

# TCSAM2013 Model Results: Tables

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## Input model cases

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## 2015AMO: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentM
## 2015AMR: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentM
## 2015AMN: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentM
## 2015AM: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentM
```

case	path
2015AMO	../Runs.2015AM/2015AMO
2015AMR	Runs.2015AM/2015AMR/best
2015AMN	Runs.2015AM/2015/best
2015AM	Runs.2015AM/2016/best

Table 1. Model cases for comparison.

## Objective function components

description	2015AM	2015AMN	2015AMO	2015AMR
maturity curve smoothness (females)	1.4	1.3	1.4	1.4
maturity curve smoothness (males)	0.18	0.17	0.16	0.17
natural mortality penalty (immature females)	36	38	51	49
natural mortality penalty (immatures)	0.75	1.1	0.64	0.61
natural mortality penalty (mature males)	3.2	1.4	4.2	5.7
penalty on F-devs in BBRKC fishery	0	0	0	0
penalty on F-devs in directed fishery	57	53	49	51
penalty on F-devs in groundfish fishery	13	13	12	12
penalty on F-devs in snow crab fishery	7.5	8	7.7	7.5
recruitment penalty	2.2	2.2	2.3	2.2
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 2. Objective function penalty components.

description	2015AM	2015AMN	2015AMO	2015AMR
female growth parameter a	0.9	0.9	0.9	0.9

description	2015AM	2015AMN	2015AMO	2015AMR
female growth parameter b	0.81	0.84	0.68	0.68
female survey q penalty	25	23	16	16
male growth parameter a	0.25	0.47	0.57	0.44
male growth parameter b	0.03	0.03	0.04	0.04
survey q penalty	5	6.8	2	1.4

Table 3. Objective function priors components.

description	2015AM	2015AMN	2015AMO	2015AMR
fishery: GTF males+females	116	120	135	138
fishery: RKC females	2	1.9	2.7	2
fishery: RKC males	28	25	24	25
fishery: SCF females	15	14	14	14
fishery: SCF males	51	48	49	49
fishery: TCF discarded females	15	14	14	14
fishery: TCF retained males	269	195	195	194
fishery: TCF total males	121	111	116	111
survey: immature females	281	282	307	302
survey: immature males	273	269	280	280
survey: mature females	111	100	99	105
survey: mature males	252	237	272	273

Table 4. Objective function likelihood: size comps components.

description	2015AM	2015AMN	2015AMO	2015AMR
fishery: GTF total catch biomass	2.3	2.2	2.5	2.5
fishery: RKF total catch biomass	9.8	9.9	9.6	9.6
fishery: SCF total catch biomass	9.1	9.1	11	10
fishery: TCF female catch biomass	5.5	6	6.6	6.5
fishery: TCF male total catch biomass	16	17	18	17
fishery: TCF retained males	30	33	32	31
survey: mature crab	193	192	311	316

Table 5. Objective function likelihood: catch biomass components.

description	2015AMR- 2015AMO	2015AMN- 2015AMO	2015AM-2015AMO
maturity curve smoothness (females)	-0.06	0	0
maturity curve smoothness (males)	0.01	0	0
natural mortality penalty (immature females)	-13	0	-1.9
natural mortality penalty (immatures)	0.5	0	-0.04
natural mortality penalty (mature males)	-2.8	0	1.4

description	2015AMR- 2015AMO	2015AMN- 2015AMO	2015AM-2015AMO
penalty on F-devs in BBRKC fishery	0	0	0
penalty on F-devs in directed fishery	4.1	0	1.4
penalty on F-devs in groundfish fishery	1	0	-0.01
penalty on F-devs in snow crab fishery	0.31	0	-0.18
recruitment penalty	-0.07	0	-0.06
sex ratio penalty	0	0	0
z50 devs for male selectivity in TCF (AR1)	0	0	0
z50 devs for male selectivity in TCF (norm2)	0	0	0

Table 6. Objective function penalty component differences.

description	2015AMR-2015AMO	2015AMN-2015AMO	2015AM-2015AMO
female growth parameter a	0	0	0
female growth parameter b	0.17	0	0
female survey q penalty	6.6	0	-0.44
male growth parameter a	-0.11	0	-0.14
male growth parameter b	-0.01	0	0
survey q penalty	4.8	0	-0.59

Table 7. Objective function priors component differences.

description	2015AMR- 2015AMO	2015AMN- 2015AMO	2015AM-2015AMO
fishery: GTF males+females	-16	0	2.4
fishery: RKC females	-0.76	0	-0.63
fishery: RKC males	0.83	0	0.37
fishery: SCF females	0.1	0	0.11
fishery: SCF males	-1	0	0.17
fishery: TCF discarded females	-0.69	0	-0.14
fishery: TCF retained males	0.38	0	-0.58
fishery: TCF total males	-4.2	0	-5
survey: immature females	-25	0	-5.4
survey: immature males	-11	0	-0.25
survey: mature females	1.3	0	6
survey: mature males	-35	0	0.63

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

description	2015AMR- 2015AMO	2015AMN- 2015AMO	2015AM-2015AMO
fishery: GTF total catch biomass	-0.31	0	-0.01
fishery: RKF total catch biomass	0.27	0	0.02
fishery: SCF total catch biomass	-1.4	0	-0.07
fishery: TCF female catch biomass	-0.68	0	-0.16
fishery: TCF male total catch biomass	-0.76	0	-0.81
fishery: TCF retained males	1.2	0	-0.86
survey: mature crab	-119	0	4.3

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

## Parameter estimates

description	param	index	value 2015AM	value 2015AMN	value 2015AMO	value 2015AMR	stdv 2015AM	stdv 2015AMN	stdv 2015AMO	stdv 2015AMR
initial log-scale mean	pMnLnRecInit		5.63	5.661	5.585	5.543	0.5027	0.5063	0	0.5165
log-scale mean	pMnLnRec		4.965	5.003	4.922	4.91	0.0681	0.06834	0	0.06183
size distribution alpha parameter	pRecAlpha		11.5	11.5	11.5	11.5	0	0	0	0
size distribution beta parameter	pRecBeta		4	4	4	4	0	0	0	0

Table 10. Parameter estimates for population recruitment .

description	param	index	value 2015AM	value 2015AMN	value 2015AMO	value 2015AMR	stdv 2015AM	stdv 2015AMN	stdv 2015AMO	stdv 2015AMR
log-scale deviation	pRecDev1	1974	0.1978	0.3509	0.7814	0.6337	0.7205	0.5925	0	0.4626
log-scale deviation	pRecDev2	1975	1.383	1.207	1.009	1.133	0.2293	0.2587	0	0.2813
log-scale deviation	pRecDev3	1976	1.84	1.85	2.094	2.024	0.1414	0.1364	0	0.1236

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
log-scale deviation	pRecDev1977	1.631	1.581	1.799	1.747	0.1507	0.1495	0	0.1356
log-scale deviation	pRecDev1978	1.039	0.9602	1.022	1.011	0.1969	0.1967	0	0.1857
log-scale deviation	pRecDev1979	-0.2212	-0.3219	-	-	0.4147	0.4222	0	0.3346
				0.08476	0.07187				
log-scale deviation	pRecDev1980	-0.9049	-1.081	-0.8637	-0.8323	0.578	0.6317	0	0.4498
log-scale deviation	pRecDev1981	-0.203	-0.2935	-0.5838	-0.5553	0.2503	0.26	0	0.2509
log-scale deviation	pRecDev1982	-0.9358	-0.9727	-1.25	-1.245	0.3892	0.3881	0	0.3865
log-scale deviation	pRecDev1983	1.005	0.9997	0.6976	0.6995	0.1064	0.1061	0	0.1044
log-scale deviation	pRecDev1984	0.7886	0.7964	0.6643	0.6643	0.1553	0.1542	0	0.1592
log-scale deviation	pRecDev1985	1.337	1.345	1.59	1.551	0.1234	0.1215	0	0.1077
log-scale deviation	pRecDev1986	1.221	1.194	1.328	1.329	0.1353	0.1355	0	0.1319
log-scale deviation	pRecDev1987	1.099	1.097	1.264	1.243	0.1425	0.1391	0	0.134
log-scale deviation	pRecDev1988	1.05	1.044	1.174	1.166	0.1263	0.125	0	0.1196
log-scale deviation	pRecDev1989	0.1951	0.1854	0.2063	0.2072	0.1738	0.174	0	0.1719
log-scale deviation	pRecDev1990	-0.721	-0.7235	-0.6595	-0.6569	0.2712	0.2706	0	0.2542
log-scale deviation	pRecDev1991	-1.254	-1.239	-1.214	-1.232	0.3067	0.3021	0	0.2961
log-scale deviation	pRecDev1992	-1.443	-1.481	-1.496	-1.474	0.2736	0.2784	0	0.2707

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
log-scale deviation	pRecDev1993	-1.537	-1.567	-1.599	-1.584	0.2555	0.2579	0	0.2496
log-scale deviation	pRecDev1994	-1.397	-1.416	-1.477	-1.47	0.2224	0.2226	0	0.2183
log-scale deviation	pRecDev1995	-1.106	-1.124	-1.193	-1.183	0.1869	0.187	0	0.1818
log-scale deviation	pRecDev1996	-1.048	-1.069	-1.09	-1.079	0.1996	0.1999	0	0.1878
log-scale deviation	pRecDev1997	-0.1048	-0.1221	-0.1871	-0.1787	0.1052	0.1052	0	0.09817
log-scale deviation	pRecDev1998	-1.021	-1.034	-1.092	-1.087	0.1896	0.1895	0	0.1825
log-scale deviation	pRecDev1999	0.123	0.1062	0.024	0.03275	0.1042	0.1042	0	0.09903
log-scale deviation	pRecDev2000	-0.42	-0.4412	-0.4791	-0.4698	0.1823	0.1827	0	0.1745
log-scale deviation	pRecDev2001	0.7304	0.7181	0.7102	0.7185	0.09417	0.09412	0	0.0875
log-scale deviation	pRecDev2002	-0.3086	-0.3141	-0.2321	-0.2335	0.2033	0.2027	0	0.1874
log-scale deviation	pRecDev2003	0.3444	0.3344	0.299	0.3106	0.1346	0.1346	0	0.1287
log-scale deviation	pRecDev2004	0.887	0.8773	0.8035	0.808	0.09165	0.09169	0	0.08589
log-scale deviation	pRecDev2005	-0.365	-0.3673	-0.4527	-0.4495	0.2038	0.2035	0	0.1974
log-scale deviation	pRecDev2006	-0.6188	-0.6187	-0.6608	-0.6512	0.2253	0.2255	0	0.2136
log-scale deviation	pRecDev2007	-0.9704	-0.9629	-0.9528	-0.9486	0.281	0.2804	0	0.2617
log-scale deviation	pRecDev2008	-0.7424	-0.747	-0.8107	-0.7988	0.2561	0.2575	0	0.2509

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
log-scale deviation	pRecDevs	1009	1.04	1.056	0.9495	0.9602	0.1037	0.1063	0	0.1
log-scale deviation	pRecDevs	1010	1.192	1.222	1.126	1.131	0.1006	0.1038	0	0.09634
log-scale deviation	pRecDevs	1011	0.6218	0.5856	0.6041	0.5999	0.1399	0.1496	0	0.1355
log-scale deviation	pRecDevs	1012	-1.04	-0.9965	-0.9664	-0.9741	0.3891	0.396	0	0.3713
log-scale deviation	pRecDevs	1013	-0.1335	-0.1085	-0.1697	-0.1669	0.1807	0.2028	0	0.198
log-scale deviation	pRecDevs	1014	-0.3523	-	-0.1013	-	0.2048	0.2112	0	0.2042
				0.04704		0.09917				
log-scale deviation	pRecDevs	1015	-0.7092	-0.4632	-0.5307	-0.529	0.2683	0.3071	0	0.3015
log-scale deviation	pRecDevs	1016	-0.1659	NA	NA	NA	0.2495	NA	NA	NA

Table 11. Parameter estimates for population recruitment devs .

