TCSAM2013 Model Results: Tables

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Input model cases

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## 2015AM: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentMo
## Model B: '/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentM
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case	path
2015AM	Runs.2015AM/2016/best
Model B	Runs.ModelB/2016/best

Table 1. Model cases for comparison.

Objective function components

description	2015AM	Model B
maturity curve smoothness (females)	1.4	2.3
maturity curve smoothness (males)	0.18	0.79
natural mortality penalty (immature females)	36	36
natural mortality penalty (immatures)	0.75	0.59
natural mortality penalty (mature males)	3.2	5.6
penalty on F-devs in BBRKC fishery	0	0.13
penalty on F-devs in directed fishery	57	57
penalty on F-devs in groundfish fishery	13	13
penalty on F-devs in snow crab fishery	7.5	7.5
recruitment penalty	2.2	2.4
sex ratio penalty	0	0
z50 devs for male selectivity in TCF (AR1)	0	0
z50 devs for male selectivity in TCF (norm2)	0	0

Table 2. Objective function penalty components.

description	2015AM	Model B
female growth parameter a	0.9	0.9
female growth parameter b	0.81	0.64
female survey q penalty	25	29
male growth parameter a	0.25	0.23
male growth parameter b	0.03	0.03
survey q penalty	5	5

Table 3. Objective function priors components.

description	2015AM	Model B
fishery: GTF males+females	116	463
fishery: RKC females	2	2.3
fishery: RKC males	28	27
fishery: SCF females	15	12
fishery: SCF males	51	53
fishery: TCF discarded females	15	9.7
fishery: TCF retained males	269	309
fishery: TCF total males	121	184
survey: immature females	281	281
survey: immature males	273	269
survey: mature females	111	129
survey: mature males	252	250

Table 4. Objective function likelihood: size comps components.

description	2015AM	Model B
fishery: GTF total catch biomass	2.3	2.4
fishery: RKF total catch biomass	9.8	13
fishery: SCF total catch biomass	9.1	6.2
fishery: TCF female catch biomass	5.5	5.1
fishery: TCF male total catch biomass	16	12
fishery: TCF retained males	30	18
survey: mature crab	193	199

Table 5. Objective function likelihood: catch biomass components.

description	Model B-2015AM
maturity curve smoothness (females)	0.97
maturity curve smoothness (males)	0.61
natural mortality penalty (immature females)	0.36
natural mortality penalty (immatures)	-0.17
natural mortality penalty (mature males)	2.4
penalty on F-devs in BBRKC fishery	0.13
penalty on F-devs in directed fishery	-0.24
penalty on F-devs in groundfish fishery	-0.11
penalty on F-devs in snow crab fishery	-0.03
recruitment penalty	0.28
sex ratio penalty	0
z50 devs for male selectivity in TCF (AR1)	0
z50 devs for male selectivity in TCF (norm2)	0

Table 6. Objective function penalty component differences.

description	Model B-2015AM
female growth parameter a	0
female growth parameter b	-0.17
female survey q penalty	4
male growth parameter a	-0.02
male growth parameter b	0
survey q penalty	-0.04

Table 7. Objective function priors component differences.

description	Model B-2015AM
fishery: GTF males+females	348
fishery: RKC females	0.32
fishery: RKC males	-0.94
fishery: SCF females	-2.3
fishery: SCF males	1.5
fishery: TCF discarded females	-5
fishery: TCF retained males	40
fishery: TCF total males	63
survey: immature females	-0.35
survey: immature males	-3.2
survey: mature females	18
survey: mature males	-2.1

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

description	Model B-2015AM
fishery: GTF total catch biomass	0.17
fishery: RKF total catch biomass	3
fishery: SCF total catch biomass	-2.9
fishery: TCF female catch biomass	-0.36
fishery: TCF male total catch biomass	-4.8
fishery: TCF retained males	-12
survey: mature crab	6.3

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

Parameter estimates

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
initial log-scale mean	pMnLnRecInit		5.63	5.527	0.5027	0.4917
log-scale mean	pMnLnRec		4.965	5	0.0681	0.06605
size distribution alpha parameter	pRecAlpha		11.5	11.5	0	0

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
size distribution beta parameter	pRecBeta		4	4	0	0

Table 10. Parameter estimates for population recruitment .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
log-scale deviation	pRecDevs	1974	0.1978	NA	0.7205	NA
log-scale deviation	pRecDevs	1975	1.383	1.408	0.2293	0.1912
log-scale deviation	pRecDevs	1976	1.84	1.997	0.1414	0.1238
log-scale deviation	pRecDevs	1977	1.631	1.762	0.1507	0.13
log-scale deviation	pRecDevs	1978	1.039	1.091	0.1969	0.1813
log-scale deviation	pRecDevs	1979	-0.2212	0.1668	0.4147	0.288
log-scale deviation	pRecDevs	1980	-0.9049	-0.4646	0.578	0.3722
log-scale deviation	pRecDevs	1981	-0.203	-0.09971	0.2503	0.2158
log-scale deviation	pRecDevs	1982	-0.9358	-0.4923	0.3892	0.2571
log-scale deviation	pRecDevs	1983	1.005	0.8442	0.1064	0.1013
log-scale deviation	pRecDevs	1984	0.7886	0.7737	0.1553	0.1286
log-scale deviation	pRecDevs	1985	1.337	1.226	0.1234	0.1092
log-scale deviation	pRecDevs	1986	1.221	1.145	0.1353	0.1195
log-scale deviation	pRecDevs	1987	1.099	1.111	0.1425	0.1202
log-scale deviation	pRecDevs	1988	1.05	1.086	0.1263	0.1098
log-scale deviation	pRecDevs	1989	0.1951	0.2516	0.1738	0.1522
log-scale deviation	pRecDevs	1990	-0.721	-0.7003	0.2712	0.249
log-scale deviation	pRecDevs	1991	-1.254	-1.241	0.3067	0.2836
log-scale deviation	pRecDevs	1992	-1.443	-1.515	0.2736	0.2687
log-scale deviation	pRecDevs	1993	-1.537	-1.59	0.2555	0.2478
log-scale deviation	pRecDevs	1994	-1.397	-1.364	0.2224	0.2051
log-scale deviation	pRecDevs	1995	-1.106	-1.078	0.1869	0.1733

