

## WHAM output tables

Table 1. Parameter estimates, standard errors, and confidence intervals. Rounded to 3 decimal places.

	Estimate	Std. Error	95% CI lower	95% CI upper
Mean Recruitment	59257.608	8611.940	44569.580	78786.116
NAA $\sigma$ (age 1)	0.509	0.073	0.385	0.674
NAA $\sigma$ (age 2-11+)	0.272	0.022	0.232	0.318
NAA residual AR1 $\rho$ age	0.000	—	—	—
NAA residual AR1 $\rho$ year	0.000	—	—	—
Index 1 fully selected q	0.000	0.000	0.000	0.000
Index 2 fully selected q	0.000	0.000	0.000	0.000
Index 3 fully selected q	0.000	0.000	0.000	0.000
Index 4 fully selected q	0.000	0.000	0.000	0.000
Block 1: Mean $a_{50}$	4.179	0.152	3.886	4.480
Block 1: Mean 1/slope (increasing)	0.545	0.028	0.492	0.604
Block 2: Selectivity for age 1	0.012	0.004	0.007	0.022
Block 2: Selectivity for age 2	0.231	0.066	0.127	0.383
Block 2: Selectivity for age 3	0.491	0.136	0.249	0.737
Block 2: Selectivity for age 4	0.877	0.248	0.074	0.998
Block 2: Selectivity for age 5	0.949	0.286	0.000	1.000
Block 2: Selectivity for age 6	1.000	—	—	—
Block 2: Selectivity for age 7	0.820	0.249	0.142	0.992
Block 2: Selectivity for age 8	0.591	0.173	0.262	0.854
Block 2: Selectivity for age 9	0.609	0.164	0.287	0.858
Block 2: Selectivity for age 10	0.644	0.176	0.287	0.891
Block 2: Selectivity for age 11+	0.569	0.123	0.331	0.779

Table 1. Parameter estimates, standard errors, and confidence intervals. Rounded to 3 decimal places. (*continued*)

	Estimate	Std. Error	95% CI lower	95% CI upper
Block 3: Selectivity for age 1	0.076	0.015	0.052	0.110
Block 3: Selectivity for age 2	0.319	0.058	0.217	0.441
Block 3: Selectivity for age 3	0.687	0.114	0.436	0.861
Block 3: Selectivity for age 4	0.950	0.140	0.057	1.000
Block 3: Selectivity for age 5	1.000	—	—	—
Block 3: Selectivity for age 6	0.790	0.116	0.488	0.937
Block 3: Selectivity for age 7	0.692	0.111	0.448	0.861
Block 3: Selectivity for age 8	0.653	0.110	0.421	0.829
Block 3: Selectivity for age 9	0.612	0.106	0.397	0.791
Block 3: Selectivity for age 10	0.574	0.102	0.373	0.753
Block 3: Selectivity for age 11+	0.516	0.072	0.378	0.652
Block 4: Selectivity for age 1	0.165	0.024	0.123	0.217
Block 4: Selectivity for age 2	0.473	0.064	0.352	0.598
Block 4: Selectivity for age 3	0.854	0.110	0.510	0.970
Block 4: Selectivity for age 4	1.000	—	—	—
Block 4: Selectivity for age 5	0.824	0.103	0.537	0.950
Block 4: Selectivity for age 6	0.674	0.090	0.481	0.821
Block 4: Selectivity for age 7	0.427	0.060	0.315	0.546
Block 4: Selectivity for age 8	0.399	0.058	0.292	0.516
Block 4: Selectivity for age 9	0.390	0.059	0.282	0.510
Block 4: Selectivity for age 10	0.524	0.087	0.356	0.686
Block 4: Selectivity for age 11+	0.991	0.120	0.000	1.000

Table 1. Parameter estimates, standard errors, and confidence intervals. Rounded to 3 decimal places. (*continued*)

	Estimate	Std. Error	95% CI lower	95% CI upper
Block 5: Selectivity for age 1	0.352	0.133	0.148	0.629
Block 5: Selectivity for age 2	0.562	0.210	0.194	0.873
Block 5: Selectivity for age 3	1.000	—	—	—
Block 5: Selectivity for age 4	0.868	0.319	0.027	0.999
Block 5: Selectivity for age 5	0.790	0.282	0.119	0.991
Block 5: Selectivity for age 6	0.625	0.227	0.200	0.918
Block 5: Selectivity for age 7	0.552	0.208	0.192	0.865
Block 5: Selectivity for age 8	0.524	0.205	0.180	0.847
Block 5: Selectivity for age 9	0.501	0.199	0.174	0.827
Block 5: Selectivity for age 10	0.722	0.260	0.170	0.970
Block 5: Selectivity for age 11+	0.417	0.122	0.211	0.658
Block 1: Selectivity RE $\sigma$	0.276	0.041	0.207	0.368
Fleet 1 age comp, logistic-normal: $\sigma$	4.560	0.270	4.060	5.122
Index 1 age comp, logistic-normal: $\sigma$	6.943	0.349	6.292	7.662
Index 2 age comp, logistic-normal: $\sigma$	2.044	0.257	1.597	2.615
Index 3 age comp, logistic-normal: $\sigma$	3.080	0.246	2.634	3.602
Index 4 age comp, logistic-normal: $\sigma$	6.113	0.482	5.238	7.134