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
log-scale deviation	pRecDevs	1010	-1.484	-1.499	-1.496	-1.486	1.609	1.611	0	1.626
log-scale deviation	pRecDevs	1050	-1.481	-1.496	-1.494	-1.484	1.465	1.468	0	1.483
log-scale deviation	pRecDevs	1051	-1.474	-1.489	-1.488	-1.478	1.327	1.33	0	1.345
log-scale deviation	pRecDevs	1052	-1.462	-1.477	-1.478	-1.468	1.197	1.2	0	1.214
log-scale deviation	pRecDevs	1053	-1.442	-1.457	-1.461	-1.451	1.077	1.081	0	1.093
log-scale deviation	pRecDevs	1054	-1.412	-1.427	-1.435	-1.425	0.9707	0.9745	0	0.9852

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
log-scale deviation	pRecDevs	1955	-1.368	-1.382	-1.395	-1.386	0.8806	0.8843	0	0.8926
log-scale deviation	pRecDevs	1956	-1.302	-1.316	-1.337	-1.327	0.8093	0.8129	0	0.8187
log-scale deviation	pRecDevs	1957	-1.206	-1.22	-1.25	-1.24	0.7582	0.7616	0	0.7654
log-scale deviation	pRecDevs	1958	-1.063	-1.077	-1.12	-1.11	0.7265	0.7295	0	0.7322
log-scale deviation	pRecDevs	1959	-0.8463	-0.8622	-0.9226	-0.9115	0.7112	0.7138	0	0.7164
log-scale deviation	pRecDevs	1960	-0.5054	-0.5238	-0.6096	-0.5968	0.7096	0.7118	0	0.7144
log-scale deviation	pRecDevs	1961	0.05121	0.02942	-	-	0.7196	0.7226	0	0.7247
log-scale deviation	pRecDevs	1962	0.8496	0.8316	0.6968	0.7083	0.7214	0.7272	0	0.7283
log-scale deviation	pRecDevs	1963	1.61	1.617	1.541	1.53	0.7079	0.7166	0	0.7177
log-scale deviation	pRecDevs	1964	1.916	1.951	1.98	1.942	0.6855	0.6938	0	0.6985
log-scale deviation	pRecDevs	1965	1.814	1.858	1.98	1.929	0.6846	0.6906	0	0.6964
log-scale deviation	pRecDevs	1966	1.553	1.594	1.758	1.714	0.6909	0.6939	0	0.7018
log-scale deviation	pRecDevs	1967	1.321	1.351	1.517	1.493	0.6878	0.6896	0	0.6973
log-scale deviation	pRecDevs	1968	1.191	1.205	1.338	1.343	0.6753	0.6787	0	0.6848
log-scale deviation	pRecDevs	1969	1.176	1.171	1.246	1.281	0.6643	0.6691	0	0.6779
log-scale deviation	pRecDevs	1970	1.19	1.191	1.194	1.233	0.6464	0.6493	0	0.6648

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
log-scale deviation	pRecDevs1971	1971	1.058	1.091	1.018	1.007	0.5859	0.5881	0	0.6059
log-scale deviation	pRecDevs1972	1972	0.7638	0.7874	0.7648	0.739	0.5628	0.5652	0	0.5738
log-scale deviation	pRecDevs1973	1973	0.5514	0.5489	0.5428	0.5192	0.5693	0.5706	0	0.5843

Table 12. Parameter estimates for population initial recruitment devs .

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
multiplier for 1980-1984	pMfac_Blg	Blg	1.209	1.198	1.494	1.472	0.1034	0.09883	0	0.09079
multiplier for 1980-1984	pMfac_Blg	Blg	2.607	2.275	3.503	3.616	0.3064	0.3007	0	0.3156
multiplier for immature crab	pMfac_Imm	Imm	1.061	1.076	1.057	1.055	0.05116	0.05129	0	0.05014
multiplier for mature female crab	pMfac_MatF	MatF	1.424	1.438	1.506	1.497	0.03662	0.0368	0	0.0348
multiplier for mature male crab	pMfac_MatM	MatM	1.126	1.085	1.145	1.168	0.04155	0.04229	0	0.0393

Table 13. Parameter estimates for population natural mortality multipliers .

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female	pPrM2MF	MF	-15	-15	-15	-15	0.002483	0.002539	0	0.002524
female	pPrM2MF	MF	-0.8844	-0.8892	-0.8169	-0.8233	0.05629	0.05679	0	0.05383
female	pPrM2MF	MF	-0.5253	-0.5289	-0.4904	-0.4945	0.03979	0.04021	0	0.03884
female	pPrM2MF	MF	-0.4157	-0.4171	-0.3648	-0.3672	0.04	0.04024	0	0.03884
female	pPrM2MF	MF	-0.1794	-0.185	-0.1162	-0.1144	0.03775	0.03802	0	0.03133
female	pPrM2MF	MF	-5.67e-09	-1.15e-08	-1.62e-09	-1.43e-09	2.194e-05	4.429e-05	0	5.571e-06

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female	pPrM2MF	-0.008992	-0.01026	-0.004397	-0.004295	0.01235	0.01283	0	0.009262
female	pPrM2MF	0.0006165	0.0007067	-7.31e-09	0.0003965	0.009224	0.009511	0	0.007194
female	pPrM2MF	-13.76	-13.75	-13.75	-13.75	0.7844	0.7846	0	0.7864
female	pPrM2MF	-12.47	-12.45	-12.44	-12.45	1.187	1.187	0	1.191
female	pPrM2MF	-11.08	-11.05	-11.04	-11.05	1.289	1.29	0	1.296
female	pPrM2MF	-9.531	-9.497	-9.48	-9.489	1.153	1.154	0	1.161
female	pPrM2MF	-7.779	-7.746	-7.722	-7.733	0.8622	0.8632	0	0.8699
female	pPrM2MF	-5.8	-5.772	-5.741	-5.753	0.523	0.5239	0	0.5271
female	pPrM2MF	-3.674	-3.657	-3.608	-3.621	0.2416	0.2426	0	0.2425
female	pPrM2MF	-1.934	-1.932	-1.843	-1.854	0.1011	0.1018	0	0.1018

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

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
male	pPrM2MM	-12.81	-12.83	-12.6	-12.55	7.827	7.825	0	7.825
male	pPrM2MM	-3.716	-3.758	-3.738	-3.699	0.2438	0.2449	0	0.2465
male	pPrM2MM	-3.189	-3.22	-3.22	-3.197	0.1852	0.1865	0	0.1887
male	pPrM2MM	-2.735	-2.758	-2.725	-2.705	0.1467	0.1484	0	0.1502
male	pPrM2MM	-2.25	-2.283	-2.219	-2.187	0.1202	0.1219	0	0.1225
male	pPrM2MM	-1.712	-1.75	-1.694	-1.66	0.09349	0.09563	0	0.09379
male	pPrM2MM	-1.33	-1.372	-1.343	-1.318	0.07558	0.0782	0	0.0773
male	pPrM2MM	-1.132	-1.151	-1.154	-1.151	0.06679	0.06848	0	0.06936
male	pPrM2MM	-1.047	-1.037	-1.032	-1.055	0.06052	0.06253	0	0.06368
male	pPrM2MM	-0.7812	-0.7829	-0.7441	-0.7689	0.05613	0.057	0	0.05837
male	pPrM2MM	-0.4977	-0.5144	-0.4572	-0.4764	0.04997	0.05207	0	0.05207

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
male	pPrM2M	-11.58	-11.59	-11.39	-11.35	5.957	5.955	0	5.956
male	pPrM2M	-0.2377	-0.2464	-0.198	-0.21	0.03957	0.04204	0	0.03828
male	pPrM2M	-0.09085	-0.08593	-0.05715	-0.06272	0.02761	0.02689	0	0.02073
male	pPrM2M	-1.38e-08	-1.4e-08	-3.53e-09	-4.22e-09	5.349e-05	5.074e-05	0	1.636e-05
male	pPrM2M	-9.17e-10	-1.54e-09	-1.2e-09	-1.15e-09	2.863e-06	5.947e-06	0	4.473e-06
male	pPrM2M	-4.64e-10	-6.51e-10	-5.72e-10	-5.48e-10	1.779e-06	2.484e-06	0	2.1e-06
male	pPrM2M	-7e-10	-1.03e-09	-8.69e-10	-7.87e-10	2.673e-06	4.07e-06	0	2.989e-06
male	pPrM2M	-9.21e-10	-1.3e-09	-1.11e-09	-9.75e-10	2.672e-06	5.035e-06	0	3.959e-06
male	pPrM2M	-1.38e-09	-1.9e-09	-1.69e-09	-1.44e-09	5.352e-06	7.362e-06	0	5.608e-06
male	pPrM2M	-2.19e-09	-2.99e-09	-2.68e-09	-2.3e-09	8.492e-06	1.156e-05	0	8.919e-06
male	pPrM2M	-4.94e-09	-6.82e-09	-6.06e-09	-5.27e-09	1.912e-05	2.638e-05	0	2.037e-05
male	pPrM2M	-10.34	-10.35	-10.18	-10.14	4.313	4.31	0	4.314
male	pPrM2M	-2.06e-08	-2.81e-08	-2.54e-08	-2.29e-08	7.985e-05	0.0001088	0	8.868e-05
male	pPrM2M	-0.04852	-0.04546	-0.02458	-0.0285	0.2949	0.2937	0	0.2804
male	pPrM2M	-0.09596	-0.09247	-0.04667	-0.05262	1.159	1.168	0	1.125
male	pPrM2M	-9.107	-9.12	-8.967	-8.932	2.934	2.929	0	2.936
male	pPrM2M	-7.877	-7.89	-7.763	-7.73	1.857	1.85	0	1.855
male	pPrM2M	-6.673	-6.687	-6.587	-6.556	1.111	1.102	0	1.096
male	pPrM2M	-5.568	-5.582	-5.502	-5.473	0.6775	0.6722	0	0.6553

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
male	pPrM2MM	-4.813	-4.834	-4.754	-4.718	0.4268	0.4255	0	0.4181