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
log-scale deviation	pRecDevs	1996	-1.048	-1.055	0.1996	0.1889
log-scale deviation	pRecDevs	1997	-0.1048	-0.1513	0.1052	0.1007
log-scale deviation	pRecDevs	1998	-1.021	-1.042	0.1896	0.1802
log-scale deviation	pRecDevs	1999	0.123	0.02804	0.1042	0.101
log-scale deviation	pRecDevs	2000	-0.42	-0.492	0.1823	0.1734
log-scale deviation	pRecDevs	2001	0.7304	0.622	0.09417	0.09122
log-scale deviation	pRecDevs	2002	-0.3086	-0.3469	0.2033	0.1917
log-scale deviation	pRecDevs	2003	0.3444	0.3434	0.1346	0.1251
log-scale deviation	pRecDevs	2004	0.887	0.7744	0.09165	0.08892
log-scale deviation	pRecDevs	2005	-0.365	-0.4573	0.2038	0.1948
log-scale deviation	pRecDevs	2006	-0.6188	-0.7171	0.2253	0.2152
log-scale deviation	pRecDevs	2007	-0.9704	-1.118	0.281	0.2764
log-scale deviation	pRecDevs	2008	-0.7424	-0.8976	0.2561	0.2538
log-scale deviation	pRecDevs	2009	1.04	0.979	0.1037	0.09907
log-scale deviation	pRecDevs	2010	1.192	1.199	0.1006	0.09329
log-scale deviation	pRecDevs	2011	0.6218	0.6585	0.1399	0.1296
log-scale deviation	pRecDevs	2012	-1.04	-1.096	0.3891	0.3829
log-scale deviation	pRecDevs	2013	-0.1335	-0.179	0.1807	0.1749
log-scale deviation	pRecDevs	2014	-0.3523	-0.4003	0.2048	0.1993
log-scale deviation	pRecDevs	2015	-0.7092	-0.7565	0.2683	0.263
log-scale deviation	pRecDevs	2016	-0.1659	-0.2126	0.2495	0.2466

Table 11. Parameter estimates for population recruitment devs .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
log-scale deviation	pRecDevsHist	1949	-1.484	-1.511	1.609	1.634
log-scale deviation	pRecDevsHist	1950	-1.481	-1.508	1.465	1.492

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
log-scale deviation	pRecDevsHist	1951	-1.474	-1.502	1.327	1.354
log-scale deviation	pRecDevsHist	1952	-1.462	-1.491	1.197	1.224
log-scale deviation	pRecDevsHist	1953	-1.442	-1.473	1.077	1.103
log-scale deviation	pRecDevsHist	1954	-1.412	-1.445	0.9707	0.9947
log-scale deviation	pRecDevsHist	1955	-1.368	-1.403	0.8806	0.9008
log-scale deviation	pRecDevsHist	1956	-1.302	-1.341	0.8093	0.8245
log-scale deviation	pRecDevsHist	1957	-1.206	-1.249	0.7582	0.7677
log-scale deviation	pRecDevsHist	1958	-1.063	-1.113	0.7265	0.73
log-scale deviation	pRecDevsHist	1959	-0.8463	-0.9055	0.7112	0.7094
log-scale deviation	pRecDevsHist	1960	-0.5054	-0.577	0.7096	0.7035
log-scale deviation	pRecDevsHist	1961	0.05121	-0.035	0.7196	0.7116
log-scale deviation	pRecDevsHist	1962	0.8496	0.7601	0.7214	0.7126
log-scale deviation	pRecDevsHist	1963	1.61	1.544	0.7079	0.6966
log-scale deviation	pRecDevsHist	1964	1.916	1.859	0.6855	0.6699
log-scale deviation	pRecDevsHist	1965	1.814	1.751	0.6846	0.6675
log-scale deviation	pRecDevsHist	1966	1.553	1.493	0.6909	0.6756
log-scale deviation	pRecDevsHist	1967	1.321	1.291	0.6878	0.6736
log-scale deviation	pRecDevsHist	1968	1.191	1.232	0.6753	0.6578
log-scale deviation	pRecDevsHist	1969	1.176	1.325	0.6643	0.638
log-scale deviation	pRecDevsHist	1970	1.19	1.424	0.6464	0.6101
log-scale deviation	pRecDevsHist	1971	1.058	1.261	0.5859	0.5647
log-scale deviation	pRecDevsHist	1972	0.7638	0.9554	0.5628	0.5424
log-scale deviation	pRecDevsHist	1973	0.5514	0.4702	0.5693	0.5478
log-scale deviation	pRecDevsHist	1974	NA	0.1862	NA	0.5773

Table 12. Parameter estimates for population initial recruitment devs .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
multiplier for 1980-1984	pMfac_Big	1	1.209	1.324	0.1034	0.1099
multiplier for 1980-1984	pMfac_Big	2	2.607	2.825	0.3064	0.3354
multiplier for immature crab	pMfac_Imm		1.061	1.054	0.05116	0.04957
multiplier for mature female crab	pMfac_MatF		1.424	1.426	0.03662	0.03686
multiplier for mature male crab	pMfac_MatM		1.126	1.168	0.04155	0.04104

Table 13. Parameter estimates for population natural mortality multipliers .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female	pPrM2MF	1	-15	-15	0.002483	0.001669
female	pPrM2MF	10	-0.8844	-0.3257	0.05629	0.09263
female	pPrM2MF	11	-0.5253	0.3487	0.03979	0.09827
female	pPrM2MF	12	-0.4157	0.6216	0.04	0.1119
female	pPrM2MF	13	-0.1794	1.567	0.03775	0.2025
female	pPrM2MF	14	-5.67e-09	3.364	2.194e-05	0.4358
female	pPrM2MF	15	-0.008992	5.306	0.01235	0.9134
female	pPrM2MF	16	-0.0006165	7.264	0.009224	1.675
female	pPrM2MF	2	-13.76	-13.76	0.7844	0.784
female	pPrM2MF	3	-12.47	-12.47	1.187	1.186
female	pPrM2MF	4	-11.08	-11.06	1.289	1.288
female	pPrM2MF	5	-9.531	-9.495	1.153	1.152
female	pPrM2MF	6	-7.779	-7.715	0.8622	0.8623
female	pPrM2MF	7	-5.8	-5.696	0.523	0.5245
female	pPrM2MF	8	-3.674	-3.52	0.2416	0.2412
female	pPrM2MF	9	-1.934	-1.686	0.1011	0.1137

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
male	pPrM2MM	1	-12.81	-12.57	7.827	7.658
male	pPrM2MM	10	-3.716	-3.669	0.2438	0.2484
male	pPrM2MM	11	-3.189	-3.078	0.1852	0.19
male	pPrM2MM	12	-2.735	-2.616	0.1467	0.1547
male	pPrM2MM	13	-2.25	-2.157	0.1202	0.1313
male	pPrM2MM	14	-1.712	-1.58	0.09349	0.1109
male	pPrM2MM	15	-1.33	-1.044	0.07558	0.1008
male	pPrM2MM	16	-1.132	-0.6822	0.06679	0.09545
male	pPrM2MM	17	-1.047	-0.4915	0.06052	0.09151
male	pPrM2MM	18	-0.7812	-0.011	0.05613	0.1025
male	pPrM2MM	19	-0.4977	0.6146	0.04997	0.1261
male	pPrM2MM	2	-11.58	-11.35	5.957	5.804
male	pPrM2MM	20	-0.2377	1.469	0.03957	0.1821
male	pPrM2MM	21	-0.09085	2.806	0.02761	0.3253
male	pPrM2MM	22	-1.38e-08	4.836	5.349e-05	0.5877
male	pPrM2MM	23	-9.17e-10	6.833	2.863e-06	1.042
male	pPrM2MM	24	-4.64e-10	8.574	1.779e-06	1.637
male	pPrM2MM	25	-7e-10	10.03	2.673e-06	2.258
male	pPrM2MM	26	-9.21e-10	11.23	2.672e-06	2.786
male	pPrM2MM	27	-1.38e-09	12.2	5.352e-06	3.126
male	pPrM2MM	28	-2.19e-09	12.99	8.492e-06	3.207
male	pPrM2MM	29	-4.94e-09	13.62	1.912e-05	2.977
male	pPrM2MM	3	-10.34	-10.12	4.313	4.178
male	pPrM2MM	30	-2.06e-08	14.14	7.985e-05	2.393
male	pPrM2MM	31	-0.04852	14.59	0.2949	1.425
male	pPrM2MM	32	-0.09596	15	1.159	0.004844