Table 2. Abundance at age (1000s).

	1	2	3	4	5	6	7	8	9	10	11+
1980	68642	62295	50765	33890	26402	18680	17825	7665	5696	3637	4980
1981	39477	66501	40837	36611	28372	20267	12430	10038	3758	2764	4410
1982	36118	37611	42434	26854	19184	14582	10341	6358	4768	2359	2634
1983	52479	38121	28438	33695	19815	12230	7705	4113	2446	1526	2579
1984	27877	55731	26856	17462	17443	10223	5153	2840	1189	757	1381
1985	60690	23054	40231	18268	13698	10548	6286	2454	1158	501	396
1986	40971	39491	14438	19083	9128	6608	4249	2523	912	383	394
1987	55961	35480	21711	9002	9396	4553	3204	1950	1181	377	322
1988	144385	49946	25073	11478	5523	3875	2053	1426	881	589	275
1989	40636	109109	33644	12274	4599	2412	1631	1114	668	382	499
1990	55489	37487	68283	21594	6442	2490	1463	1051	685	319	409
1991	37453	48268	24114	25910	10916	3608	1418	960	591	325	324
1992	44661	31297	28972	15378	15018	6190	1984	990	628	365	341
1993	115585	33363	24129	19537	9308	7888	3052	900	615	364	371
1994	95152	89095	24627	17065	10435	4228	3160	1464	414	321	347
1995	40840	75161	56877	24183	14288	5264	1917	1271	559	196	249
1996	47659	29608	39273	34518	13713	6582	2057	1015	550	268	277
1997	34346	41022	22546	26316	19590	6589	2707	759	481	248	281
1998	70895	24588	27259	17486	17978	11251	2815	1380	358	226	212
1999	76562	55300	23412	20504	14420	11778	5992	961	702	227	178
2000	30585	52491	38026	18511	16131	11389	8229	3515	754	399	212
2001	24907	24840	33449	24342	14166	10185	7037	4516	2081	498	296
2002	46047	17222	16784	24021	14735	7572	5268	3070	1902	914	618
2003	37286	36670	10970	10983	11940	6978	3716	2211	1153	743	699
2004	64530	31864	22013	10467	8892	7028	3729	2009	988	487	353
2005	60620	47621	17744	14141	7795	5694	3337	1795	1002	392	454
2006	102378	47839	29803	16517	11186	5237	3595	1677	838	462	351
2007	80895	76574	35129	22747	12446	7370	3133	1696	633	487	287
2008	94889	43918	47397	26659	16358	8784	4989	1754	1033	441	487
2009	80235	68142	23351	29721	21649	12664	6101	3216	1209	548	769
2010	49331	61388	39522	18089	22802	19121	9676	3820	2286	915	688

Table 2. Abundance at age (1000s). (*continued*)

	1	2	3	4	5	6	7	8	9	10	11+
2011	66187	35826	27778	21508	13698	16529	15763	8031	2898	1738	1160
2012	49169	47294	22405	15171	16363	10038	12076	10804	5328	1533	2036
2013	69620	36576	29512	13826	9116	14353	6499	7294	6418	3389	1669
2014	105542	57229	28928	21580	11097	6987	12125	4568	4758	4071	3924
2015	29335	119583	49540	23600	15123	7846	5708	8805	3275	3075	3795
2016	54561	26400	98759	33909	16608	10610	5013	4344	6112	2572	5625
2017	15706	33061	16069	58411	23405	12168	8194	3833	2860	4197	5227
2018	70931	9785	18839	10146	35936	16019	8355	5332	2962	2242	7773
2019	43350	56607	7107	13593	7317	20355	9498	5227	2685	1570	4743

Table 3. Total fishing mortality at age.