male	pPrM2MM	-4.315	-4.351	-4.284	-4.239	0.3184	0.3188	0	0.3172

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

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female mean growth a parameter	pGrAF1	0.7	0.7	0.7	0.7	4.982e-05	5.434e-05	0	3.146e-05
female mean growth b parameter	pGrBF1	0.8814	0.8809	0.8842	0.8841	0.001055	0.001042	0	0.001064
male mean growth a parameter	pGrAM1	0.4201	0.4138	0.4112	0.4145	0.02212	0.02172	0	0.02207
male mean growth b parameter	pGrBM1	0.972	0.974	0.9768	0.9755	0.005194	0.005101	0	0.005152
size transition beta parameter	pGrBeta <sub>1</sub> _x	0.75	0.75	0.75	0.75	0	0	0	0
size transition beta parameter	pGrBeta <sub>2</sub> _x	0.75	0.75	0.75	0.75	0	0	0	0

Table 16. Parameter estimates for population growth .

description	param index	value	value	value	value	stdv	stdv	stdv	stdv
		2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
females [-1981]	pSrv1_QF	0.5	0.5	0.5	0.5	6.26e-05	5.829e-05	0	6.797e-05
females [1982+]	pSrv2_QF	0.526	0.5411	0.594	0.5979	0.03552	0.03765	0	0.03431
male offset to 95%-selected [-1981]	pSrv1M_dz5095	20.74	20.98	21.57	21.04	3.162	3.236	0	3.184
male offset to 95%-selected [1982+]	pSrv2M_dz5095	31.68	59.12	55.62	56.71	8.059	7.718	0	6.821

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
male size at 50%-selected [-1981]	pSrv1M_z50		48.17	48.19	49.01	48.55	1.868	1.885	0	1.834
male size at 50%-selected [1982+]	pSrv2M_z50		31.99	32.15	32.49	32.94	3.253	3.13	0	2.837
males [-1981]	pSrv1_QM		0.5	0.5	0.5	0.5	2.085e-05	5.273e-05	0	1.493e-05
males [1982+]	pSrv2_QM		0.7219	0.6954	0.7808	0.7968	0.03568	0.03498	0	0.03369

Table 17. Parameter estimates for surveys surveys .

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female offset to 95%-selected [-1981]	pSrv1F_dz5095	39.79	44.45	40.82	36.57	6.886	7.597	0	5.974	
female offset to 95%-selected [1982+]	pSrv2F_dz5095	100	100	100	100	0.0006233	0.0004831	0	0.000691	
female size at 50%-selected [-1981]	pSrv1F_z50		52.72	53.97	53.63	52	2.869	2.987	0	2.61
female size at 50%-selected [1982+]	pSrv2F_z50		3.295	12.2	7.101	6.487	13.07	11.49	0	11.32

Table 18. Parameter estimates for surveys survey selectivity .

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
GTF effort extrapolation	pLnEffXtr_GTF		1	1	1	1	0	0	0	0
GTF ln-scale female offset	pAvgLnF_GTFF		0	0	0	0	0	0	0	0

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
GTF ln-scale mean [1973+]	pAvgLnF_GTF		-4.308	-4.311	-4.161	-4.145	0.07356	0.07319	0	0.07231
RKF effort extrapolation	pLnEffXtr_RKF	1	1	1	1	0	0	0	0	
RKF ln-scale female offset	pAvgLnF_RKFF	0	0	0	0	0	0	0	0	
RKF ln-scale mean [1992+]	pAvgLnF_RKF	-5.25	-5.25	-5.25	-5.25	0	0	0	0	
SCF effort extrapolation	pLnEffXtr_SCF	1	1	1	1	0	0	0	0	
SCF ln-scale female offset	pAvgLnF_SCFF	0	0	0	0	0	0	0	0	
SCF ln-scale mean [1992+]	pAvgLnF_SCF	-3.708	-3.796	-3.71	-3.674	0.1202	0.1248	0	0.1203	
TCF effort extrapolation	pLnEffXtr_TCF	1	1	1	1	0	0	0	0	
TCF ln-scale female offset	pAvgLnF_TCFF	0	0	0	0	0	0	0	0	
TCF ln-scale mean [1965+]	pAvgLnF_TCF	-1.336	-1.576	-1.496	-1.354	0.09924	0.08856	0	0.1027	

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

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1965+]	pF_DevsTCF		-0.5135	-0.525	-0.5182	-0.5088	0.4975	0.4975	0	0.4993

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv	
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR	
ln-scale devs [1965+]	pF_Devs	1	DCF	-0.1177	-0.1893	-0.3239	-0.2888	0.1401	0.1303	0	0.1289
ln-scale devs [1965+]	pF_Devs	2	DCF	0.132	0.05534	-	-	0.1039	0.09803	0	0.09699
ln-scale devs [1965+]	pF_Devs	3	DCF	0.9139	0.8127	0.7613	0.8099	0.09766	0.09076	0	0.09297
ln-scale devs [1965+]	pF_Devs	4	DCF	1.654	1.493	1.491	1.585	0.1089	0.09461	0	0.1077
ln-scale devs [1965+]	pF_Devs	5	DCF	1.895	1.663	1.688	1.848	0.143	0.1132	0	0.1474
ln-scale devs [1965+]	pF_Devs	6	DCF	2.783	2.442	2.387	2.597	0.2114	0.1622	0	0.1696
ln-scale devs [1965+]	pF_Devs	7	DCF	2.273	2.355	2.443	2.371	0.2104	0.2317	0	0.2156
ln-scale devs [1965+]	pF_Devs	8	DCF	0.4084	0.5667	0.5962	0.4569	0.1263	0.1512	0	0.1236
ln-scale devs [1965+]	pF_Devs	9	DCF	-0.5674	-0.5193	-0.3502	-0.3899	0.1278	0.1295	0	0.128
ln-scale devs [1965+]	pF_Devs	10	DCF	-1.568	-1.577	-1.277	-1.282	0.2504	0.2484	0	0.265
ln-scale devs [1965+]	pF_Devs	11	DCF	-0.7526	-0.7759	-0.7735	-0.754	0.3859	0.3864	0	0.3881
ln-scale devs [1965+]	pF_Devs	12	DCF	-0.4643	-0.5409	0.09703	0.1071	0.1816	0.1784	0	0.1788
ln-scale devs [1965+]	pF_Devs	13	DCF	-1.055	-1.119	-0.8667	-0.8383	0.215	0.2147	0	0.227
ln-scale devs [1965+]	pF_Devs	14	DCF	-0.2897	-0.349	-0.1135	-0.1024	0.1096	0.109	0	0.1114
ln-scale devs [1965+]	pF_Devs	15	DCF	0.8895	0.8125	0.8798	0.904	0.08809	0.08571	0	0.08769
ln-scale devs [1965+]	pF_Devs	16	DCF	1.538	1.45	1.372	1.379	0.0983	0.09243	0	0.09358

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1965+]	pF_Devs	25CF	1.307	1.43	1.289	1.124	0.1494	0.1242	0	0.1238
ln-scale devs [1965+]	pF_Devs	26CF	1.584	1.925	1.668	1.537	0.1386	0.1502	0	0.1322
ln-scale devs [1965+]	pF_Devs	27CF	1.003	1.191	0.9613	0.8279	0.138	0.1362	0	0.1237
ln-scale devs [1965+]	pF_Devs	28CF	0.9384	0.933	0.7619	0.6128	0.1796	0.1722	0	0.1597
ln-scale devs [1965+]	pF_Devs	29CF	-0.3564	-	-0.0703	-0.2523	0.1546	0.152	0	0.1511
ln-scale devs [1965+]	pF_Devs	30CF	0.4206	0.3764	0.3592	0.3993	0.3474	0.3435	0	0.3543
ln-scale devs [1965+]	pF_Devs	31CF	-0.2579	-1.274	-1.228	-0.5007	0.3215	0.1784	0	0.3574
ln-scale devs [1965+]	pF_Devs	32CF	-2.332	-2.139	-2.148	-2.256	0.2152	0.2148	0	0.2176
ln-scale devs [1965+]	pF_Devs	33CF	-1.867	-1.662	-1.652	-1.771	0.1529	0.1479	0	0.1532
ln-scale devs [1965+]	pF_Devs	34CF	-1.901	-1.701	-1.69	-1.805	0.1448	0.1392	0	0.1444
ln-scale devs [1965+]	pF_Devs	35CF	-1.931	-1.766	-1.753	-1.868	0.1728	0.1681	0	0.1699
ln-scale devs [1965+]	pF_Devs	36CF	-1.118	-1.065	-1.049	-1.15	0.2845	0.2781	0	0.2773
ln-scale devs [1965+]	pF_Devs	37CF	-1.882	-1.73	-1.686	-1.794	0.1518	0.1477	0	0.1518
ln-scale devs [1965+]	pF_Devs	38CF	-0.6874	-0.5015	-0.4424	-0.5572	0.1047	0.09911	0	0.1052
ln-scale devs [1965+]	pF_Devs	39CF	-0.4021	NA	NA	NA	0.105	NA	NA	NA
ln-scale devs [1965+]	pF_Devs	40CF	0.2191	0.1724	0.1213	0.1682	0.3268	0.3233	0	0.335

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1965+]	pF_Devs	TCF	0.3642	0.3076	0.2209	0.279	0.3147	0.3084	0	0.3257
ln-scale devs [1965+]	pF_Devs	TCF	0.2059	0.142	0.02202	0.08591	0.3081	0.2994	0	0.3199
ln-scale devs [1965+]	pF_Devs	TCF	0.01439	-0.05602	-0.2003	-0.1356	0.2944	0.282	0	0.3019
ln-scale devs [1965+]	pF_Devs	TCF	-0.1348	-0.2089	-0.3655	-0.3063	0.2624	0.2472	0	0.2617
ln-scale devs [1965+]	pF_Devs	TCF	-0.3433	-0.4159	-0.5702	-0.5232	0.2048	0.1908	0	0.1964