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
male	pPrM2MM	4	-9.107	-8.9	2.934	2.821
male	pPrM2MM	5	-7.877	-7.682	1.857	1.77
male	pPrM2MM	6	-6.673	-6.493	1.111	1.055
male	pPrM2MM	7	-5.568	-5.415	0.6775	0.6557
male	pPrM2MM	8	-4.813	-4.732	0.4268	0.4245
male	pPrM2MM	9	-4.315	-4.298	0.3184	0.3213

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female mean growth a parameter	pGrAF1		0.7	0.7	4.982e-05	6.962e-05
female mean growth b parameter	pGrBF1		0.8814	0.885	0.001055	0.001135
male mean growth a parameter	pGrAM1		0.4201	0.4208	0.02212	0.02185
male mean growth b parameter	pGrBM1		0.972	0.9727	0.005194	0.005172
size transition beta parameter	pGrBeta_x	1	0.75	0.75	0	0
size transition beta parameter	pGrBeta_x	2	0.75	0.75	0	0

Table 16. Parameter estimates for population growth .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
females [-1981]	pSrv1_QF		0.5	0.5	6.26e-05	4.959e-05
females [1982+]	pSrv2_QF		0.526	0.4986	0.03552	0.03222
male offset to 95%-selected [-1981]	pSrv1M_dz5095		20.74	22.14	3.162	3.262
male offset to 95%-selected [1982+]	pSrv2M_dz5095		61.68	62.91	8.059	8.294
male size at 50%-selected [-1981]	pSrv1M_z50		48.17	50.22	1.868	1.919
male size at 50%-selected [1982+]	pSrv2M_z50		31.99	32	3.253	3.201
males [-1981]	pSrv1_QM		0.5	0.5	2.085e-05	1.95e-05

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
males [1982+]	pSrv2_QM		0.7219	0.7226	0.03568	0.03642

Table 17. Parameter estimates for surveys surveys .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female offset to 95%-selected [-1981]	pSrv1F_dz5095		39.79	38.27	6.886	6.129
female offset to 95%-selected [1982+]	pSrv2F_dz5095		100	100	0.0006233	0.001205
female size at 50%-selected [-1981]	pSrv1F_z50		52.72	54.18	2.869	2.788
female size at 50%-selected [1982+]	pSrv2F_z50		3.295	-9.358	13.07	15.11

Table 18. Parameter estimates for surveys survey selectivity .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
GTF effort extrapolation	pLnEffXtr_GTF		1	1	0	0
GTF ln-scale female offset	pAvgLnF_GTFF		0	-1.024	0	0.06682
GTF ln-scale mean [1973+]	pAvgLnF_GTF		-4.308	-4.115	0.07356	0.07218
RKF effort extrapolation	pLnEffXtr_RKF		1	1	0	0
RKF ln-scale female offset	pAvgLnF_RKFF		0	2.447	0	1.335
RKF ln-scale mean [1992+]	pAvgLnF_RKF		-5.25	-4.338	0	0.9878
SCF effort extrapolation	pLnEffXtr_SCF		1	1	0	0
SCF ln-scale female offset	pAvgLnF_SCFF		0	-1.485	0	0.2126
SCF ln-scale mean [1992+]	pAvgLnF_SCF		-3.708	-2.559	0.1202	0.1239
TCF effort extrapolation	pLnEffXtr_TCF		1	1	0	0
TCF ln-scale female offset	pAvgLnF_TCFF		0	-1.619	0	0.3419
TCF ln-scale mean [1965+]	pAvgLnF_TCF		-1.336	-1.326	0.09924	0.0866

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1965+]	pF_DevsTCF	1	-0.5135	-0.512	0.4975	0.4999
ln-scale devs [1965+]	pF_DevsTCF	10	-0.1177	-0.1264	0.1401	0.1435
ln-scale devs [1965+]	pF_DevsTCF	11	0.132	0.05569	0.1039	0.105
ln-scale devs [1965+]	pF_DevsTCF	12	0.9139	0.8104	0.09766	0.09594
ln-scale devs [1965+]	pF_DevsTCF	13	1.654	1.601	0.1089	0.1092
ln-scale devs [1965+]	pF_DevsTCF	14	1.895	1.98	0.143	0.1505
ln-scale devs [1965+]	pF_DevsTCF	15	2.783	2.805	0.2114	0.1968
ln-scale devs [1965+]	pF_DevsTCF	16	2.273	2.341	0.2104	0.2767
ln-scale devs [1965+]	pF_DevsTCF	17	0.4084	0.3035	0.1263	0.1454
ln-scale devs [1965+]	pF_DevsTCF	18	-0.5674	-0.7103	0.1278	0.1271
ln-scale devs [1965+]	pF_DevsTCF	19	-1.568	-1.69	0.2504	0.248
ln-scale devs [1965+]	pF_DevsTCF	2	-0.7526	-0.7536	0.3859	0.3872
ln-scale devs [1965+]	pF_DevsTCF	20	-0.4643	-0.6106	0.1816	0.182
ln-scale devs [1965+]	pF_DevsTCF	21	-1.055	-1.303	0.215	0.2113
ln-scale devs [1965+]	pF_DevsTCF	22	-0.2897	-0.4774	0.1096	0.107
ln-scale devs [1965+]	pF_DevsTCF	23	0.8895	0.7349	0.08809	0.08343
ln-scale devs [1965+]	pF_DevsTCF	24	1.538	1.459	0.0983	0.09428
ln-scale devs [1965+]	pF_DevsTCF	25	1.307	1.415	0.1494	0.1553
ln-scale devs [1965+]	pF_DevsTCF	26	1.584	1.639	0.1386	0.1444
ln-scale devs [1965+]	pF_DevsTCF	27	1.003	0.9964	0.138	0.14
ln-scale devs [1965+]	pF_DevsTCF	28	0.9384	0.9833	0.1796	0.1978
ln-scale devs [1965+]	pF_DevsTCF	29	-0.3564	-0.1681	0.1546	0.134
ln-scale devs [1965+]	pF_DevsTCF	3	0.4206	0.4311	0.3474	0.3491
ln-scale devs [1965+]	pF_DevsTCF	30	-0.2579	-0.9586	0.3215	0.1777
ln-scale devs [1965+]	pF_DevsTCF	31	-2.332	-2.129	0.2152	0.2098

