	0.182	0.1842	0.22	0.125	0.1651	
ln-scale devs [1965+]	pF_De22TCF	-	-	-	-	-	0.2113	0.2125	0.2816	0.09623	0.1481	
ln-scale devs [1965+]	pF_De23TCF	-	-	-	-	-	0.1069	0.1076	0.1563	0.09641	0.1486	
ln-scale devs [1965+]	pF_De24TCF	-	-	-	-	-	0.08342	0.08416	0.1419	0.1016	0.1549	
ln-scale devs [1965+]	pF_De25TCF	-	-	-	-	-	0.09428	0.09828	0.1602	0.1136	0.1713	
ln-scale devs [1965+]	pF_De26TCF	-	-	-	-	-	0.1554	0.172	0.4013	0.1638	0.4022	
ln-scale devs [1965+]	pF_De27TCF	-	-	-	-	-	0.1443	0.141	0.2229	0.1214	0.1923	
ln-scale devs [1965+]	pF_De28TCF	-	-	-	-	-	0.1399	0.1429	0.2408	0.1381	0.2057	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1965+]	pF_De28TCF	0.9826	1.026	0.9656	1.738	1.101	0.1977	0.2024	0.3119	0.1892	0.2252	
ln-scale devs [1965+]	pF_De29TCF	-	-	-	2.066	1.37	0.134	0.141	0.2163	0.222	0.2375	
ln-scale devs [1965+]	pF_De30TCF	0.1684	0.1622	0.924								
ln-scale devs [1965+]	pF_De31TCF	0.4311	0.4178	0.08853	0.4356	0.01006	0.3491	0.3513	0.6631	0.3576	0.6619	
ln-scale devs [1965+]	pF_De32TCF	-	-	-	-	-	0.1776	0.1786	0.4606	0.1276	0.2074	
ln-scale devs [1965+]	pF_De33TCF	0.9591	0.9438	0.4679	0.524	1.204						
ln-scale devs [1965+]	pF_De34TCF	-	-	-	-	-	0.2098	0.2108	0.3504	0.1041	0.1812	
ln-scale devs [1965+]	pF_De35TCF	2.129	2.092	3.287	2.302	3.222						
ln-scale devs [1965+]	pF_De36TCF	-	-	-	-	-	0.143	0.144	0.2342	0.1039	0.1808	
ln-scale devs [1965+]	pF_De37TCF	1.648	1.617	2.616	1.605	2.535						
ln-scale devs [1965+]	pF_De38TCF	-	-	-	-	-	0.1361	0.1373	0.2281	0.1032	0.1807	
ln-scale devs [1965+]	pF_De39TCF	1.648	1.609	2.599	1.782							
ln-scale devs [1965+]	pF_De40TCF	-	-	-	-	-3.11	0.1598	0.1609	0.2519	0.1028	0.1807	
ln-scale devs [1965+]	pF_De41TCF	1.963	1.925	2.955	2.169							
ln-scale devs [1965+]	pF_De42TCF	-1.32	-	-	-	-	0.2573	0.2571	0.3428	0.119	0.1886	
ln-scale devs [1965+]	pF_De43TCF		1.302	2.392	2.492	3.438						
ln-scale devs [1965+]	pF_De44TCF	-	-	-	-	-	0.1386	0.14	0.2293	0.1032	0.1807	
ln-scale devs [1965+]	pF_De45TCF	1.709	1.649	2.626	1.742	2.666						
ln-scale devs [1965+]	pF_De46TCF	-	-	-	-	-	0.09236	0.0944	0.1991	0.1063	0.1829	
ln-scale devs [1965+]	pF_De47TCF	0.4911	0.4371	1.366	0.4751	1.386						
ln-scale devs [1965+]	pF_De48TCF	-	-	-	-	-	0.09397	0.09624	0.1999	0.1112	0.1854	
ln-scale devs [1965+]	pF_De49TCF	0.199	0.1485	1.084	0.1383	1.054						
ln-scale devs [1965+]	pF_De50TCF	0.2534	0.2231	0.6857	0.2349	0.6236	0.3249	0.3296	0.6428	0.3357	0.6473	
ln-scale devs [1965+]	pF_De51TCF	0.434	0.3822	1.832	0.3943	1.796	0.3129	0.3189	0.816	0.3284	0.8243	
ln-scale devs [1965+]	pF_De52TCF	0.3146	0.2408	3.287	0.2588	3.25	0.3127	0.3186	1.048	0.3314	1.017	
ln-scale devs [1965+]	pF_De53TCF	0.1447	0.05306	3.867	0.07361	3.901	0.3077	0.3111	0.9143	0.3281	0.7179	

description	param	index	value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
ln-scale devs [1965+]	pF_De 1992 TCF	-	-	1.85	-	1.978	0.2797	0.2794	1.44	0.299	1.341	
		0.01342	0.1155		0.1006							
ln-scale devs [1965+]	pF_De 1992 TCF	-	-	0.1028	-	0.1185	0.2159	0.2133	0.4353	0.2311	0.4287	
		0.2734	0.3728		0.3736							

Table 20. Parameter estimates for fisheries TCF mortality/capture rate devs .

description	param	index	value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
ln-scale devs [1992+]	pF_De 1992 CF	1.821	1.54	2.567	1.733	1.956	0.1186	0.1563	115.8	0.1963	0.1827	
ln-scale devs [1992+]	pF_De 1992 CF	1.579	1.33	2.362	1.865	2.059	0.1257	0.1608	115.8	0.2011	0.1866	
ln-scale devs [1992+]	pF_De 1992 CF	1.218	0.996	2.042	1.593	1.817	0.149	0.1784	115.8	0.1999	0.187	
ln-scale devs [1992+]	pF_De 1992 CF	1.206	1.012	2.062	1.866	2.137	0.1751	0.198	115.8	0.1994	0.188	
ln-scale devs [1992+]	pF_De 1992 CF	0.1478	0.08758	1.104	0.2139	0.407	0.4561	0.4109	115.8	0.198	0.1838	
ln-scale devs [1992+]	pF_De 1992 CF	0.7503	0.9682	1.694	0.9962	0.94	0.3891	0.393	115.8	0.1915	0.1923	
ln-scale devs [1992+]	pF_De 1992 CF	0.6729	0.8982	1.679	1.032	0.9668	0.4395	0.43	115.8	0.1925	0.1917	
ln-scale devs [1992+]	pF_De 1992 CF	-	-	0.304	0.4412	0.3489	0.6841	0.698	115.8	0.1952	0.1932	
		0.3261	0.1288									
ln-scale devs [1992+]	pF_De 2000 CF	-	-	-	-	-	0.6612	0.6842	117	0.1983	0.1945	
		0.6544	0.4989	2.428	1.362	1.504						
ln-scale devs [1992+]	pF_De 2000 CF	-	-	-	-	-	0.6298	0.6478	115.8	0.1966	0.1933	
		0.6188	0.4619	0.656	1.404	1.552						
ln-scale devs [1992+]	pF_De 2000 CF	-	-	-	-	-	0.5951	0.6094	115.8	0.1992	0.1948	
		0.5474	0.3848	0.1445	0.6527	0.8005						
ln-scale devs [1992+]	pF_De 2000 CF	-	-	-	-	-	0.5888	0.6072	115.9	0.1994	0.1953	
		0.8531	0.708	1.523	1.507	1.683						