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

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1992+]	pF_Devs	TCF	1.856	1.949	1.85	1.815	0.1163	0.1215	0	0.1185
ln-scale devs [1992+]	pF_Devs	TCF	1.619	1.696	1.627	1.601	0.1239	0.1285	0	0.1256
ln-scale devs [1992+]	pF_Devs	TCF	1.254	1.318	1.273	1.254	0.1479	0.1519	0	0.1493
ln-scale devs [1992+]	pF_Devs	TCF	1.235	1.285	1.276	1.266	0.1753	0.1788	0	0.1756
ln-scale devs [1992+]	pF_Devs	TCF	0.1055	0.1106	0.1966	0.1874	0.4771	0.4999	0	0.4682
ln-scale devs [1992+]	pF_Devs	TCF	0.6516	0.6571	0.7336	0.7348	0.3686	0.3888	0	0.3605
ln-scale devs [1992+]	pF_Devs	TCF	0.5198	0.5067	0.4942	0.4985	0.449	0.4774	0	0.4781
ln-scale devs [1992+]	pF_Devs	TCF	-0.3253	-0.3489	-0.3819	-0.3754	0.6631	0.6802	0	0.6799
ln-scale devs [1992+]	pF_Devs	TCF	-0.6302	-0.6401	-0.622	-0.6171	0.6501	0.6598	0	0.657

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1992+]	pF_De	2802F	-0.6097	-0.6176	-0.5801	-0.5742	0.6167	0.6287	0	0.6269
ln-scale devs [1992+]	pF_De	2802F	-0.5694	-0.5762	-0.5681	-0.5635	0.5822	0.5954	0	0.5969
ln-scale devs [1992+]	pF_De	2803F	-0.8507	-0.8489	-0.8117	-0.808	0.5731	0.5827	0	0.5811
ln-scale devs [1992+]	pF_De	2804F	-1.102	-1.094	-1.146	-1.149	0.5555	0.5626	0	0.5636
ln-scale devs [1992+]	pF_De	2805F	-0.5575	-0.5881	-0.6494	-0.6439	0.4907	0.4986	0	0.5027
ln-scale devs [1992+]	pF_De	2806F	-0.2852	-0.3142	-0.3398	-0.3337	0.4081	0.4159	0	0.4136
ln-scale devs [1992+]	pF_De	2807F	-0.1907	-0.2136	-0.2064	-0.1994	0.3452	0.3501	0	0.3415
ln-scale devs [1992+]	pF_De	2808F	-0.6561	-0.6676	-0.6099	-0.6038	0.4271	0.4298	0	0.418
ln-scale devs [1992+]	pF_De	2809F	-0.5286	-0.5351	-0.4861	-0.4813	0.421	0.4224	0	0.4207
ln-scale devs [1992+]	pF_De	2800F	-0.4024	-0.4111	-0.4197	-0.4133	0.4319	0.4319	0	0.4472
ln-scale devs [1992+]	pF_De	2801F	0.04148	0.02589	0.01307	0.0226	0.3506	0.3505	0	0.3659
ln-scale devs [1992+]	pF_De	2802F	-0.5435	-0.562	-0.5777	-0.567	0.4655	0.4615	0	0.4709
ln-scale devs [1992+]	pF_De	2803F	-0.4805	-0.5037	-0.4793	-0.4709	0.3506	0.3492	0	0.3473
ln-scale devs [1992+]	pF_De	2804F	0.3949	0.3729	0.4142	0.4205	0.1762	0.1816	0	0.1786
ln-scale devs [1992+]	pF_De	2805F	0.0551	NA	NA	NA	0.2325	NA	NA	NA

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

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1992+]	pF_Devs	1	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	10	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	11	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	12	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	13	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	14	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	15	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	16	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	17	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	18	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	19	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	2	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	10	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	11	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	12	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	13	0	0	0	0	0	0	0	0

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1992+]	pF_Devs	RKF	0	NA	NA	NA	0	NA	NA	NA
ln-scale devs [1992+]	pF_Devs	RKF	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	RKF	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	RKF	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	RKF	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	RKF	0	0	0	0	0	0	0	0
ln-scale devs [1992+]	pF_Devs	RKF	0	0	0	0	0	0	0	0

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

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1973+]	pF_Devs	RKF	1.018	0.9917	0.8448	0.8658	0.1134	0.1123	0	0.1148
ln-scale devs [1973+]	pF_Devs	RKF	1.424	1.396	1.273	1.291	0.08794	0.08663	0	0.08655
ln-scale devs [1973+]	pF_Devs	RKF	0.5871	0.5595	0.4606	0.4785	0.08327	0.08199	0	0.08216
ln-scale devs [1973+]	pF_Devs	RKF	0.06913	0.05159	-	-0.0144	0.09457	0.09355	0	0.09411
ln-scale devs [1973+]	pF_Devs	RKF	-0.1966	-0.1851	0.02814	-0.2519	0.1217	0.121	0	0.1214
ln-scale devs [1973+]	pF_Devs	RKF	-0.3909	-0.345	-0.4198	-0.44	0.1586	0.1583	0	0.1572

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1973+]	pF_De	107DF	0.2978	0.3704	0.2182	0.1886	0.1169	0.1142	0	0.112
ln-scale devs [1973+]	pF_De	108DF	0.01087	0.1055	0.0456	-	0.152	0.1529	0	0.1477
ln-scale devs [1973+]	pF_De	109DF	-0.1881	-0.1131	-	-0.1145	0.1922	0.194	0	0.1893
ln-scale devs [1973+]	pF_De	108DF	-0.9071	-0.8856	-0.7261	-0.7403	0.3968	0.3978	0	0.4054
ln-scale devs [1973+]	pF_De	108BF	-0.3951	-0.4125	-0.1502	-0.1581	0.3631	0.3594	0	0.3913
ln-scale devs [1973+]	pF_De	108IF	-0.1717	-0.2186	0.2517	0.2442	0.4003	0.3927	0	0.4182
ln-scale devs [1973+]	pF_De	1085F	-0.5848	-0.6247	-0.2853	-0.2922	0.4885	0.4815	0	0.5249
ln-scale devs [1973+]	pF_De	1086F	-0.5061	-0.547	-0.3679	-0.3687	0.3848	0.3818	0	0.41
ln-scale devs [1973+]	pF_De	1087F	-0.7006	-0.7476	-0.6498	-0.6408	0.3844	0.381	0	0.4115
ln-scale devs [1973+]	pF_De	1088F	-1.105	-1.149	-1.116	-1.104	0.4116	0.4085	0	0.4205
ln-scale devs [1973+]	pF_De	108DF	-0.9651	-1	-1.033	-1.026	0.3489	0.3477	0	0.3499
ln-scale devs [1973+]	pF_De	109DF	-0.6319	-0.6434	-0.7165	-0.7357	0.2871	0.2876	0	0.2881
ln-scale devs [1973+]	pF_De	109IF	0.4754	0.4834	0.3923	0.3628	0.1396	0.1391	0	0.1451
ln-scale devs [1973+]	pF_De	109DF	0.7805	0.7807	0.6863	0.6716	0.1297	0.129	0	0.1351
ln-scale devs [1973+]	pF_De	109BF	0.6393	0.6283	0.5558	0.5462	0.1723	0.1716	0	0.1747
ln-scale devs [1973+]	pF_De	109IF	1.134	1.114	1.068	1.063	0.1507	0.1497	0	0.1542

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1973+]	pF_De	1005F	1.148	1.12	1.115	1.116	0.189	0.1878	0	0.189
ln-scale devs [1973+]	pF_De	1006F	1.472	1.437	1.473	1.479	0.1812	0.1798	0	0.1803
ln-scale devs [1973+]	pF_De	1007F	1.453	1.408	1.374	1.386	0.2399	0.2393	0	0.2352
ln-scale devs [1973+]	pF_De	1008F	1.138	1.099	1.066	1.071	0.3417	0.3371	0	0.3361
ln-scale devs [1973+]	pF_De	1009F	0.6034	0.5766	0.5314	0.5278	0.5133	0.4989	0	0.5064
ln-scale devs [1973+]	pF_De	2000F	0.6985	0.6627	0.6577	0.6621	0.4132	0.4044	0	0.3943
ln-scale devs [1973+]	pF_De	2001F	1.061	1.014	1.003	1.014	0.2525	0.2501	0	0.2452
ln-scale devs [1973+]	pF_De	2002F	0.4255	0.3821	0.3666	0.3748	0.3765	0.3714	0	0.3691
ln-scale devs [1973+]	pF_De	2003F	-0.1481	-0.1881	-0.2167	-0.2089	0.4833	0.4758	0	0.4746
ln-scale devs [1973+]	pF_De	2004F	0.001188	-0.04469	-0.1253	-0.117	0.3674	0.3635	0	0.3715