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1965+]	pF_DevsTCF	32	-1.867	-1.648	0.1529	0.143
ln-scale devs [1965+]	pF_DevsTCF	33	-1.901	-1.647	0.1448	0.1361
ln-scale devs [1965+]	pF_DevsTCF	34	-1.931	-1.963	0.1728	0.1598
ln-scale devs [1965+]	pF_DevsTCF	35	-1.118	-1.32	0.2845	0.2573
ln-scale devs [1965+]	pF_DevsTCF	36	-1.882	-1.709	0.1518	0.1386
ln-scale devs [1965+]	pF_DevsTCF	37	-0.6874	-0.4909	0.1047	0.09238
ln-scale devs [1965+]	pF_DevsTCF	38	-0.4021	-0.1988	0.105	0.09399
ln-scale devs [1965+]	pF_DevsTCF	4	0.2191	0.2534	0.3268	0.325
ln-scale devs [1965+]	pF_DevsTCF	5	0.3642	0.434	0.3147	0.3129
ln-scale devs [1965+]	pF_DevsTCF	6	0.2059	0.3146	0.3081	0.3128
ln-scale devs [1965+]	pF_DevsTCF	7	0.01439	0.1447	0.2944	0.3077
ln-scale devs [1965+]	pF_DevsTCF	8	-0.1348	-0.01334	0.2624	0.2798
ln-scale devs [1965+]	pF_DevsTCF	9	-0.3433	-0.2734	0.2048	0.2159

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1992+]	pF_DevsSCF	1992	1.856	1.821	0.1163	0.1186
ln-scale devs [1992+]	pF_DevsSCF	1993	1.619	1.579	0.1239	0.1257
ln-scale devs [1992+]	pF_DevsSCF	1994	1.254	1.218	0.1479	0.149
ln-scale devs [1992+]	pF_DevsSCF	1995	1.235	1.206	0.1753	0.1751
ln-scale devs [1992+]	pF_DevsSCF	1996	0.1055	0.148	0.4771	0.4561
ln-scale devs [1992+]	pF_DevsSCF	1997	0.6516	0.7506	0.3686	0.3891
ln-scale devs [1992+]	pF_DevsSCF	1998	0.5198	0.6731	0.449	0.4395
ln-scale devs [1992+]	pF_DevsSCF	1999	-0.3253	-0.3261	0.6631	0.6841
ln-scale devs [1992+]	pF_DevsSCF	2000	-0.6302	-0.6543	0.6501	0.6612
ln-scale devs [1992+]	pF_DevsSCF	2001	-0.6097	-0.6188	0.6167	0.6299

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1992+]	pF_DevsSCF	2002	-0.5694	-0.5473	0.5822	0.5951
ln-scale devs [1992+]	pF_DevsSCF	2003	-0.8507	-0.853	0.5731	0.5888
ln-scale devs [1992+]	pF_DevsSCF	2004	-1.102	-1.083	0.5555	0.5689
ln-scale devs [1992+]	pF_DevsSCF	2005	-0.5575	-0.6097	0.4907	0.504
ln-scale devs [1992+]	pF_DevsSCF	2006	-0.2852	-0.3324	0.4081	0.4196
ln-scale devs [1992+]	pF_DevsSCF	2007	-0.1907	-0.2242	0.3452	0.3499
ln-scale devs [1992+]	pF_DevsSCF	2008	-0.6561	-0.662	0.4271	0.4299
ln-scale devs [1992+]	pF_DevsSCF	2009	-0.5286	-0.5214	0.421	0.4248
ln-scale devs [1992+]	pF_DevsSCF	2010	-0.4024	-0.3796	0.4319	0.4345
ln-scale devs [1992+]	pF_DevsSCF	2011	0.04148	0.0832	0.3506	0.3501
ln-scale devs [1992+]	pF_DevsSCF	2012	-0.5435	-0.526	0.4655	0.4669
ln-scale devs [1992+]	pF_DevsSCF	2013	-0.4805	-0.4942	0.3506	0.3501
ln-scale devs [1992+]	pF_DevsSCF	2014	0.3949	0.3533	0.1762	0.1773
ln-scale devs [1992+]	pF_DevsSCF	2015	0.0551	0.0004133	0.2325	0.2323

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1992+]	pF_DevsRKF	1	0	-0.1442	0	0.3555
ln-scale devs [1992+]	pF_DevsRKF	10	0	-0.008593	0	0.3936
ln-scale devs [1992+]	pF_DevsRKF	11	0	-0.0192	0	0.3913
ln-scale devs [1992+]	pF_DevsRKF	12	0	-0.004572	0	0.3919
ln-scale devs [1992+]	pF_DevsRKF	13	0	-0.02814	0	0.388
ln-scale devs [1992+]	pF_DevsRKF	14	0	0.009361	0	0.3998
ln-scale devs [1992+]	pF_DevsRKF	15	0	0.01015	0	0.3994
ln-scale devs [1992+]	pF_DevsRKF	16	0	0.01228	0	0.3995
ln-scale devs [1992+]	pF_DevsRKF	17	0	0.02674	0	0.4013

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1992+]	pF_DevsRKF	18	0	0.01761	0	0.3993
ln-scale devs [1992+]	pF_DevsRKF	19	0	0.008798	0	0.3984
ln-scale devs [1992+]	pF_DevsRKF	2	0	-0.03328	0	0.3736
ln-scale devs [1992+]	pF_DevsRKF	20	0	0.003224	0	0.3981
ln-scale devs [1992+]	pF_DevsRKF	21	0	0.003241	0	0.3984
ln-scale devs [1992+]	pF_DevsRKF	22	0	0.01031	0	0.3986
ln-scale devs [1992+]	pF_DevsRKF	23	0	0.02521	0	0.3988
ln-scale devs [1992+]	pF_DevsRKF	24	0	-0.005533	0	0.3937
ln-scale devs [1992+]	pF_DevsRKF	3	0	-0.07219	0	0.3685
ln-scale devs [1992+]	pF_DevsRKF	4	0	0.01156	0	0.3851
ln-scale devs [1992+]	pF_DevsRKF	5	0	0.08087	0	0.4038
ln-scale devs [1992+]	pF_DevsRKF	6	0	0.08147	0	0.4093
ln-scale devs [1992+]	pF_DevsRKF	7	0	0.01331	0	0.3978
ln-scale devs [1992+]	pF_DevsRKF	8	0	-0.0004064	0	0.3961
ln-scale devs [1992+]	pF_DevsRKF	9	0	0.001997	0	0.3964

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1973+]	pF_DevsGTH	1973	1.018	1.1	0.1134	0.1045
ln-scale devs [1973+]	pF_DevsGTH	1974	1.424	1.469	0.08794	0.0816
ln-scale devs [1973+]	pF_DevsGTH	1975	0.5871	0.6095	0.08327	0.07822
ln-scale devs [1973+]	pF_DevsGTH	1976	0.06913	0.07735	0.09457	0.09029
ln-scale devs [1973+]	pF_DevsGTH	1977	-0.1966	-0.2099	0.1217	0.1181
ln-scale devs [1973+]	pF_DevsGTH	1978	-0.3909	-0.4404	0.1586	0.156
ln-scale devs [1973+]	pF_DevsGTH	1979	0.2978	0.2327	0.1169	0.1127
ln-scale devs [1973+]	pF_DevsGTH	1980	0.01087	-0.0223	0.152	0.1522