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1992+]	pF_De2095CF	-	-	-	-	-	-	0.5689	0.5896	2663	0.2026	0.1966
			1.083	0.9536	13.65	2.489	2.695					
ln-scale devs [1992+]	pF_De2095CF	-	-	-	-	-	-	0.504	0.4841	115.8	0.177	0.1809
			0.6097	0.6253	0.07063	0.02889	0.0356					
ln-scale devs [1992+]	pF_De2095CF	-	-	0.3976	0.7299	0.7332		0.4196	0.4053	115.8	0.1765	0.1806
			0.3325	0.3624								
ln-scale devs [1992+]	pF_De2095CF	-	-	0.5404	0.4228	0.4195		0.3499	0.3442	115.8	0.1747	0.1792
			0.2243	0.2663								
ln-scale devs [1992+]	pF_De2095CF	-	-	-	-	-		0.4299	0.418	115.8	0.1749	0.1794
			0.6621	0.6955	0.0412	0.2547	0.2724					
ln-scale devs [1992+]	pF_De2095CF	-	-	0.158	-	-		0.4248	0.4124	115.8	0.1751	0.1794
			0.5214	0.554		0.6646	0.6916					
ln-scale devs [1992+]	pF_De2095CF	-	-	0.3528	-	-		0.4345	0.4192	115.8	0.1747	0.179
			0.3796	0.3965		0.462	0.4854					
ln-scale devs [1992+]	pF_De2095CF	0.08325	0.06286	0.9181	-	-		0.3501	0.3416	115.8	0.174	0.1784
						0.2214	0.2397					
ln-scale devs [1992+]	pF_De2095CF	-	-	0.1439	-	-		0.4669	0.4526	115.8	0.1754	0.18
			0.526	0.5341		0.8716	0.8934					
ln-scale devs [1992+]	pF_De2095CF	-	-	0.251	-	-		0.3501	0.3467	115.8	0.1754	0.18
			0.4941	0.5361		0.7223	0.725					
ln-scale devs [1992+]	pF_De2095CF	0.3534	0.2784	1.145	0.1903	0.2193		0.1773	0.1912	115.8	0.1738	0.1784
ln-scale devs [1992+]	pF_De2095CF	0.0005361	-	0.7903	-	-		0.2323	0.2408	115.8	0.1765	0.1809
			0.06709			0.4422	0.4265					

Table 21. Parameter estimates for fisheries SCF mortality/capture rate devs .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1992+]	pF_De10RKf	-	0.009451	11.005	2.31	3.608	0.3561	0.3842	1.008	0.1621	157.6	
			0.1412									
ln-scale devs [1992+]	pF_De10RKf	-	-	-	-	-	0.6809	0.3933	0.3821	2.438	0.1659	157.6
			0.009504	0.03062	0.4838	0.3624						

description	param	index	value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
ln-scale devs [1992+]	pF_De11RKF	-	-	-	-	0.9196	0.3911	0.378	2.703	0.1628	157.6	
			0.02002	0.04493	0.7114	0.135						
ln-scale devs [1992+]	pF_De12RKF	-	-	-	-	0.7658	0.3916	0.3764	1.774	0.1638	157.6	
			0.005217	0.02452	0.2898	0.265						
ln-scale devs [1992+]	pF_De13RKF	-	-	-	-	0.4082	0.3877	0.3686	2.084	0.1641	157.6	
			0.02902	0.06706	0.6819	0.5705						
ln-scale devs [1992+]	pF_De14RKF	0.009176	-	-	-	0.6312	0.3997	0.3857	1.81	0.1556	157.6	
			0.000813	0.11197	0.05276							
ln-scale devs [1992+]	pF_De15RKF	0.009851	-	-	-	0.3077	0.3992	0.3792	1.81	0.1584	157.6	
			0.0162	0.2914	0.326							
ln-scale devs [1992+]	pF_De16RKF	0.01192	-	-	-	0.5247	1.274	0.3992	0.3769	1.682	0.151	157.6
			0.02084	0.2751								
ln-scale devs [1992+]	pF_De17RKF	0.02674	-	-	-	0.8395	1.639	0.401	0.3728	1.255	0.1473	157.6
			0.007308	0.05678								
ln-scale devs [1992+]	pF_De18RKF	0.0172	-	-	-	0.0112	0.7164	0.3989	0.3678	1.441	0.1507	157.6
			0.03975	0.2916								
ln-scale devs [1992+]	pF_De19RKF	0.008294	-	-	-	-	0.3981	0.3717	1.709	0.1593	157.6	
			0.04025	0.3852	0.6888	0.1089						
ln-scale devs [1992+]	pF_De20RKF	-	0.311	2.311	3.818	5.24	0.3741	0.4723	0.7284	0.1628	157.6	
			0.02859									
ln-scale devs [1992+]	pF_De21RKF	0.002897	-	-	-	-	0.3979	0.3777	2.025	0.1625	157.6	
			0.02574	0.4213	1.408	0.9794						
ln-scale devs [1992+]	pF_De22RKF	0.003038	-	-	-	0.2924	0.3982	0.3817	2.033	0.1585	157.6	
			0.01328	0.3334	0.3223							
ln-scale devs [1992+]	pF_De23RKF	0.01013	-	-	-	0.6169	0.3983	0.3744	1.627	0.1531	157.6	
			0.02072	0.2822	0.05621							
ln-scale devs [1992+]	pF_De24RKF	0.02512	-	-	-	0.1114	0.8382	0.3984	0.3608	1.261	0.1481	157.6
			0.03864	0.2554								
ln-scale devs [1992+]	pF_De25RKF	-	-	-	-	0.5146	1.309	0.3931	0.3544	2.104	0.1523	157.6
			0.00686	0.1226	0.9588							
ln-scale devs [1992+]	pF_De26RKF	-	-	-	-	-	0.3689	0.3838	8.197	0.2074	2432	
			0.07104	0.02226	0.9098	3.483	13.49					

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1992+]	pF_De1973TF	1.1	0.01187	0.0292	0.8293	-	-	0.3853	0.3972	2.051	0.2147	2639
ln-scale devs [1992+]	pF_De1974TF	1.469	0.08041	0.07329	1.825	0.8719	1.926	0.4039	0.4108	1.165	0.1685	157.6
ln-scale devs [1992+]	pF_De1975TF	1.6096	0.08178	0.1243	0.8399	0.6519	1.875	0.4092	0.3967	1.431	0.1673	157.6
ln-scale devs [1992+]	pF_De1976TF	1.07746	0.01292	0.01461	0.2989	0.5735	1.774	0.3976	0.3909	1.801	0.1653	157.6
ln-scale devs [1992+]	pF_De1977TF	-	-	-	0.4762	1.652	0.3959	0.3885	2.476	0.1646	157.6	
ln-scale devs [1992+]	pF_De1978TF	-	0.0011090	0.01392	0.2159	-	-	0.3961	0.3877	2.129	0.1647	157.6
ln-scale devs [1992+]	pF_De1979TF	1.001211	-	-	0.1223	1.243	0.3961	0.3877	2.129	0.1647	157.6	
				0.01242	0.1453							

Table 22. Parameter estimates for fisheries RKF mortality/capture rate devs .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1973+]	pF_De1973TF	1.1	1.031	1.331	1.082	1.334	0.1045	0.1044	0.1358	0.2093	0.2188	
ln-scale devs [1973+]	pF_De1974TF	1.469	1.412	1.603	1.459	1.619	0.08161	0.08175	0.1055	0.1997	0.2036	
ln-scale devs [1973+]	pF_De1975TF	1.6096	0.5615	0.7215	0.6517	0.7588	0.07822	0.07852	0.1	0.2001	0.2044	
ln-scale devs [1973+]	pF_De1976TF	1.07746	0.03346	0.1766	0.1196	0.1856	0.09029	0.09064	0.109	0.1983	0.2023	
ln-scale devs [1973+]	pF_De1977TF	-	-	-	-	-	0.1181	0.1184	0.1334	0.1979	0.2019	
ln-scale devs [1973+]	pF_De1978TF	-	0.2098	0.2539	0.1429	0.1847	0.1556	0.156	0.1561	0.1712	0.1984	0.2031
ln-scale devs [1973+]	pF_De1979TF	-	0.4403	0.4858	0.4218	0.4411	0.4226	0.1127	0.1124	0.1258	0.2025	0.2064
ln-scale devs [1973+]	pF_De1980TF	1.2331	0.1903	0.3196	0.1813	0.2806	0.1127	0.1124	0.1258	0.2025	0.2064	
ln-scale devs [1973+]	pF_De1981TF	-	-	0.2361	-	0.2116	0.1522	0.1558	0.1604	0.2031	0.205	
			0.02168	0.03259		0.05781						