ln-scale devs [1973+]	pF_De	2005F	-0.2292	-0.2754	-0.3531	-0.3447	0.3751	0.3712	0	0.3739
ln-scale devs [1973+]	pF_De	2006F	-0.1889	-0.2396	-0.2895	-0.2805	0.333	0.3302	0	0.3268
ln-scale devs [1973+]	pF_De	2007F	-0.2915	-0.3453	-0.3671	-0.3559	0.3317	0.329	0	0.3202
ln-scale devs [1973+]	pF_De	2008F	-0.5453	-0.5972	-0.584	-0.5734	0.3743	0.3708	0	0.3584
ln-scale devs [1973+]	pF_De	2009F	-0.7291	-0.7786	-0.7691	-0.7618	0.4315	0.4261	0	0.423
ln-scale devs [1973+]	pF_De	2010F	-0.8182	-0.8692	-0.881	-0.874	0.4835	0.4763	0	0.482

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
ln-scale devs [1973+]	pF_DeV <sub>GTF</sub>	2015AM	-0.82	-0.8752	-0.8796	-0.8699	0.5017	0.4929	0	0.4973
ln-scale devs [1973+]	pF_DeV <sub>GTF</sub>	2015AMN	-0.9911	-1.051	-1.057	-1.044	0.5051	0.4957	0	0.4967
ln-scale devs [1973+]	pF_DeV <sub>GTF</sub>	2015AMO	-0.951	-1.017	-1.017	-1.003	0.4326	0.4251	0	0.4218
ln-scale devs [1973+]	pF_DeV <sub>GTF</sub>	2015AMR	-0.9622	-1.027	-1.03	-1.017	0.3983	0.3922	0	0.3923
ln-scale devs [1973+]	pF_DeV <sub>GTF</sub>	2015AM	-1.02	NA	NA	NA	0.4319	NA	NA	NA

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

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
size at 50%-selected [-1990]	pRetTCFM_z50	2015AM	137.3	138	137.7	137.2	0.3713	0.3615	0	0.3893
size at 50%-selected [1991+]	pRetTCFM_z50	2015AMN	132.1	133	133.1	133	0.4998	0.4882	0	0.499
slope [-1990]	pRetTCFM_slp	2015AM	0.7764	0.7535	0.7907	0.7849	0.141	0.1356	0	0.1395
slope [1991+]	pRetTCFM_slp	2015AMN	0.347	0.3681	0.367	0.3643	0.03063	0.02972	0	0.02972

Table 24. Parameter estimates for fisheries TCF retention .

description	param	value	value	value	value	stdv	stdv	stdv	stdv	
		index	2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female size at 50%-selected [all years]	pSelTCFF_z50	2015AM	118.6	118.7	117.5	117.5	2.745	2.9	0	2.727
female slope [all years]	pSelTCFF_slp	2015AM	0.1412	0.1435	0.1405	0.1408	0.008012	0.008254	0	0.008286
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_1devs	2015AM	0.07575	0.08558	0.08323	0.0438	0.02033	0.01948	0	0.02025

description	param	value	value	value	value	stdv	stdv	stdv	stdv
		index 2015AM	2015AMN	2015AMQ	2015AMR	2015AM	2015AMN	2015AMQ	2015AMR
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_1devsZ50	0.01335	0.05206	0.04608	0.008853	0.01601	0.01631	0	0.0171
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_1devsZ50	0.0864	0.2244	0.2191	0.1832	0.01904	0.01924	0	0.01993
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_1devsZ50	-	-	-	-	0.01803	0.01817	0	0.01881
		0.05361	0.01466	0.0185	0.05493				
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_1devsZ50	-	-	-	-	0.01466	0.01473	0	0.01562
		0.08742	0.03808	0.04222	0.07921				
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_1devsZ50	0.113	NA	NA	NA	0.01506	NA	NA	NA
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_2devsZ50	0.08451	0.1401	0.1301	0.09288	0.01587	0.01595	0	0.0159
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_3devsZ50	0.07861	0.1132	0.1002	0.0618	0.01757	0.01683	0	0.01706
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_4devsZ50	0.0331	0.1468	0.137	0.09575	0.01963	0.02019	0	0.02102
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_5devsZ50	-	-	-	-	0.04081	0.03209	0	0.03705
		0.08748	0.004571	0.009329	0.06945				
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_6devsZ50	0.0971	-	-	0.04173	0.04207	0.01989	0	0.07182
			0.5001	0.4311					

description	param	value	value	value	value	stdv	stdv	stdv	stdv
		index 2015AM	2015AMN	2015AMQ	2015AMR	2015AM	2015AMN	2015AMQ	2015AMR
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_7levsZ50	-	-	-	-	0.01952	0.01973	0	0.02036
		0.09416	0.05279	0.05624	0.09247				
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_8levsZ50	-	-	-	-	0.01984	0.0199	0	0.02045
		0.1033	0.06213	0.06404	0.1012				
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_9levsZ50	-	-	-	-	0.01794	0.01803	0	0.01877
		0.1299	0.08982	0.09431	0.1307				
male ln-scale mean size at 50%-selected	pSelTCFM_mnLnZ50A2	4.829	4.832	4.868		0.008216	0.008262	0	0.01001
male slope [-1996]	pSelTCFM_slpA1	0.1114	0.1156	0.1141	0.1147	0.005993	0.006343	0	0.006587
male slope [1997+]	pSelTCFM_slpA2	0.1461	0.1448	0.1446	0.1452	0.008002	0.008468	0	0.008592

Table 25. Parameter estimates for fisheries TCF selectivity .

description	param	value	value	value	value	stdv	stdv	stdv	stdv
		index 2015AM	2015AMN	2015AMQ	2015AMR	2015AM	2015AMN	2015AMQ	2015AMR
female size at 50%-selected [-1996]	pSelSCFF_z50A1	112.7	112.2	110.4	110.3	4.726	4.668	0	4.546
female size at 50%-selected	pSelSCFF_z50A2	77.61	77.26	76.19	76.14	5.088	4.959	0	4.881
[1997-2004]	pSelSCFF_z50A3	92.7	89.62	88.7	89.36	8.06	7.345	0	7.284
female size at 50%-selected [2005+]	pSelSCFF_slpA1	0.05	0.05	0.05	0.05	3.566e-05	3.436e-05	0	3.089e-05
female slope [-1996]	pSelSCFF_slpA2	0.233	0.2408	0.254	0.254	0.1161	0.1193	0	0.1305
female slope [1997-2004]	pSelSCFF_slpA3	0.1222	0.1348	0.1348	0.1316	0.0339	0.04033	0	0.03986
female slope [2005+]									

description	param	value	value	value	value	stdv	stdv	stdv	stdv
		index 2015AM	2015AMN	2015AMQ	2015AMR	2015AM	2015AMN	2015AMQ	2015AMR
male ascending size at 50%-selected [-1996]	pSelSCFM_z50A	87.55	87.39	86.8	86.81	1.523	1.638	0	1.606
male ascending size at 50%-selected [1997-2004]	pSelSCFM_z50A	94.36	94.02	93.91	94.24	3.23	3.163	0	3.142
male ascending size at 50%-selected [2005+]	pSelSCFM_z50A	105.3	104.2	103.6	104	1.595	1.633	0	1.56
male ascending slope [-1996]	pSelSCFM_slpA	0.3903	0.3744	0.4043	0.4138	0.1319	0.1294	0	0.1494
male ascending slope [1997-2004]	pSelSCFM_slpA	0.2244	0.2291	0.2318	0.227	0.07064	0.07304	0	0.07078
male ascending slope [2005+]	pSelSCFM_slpA	0.172	0.1746	0.1786	0.1778	0.01574	0.01713	0	0.01742
male descending ln-scale offset to size at 50%-selected [-1996]	pSelSCFM_lnZ50B	3.953	3.963	3.972	3.972	0.03806	0.04106	0	0.03973
male descending ln-scale offset to size at 50%-selected [1997-2004]	pSelSCFM_lnZ50B	3.79	3.8	3.801	3.794	0.1442	0.1394	0	0.1396
male descending ln-scale offset to size at 50%-selected [2005+]	pSelSCFM_lnZ50B	3.51	3.503	3.531	3.516	0.09212	0.08963	0	0.08394
male descending slope [-1996]	pSelSCFM_slpD1	0.5	0.5	0.5	0.5	0.000471	0.001419	0	0.001404

description	param	value	value	value	value	stdv	stdv	stdv	stdv
		index 2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
male descending slope [1997-2004]	pSelSCFM_slpD	0.1726	0.1751	0.1771	0.176	0.09024	0.08849	0	0.08974
male descending slope [2005+]	pSelSCFM_slpD	0.1798	0.1783	0.1835	0.1825	0.0254	0.02694	0	0.0273

Table 26. Parameter estimates for fisheries SCF selectivity .