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1973+]	pF_DevsGTF	1981	-0.1881	-0.207	0.1922	0.1924
ln-scale devs [1973+]	pF_DevsGTF	1982	-0.9071	-0.9167	0.3968	0.3942
ln-scale devs [1973+]	pF_DevsGTF	1983	-0.3951	-0.4128	0.3631	0.3591
ln-scale devs [1973+]	pF_DevsGTF	1984	-0.1717	-0.2037	0.4003	0.3921
ln-scale devs [1973+]	pF_DevsGTF	1985	-0.5848	-0.629	0.4885	0.4777
ln-scale devs [1973+]	pF_DevsGTF	1986	-0.5061	-0.548	0.3848	0.3802
ln-scale devs [1973+]	pF_DevsGTF	1987	-0.7006	-0.7197	0.3844	0.3776
ln-scale devs [1973+]	pF_DevsGTF	1988	-1.105	-1.104	0.4116	0.4079
ln-scale devs [1973+]	pF_DevsGTF	1989	-0.9651	-0.9517	0.3489	0.3444
ln-scale devs [1973+]	pF_DevsGTF	1990	-0.6319	-0.6055	0.2871	0.2799
ln-scale devs [1973+]	pF_DevsGTF	1991	0.4754	0.4938	0.1396	0.1277
ln-scale devs [1973+]	pF_DevsGTF	1992	0.7805	0.7841	0.1297	0.1192
ln-scale devs [1973+]	pF_DevsGTF	1993	0.6393	0.6354	0.1723	0.165
ln-scale devs [1973+]	pF_DevsGTF	1994	1.134	1.128	0.1507	0.1428
ln-scale devs [1973+]	pF_DevsGTF	1995	1.148	1.152	0.189	0.1811
ln-scale devs [1973+]	pF_DevsGTF	1996	1.472	1.487	0.1812	0.1717
ln-scale devs [1973+]	pF_DevsGTF	1997	1.453	1.442	0.2399	0.2321
ln-scale devs [1973+]	pF_DevsGTF	1998	1.138	1.119	0.3417	0.3325
ln-scale devs [1973+]	pF_DevsGTF	1999	0.6034	0.5733	0.5133	0.5015
ln-scale devs [1973+]	pF_DevsGTF	2000	0.6985	0.6482	0.4132	0.4107
ln-scale devs [1973+]	pF_DevsGTF	2001	1.061	1.015	0.2525	0.2527
ln-scale devs [1973+]	pF_DevsGTF	2002	0.4255	0.3961	0.3765	0.3767
ln-scale devs [1973+]	pF_DevsGTF	2003	-0.1481	-0.1519	0.4833	0.4806
ln-scale devs [1973+]	pF_DevsGTF	2004	0.001188	-0.0009772	0.3674	0.3687
ln-scale devs [1973+]	pF_DevsGTF	2005	-0.2292	-0.2226	0.3751	0.3767

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
ln-scale devs [1973+]	pF_DevsGTF	2006	-0.1889	-0.1745	0.333	0.3325
ln-scale devs [1973+]	pF_DevsGTF	2007	-0.2915	-0.2808	0.3317	0.3313
ln-scale devs [1973+]	pF_DevsGTF	2008	-0.5453	-0.5177	0.3743	0.3744
ln-scale devs [1973+]	pF_DevsGTF	2009	-0.7291	-0.6727	0.4315	0.4316
ln-scale devs [1973+]	pF_DevsGTF	2010	-0.8182	-0.7459	0.4835	0.4845
ln-scale devs [1973+]	pF_DevsGTF	2011	-0.82	-0.7536	0.5017	0.503
ln-scale devs [1973+]	pF_DevsGTF	2012	-0.9911	-0.9463	0.5051	0.5031
ln-scale devs [1973+]	pF_DevsGTF	2013	-0.951	-0.9323	0.4326	0.4268
ln-scale devs [1973+]	pF_DevsGTF	2014	-0.9622	-0.9636	0.3983	0.3941
ln-scale devs [1973+]	pF_DevsGTF	2015	-1.02	-1.029	0.4319	0.4289

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

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
size at 50%-selected [-1990]	pRetTCFM_z50	A1	137.3	138.3	0.3713	0.4632
size at 50%-selected [1991+]	pRetTCFM_z50	A2	129.1	133	0.4998	0.5927
slope [-1990]	pRetTCFM_slp	A1	0.7764	0.6844	0.141	0.1209
slope [1991+]	pRetTCFM_slp	A2	0.3347	0.2546	0.03063	0.01865

Table 24. Parameter estimates for fisheries TCF retention .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female size at 50%-selected [all years]	pSelTCFF_z50		118.6	94.48	2.745	2.152
female slope [all years]	pSelTCFF_slp		0.1412	0.1961	0.008012	0.02036
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	1	0.07575	0.1609	0.02033	0.03071
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	2	0.01335	0.03313	0.01601	0.02221

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	1	0.1864	0.2646	0.01904	0.02021
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	2	-0.05361	-0.01657	0.01803	0.0217
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	3	-0.08742	-0.04798	0.01466	0.01917
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	4	-0.113	-0.09	0.01506	0.02161
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	5	0.08451	0.1679	0.01587	0.02232
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	6	0.07861	0.1524	0.01757	0.02605
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	7	0.1331	0.2455	0.01963	0.02843
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	8	-0.08748	-0.117	0.04081	0.09133
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	9	0.0971	-0.5005	0.04207	0.01316
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	10	-0.09416	-0.06912	0.01952	0.0245
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	11	-0.1033	-0.08555	0.01984	0.02357
male ln-scale devs in size at 50%-selected [1991+]	pSelTCFM_devsZ50	12	-0.1299	-0.09774	0.01794	0.02153
male ln-scale mean size at 50%-selected	pSelTCFM_mnLnZ50A2		4.874	4.757	0.008216	0.01169
male slope [-1996]	pSelTCFM_slpA1		0.1114	0.08984	0.005993	0.006701
male slope [1997+]	pSelTCFM_slpA2		0.1461	0.1793	0.008002	0.0141

Table 25. Parameter estimates for fisheries TCF selectivity .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female size at 50%-selected [-1996]	pSelSCFF_z50A1		112.7	67.46	4.726	7.14