description	param	index	value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG	Mod- elC	Mod- elD	Mod- elE	Mod- elF	Mod- elG
ln-scale devs [1973+]	pF_De1963TF	-	-	0.0304	-	0.02613	0.1925	0.195	0.2061	0.2	0.2068	
			0.2065	0.2118		0.2214						
ln-scale devs [1973+]	pF_De1962TF	-	-	-	-1.1	-	0.3942	0.3931	0.5914	0.1971	0.2016	
			0.9161	0.9207	1.017		1.059					
ln-scale devs [1973+]	pF_De1963TF	-	-	-	-	-	0.3591	0.3593	0.4232	0.1974	0.2016	
			0.413	0.4042	0.3888	0.3513	0.3773					
ln-scale devs [1973+]	pF_De1963TF	-	-	-	-	-	0.3921	0.3935	0.4456	0.2	0.2058	
			0.2044	0.1749	0.1549	0.0555	0.1274					
ln-scale devs [1973+]	pF_De1965TF	-	-	-	-	-	0.4777	0.4803	0.7669	0.1969	0.2023	
			0.6293	0.601	0.7702	0.6124	0.6664					
ln-scale devs [1973+]	pF_De1965TF	-	-	-	-	-	0.3802	0.3818	0.4753	0.1936	0.1981	
			0.5482	0.5197	0.5169	0.4216	0.4312					
ln-scale devs [1973+]	pF_De1967TF	-	-	-	-	-	0.3776	0.3779	0.4954	0.196	0.2008	
			0.7199	0.7121	0.7333	0.6273	0.6224					
ln-scale devs [1973+]	pF_De1968TF	-	-	-	-	-	0.4079	0.4077	0.6877	0.1959	0.2004	
			1.104	1.095	1.293	1.148	1.158					
ln-scale devs [1973+]	pF_De1969TF	-	-	-	-	-	0.3444	0.343	0.4491	0.195	0.1996	
			0.9517	0.9437	0.9733	0.9155	0.9127					
ln-scale devs [1973+]	pF_De1969TF	-	-	-	-	-	0.2799	0.277	0.3128	0.1948	0.1996	
			0.6056	0.6205	0.5774	0.5947	0.581					
ln-scale devs [1973+]	pF_De1969TF	0.4937	0.4195	0.4957	0.4127	0.4588	0.1277	0.1269	0.1395	0.1937	0.1989	
ln-scale devs [1973+]	pF_De1962TF	0.7839	0.6914	0.7695	0.7549	0.786	0.1192	0.1184	0.1316	0.1986	0.2031	
ln-scale devs [1973+]	pF_De1963TF	0.6352	0.572	0.6606	0.7114	0.7066	0.165	0.1637	0.1729	0.2035	0.2064	
ln-scale devs [1973+]	pF_De1964TF	1.128	1.078	1.172	1.284	1.299	0.1428	0.1419	0.1518	0.21	0.2142	
ln-scale devs [1973+]	pF_De1965TF	1.152	1.116	1.219	1.242	1.301	0.1811	0.1799	0.1852	0.2051	0.2139	
ln-scale devs [1973+]	pF_De1965TF	1.487	1.462	1.566	1.59	1.683	0.1717	0.1707	0.1762	0.2103	0.2225	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
ln-scale devs [1973+]	pF_De1907TF	11	1.442	1.469	1.607	1.561	1.594	0.2321	0.2326	0.2258	0.2034	0.2107
ln-scale devs [1973+]	pF_De1908TF	11	1.119	1.143	1.33	1.341	1.353	0.3324	0.3383	0.3095	0.1986	0.2035
ln-scale devs [1973+]	pF_De1909TF	11	0.5735	0.5786	0.8007	0.9151	0.9064	0.5015	0.5189	0.4827	0.1973	0.2014
ln-scale devs [1973+]	pF_De2001TF	11	0.6482	0.6649	0.8375	0.936	0.9234	0.4107	0.4216	0.3981	0.1975	0.2012
ln-scale devs [1973+]	pF_De2002TF	11	0.1015	1.046	1.159	1.257	1.247	0.2527	0.2556	0.2505	0.201	0.2042
ln-scale devs [1973+]	pF_De2002TF	11	0.3961	0.4245	0.5214	0.6472	0.6089	0.3767	0.3816	0.3865	0.2021	0.2055
ln-scale devs [1973+]	pF_De2003TF	11	-	-	-	-	-	0.4806	0.4865	0.6198	0.2009	0.2046
ln-scale devs [1973+]	pF_De2004TF	11	-	0.03256	0.04797	0.2122	0.1433	0.3687	0.372	0.4123	0.2032	0.2065
ln-scale devs [1973+]	pF_De2005TF	11	-	-	-	-	-	0.3766	0.3798	0.4464	0.2014	0.205
ln-scale devs [1973+]	pF_De2005TF	11	-	-	-	-	-	0.3325	0.3346	0.3763	0.1998	0.2036
ln-scale devs [1973+]	pF_De2007TF	11	-	-	-	-	-	0.3313	0.3334	0.381	0.1969	0.2009
ln-scale devs [1973+]	pF_De2008TF	11	-	-	-	-	-	0.3744	0.3768	0.4752	0.1961	0.2002
ln-scale devs [1973+]	pF_De2009TF	11	-	-	-	-	-	0.4316	0.435	0.652	0.1962	0.2003
ln-scale devs [1973+]	pF_De2009TF	11	-	-	-	-	-	0.4845	0.4892	0.9367	0.1965	0.2006
ln-scale devs [1973+]	pF_De2009TF	11	-	-	-	-	-	0.503	0.5094	1.093	0.1961	0.2003
ln-scale devs [1973+]	pF_De2002TF	11	-	-	-	-	-	0.5031	0.51	1.485	0.1958	0.2002

			value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-
description	param	index	elC	elD	elE	elF	elG	elC	elD	elE	elF	elG
ln-scale	pF_De2003TF	-	-	-	-	-	-1.27	0.4268	0.4318	0.7377	0.1956	0.2001
devs			0.9322	0.889	1.166	1.168						
[1973+]												
ln-scale	pF_De2003TF	-	-	-	-	-	-	0.3941	0.398	0.6099	0.1962	0.2008
devs			0.9635	0.923	1.127	1.083	1.176					
[1973+]												
ln-scale	pF_De2005TF	-	-	-	-	-	-1.3	0.4289	0.4341	0.7914	0.1979	0.2024
devs			1.029	0.9914	1.322	1.195						
[1973+]												

Table 23. Parameter estimates for fisheries GTF mortality/capture rate devs .

			value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-
description	param	index	elC	elD	elE	elF	elG	elC	elD	elE	elF	elG
size at	pRetTCFM_z50	138.3	138.4	138.1	138	138.2	0.4633	0.4858	0.4366	0.4176	0.4195	
50%-												
selected												
[-1990]												
size at	pRetTCFM_z50	133.2	133.2	132.9	138	137.7	0.5927	0.5792	0.5795	0.5645	0.5765	
50%-												
selected												
[1991+]												
slope	pRetTCFM_slp	0.6845	0.6904	0.7794	0.7011	0.7805	0.1209	0.1218	0.1468	0.1265	0.144	
[-1990]												
slope	pRetTCFM_slp	0.2526	0.2549	0.2524	0.25	0.25	0.01865	0.01836	0.01834	3.592e-	3.908e-	
[1991+]										06	06	

Table 24. Parameter estimates for fisheries TCF retention .

			value	value	value	value	value	stdv	stdv	stdv	stdv	stdv
			Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-	Mod-
description	param	index	elC	elD	elE	elF	elG	elC	elD	elE	elF	elG
female size	pSelTCFF_z50	94.5	94.5	95.1	94.25	94.41	93.09	2.157	2.27	2.145	2.227	2.018
at 50%-												
selected												
[all years]												
female	pSelTCFF_slp	0.196	0.196	0.1948	0.1985	0.1914	0.1993	0.02035	0.02003	0.02047	0.02051	0.02139
slope [all												
years]												