description	param	value	value	value	value	stdv	stdv	stdv	stdv
		index 2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female size at 50%-selected [-1996]	pSelRKFF_z50A	150	150	98.35	150	1.05	1.222	0	1.331
female size at 50%-selected [1997-2004]	pSelRKFF_z50A	150	150	103.3	103	8.327	8.651	0	44.55
female size at 50%-selected [2005+]	pSelRKFF_z50A	157.3	156.2	157.1	156.9	374.6	330.1	0	334.5
female slope [-1996]	pSelRKFF_slpA	0.1761	0.1775	0.2384	0.1711	0.03997	0.04008	0	0.03922
female slope [1997-2004]	pSelRKFF_slpA	0.1541	0.1552	0.1795	0.1803	0.06971	0.06976	0	0.1719
female slope [2005+]	pSelRKFF_slpA	0.1863	0.1906	0.1832	0.1837	0.05303	0.05448	0	0.0539
male size at 50%-selected [-1996]	pSelRKFM_z50A	150	150	150	150	0.0005605	0.0006746	0	0.0008309
male size at 50%-selected [1997-2004]	pSelRKFM_z50A	137.3	134.7	133.2	133.8	13.98	12.86	0	12.54
male size at 50%-selected [2005+]	pSelRKFM_z50A	150	150	150	150	0.001423	0.001097	0	0.001384
male slope [-1996]	pSelRKFM_slpA	0.1082	0.1062	0.1012	0.1018	0.01083	0.01065	0	0.01047
male slope [1997-2004]	pSelRKFM_slpA	0.08721	0.08959	0.09151	0.09141	0.02376	0.02522	0	0.02619
male slope [2005+]	pSelRKFM_slpA	0.08281	0.08343	0.08236	0.08244	0.005979	0.006542	0	0.00648

Table 27. Parameter estimates for fisheries RKF selectivity .

description	param	index	value	value	value	value	stdv	stdv	stdv	stdv
			2015AM	2015AMN	2015AMO	2015AMR	2015AM	2015AMN	2015AMO	2015AMR
female size at 50%-selected [-1987]	pSelGTFF_z50A	125	125	125	125	0.0004432	0.0004308	0	0.0004483	
female size at 50%-selected [1988-1996]	pSelGTFF_z50A	161.4	156.5	159.2	157.5	40.25	37.15	0	33.55	
female size at 50%-selected [1997+]	pSelGTFF_z50A	144.2	143.5	144	144.8	9.62	9.87	0	10.05	
female slope [-1987]	pSelGTFF_slpA	0.02561	0.02569	0.02868	0.02831	0.001667	0.001672	0	0.001616	
female slope [1988-1996]	pSelGTFF_slpA	0.01398	0.01459	0.01589	0.01608	0.005411	0.005447	0	0.005283	
female slope [1997+]	pSelGTFF_slpA	0.05254	0.0521	0.05204	0.05188	0.007322	0.007404	0	0.007438	
male size at 50%-selected [-1987]	pSelGTFM_z50A	53.33	53.34	57.07	56.6	1.956	1.977	0	1.969	
male size at 50%-selected [1988-1996]	pSelGTFM_z50A	62.02	63.53	72.61	72.32	8.574	8.366	0	9.689	
male size at 50%-selected [1997+]	pSelGTFM_z50A	83.69	83.44	83.19	84.04	2.145	2.185	0	2.101	
male slope [-1987]	pSelGTFM_slpA	0.1135	0.1134	0.1087	0.1102	0.01261	0.01274	0	0.01104	
male slope [1988-1996]	pSelGTFM_slpA	0.04957	0.05016	0.04273	0.04306	0.01275	0.01284	0	0.009054	
male slope [1997+]	pSelGTFM_slpA	0.07544	0.07675	0.07776	0.07678	0.004168	0.004439	0	0.004324	

Table 28. Parameter estimates for fisheries GTF selectivity .

### Mature biomass-at-mating

year	2015AMO	2015AMR	2015AMN	2015AM
1949	0	0	0	0
1950	0.01005	0.00979	0.009531	0.009453
1951	0.1737	0.1653	0.158	0.1544
1952	1.362	1.282	1.236	1.197
1953	4.754	4.509	4.512	4.389
1954	8.656	8.294	8.66	8.491

year	2015AMO	2015AMR	2015AMN	2015AM
1955	11.63	11.19	11.95	11.76
1956	13.84	13.35	14.44	14.23
1957	15.53	15	16.38	16.16
1958	16.92	16.34	17.99	17.76
1959	18.15	17.55	19.45	19.2
1960	19.43	18.78	20.95	20.68
1961	20.97	20.27	22.75	22.45
1962	23.15	22.37	25.29	24.95
1963	26.8	25.89	29.5	29.1
1964	34.23	33.02	37.97	37.45
1965	49.92	48.04	55.79	54.98
1966	90.17	85.84	99.27	96.93
1967	150.6	143.1	161.6	158.6
1968	233.5	220.1	241.6	235.8
1969	291.4	273.6	291.6	284.4
1970	317	297.6	308.8	300.9
1971	317.5	299.1	304.2	296.2
1972	305.4	290	291.4	283.9
1973	287.6	275.8	276.8	269.7
1974	257.2	248.9	253.8	247.5
1975	226.4	220.3	231.4	226.3
1976	171.8	169.7	181.9	181.6
1977	106.2	108.9	116.3	122.7
1978	70.3	74.62	77.56	86.22
1979	48.18	54.41	49.52	60.14
1980	31.15	38.21	39.38	51.45
1981	40.66	44.2	53.38	60.46
1982	37.88	37.94	56.5	57.41
1983	25.33	24.52	45.2	42.69
1984	12.79	12.21	29.4	26.07
1985	13.61	13.19	27.43	24.75
1986	19.12	18.54	32.57	30.11
1987	31.17	30.17	45.73	42.69
1988	48.32	46.94	61.84	58.39
1989	60.28	59.73	66.27	64.48
1990	55.1	57.56	55.22	57.16
1991	55.11	56.09	52.84	55.09
1992	48.23	47.85	45.34	45.93
1993	40.85	40.19	39.72	39.49
1994	31.48	30.79	31.89	31.32
1995	22.85	22.12	23.93	23.14
1996	17.66	17.09	19.11	18.36
1997	14.71	14.29	16.29	15.62
1998	13.22	12.85	14.84	14.16
1999	13.39	13.01	15.07	14.34
2000	15.17	14.73	16.96	16.11
2001	18.42	17.9	20.61	19.56
2002	21.49	20.93	24.4	23.19
2003	26.2	25.51	29.57	28.09
2004	32.9	32.06	36.64	34.85
2005	41.89	40.78	45.54	43.23
2006	46.77	45.62	51.16	48.53

year	2015AMO	2015AMR	2015AMN	2015AM
2007	51.35	49.95	56.17	53.08
2008	58.42	56.81	65.04	61.39
2009	57.44	55.99	66.27	62.5
2010	50.95	49.6	59.75	56.08
2011	45.1	43.8	53.06	49.46
2012	46.55	45.08	53.84	49.87
2013	60.59	58.63	68.89	63.4
2014	71.57	69.32	83.27	76.32
2015	NA	NA	NA	74.32

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

year	2015AMO	2015AMR	2015AMN	2015AM
1949	0	0	0	0
1950	0.03301	0.03175	0.02855	0.02902
1951	0.2882	0.2775	0.2392	0.246
1952	1.118	1.081	0.9625	0.9897
1953	2.308	2.238	2.126	2.174
1954	3.321	3.228	3.227	3.283
1955	4.057	3.95	4.061	4.122
1956	4.598	4.482	4.685	4.752
1957	5.019	4.897	5.176	5.248
1958	5.38	5.253	5.599	5.677
1959	5.737	5.604	6.013	6.098
1960	6.156	6.015	6.49	6.583
1961	6.736	6.582	7.137	7.244
1962	7.681	7.506	8.173	8.305
1963	9.537	9.316	10.18	10.36
1964	13.89	13.54	14.75	15.05
1965	24.34	23.51	25.29	25.71
1966	45.29	43.19	45.64	45.9
1967	74.94	70.48	73.76	72.98
1968	103	95.97	99.9	97.45
1969	118.9	110.4	114.5	110.6
1970	121.9	113.5	117.1	112.6
1971	117.2	110	112.7	108.5
1972	109.7	104.3	106.4	103
1973	101.5	97.62	100.2	97.55
1974	92.15	89.1	93.69	91.33
1975	82.26	79.42	86.28	83.96
1976	71.14	68.39	76.37	74.03
1977	60.04	57.4	65.1	62.7
1978	53.83	51.4	57.29	55.41
1979	55.1	51.94	55.3	53.2
1980	52.06	49.47	54.05	52.7
1981	44.44	42.83	49.98	49.33
1982	33.31	32.54	41.41	41.22
1983	22.76	22.57	31.37	31.44
1984	15.2	15.25	23.21	23.41
1985	12.51	12.6	19.27	19.57
1986	13.67	13.69	19.47	19.78

year	2015AMO	2015AMR	2015AMN	2015AM
1987	18.02	17.87	22.82	23
1988	25.34	24.84	27.69	27.69
1989	32.2	31.42	32.18	32.01
1990	35.06	34.22	34.24	33.81
1991	34.72	34.03	33.93	33.46
1992	30.23	29.73	30.24	29.91
1993	24.02	23.7	24.93	24.63
1994	17.98	17.8	19.24	18.94
1995	13.28	13.18	14.54	14.35
1996	10	9.934	11.14	11
1997	7.628	7.583	8.636	8.552
1998	6.265	6.235	7.123	7.077
1999	5.832	5.814	6.548	6.539
2000	6.165	6.154	6.793	6.82
2001	6.697	6.693	7.399	7.443
2002	7.508	7.505	8.268	8.327
2003	8.932	8.931	9.674	9.759
2004	11.16	11.16	11.76	11.87
2005	13.08	13.08	13.74	13.84
2006	14.4	14.4	15.2	15.29
2007	16.09	16.1	17.11	17.21
2008	16.27	16.3	17.98	18.03
2009	14.25	14.29	16.39	16.38
2010	12.07	12.11	14.04	14.02
2011	11.5	11.54	13.09	13.06
2012	14.58	14.6	15.84	15.75
2013	19.73	19.74	21.35	21.1
2014	22.01	22	24.61	24.23