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female size at 50%-selected [1997-2004]	pSelSCFF_z50A2		77.61	75.32	5.088	4.721
female size at 50%-selected [2005+]	pSelSCFF_z50A3		92.7	78.96	8.06	3.913
female slope [-1996]	pSelSCFF_slpA1		0.05	0.2069	3.566e-05	0.1731
female slope [1997-2004]	pSelSCFF_slpA2		0.233	0.2713	0.1161	0.1437
female slope [2005+]	pSelSCFF_slpA3		0.1222	0.2062	0.0339	0.06879
male ascending size at 50%-selected [-1996]	pSelSCFM_z50A1		87.55	87.61	1.523	1.468
male ascending size at 50%-selected [1997-2004]	pSelSCFM_z50A2		94.36	94.2	3.23	3.393
male ascending size at 50%-selected [2005+]	pSelSCFM_z50A3		105.3	104.9	1.595	1.61
male ascending slope [-1996]	pSelSCFM_slpA1		0.3903	0.4016	0.1319	0.1341
male ascending slope [1997-2004]	pSelSCFM_slpA2		0.2244	0.2262	0.07064	0.07431
male ascending slope [2005+]	pSelSCFM_slpA3		0.172	0.172	0.01574	0.01611
male descending ln-scale offset to size at 50%-selected [-1996]	pSelSCFM_lnZ50D1		3.953	3.957	0.03806	0.03686
male descending ln-scale offset to size at 50%-selected [1997-2004]	pSelSCFM_lnZ50D2		3.79	3.793	0.1442	0.1649
male descending ln-scale offset to size at 50%-selected [2005+]	pSelSCFM_lnZ50D3		3.451	3.485	0.09212	0.09176
male descending slope [-1996]	pSelSCFM_slpD1		0.5	0.5	0.000471	0.0003336
male descending slope [1997-2004]	pSelSCFM_slpD2		0.1726	0.1545	0.09024	0.09008
male descending slope [2005+]	pSelSCFM_slpD3		0.1798	0.1761	0.0254	0.02709

Table 26. Parameter estimates for fisheries SCF selectivity .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female size at 50%-selected [-1996]	pSelRKFF_z50A1		150	96.8	1.05	11.27
female size at 50%-selected [1997-2004]	pSelRKFF_z50A2		150	96.79	8.327	10.06

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female size at 50%-selected [2005+]	pSelRKFF_z50	A3	157.3	114.5	374.6	18.02
female slope [-1996]	pSelRKFF_slp	A1	0.1761	0.2126	0.03997	0.117
female slope [1997-2004]	pSelRKFF_slp	A2	0.1541	0.2047	0.06971	0.1414
female slope [2005+]	pSelRKFF_slp	A3	0.1863	0.1645	0.05303	0.06067
male size at 50%-selected [-1996]	pSelRKFM_z50	A1	150	150	0.0005605	0.0006121
male size at 50%-selected [1997-2004]	pSelRKFM_z50	A2	137.3	138.9	13.98	14.13
male size at 50%-selected [2005+]	pSelRKFM_z50	A3	150	150	0.001423	0.001329
male slope [-1996]	pSelRKFM_slp	A1	0.1082	0.1131	0.01083	0.01112
male slope [1997-2004]	pSelRKFM_slp	A2	0.08721	0.08638	0.02376	0.02297
male slope [2005+]	pSelRKFM_slp	A3	0.08281	0.08517	0.005979	0.006282

Table 27. Parameter estimates for fisheries RKF selectivity .

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
female size at 50%-selected [-1987]	pSelGTFF_z50	A1	125	40.08	0.0004432	1.451
female size at 50%-selected [1988-1996]	pSelGTFF_z50	A2	161.4	40	40.25	0.0001508
female size at 50%-selected [1997+]	pSelGTFF_z50	A3	144.2	79.14	9.62	2.459
female slope [-1987]	pSelGTFF_slp	A1	0.02561	0.1522	0.001667	0.0232
female slope [1988-1996]	pSelGTFF_slp	A2	0.01398	0.1832	0.005411	0.03752
female slope [1997+]	pSelGTFF_slp	A3	0.05254	0.07683	0.007322	0.00586
male size at 50%-selected [-1987]	pSelGTFM_z50	A1	53.33	54.73	1.956	1.833
male size at 50%-selected [1988-1996]	pSelGTFM_z50	A2	64.02	66.41	8.574	4.996
male size at 50%-selected [1997+]	pSelGTFM_z50	A3	84.69	84.66	2.145	2.007
male slope [-1987]	pSelGTFM_slp	A1	0.1135	0.1034	0.01261	0.009789
male slope [1988-1996]	pSelGTFM_slp	A2	0.04957	0.04837	0.01275	0.007571

description	param	index	value 2015AM	value Model B	stdv 2015AM	stdv Model B
male slope [1997+]	pSelGTFM_slp	A3	0.07544	0.07541	0.004168	0.003878

Table 28. Parameter estimates for fisheries GTF selectivity .

Mature biomass-at-mating

year	2015AM	Model B
1949	0	0
1950	0.009453	0.00892
1951	0.1544	0.1479
1952	1.197	1.157
1953	4.389	4.139
1954	8.491	7.767
1955	11.76	10.6
1956	14.23	12.73
1957	16.16	14.38
1958	17.76	15.74
1959	19.2	16.96
1960	20.68	18.21
1961	22.45	19.72
1962	24.95	21.83
1963	29.1	25.36
1964	37.45	32.51
1965	54.98	47.54
1966	96.93	84.18
1967	158.6	136.5
1968	235.8	200
1969	284.4	235.6
1970	300.9	244.8
1971	296.2	240.7
1972	283.9	236.2
1973	269.7	235.8
1974	247.5	229.8
1975	226.3	219.5
1976	181.6	179.3
1977	122.7	119
1978	86.22	81.15
1979	60.14	54.8
1980	51.45	44.91
1981	60.46	56.63
1982	57.41	54.9
1983	42.69	41
1984	26.07	25.69
1985	24.75	26.21
1986	30.11	32.57
1987	42.69	44.39
1988	58.39	58.51

year	2015AM	Model B
1989	64.48	63.32
1990	57.16	54.33
1991	55.09	52.52
1992	45.93	45.19
1993	39.49	39.5
1994	31.32	31.39
1995	23.14	23.11
1996	18.36	18.07
1997	15.62	15.22
1998	14.16	13.86
1999	14.34	14.28
2000	16.11	16.28
2001	19.56	19.79
2002	23.19	23.12
2003	28.09	27.67
2004	34.85	33.83
2005	43.23	41.59
2006	48.53	46.3
2007	53.08	51.27
2008	61.39	58.84
2009	62.5	58.42
2010	56.08	51.68
2011	49.46	45.16
2012	49.87	46.21
2013	63.4	61.18
2014	76.32	75.38
2015	74.32	73.9

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

year	2015AM	Model B
1949	0	0
1950	0.02902	0.03093
1951	0.246	0.2727
1952	0.9897	1.057
1953	2.174	2.203
1954	3.283	3.199
1955	4.122	3.932
1956	4.752	4.479
1957	5.248	4.908
1958	5.677	5.281
1959	6.098	5.651
1960	6.583	6.085
1961	7.244	6.686
1962	8.305	7.63
1963	10.36	9.48
1964	15.05	13.89
1965	25.71	24.26
1966	45.9	43.66
1967	72.98	68.59
1968	97.45	88.98

year	2015AM	Model B
1969	110.6	98.41
1970	112.6	98.87
1971	108.5	96.37
1972	103	93.85
1973	97.55	92.63
1974	91.33	89.3
1975	83.96	82.9
1976	74.03	71.69
1977	62.7	59.87
1978	55.41	55.19
1979	53.2	57.3
1980	52.7	55.95
1981	49.33	49.66
1982	41.22	40.54
1983	31.44	30.57
1984	23.41	22.98
1985	19.57	19.99
1986	19.78	20.58
1987	23	23.74
1988	27.69	28.49
1989	32.01	32.62
1990	33.81	34.29
1991	33.46	33.99
1992	29.91	30.6
1993	24.63	24.96
1994	18.94	18.96
1995	14.35	14.17
1996	11	10.76
1997	8.552	8.517
1998	7.077	7.255
1999	6.539	6.877
2000	6.82	7.289
2001	7.443	7.904
2002	8.327	8.787
2003	9.759	10.23
2004	11.87	12.37
2005	13.84	14.36
2006	15.29	16.02
2007	17.21	18.15
2008	18.03	18.55
2009	16.38	16.43
2010	14.02	13.94
2011	13.06	13.3
2012	15.75	16.97
2013	21.1	23.36
2014	24.23	26.71
2015	22.99	24.9