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM_devsZ50	0.7509	0.1736	0.2414	0.1431	0.2232	0.03071	0.03167	0.06545	0.03088	0.07149	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM1_devsZ50	0.7331	0.02849	-	-	-	0.02221	0.022	0.02553	0.01897	0.02255	
				0.07422	0.01443	0.09253						
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM1_devsZ50	0.7506	0.26	0.1539	0.1282	0.04774	0.0202	0.02	0.02357	0.01971	0.02305	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM2_devsZ50		-	-	-	-	0.0217	0.02135	0.02501	0.01915	0.02285	
			0.01658	0.01852	0.1221	0.05724	0.1371					
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM3_devsZ50		-	-	-	-	0.01917	0.01883	0.02286	0.01756	0.02152	
			0.04799	0.04886	0.1515	0.09394	0.1736					
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM4_devsZ50		-	-	-	-	0.02161	0.02114	0.02484	0.02084	0.02435	
			0.09001	0.09035	0.1932	0.143	0.2229					
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM1_devsZ50	0.7507	0.1666	0.1735	0.08049	0.06993	0.02231	0.02144	0.03017	0.02501	0.02887	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM1_devsZ50	0.7523	0.1557	0.1818	0.1547	0.1611	0.02604	0.02545	0.03641	0.02485	0.02968	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM4_devsZ50	0.2455	0.2486	0.2957	0.291	0.3168	0.02842	0.02802	0.05226	0.02568	0.04155	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM5_devsZ50		-	-	0.3555	0.441	0.09122	0.09322	0.08471	0.03525	0.0623	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM6_devsZ50		-	0.2064	-	-	0.01317	0.01285	0.07311	0.01834	0.082	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM7_devsZ50		-	-	-	-	0.0245	0.02403	0.02727	0.02149	0.02476	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM8_devsZ50		-	-	-	-	0.02357	0.02322	0.02665	0.02093	0.02432	
male ln-scale devs in size at 50%- selected [1991+]	pSelTCFM9_devsZ50		-	-	-	-	0.02153	0.02118	0.02485	0.01905	0.0227	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
male ln-scale mean size at 50%- selected	pSelTCFM_mn	1.7750A	4.76	4.862	4.799	4.878	0.01168	0.01153	0.01741	0.009423	0.01571	
male slope [-1996]	pSelTCFM_slp	0.08984	0.08966	0.07014	0.07929	0.06554	0.006701	0.006486	0.005024	0.005443	0.004187	
male slope [1997+]	pSelTCFM_slp	0.1793	0.182	0.1836	0.2133	0.2131	0.0141	0.01419	0.0143	0.01649	0.01647	

Table 25. Parameter estimates for fisheries TCF selectivity .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female size at 50%- selected [-1996]	pSelSCFF_z50A	57.49	71.13	70.93	67.52	69.4	7.138	5.26	5.242	5.067	5.125	
female size at 50%- selected [1997- 2004]	pSelSCFF_z50A	73.34	75.61	75.55	78.56	73.73	4.723	4.758	4.722	5.006	4.223	
female size at 50%- selected [2005+]	pSelSCFF_z50A	78.98	80.02	79.15	111.4	111.8	3.917	4.089	3.99	6.016	6.276	
female slope [-1996]	pSelSCFF_slp	0.12065	0.2074	0.2107	0.2997	0.2356	0.1721	0.1209	0.1247	0.2597	0.1547	
female slope [1997- 2004]	pSelSCFF_slp	0.22711	0.269	0.2695	0.2124	0.3007	0.1435	0.1394	0.1408	0.1058	0.171	
female slope [2005+]	pSelSCFF_slp	0.3206	0.1984	0.2044	0.08335	0.07976	0.06865	0.06407	0.0681	0.01387	0.01366	
male ascending size at 50%- selected [-1996]	pSelSCFM_z50A	87.61	85.19	85.91	86.16	86.86	1.468	1.963	2.345	2.115	2.084	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
male ascending size at 50%-selected [1997-2004]	pSelSCFM_z50	94.19	98.19	94.55	96.94	94.5	3.392	5.121	3.851	3.975	3.551	
male ascending size at 50%-selected [2005+]	pSelSCFM_z50	104.9	106.1	105.6	105.6	105.2	1.61	1.936	1.739	1.829	1.74	
male ascending slope [-1996]	pSelSCFM_slp	0.4016	0.4026	0.377	0.3684	0.3435	0.1341	0.1659	0.1529	0.1443	0.13	
male ascending slope [1997-2004]	pSelSCFM_slp	0.2262	0.1818	0.2228	0.1948	0.2245	0.07431	0.0568	0.07629	0.05785	0.07372	
male ascending slope [2005+]	pSelSCFM_slp	0.1372	0.1665	0.1693	0.1694	0.1705	0.01611	0.01605	0.01579	0.0162	0.01616	
male descending ln-scale offset to size at 50%-selected [-1996]	pSelSCFM_lnZ50	3.957	3.994	3.898	3.831	3.733	0.03687	0.06787	0.2014	0.1486	0.1402	
male descending ln-scale offset to size at 50%-selected [1997-2004]	pSelSCFM_lnZ50	3.792	3.515	3.782	3.583	3.761	0.1648	0.3488	0.2046	0.2513	0.1986	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
male de- scending ln-scale offset to size at 50%- selected [2005+]	pSelSCFM_lnZ50183	30183	3.415	3.452	3.452	3.48	0.09174	0.1249	0.1048	0.115	0.104	
male de- scending slope [-1996]	pSelSCFM_slpD0.5	0.5	0.2911	0.1449	0.1019	0.1	0.0003341	0.1965	0.1249	0.03992	0.000139	
male de- scending slope [1997- 2004]	pSelSCFM_slpD1546	1546	0.1	0.1451	0.1	0.1255	0.09008	0.0004101	0.09617	0.0005807	0.08123	
male de- scending slope [2005+]	pSelSCFM_slpD1761	1761	0.1648	0.1726	0.1611	0.1667	0.02709	0.02748	0.0273	0.02698	0.02727	

Table 26. Parameter estimates for fisheries SCF selectivity .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female size at 50%- selected [-1996]	pSelRKFF_z50125	125	135.2	148.4	103.1	100.8	11.72	10.89	14.09	19.33	14.98	
female size at 50%- selected [1997- 2004]	pSelRKFF_z50123	123	119.5	121	109.8	99.9	10.2	11	15.37	51.59	46.8	
female size at 50%- selected [2005+]	pSelRKFF_z50147	147	136.7	133.4	108.5	103.9	17.97	15.91	14.33	21.8	22.04	
female slope [-1996]	pSelRKFF_slp02101	02101	0.1413	0.1375	0.1884	0.2003	0.1168	0.03476	0.03445	0.1173	0.1211	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female slope [1997- 2004]	pSelRKFF_slp	0.204	0.1875	0.1725	0.05	0.05	0.14	0.08758	0.08179	0.0001479	0.000107	
female slope [2005+]	pSelRKFF_slp	0.1344	0.1635	0.1608	0.1287	0.101	0.06032	0.05006	0.0506	0.0708	0.07517	
male size at 50%- selected [-1996]	pSelRKFM_z50	150	150	150	150	150	0.0006112	0.0016570	0.0004066	0.00036	0.0002993	
male size at 50%- selected [1997- 2004]	pSelRKFM_z50	149	145.5	145.8	121.9	133.3	14.13	15.07	18.23	5.236	12.37	
male size at 50%- selected [2005+]	pSelRKFM_z50	150	150	150	150	150	0.0013340	0.0006074	0.0008815	0.00036	0.0006951	
male slope [-1996]	pSelRKFM_slp	0.1131	0.1136	0.1215	0.1317	0.1302	0.01111	0.01134	0.01185	0.01176	0.01235	
male slope [1997- 2004]	pSelRKFM_slp	0.08633	0.08028	0.08144	0.1231	0.09522	0.02292	0.01888	0.02065	0.033	0.02691	
male slope [2005+]	pSelRKFM_slp	0.08519	0.08728	0.08666	0.08896	0.08823	0.0062820	0.0063730	0.0063460	0.0062530	0.006396	

Table 27. Parameter estimates for fisheries RKF selectivity .