2015	NA	NA	NA	22.99

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

## Recruitment

year	2015AMO	2015AMR	2015AMN	2015AM
1949	59.68	57.79	64.19	63.18
1950	59.82	57.93	64.37	63.36
1951	60.16	58.26	64.81	63.79
1952	60.79	58.87	65.61	64.57
1953	61.83	59.87	66.91	65.85
1954	63.47	61.45	68.96	67.85
1955	66.02	63.93	72.12	70.95
1956	70	67.79	77.02	75.77
1957	76.35	73.94	84.82	83.44
1958	86.92	84.21	97.82	96.25
1959	105.9	102.7	121.3	119.5
1960	144.8	140.7	170.2	168.1
1961	243.6	237.2	295.9	293.2
1962	534.9	518.8	659.9	651.4

year	2015AMO	2015AMR	2015AMN	2015AM
1963	1245	1180	1448	1393
1964	1931	1781	2021	1893
1965	1929	1759	1842	1708
1966	1546	1419	1415	1316
1967	1215	1137	1110	1044
1968	1016	978.9	958.2	916.6
1969	926.1	919.7	927	902.7
1970	879.7	877	945.4	916
1971	737.4	699.5	855.1	802.1
1972	572.6	535	631.4	597.9
1973	458.6	429.4	497.5	483.5
1974	299.8	255.7	211.4	174.7
1975	376.5	421.2	497.5	571.6
1976	1114	1027	946.7	903.1
1977	829.2	778.5	723.6	732.2
1978	381.1	372.8	388.7	405.1
1979	126.1	126.3	107.9	114.9
1980	57.85	59.03	50.49	58.01
1981	76.54	77.87	111	117
1982	39.31	39.08	56.26	56.24
1983	275.7	273.1	404.4	391.7
1984	266.6	263.7	330	315.4
1985	673.1	640	571.1	545.7
1986	517.9	512.5	491.3	486
1987	485.6	470.5	445.9	430.2
1988	444	435.4	422.8	409.6
1989	168.7	166.9	179.1	174.3
1990	70.95	70.34	72.18	69.71
1991	40.76	39.6	43.09	40.91
1992	30.74	31.09	33.86	33.87
1993	27.74	27.84	31.04	30.82
1994	31.32	31.18	36.13	35.45
1995	41.62	41.57	48.36	47.43
1996	46.14	46.1	51.12	50.28
1997	113.8	113.5	131.7	129.1
1998	46.05	45.78	52.9	51.65
1999	140.6	140.2	165.5	162.1
2000	84.99	84.82	95.73	94.2
2001	279.2	278.4	305.2	297.6
2002	108.8	107.4	108.7	105.3
2003	185	185.1	207.9	202.3
2004	306.4	304.4	357.8	348.1
2005	87.26	86.57	103.1	99.52
2006	70.87	70.75	80.16	77.22
2007	52.92	52.55	56.81	54.33
2008	61	61.04	70.51	68.24
2009	354.6	354.5	427.8	405.5
2010	422.9	420.4	505.1	472.1
2011	251.1	247.2	267.3	267
2012	52.2	51.23	54.94	50.69
2013	115.8	114.8	133.5	125.5
2014	124	122.9	142	100.8

year	2015AMO	2015AMR	2015AMN	2015AM
2015	80.71	79.95	93.64	70.55
2016	NA	NA	NA	121.5

Table 31. Estimated recruitment (millions).

## Mature survey biomass

year	observed	2015AMO	2015AMR	2015AMN	2015AM
1975	246	155.1	149.8	157.2	152.2
1976	126.2	133.7	129	139.1	135
1977	110.6	102.2	99.71	107.9	106.9
1978	77.6	68.29	68.73	71.97	74.88
1979	32.21	59.04	60.65	59.95	64.99
1980	86.15	61.48	63.5	55.74	62.39
1981	49.36	46.38	49.69	46.96	54.22
1982	48.97	58.9	61.33	60.69	67.58
1983	28.46	37.31	37.88	46.44	48.53
1984	24.17	21.45	21.33	31.97	31.38
1985	11.36	12.96	12.86	22.87	21.56
1986	12.81	18.33	18.19	27.35	26.41
1987	24.08	31.57	31.14	40.14	38.99
1988	60.43	51.14	50.25	56.2	54.88
1989	91.93	76.99	75.51	72.26	71.07
1990	96.29	85.74	86.23	75.56	76.45
1991	109.7	74.51	77.6	63.26	66.74
1992	103.2	68.36	69.56	57.67	60.37
1993	60.14	50.42	50.95	43.35	44.77
1994	42.13	35.97	36.14	31.92	32.67
1995	31.1	25.86	25.78	23.54	23.84
1996	26.26	18.56	18.34	17.38	17.36
1997	10.69	14.64	14.58	14.12	14.16
1998	10.29	12.87	12.81	12.64	12.61
1999	12.45	12.64	12.56	12.49	12.39
2000	16.15	14.34	14.25	14.05	13.92
2001	17.85	17.63	17.54	17.27	17.11
2002	17.8	20.19	20.13	20.12	19.95
2003	23.32	24.36	24.26	24.15	23.93
2004	26.35	30.56	30.47	29.95	29.7
2005	43.14	39.6	39.47	37.83	37.46
2006	64.2	44.92	44.87	43.08	42.66
2007	66.44	49.34	49.15	47.28	46.63
2008	62.71	55.27	55.04	53.95	53.12
2009	36.32	53.94	53.83	54.62	53.75
2010	37.61	47.22	47.04	48.71	47.68
2011	41.49	41.93	41.67	43.38	42.18
2012	41.18	42.95	42.55	43.7	42.19
2013	65.66	57.42	56.88	57.21	54.96
2014	79.47	73.84	73.4	74.41	71.5
2015	60.18	72.59	72.17	75.08	72.21

year	observed	2015AMO	2015AMR	2015AMN	2015AM
2016	NA	NA	NA	NA	59.48

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

year	observed	2015AMO	2015AMR	2015AMN	2015AM
1975	31.71	46.41	46.15	47.03	47.29
1976	31.44	40.4	40.01	41.82	41.98
1977	38.76	34.51	34.08	35.95	36.05
1978	26.18	30.86	30.56	31.58	31.87
1979	19.65	32.15	31.79	31.02	31.72
1980	64.16	34.17	33.26	31.54	31.95
1981	43.06	28.17	27.7	28.48	29.03
1982	64.43	25.2	24.63	25.93	25.73
1983	20.61	17.18	17.03	19.61	19.58
1984	15.01	11.59	11.66	14.6	14.68
1985	5.629	8.507	8.625	11.61	11.73
1986	3.452	9.275	9.349	11.7	11.84
1987	5.193	12.26	12.24	13.74	13.81
1988	25.47	17.22	17	16.66	16.62
1989	19.5	22.24	21.89	19.6	19.5
1990	37.84	24.76	24.38	21.26	21.08
1991	45.03	24.55	24.19	21.13	20.82
1992	26.47	21.78	21.56	19.26	18.91
1993	11.74	16.94	16.83	15.55	15.3
1994	10.01	12.59	12.55	11.92	11.71
1995	12.72	9.241	9.232	8.94	8.774
1996	9.797	6.87	6.884	6.77	6.672
1997	3.514	5.328	5.342	5.317	5.248
1998	2.315	4.329	4.344	4.356	4.315
1999	3.877	3.947	3.965	3.931	3.911
2000	4.181	4.159	4.183	4.061	4.061
2001	4.607	4.527	4.557	4.429	4.438
2002	4.495	5.067	5.102	4.944	4.961
2003	8.436	6.008	6.051	5.767	5.795
2004	4.903	7.489	7.541	6.998	7.034
2005	11.62	8.787	8.85	8.191	8.21
2006	15.04	9.693	9.765	9.079	9.084
2007	13.53	10.85	10.93	10.22	10.23
2008	11.73	10.97	11.06	10.74	10.72
2009	8.556	9.64	9.734	9.83	9.77
2010	5.524	8.144	8.232	8.415	8.35
2011	5.493	7.756	7.838	7.84	7.781
2012	12.5	9.752	9.836	9.395	9.307
2013	17.98	13.24	13.34	12.69	12.49
2014	14.95	15	15.1	14.83	14.52
2015	11.29	13.78	13.88	14.1	13.79
2016	NA	NA	NA	NA	11.81

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

## Retained catch

year	observed	2015AMO	2015AMR	2015AMN	2015AM
1965	1.923	1.952	1.951	1.952	1.951
1966	2.445	2.475	2.474	2.475	2.474
1967	13.6	13.59	13.59	13.59	13.59
1968	18	18	18	18	18
1969	27.49	27.48	27.48	27.48	27.48
1970	25.49	25.49	25.49	25.49	25.49
1971	20.71	20.71	20.7	20.71	20.7
1972	16.91	16.9	16.9	16.9	16.9
1973	13.03	13.02	13.02	13.02	13.02
1974	15.24	15.22	15.22	15.23	15.22
1975	17.65	17.65	17.64	17.65	17.64
1976	30.02	30	30	30	30
1977	35.53	35.51	35.51	35.51	35.51
1978	21.09	21.09	21.09	21.08	21.08
1979	19.01	18.84	18.84	18.94	18.94
1980	13.43	13.45	13.42	13.47	13.43
1981	4.99	5.072	5.056	5.066	5.049
1982	2.391	2.479	2.477	2.472	2.467
1983	0.5489	0.7278	0.7303	0.7828	0.7785
1984	1.429	1.531	1.522	1.499	1.492
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0.998	0.9314	0.9544	1.005	1.013
1988	3.18	3.044	3.067	3.076	3.086
1989	11.11	10.97	10.99	10.98	10.99
1990	18.19	18.04	18.06	18.04	18.04
1991	14.43	14.32	14.32	14.3	14.29
1992	15.92	14.85	14.83	14.82	15.18
1993	7.666	7.184	7.168	7.175	7.516
1994	3.538	3.695	3.687	3.684	3.83
1995	1.919	1.871	1.815	1.841	1.915
1996	0.821	0.5067	0.8393	0.4686	0.8712
1997	0	0	0	0	0
1998	0	0	0	0	0
1999	0	0	0	0	0
2000	0	0	0	0	0
2001	0	0	0	0	0
2002	0	0	0	0	0
2003	0	0	0	0	0
2004	0	0	0	0	0
2005	0.4309	0.5047	0.5111	0.5089	0.5669
2006	0.9617	0.9845	0.9912	0.9825	1.075
2007	0.9571	1.018	1.025	1.011	1.116