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

Recruitment

year	2015AM	Model B
1949	63.18	55.51
1950	63.36	55.66
1951	63.79	56
1952	64.57	56.63
1953	65.85	57.66
1954	67.85	59.3
1955	70.95	61.84
1956	75.77	65.79
1957	83.44	72.09
1958	96.25	82.62
1959	119.5	101.7
1960	168.1	141.2
1961	293.2	242.8
1962	651.4	537.7
1963	1393	1177
1964	1893	1614
1965	1708	1449
1966	1316	1119
1967	1044	914.2
1968	916.6	862.3
1969	902.7	945.9
1970	916	1044
1971	802.1	887.5
1972	597.9	653.7
1973	483.5	402.4
1974	174.7	302.9
1975	571.6	606.3
1976	903.1	1093
1977	732.2	864.1
1978	405.1	441.8
1979	114.9	175.3
1980	58.01	93.22
1981	117	134.3
1982	56.24	90.68
1983	391.7	345.1
1984	315.4	321.6
1985	545.7	505.7
1986	486	466.1
1987	430.2	450.7
1988	409.6	439.6
1989	174.3	190.8
1990	69.71	73.65
1991	40.91	42.88
1992	33.87	32.59
1993	30.82	30.26
1994	35.45	37.94
1995	47.43	50.49
1996	50.28	51.63
1997	129.1	127.5
1998	51.65	52.31

year	2015AM	Model B
1999	162.1	152.6
2000	94.2	90.69
2001	297.6	276.3
2002	105.3	104.9
2003	202.3	209.1
2004	348.1	321.8
2005	99.52	93.91
2006	77.22	72.42
2007	54.33	48.49
2008	68.24	60.46
2009	405.5	394.9
2010	472.1	491.8
2011	267	286.6
2012	50.69	49.59
2013	125.5	124
2014	100.8	99.41
2015	70.55	69.62
2016	121.5	119.9

Table 31. Estimated recruitment (millions).

Mature survey biomass

year	observed	2015AM	Model B
1975	246	152.2	148.1
1976	126.2	135	133.5
1977	110.6	106.9	105.5
1978	77.6	74.88	75.14
1979	32.21	64.99	67
1980	86.15	62.39	63.05
1981	49.36	54.22	53.79
1982	48.97	67.58	68.19
1983	28.46	48.53	49.1
1984	24.17	31.38	32.61
1985	11.36	21.56	23.01
1986	12.81	26.41	28.78
1987	24.08	38.99	40.73
1988	60.43	54.88	55.25
1989	91.93	71.07	70.25
1990	96.29	76.45	74.43
1991	109.7	66.74	64.84
1992	103.2	60.37	60.07
1993	60.14	44.77	45.05
1994	42.13	32.67	32.89
1995	31.1	23.84	23.92
1996	26.26	17.36	17.32
1997	10.69	14.16	13.91
1998	10.29	12.61	12.46
1999	12.45	12.39	12.41

year	observed	2015AM	Model B
2000	16.15	13.92	14.12
2001	17.85	17.11	17.37
2002	17.8	19.95	20
2003	23.32	23.93	23.7
2004	26.35	29.7	28.99
2005	43.14	37.46	36.28
2006	64.2	42.66	40.99
2007	66.44	46.63	45.35
2008	62.71	53.12	51.32
2009	36.32	53.75	50.66
2010	37.61	47.68	44.26
2011	41.49	42.18	38.81
2012	41.18	42.19	39.35
2013	65.66	54.96	53.42
2014	79.47	71.5	71.11
2015	60.18	72.21	72.18
2016	57.61	59.48	59.11

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

year	observed	2015AM	Model B
1975	31.71	47.29	47.76
1976	31.44	41.98	42
1977	38.76	36.05	35.78
1978	26.18	31.87	32.69
1979	19.65	31.72	34.67
1980	64.16	31.95	36.47
1981	43.06	29.03	31.54
1982	64.43	25.73	25.7
1983	20.61	19.58	19.22
1984	15.01	14.68	14.42
1985	5.629	11.73	11.72
1986	3.452	11.84	12.28
1987	5.193	13.81	14.26
1988	25.47	16.62	16.98
1989	19.5	19.5	19.81
1990	37.84	21.08	21.4
1991	45.03	20.82	21.21
1992	26.47	18.91	19.09
1993	11.74	15.3	15.32
1994	10.01	11.71	11.61
1995	12.72	8.774	8.606
1996	9.797	6.672	6.482
1997	3.514	5.248	5.095
1998	2.315	4.315	4.313
1999	3.877	3.911	4.044
2000	4.181	4.061	4.282
2001	4.607	4.438	4.658
2002	4.495	4.961	5.157
2003	8.436	5.795	5.991
2004	4.903	7.034	7.239

year	observed	2015AM	Model B
2005	11.62	8.21	8.351
2006	15.04	9.084	9.324
2007	13.53	10.23	10.57
2008	11.73	10.72	10.8
2009	8.556	9.77	9.586
2010	5.524	8.35	8.125
2011	5.493	7.781	7.74
2012	12.5	9.307	9.824
2013	17.98	12.49	13.55
2014	14.95	14.52	15.62
2015	11.29	13.79	14.59
2016	7.554	11.81	12.39

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

Retained catch

year	observed	2015AM	Model B
1965	1.923	1.951	1.952
1966	2.445	2.474	2.474
1967	13.6	13.59	13.59
1968	18	18	18
1969	27.49	27.48	27.48
1970	25.49	25.49	25.49
1971	20.71	20.7	20.71
1972	16.91	16.9	16.9
1973	13.03	13.02	13.02
1974	15.24	15.22	15.22
1975	17.65	17.64	17.64
1976	30.02	30	30
1977	35.53	35.51	35.51
1978	21.09	21.08	21.07
1979	19.01	18.94	18.92
1980	13.43	13.43	13.44
1981	4.99	5.049	5.047
1982	2.391	2.467	2.465
1983	0.5489	0.7785	0.7836
1984	1.429	1.492	1.496
1985	0	0	0
1986	0	0	0
1987	0.998	1.013	1.014
1988	3.18	3.086	3.065
1989	11.11	10.99	10.96
1990	18.19	18.04	18.01
1991	14.43	14.29	14.28
1992	15.92	15.18	15.22
1993	7.666	7.516	7.523
1994	3.538	3.83	3.839
1995	1.919	1.915	1.98

year	observed	2015AM	Model B
1996	0.821	0.8712	0.7164
1997	0	0	0
1998	0	0	0
1999	0	0	0
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0.4309	0.5669	0.5973
2006	0.9617	1.075	1.129
2007	0.9571	1.116	1.202
2008	0.88	1.006	0.9983
2009	0.6026	0.7342	0.7623
2010	0	0	0
2011	0	0	0
2012	0	0	0
2013	1.248	1.173	1.223
2014	6.158	5.37	5.67
2015	8.91	7.678	8.1