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female size at 50%- selected [-1987]	pSelGTFF_z50	40	40	40	40.22	40	1.45	0.00715	0.0006028	1.473	0.0007513	
female size at 50%- selected [1988- 1996]	pSelGTFF_z50	40	40	40	40	40	0.0001550	0.0001412	0.0001305	0.0001110	0.0001036	

description	param	index	value Mod- elC	value Mod- elD	value Mod- elE	value Mod- elF	value Mod- elG	stdv Mod- elC	stdv Mod- elD	stdv Mod- elE	stdv Mod- elF	stdv Mod- elG
female size at 50%- selected [1997+]	pSelGTFF_z50A	1.15	81.43	81.58	82.13	81.2	2.456	2.355	2.497	2.516	2.622	
female slope [-1987]	pSelGTFF_slope	0.1522	0.1501	0.1487	0.1494	0.149	0.02319	0.02173	0.02201	0.02292	0.02203	
female slope [1988- 1996]	pSelGTFF_slope	0.1832	0.1872	0.1895	0.189	0.1922	0.03752	0.03751	0.0376	0.03768	0.03777	
female slope [1997+]	pSelGTFF_slope	0.07686	0.07539	0.07432	0.07371	0.07383	0.005855	0.005404	0.005481	0.005355	0.005602	
male size at 50%- selected [-1987]	pSelGTFM_z50A	1.73	53.77	53.9	53.87	54.23	1.833	1.752	1.851	1.771	1.931	
male size at 50%- selected [1988- 1996]	pSelGTFM_z50A	1.62	63.29	63.71	62.98	64.14	4.993	4.935	5.271	5.325	5.666	
male size at 50%- selected [1997+]	pSelGTFM_z50A	1.67	86.18	86.27	86.18	85.69	2.008	2.036	2.069	2.087	2.107	
male slope [-1987]	pSelGTFM_slope	0.1035	0.1056	0.1039	0.1051	0.102	0.009792	0.01009	0.01025	0.009996	0.01024	
male slope [1988- 1996]	pSelGTFM_slope	0.0484	0.05209	0.05142	0.05098	0.04966	0.007576	0.009376	0.009771	0.009922	0.009928	
male slope [1997+]	pSelGTFM_slope	0.0754	0.07408	0.07399	0.07376	0.07428	0.003877	0.00371	0.003728	0.003773	0.003848	

Table 28. Parameter estimates for fisheries GTF selectivity .

Mature biomass-at-mating

year	ModelC	ModelD	ModelE	ModelF	ModelG
1949	0	0	0	0	0
1950	0.008918	0.008637	0.05247	0.00756	0.05364
1951	0.1478	0.1358	0.8161	0.1172	0.8361

year	ModelC	ModelD	ModelE	ModelF	ModelG
1952	1.157	1.042	6.256	0.9015	6.494
1953	4.138	3.801	23.05	3.309	24.16
1954	7.769	7.317	44.98	6.391	47.33
1955	10.61	10.09	62.4	8.85	65.94
1956	12.74	12.16	75.23	10.71	79.83
1957	14.39	13.75	84.7	12.16	90.2
1958	15.75	15.05	91.75	13.36	97.98
1959	16.98	16.2	97.06	14.44	103.9
1960	18.23	17.39	101.2	15.56	108.5
1961	19.73	18.81	104.5	16.91	112.1
1962	21.84	20.82	107.3	18.81	115.1
1963	25.36	24.23	109.9	22.02	117.8
1964	32.52	31.19	112.5	28.59	120.4
1965	47.55	45.84	114.4	42.32	122.1
1966	84.19	81.79	116.6	76.3	124
1967	136.5	133.6	107.4	125.7	114.7
1968	200.1	198.3	97.61	187.5	104.7
1969	235.6	237	79.05	224.7	85.59
1970	244.9	249.8	52.8	237.5	57.21
1971	240.8	248	41.61	237.1	42.3
1972	236.2	244	85.18	235.3	84.87
1973	235.9	241.9	158.9	235.7	159.1
1974	229.8	232.4	200	228	199.9
1975	219.6	219	203.3	215.2	202.8
1976	179.3	177.6	169	176.6	168.8
1977	119	117.8	116.8	120.9	115.6
1978	81.14	81.73	85.19	84.81	76.16
1979	54.75	54.94	46.57	66.59	50.21
1980	44.87	41.22	23.21	52.48	22.46
1981	56.61	53.42	41.35	58.17	40.23
1982	54.89	52.47	51.75	51.75	51.55
1983	41.04	38.66	41.86	36.13	41.76
1984	25.72	23.83	27.5	21.11	27.25
1985	26.23	24.89	27.1	23.13	27.08
1986	32.59	31.55	32.59	30.18	32.74
1987	44.41	43.27	43.68	41.68	43.71
1988	58.52	57	57.15	55.04	57.09
1989	63.34	61.76	62.7	61.5	63.62
1990	54.34	55.58	59.34	60.87	63.16
1991	52.54	58.31	62.08	62.31	65.22
1992	45.21	48.76	51.44	49.37	52.8
1993	39.52	40.48	41.87	37.35	41.07
1994	31.41	31.32	32.38	27.52	30.86
1995	23.13	22.59	23.28	19.77	21.87
1996	18.08	17.33	17.82	15.31	17
1997	15.22	14.3	14.63	13.03	14.37
1998	13.87	12.84	13.06	11.81	12.97
1999	14.29	13.21	13.48	12.03	13.12
2000	16.28	15.04	15.52	13.68	14.86
2001	19.8	18.26	19.01	16.6	18.07
2002	23.13	21.44	22.51	19.41	21.26
2003	27.68	25.61	27.09	23.14	25.44

year	ModelC	ModelD	ModelE	ModelF	ModelG
2004	33.84	31.35	33.5	28.41	31.45
2005	41.61	38.42	41.38	35.25	39.31
2006	46.33	42.96	46.52	39.99	45.12
2007	51.29	47.23	51.11	46.07	52.28
2008	58.87	54.15	58.51	54.18	61.67
2009	58.45	54.1	58.66	54.45	62.27
2010	51.7	47.76	51.82	48.22	55.22
2011	45.17	41.47	44.95	42.32	48.38
2012	46.23	42.08	45.37	42.99	48.56
2013	61.21	55.46	59.3	55.65	61.8
2014	75.41	68.49	73.25	66.56	73.84
2015	73.93	67.17	72.38	63.28	70.87

Table 29. Estimated MMB-at-mating time (1000's t).

year	ModelC	ModelD	ModelE	ModelF	ModelG
1949	0	0	0	0	0
1950	0.03094	0.02952	0.1824	0.02836	0.2136
1951	0.2727	0.2558	1.594	0.249	1.902
1952	1.057	0.9971	6.253	0.9512	7.294
1953	2.209	2.099	13.22	1.935	14.83
1954	3.22	3.08	19.39	2.772	21.14
1955	3.965	3.812	23.93	3.387	25.69
1956	4.517	4.36	27.2	3.849	28.93
1957	4.962	4.792	29.58	4.216	31.26
1958	5.344	5.165	31.33	4.54	32.95
1959	5.727	5.533	32.65	4.87	34.2
1960	6.171	5.961	33.68	5.266	35.17
1961	6.748	6.551	34.55	5.827	35.96
1962	7.673	7.519	35.33	6.766	36.67
1963	9.51	9.444	36.11	8.674	37.37
1964	13.91	13.96	36.98	13.23	38.16
1965	24.27	24.4	38	23.84	39.14
1966	43.67	44.04	39.37	43.45	40.5
1967	68.6	69.55	41.13	68.19	42.38
1968	89	91.56	43.96	88.38	45.56
1969	98.44	102.8	48.14	97.92	50.52
1970	98.91	104.7	51.3	99.07	55.01
1971	96.41	102.5	56.94	97.14	60.84
1972	93.91	100.4	79.21	95.75	83.51
1973	92.69	98.46	95.38	94.25	98.08
1974	89.36	94.25	97.07	89.9	97.17
1975	82.97	87.23	89.9	82.57	88.35
1976	71.79	76.5	78.31	72.17	76.46
1977	60.02	65.22	66.76	62.32	66.06
1978	55.33	59.79	60.64	59.17	60.27
1979	57.4	59.62	54.1	62.48	58.25
1980	56.04	56.44	44.38	60.01	46.46
1981	49.72	50.03	44.71	51.42	46.02
1982	40.52	39.43	37.69	39.37	37.91
1983	30.76	28.65	28.42	27.96	28.08