2008	0.88	0.9588	0.9651	0.9458	1.006
2009	0.6026	0.7265	0.7332	0.7186	0.7342
2010	0	0	0	0	0
2011	0	0	0	0	0
2012	0	0	0	0	0
2013	1.248	1.064	1.071	1.06	1.173
2014	6.158	4.955	4.971	4.942	5.37

year	observed	2015AMO	2015AMR	2015AMN	2015AM
2015	NA	NA	NA	NA	7.678

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	2015AMO	2015AMR	2015AMN	2015AM
1992	17.9	18.68	18.69	18.67	18.41
1993	8.909	9.282	9.29	9.26	8.99
1994	4.543	4.467	4.477	4.445	4.297
1995	2.806	2.965	3.004	2.948	2.92
1996	0.8583	1.278	1.097	1.245	0.998
2005	0.5792	0.8221	0.8282	0.8287	0.8107
2006	1.402	1.554	1.556	1.552	1.502
2007	1.612	1.754	1.755	1.739	1.682
2008	1.018	1.221	1.226	1.202	1.17
2009	0.6255	0.7528	0.7589	0.7445	0.7486
2013	1.372	1.636	1.639	1.629	1.584
2014	6.966	7.769	7.763	7.763	7.559
2015	NA	NA	NA	NA	10.77

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	2015AMO	2015AMR	2015AMN	2015AM
1992	0.3225	0.9321	0.9132	0.8606	0.8204
1993	0.33	0.3723	0.3654	0.3487	0.3883
1994	0.4077	0.2285	0.2218	0.2111	0.283
1995	0.565	0.07253	0.06838	0.06175	0.05812
1996	0.01434	0.01694	0.03965	0.01326	0.04867
2005	0.01412	0.008495	0.008647	0.006367	0.007286
2006	0.114	0.0156	0.01572	0.01167	0.01313
2007	0.03113	0.01654	0.01673	0.01232	0.01394
2008	0.004368	0.01706	0.01726	0.01295	0.01517
2009	0.0007281	0.03234	0.03321	0.02596	0.03376
2013	0.007428	0.01854	0.01891	0.01346	0.01583
2014	0.01243	0.08142	0.08232	0.05992	0.06748
2015	NA	NA	NA	NA	0.09438

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	2015AMO	2015AMR	2015AMN	2015AM
1992	8.269	8.162	8.167	8.153	8.183

year	observed	2015AMO	2015AMR	2015AMN	2015AM
1993	4.664	4.641	4.642	4.632	4.658
1994	2.287	2.308	2.306	2.296	2.319
1995	1.54	1.647	1.641	1.62	1.635
1996	0.2674	0.4126	0.415	0.3794	0.4021
1997	0.5616	0.5076	0.5191	0.482	0.5144
1998	0.6385	0.3641	0.3711	0.3833	0.4119
1999	0.2232	0.1574	0.1602	0.1691	0.1821
2000	0.04674	0.1505	0.1525	0.152	0.1607
2001	0.1038	0.1842	0.1871	0.1857	0.1961
2002	0.1788	0.2132	0.2157	0.2214	0.2329
2003	0.06193	0.2064	0.209	0.2077	0.2167
2004	0.02513	0.1926	0.1934	0.2052	0.2122
2005	0.3106	0.3169	0.3181	0.3298	0.3415
2006	0.4693	0.4537	0.4547	0.4558	0.4696
2007	0.601	0.5963	0.5971	0.5821	0.5931
2008	0.3591	0.4337	0.4348	0.4161	0.4209
2009	0.4249	0.437	0.4371	0.4346	0.437
2010	0.4314	0.4037	0.4031	0.4279	0.4282
2011	0.6801	0.5586	0.5576	0.5935	0.5924
2012	0.381	0.3632	0.3625	0.3781	0.3737
2013	0.5881	0.5756	0.5761	0.5762	0.5714
2014	1.728	1.617	1.617	1.624	1.616
2015	NA	NA	NA	NA	1.029

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	2015AMO	2015AMR	2015AMN	2015AM
1992	0.5738	1.218	1.207	1.161	1.118
1993	0.5822	0.7547	0.7566	0.7219	0.7075
1994	0.4081	0.3929	0.3983	0.3778	0.3743
1995	0.5646	0.2902	0.2978	0.2758	0.2771
1996	0.07355	0.07454	0.07665	0.06557	0.06902
1997	0.07259	0.3167	0.3281	0.2919	0.3093
1998	0.05622	0.2046	0.2128	0.2072	0.2243
1999	0.0466	0.0793	0.0828	0.08086	0.08884
2000	0.006962	0.06687	0.06979	0.06339	0.06905
2001	0.003563	0.07608	0.07955	0.07123	0.0776
2002	0.01184	0.08665	0.09054	0.08301	0.09048
2003	0.008456	0.08091	0.08449	0.0742	0.0803
2004	0.004416	0.07287	0.0756	0.07084	0.07616
2005	0.0138	0.07322	0.07376	0.07052	0.0679
2006	0.05432	0.1096	0.1105	0.1028	0.09872
2007	0.03271	0.1395	0.1407	0.1267	0.1208
2008	0.0159	0.09667	0.09752	0.08652	0.08141
2009	0.004597	0.09743	0.09835	0.09214	0.08618
2010	0.005022	0.08819	0.0893	0.08978	0.08418
2011	0.004337	0.1263	0.1283	0.1269	0.1199
2012	0.002776	0.08444	0.08567	0.08082	0.07605
2013	0.004927	0.1274	0.1286	0.1155	0.1081
2014	0.01612	0.361	0.3636	0.3325	0.3096

year	observed	2015AMO	2015AMR	2015AMN	2015AM
2015	NA	NA	NA	NA	0.2155

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

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year	observed	2015AMO	2015AMR	2015AMN	2015AM
1992	0.3813	0.05833	0.05727	0.05025	0.0487
1993	0.9526	0.04874	0.04762	0.0432	0.04135
1994	0	0.03651	0.03563	0.03423	0.0322
1995	0	0.02658	0.02587	0.02596	0.02422
1996	0.008674	0.02049	0.01938	0.02082	0.01872
1997	0.05291	0.03566	0.03338	0.03688	0.03122
1998	0.0381	0.03236	0.0305	0.03406	0.02895
1999	0.02454	0.03273	0.03095	0.03472	0.02952
2000	0.02137	0.03722	0.03532	0.0393	0.03346
2001	0.01379	0.04693	0.0447	0.04934	0.0421
2002	0.01982	0.05529	0.05294	0.05952	0.0511
2003	0.01787	0.06686	0.06397	0.0716	0.06139
2004	0.01539	0.08356	0.08011	0.08902	0.07652
2005	0.01351	0.05799	0.05649	0.06233	0.05811
2006	0.008403	0.06826	0.06673	0.07376	0.0688
2007	0.01808	0.07293	0.0711	0.07867	0.07309
2008	0.08648	0.08427	0.08207	0.09178	0.08504
2009	0.0483	0.08726	0.08527	0.09899	0.09177
2010	0.01051	0.0777	0.07587	0.09032	0.0834
2011	0.005605	0.06826	0.06649	0.07979	0.07322
2012	0.0135	0.06474	0.06282	0.07482	0.06819
2013	0.03639	0.08051	0.0779	0.09025	0.08161
2014	0.09495	0.1041	0.1011	0.1185	0.1067
2015	NA	NA	NA	NA	0.112

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

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year	observed	2015AMO	2015AMR	2015AMN	2015AM
1992	0.009223	0.02474	9.534e-06	6.64e-06	7.073e-06
1993	0.06348	0.02016	7.834e-06	5.669e-06	6.064e-06
1994	0	0.01513	5.919e-06	4.484e-06	4.746e-06
1995	0	0.01104	4.327e-06	3.379e-06	3.56e-06
1996	0.001375	0.008187	3.213e-06	2.569e-06	2.701e-06
1997	0.0009669	0.004153	0.004234	6.119e-06	6.389e-06
1998	0.0009392	0.003302	0.003368	4.904e-06	5.154e-06
1999	0.001251	0.002925	0.002987	4.302e-06	4.562e-06
2000	0.0007645	0.00299	0.003057	4.264e-06	4.575e-06
2001	0.0005664	0.003381	0.003458	4.728e-06	5.125e-06
2002	0.0008795	0.003739	0.003826	5.33e-06	5.793e-06
2003	0.001041	0.004375	0.004477	6.121e-06	6.681e-06
2004	0.0009072	0.005359	0.005484	7.352e-06	8.043e-06

year	observed	2015AMO	2015AMR	2015AMN	2015AM
2005	0.0005781	6.176e-07	6.153e-07	4.693e-07	5.006e-07
2006	0.0008124	7.018e-07	6.996e-07	5.441e-07	5.772e-07
2007	0.002943	7.65e-07	7.627e-07	5.917e-07	6.274e-07
2008	0.001417	8.59e-07	8.563e-07	6.724e-07	7.134e-07
2009	0.0003304	8.303e-07	8.288e-07	6.938e-07	7.297e-07
2010	0.0003171	7.06e-07	7.06e-07	6.15e-07	6.423e-07
2011	2.301e-05	6.025e-07	6.029e-07	5.254e-07	5.485e-07
2012	0.00043	6.056e-07	6.054e-07	5.014e-07	5.265e-07
2013	0.0003977	8.191e-07	8.167e-07	6.331e-07	6.675e-07
2014	0.0003172	1.079e-06	1.074e-06	8.544e-07	8.921e-07
2015	NA	NA	NA	NA	9.798e-07

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

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year	observed	2015AMO	2015AMR	2015AMN	2015AM
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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	2015AMO	2015AMR	2015AMN	2015AM
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Table 42. Observed and estimated total female catch mortality biomass (1000's t) in GTF.