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

Total catch mortality

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo
2016B/ModelComparison.TotalCatch.TCF.male.csv

year	observed	2015AM	Model B
1992	17.9	18.41	18.37
1993	8.909	8.99	8.974
1994	4.543	4.297	4.267
1995	2.806	2.92	2.865
1996	0.8583	0.998	1.161
2005	0.5792	0.8107	0.7888
2006	1.402	1.502	1.472
2007	1.612	1.682	1.62
2008	1.018	1.17	1.184
2009	0.6255	0.7486	0.7723
2013	1.372	1.584	1.582
2014	6.966	7.559	7.414
2015	9.888	10.77	10.54

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
2016B/ModelComparison.TotalCatch.TCF.female.csv

year	observed	2015AM	Model B
1992	0.3225	0.8204	0.7803
1993	0.33	0.3883	0.3453
1994	0.4077	0.283	0.2606
1995	0.565	0.05812	0.06086
1996	0.01434	0.04867	0.02059
2005	0.01412	0.007286	0.007995
2006	0.114	0.01313	0.01439
2007	0.03113	0.01394	0.01637
2008	0.004368	0.01517	0.01321
2009	0.0007281	0.03376	0.0234
2013	0.007428	0.01583	0.01843
2014	0.01243	0.06748	0.07994
2015	0.01902	0.09438	0.108

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
2016B/ModelComparison.TotalCatch.SCF.male.csv

year	observed	2015AM	Model B
1992	8.269	8.183	8.198
1993	4.664	4.658	4.681
1994	2.287	2.319	2.345
1995	1.54	1.635	1.667
1996	0.2674	0.4021	0.4327
1997	0.5616	0.5144	0.5723
1998	0.6385	0.4119	0.4885
1999	0.2232	0.1821	0.1871
2000	0.04674	0.1607	0.1618
2001	0.1038	0.1961	0.1986
2002	0.1788	0.2329	0.2409
2003	0.06193	0.2167	0.215
2004	0.02513	0.2122	0.2131
2005	0.3106	0.3415	0.328
2006	0.4693	0.4696	0.4583
2007	0.601	0.5931	0.5927
2008	0.3591	0.4209	0.4239
2009	0.4249	0.437	0.44
2010	0.4314	0.4282	0.434
2011	0.6801	0.5924	0.6063
2012	0.381	0.3737	0.3798
2013	0.5881	0.5714	0.5815
2014	1.728	1.616	1.643
2015	1.13	1.029	1.051

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
2016B/ModelComparison.TotalCatch.SCF.female.csv

year	observed	2015AM	Model B
1992	0.5738	1.118	1.109
1993	0.5822	0.7075	0.6816
1994	0.4081	0.3743	0.3559
1995	0.5646	0.2771	0.262
1996	0.07355	0.06902	0.06944
1997	0.07259	0.3093	0.08672
1998	0.05622	0.2243	0.06878
1999	0.0466	0.08884	0.0242
2000	0.006962	0.06905	0.01881
2001	0.003563	0.0776	0.02118
2002	0.01184	0.09048	0.0254
2003	0.008456	0.0803	0.02184
2004	0.004416	0.07616	0.02117
2005	0.0138	0.0679	0.03327
2006	0.05432	0.09872	0.04876
2007	0.03271	0.1208	0.062
2008	0.0159	0.08141	0.04096
2009	0.004597	0.08618	0.04157
2010	0.005022	0.08418	0.04056
2011	0.004337	0.1199	0.06105
2012	0.002776	0.07605	0.04243
2013	0.004927	0.1081	0.06106
2014	0.01612	0.3096	0.1638
2015	0.00548	0.2155	0.1066

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
2016B/ModelComparison.TotalCatch.RKF.male.csv

year	observed	2015AM	Model B
1992	0.3813	0.0487	0.03033
1993	0.9526	0.04135	0.03003
1994	0	0.0322	0.02263
1995	0	0.02422	0.01829
1996	0.008674	0.01872	0.0153
1997	0.05291	0.03122	0.02481
1998	0.0381	0.02895	0.0216
1999	0.02454	0.02952	0.02216
2000	0.02137	0.03346	0.02557
2001	0.01379	0.0421	0.03196
2002	0.01982	0.0511	0.0379
2003	0.01787	0.06139	0.04563
2004	0.01539	0.07652	0.05462
2005	0.01351	0.05811	0.04612
2006	0.008403	0.0688	0.05384
2007	0.01808	0.07309	0.05773
2008	0.08648	0.08504	0.06844
2009	0.0483	0.09177	0.07154
2010	0.01051	0.0834	0.06342
2011	0.005605	0.07322	0.05481
2012	0.0135	0.06819	0.05103

year	observed	2015AM	Model B
2013	0.03639	0.08161	0.06364
2014	0.09495	0.1067	0.08671
2015	0.05597	0.112	0.08871

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
2016B/ModelComparison.TotalCatch.RKF.female.csv

year	observed	2015AM	Model B
1992	0.009223	7.073e-06	0.2949
1993	0.06348	6.064e-06	0.2801
1994	0	4.746e-06	0.2068
1995	0	3.56e-06	0.166
1996	0.001375	2.701e-06	0.1324
1997	0.0009669	6.389e-06	0.1031
1998	0.0009392	5.154e-06	0.07912
1999	0.001251	4.562e-06	0.07081
2000	0.0007645	4.575e-06	0.07298
2001	0.0005664	5.125e-06	0.08121
2002	0.0008795	5.793e-06	0.08805
2003	0.001041	6.681e-06	0.1032
2004	0.0009072	8.043e-06	0.1203
2005	0.0005781	5.006e-07	0.02208
2006	0.0008124	5.772e-07	0.02513
2007	0.002943	6.274e-07	0.02822
2008	0.001417	7.134e-07	0.03251
2009	0.0003304	7.297e-07	0.03122
2010	0.0003171	6.423e-07	0.02639
2011	2.301e-05	5.485e-07	0.02243
2012	0.00043	5.265e-07	0.023
2013	0.0003977	6.675e-07	0.03213
2014	0.0003172	8.921e-07	0.04391
2015	0.001781	9.798e-07	0.04528

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

/Users/WilliamStockhausen/StockAssessments-Crab/Assessments/TannerCrab/2016-09/AssessmentModelRuns/NewData/Mo
2016B/ModelComparison.TotalCatch.GTF.male.csv

year	**observed**	**2015AM**	**Model B**

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
2016B/ModelComparison.TotalCatch.GTF.female.csv

year	**observed**	**2015AM**	**Model B**

Table 42. Observed and estimated total female catch mortality biomass (1000's t) in GTF.