year	ModelC	ModelD	ModelE	ModelF	ModelG
1984	23.06	20.67	21.17	19.86	20.75
1985	20.04	17.89	18.38	17.25	18.1
1986	20.61	18.77	19.17	18.33	19.16
1987	23.76	21.85	22.24	21.44	22.41
1988	28.51	25.96	26.28	25.54	26.58
1989	32.64	29.9	30.19	29.57	30.57
1990	34.31	32.32	32.68	32.3	33.15
1991	34.01	32.83	33.19	32.77	33.61
1992	30.61	29.09	29.85	28.94	30.02
1993	24.97	23.59	24.27	22.88	23.91
1994	18.96	17.91	18.54	17.13	17.87
1995	14.18	13.43	14.03	12.57	13.02
1996	10.76	10.22	10.7	9.673	10.01
1997	8.519	7.956	8.227	7.745	8.055
1998	7.255	6.716	6.994	6.624	6.946
1999	6.877	6.359	6.717	6.257	6.653
2000	7.289	6.741	7.204	6.59	7.133
2001	7.903	7.317	7.918	7.049	7.739
2002	8.787	8.143	8.909	7.758	8.626
2003	10.23	9.485	10.45	9.017	10.16
2004	12.37	11.47	12.74	11.05	12.58
2005	14.36	13.4	14.86	13.1	14.98
2006	16.02	15	16.59	15.24	17.52
2007	18.15	16.98	18.75	17.61	20.31
2008	18.55	17.37	19.16	17.65	20.36
2009	16.43	15.43	17.01	15.31	17.62
2010	13.94	13.09	14.44	12.89	14.82
2011	13.3	12.46	13.73	12.43	14.25
2012	16.97	15.84	17.38	16.1	18.31
2013	23.36	21.79	23.82	21.87	24.63
2014	26.71	24.94	27.2	24.49	27.29
2015	24.9	23.29	25.44	22.46	24.87

Table 30. Estimated MFB-at-mating time (1000's t).

Recruitment

year	ModelC	ModelD	ModelE	ModelF	ModelG
1949	55.5	54.92	340.4	48.03	356.1
1950	55.65	55.06	340.5	48.17	356.2
1951	55.99	55.39	340.8	48.49	356.5
1952	56.62	56	341.4	49.08	356.9
1953	57.66	57.01	342.3	50.04	357.6
1954	59.3	58.61	343.6	51.57	358.6
1955	61.84	61.11	345.4	53.93	360.1
1956	65.8	65.01	348	57.61	362.1
1957	72.11	71.29	351.4	63.51	364.9
1958	82.65	81.86	356	73.41	368.7
1959	101.7	101.2	362.2	91.52	373.9

year	ModelC	ModelD	ModelE	ModelF	ModelG
1960	141.2	142	370.4	129.9	381.2
1961	242.9	248.6	381.5	230.9	391.4
1962	537.9	560.5	397.2	529.4	406.5
1963	1177	1224	420.7	1164	430.1
1964	1615	1670	459	1577	469.8
1965	1450	1506	527	1415	542.4
1966	1119	1177	659.5	1110	685.5
1967	914.8	971.4	915.8	927.8	961.2
1968	862.8	912.4	1409	887.5	1475
1969	946.3	975.7	1734	962.6	1766
1970	1045	1021	1256	994.7	1225
1971	887.8	862.4	830.1	813.3	802.9
1972	653.8	634.5	593.9	611.5	588
1973	402.4	388.5	358.3	369.6	344.6
1974	303.1	304.4	395	288.9	486
1975	606.3	578.8	507.5	644.9	583.6
1976	1094	1077	1199	1068	1258
1977	863.9	815.3	937.7	853.5	1021
1978	441.6	409.2	386.7	445.7	410.4
1979	175.2	162	143	180.9	151.1
1980	93.15	88.67	77.8	99.78	82.09
1981	134.3	123.8	114.6	127.3	115.2
1982	90.73	83.71	81.7	85.18	83.25
1983	345.2	308.8	306.9	297.4	301.1
1984	321.8	280.5	279.9	269.9	276.2
1985	505.7	423.4	407.8	415.4	411.3
1986	466.2	402.2	395.8	390.5	390.6
1987	451	408.5	411.9	410.7	417.9
1988	439.7	383	379.6	368.2	378.1
1989	190.9	176.4	181.1	153.8	172.1
1990	73.68	68.49	66.59	55.21	60.03
1991	42.9	41.37	41.85	61.94	52.61
1992	32.61	31.88	33.47	34.59	34.53
1993	30.27	29.34	30.51	30.28	31.26
1994	37.96	37.8	39.58	36.68	37.78
1995	50.53	50.33	52.84	46.47	48.56
1996	51.67	51.06	53.83	46.84	50.24
1997	127.6	124.3	130.8	112	122
1998	52.35	50.68	53.34	45.36	49.12
1999	152.7	149.7	159.4	131.3	144.6
2000	90.77	88.08	95.21	76.8	86.32
2001	276.6	270	291.2	249.3	278.2
2002	105	99.89	106.2	106.4	117
2003	209.3	206.5	224.5	238.9	270.3
2004	322	308.4	329	310.5	346.4
2005	93.97	89.43	94.44	78.28	86.44
2006	72.47	69.29	73.43	67.5	75.12
2007	48.53	46.54	49.33	44.94	49.53
2008	60.51	59.53	64.5	58.25	65.01
2009	395.2	388.2	418.2	383.5	420.1
2010	492.1	474	500.8	440.8	469
2011	286.8	271	279.7	262.6	272.6

year	ModelC	ModelD	ModelE	ModelF	ModelG
2012	49.61	46.31	48.73	43.58	46.71
2013	124.1	117.8	124.9	112.1	120.6
2014	99.47	93.8	99.81	89.88	97.24
2015	69.67	65.75	70.08	62.76	68.02
2016	120	113.5	121.1	107.1	116.2

Table 31. Estimated recruitment (millions).

Mature survey biomass

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1975	246	148.1	147.8	136.8	143.9	135.5
1976	126.2	133.6	132.2	124	128.9	123.1
1977	110.6	105.5	104	99.65	102.7	100
1978	77.6	75.14	73.67	74.49	75.12	76.26
1979	32.21	66.99	65.59	68.14	68.16	66.07
1980	86.15	63.01	61.52	57.28	69.69	61.84
1981	49.36	53.76	50.7	37.38	58.26	37.18
1982	48.97	68.14	69.59	60.89	76.53	61.63
1983	28.46	49.07	49.82	47.7	51.83	48.36
1984	24.17	32.61	32.34	32.78	32.17	33
1985	11.36	23.01	22.4	23.43	21.52	23.36
1986	12.81	28.78	28.36	28.18	28.07	28.24
1987	24.08	40.73	39.99	38.6	39.8	38.6
1988	60.43	55.24	54.64	52.28	54.49	52.15
1989	91.93	70.24	68.85	65.45	69.07	65.52
1990	96.29	74.42	74.31	71.72	76.32	72.48
1991	109.7	64.83	68.23	68.7	74.78	71.58
1992	103.2	60.06	67.1	66.99	71.3	69.14
1993	60.14	45.05	48.77	48.69	49.55	49.32
1994	42.13	32.9	34.89	34.51	33.02	33.69
1995	31.1	23.93	24.98	24.68	23.42	23.86
1996	26.26	17.32	17.77	17.57	16.85	16.87
1997	10.69	13.91	14.02	13.91	13.16	13.45
1998	10.29	12.46	12.35	12.19	11.8	12
1999	12.45	12.41	12.22	11.99	11.65	11.76
2000	16.15	14.12	13.89	13.69	13.03	13.11
2001	17.85	17.37	17.08	17	16	16.11
2002	17.8	20	19.75	19.85	18.43	18.68
2003	23.32	23.71	23.34	23.57	21.65	22.05
2004	26.35	28.99	28.58	29.15	26.61	27.28
2005	43.14	36.28	35.71	36.66	33.91	34.91
2006	64.2	41	40.56	41.97	39.76	41.27
2007	66.44	45.36	44.56	46.1	45.15	47.19
2008	62.71	51.33	50.32	52	51.95	54.6
2009	36.32	50.67	49.96	51.81	51.49	54.46
2010	37.61	44.26	43.52	45.25	45.08	47.82
2011	41.49	38.81	37.95	39.41	39.58	41.92
2012	41.18	39.36	38.12	39.35	39.91	41.8

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
2013	65.66	53.43	51.6	52.78	53.38	54.77
2014	79.47	71.11	69.29	70.69	70.35	71.49
2015	60.18	72.18	70.58	72.23	70.44	71.85
2016	57.61	59.11	57.47	59.32	56.21	58.12

Table 32. Observed and estimated mature male survey biomass (1000's t).