	1	2	3	4	5	6	7	8	9	10	11+
1980	0.000	0.001	0.015	0.115	0.308	0.366	0.373	0.373	0.373	0.373	0.373
1981	0.000	0.009	0.105	0.241	0.258	0.259	0.259	0.259	0.259	0.259	0.259
1982	0.001	0.009	0.092	0.342	0.436	0.445	0.446	0.446	0.446	0.446	0.446
1983	0.001	0.007	0.059	0.290	0.509	0.555	0.561	0.561	0.561	0.561	0.561
1984	0.000	0.002	0.024	0.197	0.555	0.664	0.676	0.677	0.677	0.677	0.677
1985	0.001	0.006	0.027	0.111	0.318	0.529	0.615	0.637	0.642	0.643	0.643
1986	0.003	0.015	0.075	0.239	0.383	0.428	0.437	0.438	0.439	0.439	0.439
1987	0.002	0.023	0.168	0.428	0.502	0.511	0.512	0.512	0.512	0.512	0.512
1988	0.004	0.029	0.147	0.362	0.460	0.478	0.481	0.482	0.482	0.482	0.482
1989	0.001	0.016	0.121	0.294	0.337	0.341	0.341	0.341	0.341	0.341	0.341
1990	0.002	0.013	0.065	0.209	0.327	0.361	0.367	0.368	0.369	0.369	0.369
1991	0.000	0.004	0.077	0.318	0.363	0.365	0.365	0.365	0.365	0.365	0.365
1992	0.001	0.009	0.067	0.276	0.434	0.465	0.469	0.469	0.469	0.469	0.469
1993	0.003	0.011	0.047	0.161	0.344	0.458	0.495	0.503	0.505	0.506	0.506
1994	0.001	0.007	0.032	0.127	0.334	0.508	0.571	0.586	0.589	0.590	0.590
1995	0.006	0.023	0.079	0.195	0.300	0.345	0.357	0.360	0.361	0.361	0.361
1996	0.008	0.032	0.098	0.199	0.264	0.287	0.293	0.295	0.295	0.295	0.295
1997	0.003	0.010	0.040	0.122	0.234	0.298	0.319	0.324	0.325	0.326	0.326

Table 3. Total fishing mortality at age. (*continued*)

	1	2	3	4	5	6	7	8	9	10	11+
1998	0.000	0.002	0.018	0.113	0.258	0.298	0.303	0.303	0.304	0.304	0.304
1999	0.000	0.001	0.007	0.051	0.163	0.215	0.223	0.224	0.224	0.224	0.224
2000	0.000	0.001	0.015	0.110	0.189	0.198	0.199	0.199	0.199	0.199	0.199
2001	0.001	0.006	0.030	0.105	0.195	0.233	0.242	0.244	0.244	0.244	0.244
2002	0.000	0.000	0.004	0.028	0.132	0.253	0.286	0.291	0.291	0.291	0.291
2003	0.002	0.008	0.027	0.080	0.164	0.224	0.248	0.255	0.257	0.258	0.258
2004	0.000	0.001	0.007	0.034	0.112	0.194	0.225	0.232	0.233	0.234	0.234
2005	0.001	0.004	0.017	0.054	0.111	0.147	0.159	0.162	0.162	0.162	0.162
2006	0.001	0.002	0.009	0.032	0.083	0.131	0.153	0.159	0.161	0.161	0.161
2007	0.001	0.004	0.012	0.034	0.065	0.088	0.098	0.101	0.101	0.102	0.102
2008	0.000	0.001	0.004	0.017	0.052	0.096	0.116	0.122	0.123	0.123	0.123
2009	0.000	0.002	0.007	0.023	0.058	0.097	0.116	0.122	0.124	0.124	0.124
2010	0.001	0.002	0.007	0.017	0.038	0.067	0.093	0.108	0.115	0.118	0.119
2011	0.001	0.003	0.010	0.024	0.043	0.056	0.061	0.062	0.063	0.063	0.063
2012	0.000	0.004	0.025	0.056	0.064	0.065	0.065	0.066	0.066	0.066	0.066
2013	0.000	0.002	0.010	0.031	0.052	0.060	0.061	0.062	0.062	0.062	0.062
2014	0.000	0.001	0.006	0.025	0.042	0.047	0.047	0.047	0.047	0.047	0.047
2015	0.000	0.001	0.005	0.021	0.039	0.045	0.045	0.046	0.046	0.046	0.046
2016	0.000	0.000	0.002	0.013	0.029	0.033	0.033	0.033	0.033	0.033	0.033
2017	0.000	0.001	0.003	0.013	0.025	0.030	0.031	0.031	0.031	0.031	0.031
2018	0.000	0.001	0.003	0.014	0.025	0.028	0.028	0.028	0.028	0.028	0.028
2019	0.000	0.001	0.005	0.018	0.031	0.035	0.036	0.036	0.036	0.036	0.036