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1975	31.71	47.76	48.53	48.64	47.57	48.24
1976	31.44	42	42.79	42.61	41.63	41.94
1977	38.76	35.8	36.94	36.95	36.16	36.97
1978	26.18	32.72	33.89	34.02	34.42	35.32
1979	19.65	34.7	35.24	35.44	37.1	37.12
1980	64.16	36.48	36.04	33.97	39.01	37.04
1981	43.06	31.54	30.37	25.47	32.83	26.61
1982	64.43	25.7	27.03	23.98	28.34	24.52
1983	20.61	19.19	19.64	18.09	20.15	18.17
1984	15.01	14.48	14.22	13.51	14.35	13.46
1985	5.629	11.75	11.12	10.88	11.11	10.85
1986	3.452	12.3	11.64	11.34	11.79	11.49
1987	5.193	14.27	13.56	13.16	13.79	13.44
1988	25.47	16.98	16.13	15.57	16.42	15.96
1989	19.5	19.81	18.75	18.06	19.11	18.51
1990	37.84	21.4	20.59	19.89	21.01	20.33
1991	45.03	21.21	21	20.35	21.44	20.72
1992	26.47	19.09	19.43	18.84	19.55	18.92
1993	11.74	15.32	15.51	15.23	15.53	15.15
1994	10.01	11.61	11.75	11.55	11.7	11.39
1995	12.72	8.605	8.709	8.628	8.701	8.419
1996	9.797	6.482	6.58	6.585	6.417	6.197
1997	3.514	5.095	5.187	5.203	5.089	4.933
1998	2.315	4.313	4.329	4.306	4.338	4.24
1999	3.877	4.044	4.032	4.043	4.061	4.025
2000	4.181	4.28	4.263	4.327	4.257	4.297
2001	4.607	4.656	4.645	4.759	4.567	4.676
2002	4.495	5.156	5.149	5.327	5.006	5.19
2003	8.436	5.989	5.979	6.251	5.795	6.089
2004	4.903	7.237	7.222	7.593	7.105	7.54
2005	11.62	8.348	8.345	8.83	8.423	8.989
2006	15.04	9.321	9.351	9.869	9.807	10.51
2007	13.53	10.57	10.59	11.16	11.33	12.19
2008	11.73	10.8	10.84	11.41	11.37	12.22
2009	8.556	9.583	9.65	10.14	9.864	10.59
2010	5.524	8.122	8.179	8.601	8.297	8.896
2011	5.493	7.737	7.773	8.167	7.98	8.533
2012	12.5	9.821	9.819	10.28	10.3	10.94
2013	17.98	13.55	13.54	14.12	14.03	14.74
2014	14.95	15.62	15.64	16.25	15.78	16.4
2015	11.29	14.58	14.64	15.19	14.5	14.97
2016	7.554	12.39	12.41	12.93	12.23	12.62

Table 33. Observed and estimated mature female survey biomass (1000's t).

Retained catch

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1965	1.923	1.952	1.952	1.923	1.929	1.923
1966	2.445	2.474	2.474	2.444	2.454	2.445
1967	13.6	13.59	13.59	13.6	13.53	13.59
1968	18	18	18	18	17.92	17.98
1969	27.49	27.48	27.48	27.49	27.26	27.43
1970	25.49	25.49	25.49	25.49	25.27	25.42
1971	20.71	20.71	20.71	20.71	20.54	20.6
1972	16.91	16.9	16.9	16.9	16.76	16.75
1973	13.03	13.02	13.02	13.01	12.92	12.9
1974	15.24	15.22	15.22	15.22	15	15
1975	17.65	17.64	17.64	17.64	17.42	17.49
1976	30.02	30	30	30	29.21	29.66
1977	35.53	35.51	35.51	35.52	34.35	35.32
1978	21.09	21.07	21.07	21.09	20.74	21.14
1979	19.01	18.92	18.92	18.91	17.44	16.93
1980	13.43	13.44	13.44	13.53	13.08	14.17
1981	4.99	5.047	5.052	5.047	5.058	5.055
1982	2.391	2.465	2.469	2.446	2.414	2.407
1983	0.5489	0.7838	0.7843	0.5758	0.5548	0.5492
1984	1.429	1.496	1.498	1.47	1.436	1.433
1985	0	0	0	0	0	0
1986	0	0	0	0	0	0
1987	0.998	1.014	1.01	0.9096	0.9991	0.9935
1988	3.18	3.065	3.062	3.074	3.121	3.126
1989	11.11	10.96	10.96	10.99	10.24	10.39
1990	18.19	18.01	18	18.03	15.66	15.97
1991	14.43	14.28	14.28	14.29	12.79	12.92
1992	15.92	15.22	15.14	15.15	14.14	14.06
1993	7.666	7.523	7.494	7.541	7.646	7.396
1994	3.538	3.839	3.821	3.801	3.691	3.597
1995	1.919	1.98	1.958	1.989	1.986	1.999
1996	0.821	0.7165	0.7065	0.8418	0.7702	0.7821
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0.4309	0.5973	0.5961	0.4574	0.4689	0.4645
2006	0.9617	1.129	1.13	1.067	1.14	1.132
2007	0.9571	1.203	1.203	1.148	1.047	1.04
2008	0.88	0.9983	0.997	0.9108	0.8588	0.8533
2009	0.6026	0.7622	0.7643	0.6701	0.5505	0.5464
2010	0	0	0	0	0	0
2011	0	0	0	0	0	0

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
2012	0	0	0	0	0	0
2013	1.248	1.223	1.22	1.168	1.21	1.205
2014	6.158	5.67	5.659	5.67	5.685	5.698
2015	8.91	8.1	8.087	8.111	8.187	8.238

Table 34. Observed and estimated retained catch (1000's t).

Total catch mortality

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1992	17.9	18.37	18.41	18.43	21.53	21.31
1993	8.909	8.974	8.986	8.946	10.58	10.19
1994	4.543	4.267	4.271	4.316	4.644	4.617
1995	2.806	2.864	2.881	2.849	2.514	2.572
1996	0.8583	1.162	1.168	0.9711	1.821	1.323
2005	0.5792	0.7888	0.7894	0.605	0.708	0.699
2006	1.402	1.472	1.474	1.39	1.692	1.676
2007	1.612	1.62	1.623	1.544	1.623	1.607
2008	1.018	1.184	1.187	1.081	1.144	1.13
2009	0.6255	0.7723	0.7745	0.679	0.5979	0.5929
2013	1.372	1.582	1.584	1.511	1.78	1.76
2014	6.966	7.413	7.424	7.406	8.607	8.567
2015	9.888	10.54	10.54	10.53	12.47	12.45

Table 35. Observed and estimated total male catch mortality biomass (1000's t) in TCF.

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1992	0.3225	0.783	0.8865	0.7372	0.3858	0.4401
1993	0.33	0.3465	0.4116	0.3838	0.2981	0.3552
1994	0.4077	0.2615	0.3249	0.3718	0.3564	0.4003
1995	0.565	0.06108	0.07313	0.04208	0.3592	0.3782
1996	0.01434	0.02066	0.02506	0.05011	0.02007	0.02142
2005	0.01412	0.008019	0.009285	0.003731	0.004105	0.003893
2006	0.114	0.01444	0.0169	0.008177	0.009454	0.008895
2007	0.03113	0.01642	0.01939	0.009431	0.009352	0.008795
2008	0.004368	0.01326	0.01575	0.007302	0.006951	0.006489
2009	0.0007281	0.02348	0.0276	0.01197	0.004568	0.004205
2013	0.007428	0.01849	0.02226	0.01087	0.01133	0.01067
2014	0.01243	0.0802	0.09668	0.0491	0.05029	0.04708
2015	0.01902	0.1084	0.1312	0.06591	0.0697	0.06385

Table 36. Observed and estimated total female catch mortality biomass (1000's t) in TCF.

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1992	8.269	8.198	8.255	8.26	6.473	6.779
1993	4.664	4.681	4.728	4.735	4.977	5.151
1994	2.287	2.345	2.394	2.413	2.637	2.797
1995	1.54	1.667	1.723	1.742	2.507	2.737
1996	0.2674	0.4327	0.5032	0.4981	0.3534	0.3606
1997	0.5616	0.5723	0.6523	0.7169	0.5495	0.5902
1998	0.6385	0.4885	0.5531	0.6344	0.5167	0.5466
1999	0.2232	0.1871	0.2049	0.165	0.29	0.2974
2000	0.04674	0.1618	0.1691	0.01285	0.05615	0.05473
2001	0.1038	0.1986	0.2086	0.0904	0.06354	0.06183
2002	0.1788	0.2409	0.2531	0.1704	0.1502	0.1471
2003	0.06193	0.215	0.2225	0.05243	0.07714	0.07389
2004	0.02513	0.2131	0.2163	3.567e-07	0.03634	0.03392
2005	0.3106	0.328	0.3552	0.2656	0.5006	0.494
2006	0.4693	0.4583	0.4881	0.4501	1.173	1.18
2007	0.601	0.5927	0.6199	0.5965	1.032	1.035
2008	0.3591	0.4239	0.4483	0.3709	0.5851	0.5818
2009	0.4249	0.44	0.4657	0.4098	0.3501	0.3472
2010	0.4314	0.434	0.4633	0.4229	0.3669	0.3653
2011	0.6801	0.6063	0.6404	0.6487	0.4114	0.4108
2012	0.381	0.3798	0.4036	0.3392	0.2441	0.2384
2013	0.5881	0.5815	0.6032	0.5619	0.4152	0.4058
2014	1.728	1.643	1.659	1.675	1.24	1.246
2015	1.13	1.051	1.066	1.071	0.5953	0.5948

Table 37. Observed and estimated total male catch mortality biomass (1000's t) in SCF.

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1992	0.5738	1.109	0.9688	0.96	0.8238	0.8474
1993	0.5822	0.6816	0.6165	0.618	0.7272	0.7328
1994	0.4081	0.3558	0.3306	0.3376	0.4148	0.4285
1995	0.5646	0.2619	0.2501	0.2588	0.4017	0.4328
1996	0.07355	0.06941	0.07573	0.07624	0.05841	0.0581
1997	0.07259	0.08665	0.1303	0.0975	0.07548	0.07404
1998	0.05622	0.06872	0.1026	0.0811	0.06693	0.06624
1999	0.0466	0.02417	0.03488	0.01973	0.03491	0.0346
2000	0.006962	0.01879	0.02594	0.001402	0.006089	0.005912
2001	0.003563	0.02116	0.02933	0.009081	0.006278	0.006095
2002	0.01184	0.02538	0.03535	0.0171	0.01463	0.01452
2003	0.008456	0.02182	0.02987	0.005072	0.007222	0.007089
2004	0.004416	0.02114	0.02849	3.385e-08	0.003332	0.003227
2005	0.0138	0.03321	0.03722	0.0262	0.008773	0.008835
2006	0.05432	0.04868	0.05396	0.04651	0.02158	0.02202
2007	0.03271	0.06188	0.06774	0.06101	0.01821	0.01851
2008	0.0159	0.04089	0.04552	0.03495	0.009606	0.009582
2009	0.004597	0.0415	0.04651	0.03769	0.005691	0.005596
2010	0.005022	0.0405	0.04609	0.03878	0.00595	0.005872
2011	0.004337	0.06094	0.06854	0.06444	0.007154	0.007117
2012	0.002776	0.04235	0.04756	0.03765	0.004498	0.004458
2013	0.004927	0.06095	0.06631	0.05816	0.007035	0.007026

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
2014	0.01612	0.1635	0.1738	0.1634	0.0204	0.02069
2015	0.00548	0.1064	0.1148	0.1064	0.01033	0.01022

Table 38. Observed and estimated total female catch mortality biomass (1000's t) in SCF.

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1992	0.3813	0.03174	0.1303	0.2702	0.1513	0.2452
1993	0.9526	0.03148	0.1483	0.8244	0.4918	0.9545
1994	0	0.02363	0.08036	0.02485	0.0002122	4.91e-09
1995	0	0.01909	0.06179	0.1044	0.0001898	4.645e-09
1996	0.008674	0.01595	0.04974	0.2117	0.008809	0.01262
1997	0.05291	0.02584	0.06824	0.1114	0.03039	0.03368
1998	0.0381	0.02248	0.05649	0.06056	0.02622	0.02873
1999	0.02454	0.02305	0.0572	0.03826	0.0246	0.02646
2000	0.02137	0.02659	0.0663	0.04843	0.01986	0.02026
2001	0.01379	0.03324	0.08227	0.0444	0.01545	0.01469
2002	0.01982	0.03942	0.09857	0.04369	0.02293	0.02263
2003	0.01787	0.04747	0.1188	0.07924	0.02391	0.02305
2004	0.01539	0.0568	0.1402	0.06671	0.02161	0.01999
2005	0.01351	0.04807	0.1473	0.1189	0.01694	0.01654
2006	0.008403	0.05611	0.1705	0.1189	0.01542	0.01448
2007	0.01808	0.06016	0.1803	0.1288	0.03998	0.04251
2008	0.08648	0.07134	0.2128	0.186	0.06626	0.07433
2009	0.0483	0.07454	0.2192	0.1572	0.03117	0.03198
2010	0.01051	0.06607	0.196	0.1285	0.01393	0.01266
2011	0.005605	0.05711	0.1716	0.107	0.005909	0.004611
2012	0.0135	0.05318	0.1599	0.1071	0.01619	0.01512
2013	0.03639	0.06631	0.1942	0.1364	0.02539	0.02468
2014	0.09495	0.09037	0.2579	0.1889	0.039	0.03972
2015	0.05597	0.09235	0.2513	0.09974	0.05916	0.06507

Table 39. Observed and estimated total male catch mortality biomass (1000's t) in RKF.

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
1992	0.009223	0.2931	0.1911	0.0884	0.01339	0.01411
1993	0.06348	0.279	0.2144	0.2741	0.05018	0.06046
1994	0	0.2053	0.1168	0.008412	2.537e-05	3.348e-10
1995	0	0.1646	0.09015	0.03596	2.539e-05	3.392e-10
1996	0.001375	0.1311	0.06983	0.0728	0.001058	0.000878
1997	0.0009669	0.1041	0.1906	0.3682	0.001534	0.001624
1998	0.0009392	0.07974	0.1249	0.1541	0.001243	0.001307
1999	0.001251	0.07131	0.1042	0.08282	0.001091	0.001144
2000	0.0007645	0.07346	0.1049	0.0933	0.0008074	0.0008166
2001	0.0005664	0.08175	0.1182	0.07855	0.0005454	0.0005185
2002	0.0008795	0.08866	0.1307	0.07227	0.0007642	0.0007456
2003	0.001041	0.1039	0.1524	0.1277	0.0007882	0.0007613

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
2004	0.0009072	0.1211	0.1752	0.1047	0.0007033	0.0006504
2005	0.0005781	0.02215	0.02527	0.04327	0.0004252	0.0004327
2006	0.0008124	0.02522	0.02995	0.04263	0.0003731	0.0003621
2007	0.002943	0.02832	0.03389	0.04869	0.001021	0.001108
2008	0.001417	0.03263	0.03959	0.06893	0.001531	0.001679
2009	0.0003304	0.03135	0.03809	0.05357	0.0006127	0.000595
2010	0.0003171	0.02649	0.03268	0.04174	0.0002559	0.0002203
2011	2.301e-05	0.02252	0.02814	0.03423	0.0001102	8.507e-05
2012	0.00043	0.02308	0.02849	0.03762	0.0003653	0.0003599
2013	0.0003977	0.03224	0.03862	0.0542	0.000664	0.0006763
2014	0.0003172	0.04408	0.05207	0.07582	0.0009798	0.0009884
2015	0.001781	0.04541	0.05214	0.0407	0.001463	0.001508

Table 40. Observed and estimated total female catch mortality biomass (1000's t) in RKF.

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year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
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Table 41. Observed and estimated total male catch mortality biomass (1000's t) in GTF.

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo

year	observed	ModelC	ModelD	ModelE	ModelF	ModelG
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Table 42. Observed and estimated total female catch mortality biomass (1000's t) in GTF.