

## 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	332355.159	61796.744	230851.940	478488.296
NAA $\sigma$ (age 1)	1.025	0.110	0.831	1.265
NAA $\sigma$ (age 2-10+)	0.217	0.032	0.163	0.289
NAA residual AR1 $\rho$ age	0.000	—	—	—
NAA residual AR1 $\rho$ year	0.000	—	—	—
Index 1 fully selected q	0.003	0.000	0.002	0.004
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
Block 1: Selectivity for age 1	0.154	0.017	0.125	0.189
Block 1: Selectivity for age 2	0.484	0.041	0.404	0.565
Block 1: Selectivity for age 3	0.816	0.053	0.690	0.899
Block 1: Selectivity for age 4	1.000	—	—	—
Block 1: Selectivity for age 5	1.000	—	—	—
Block 1: Selectivity for age 6	1.000	—	—	—
Block 1: Selectivity for age 7	1.000	—	—	—
Block 1: Selectivity for age 8	1.000	—	—	—
Block 1: Selectivity for age 9	1.000	—	—	—
Block 1: Selectivity for age 10+	1.000	—	—	—
Block 2: Selectivity for age 1	1.000	—	—	—
Block 2: Selectivity for age 2	1.000	—	—	—
Block 2: Selectivity for age 3	1.000	—	—	—
Block 2: Selectivity for age 4	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 2: Selectivity for age 5	1.000	—	—	—
Block 2: Selectivity for age 6	1.000	—	—	—
Block 2: Selectivity for age 7	1.000	—	—	—
Block 2: Selectivity for age 8	1.000	—	—	—
Block 2: Selectivity for age 9	1.000	—	—	—
Block 2: Selectivity for age 10+	1.000	—	—	—
Block 3: Selectivity for age 1	0.000	—	—	—
Block 3: Selectivity for age 2	0.000	—	—	—
Block 3: Selectivity for age 3	1.000	—	—	—
Block 3: Selectivity for age 4	0.516	0.157	0.237	0.785
Block 3: Selectivity for age 5	0.280	0.112	0.116	0.536
Block 3: Selectivity for age 6	0.262	0.105	0.109	0.507
Block 3: Selectivity for age 7	0.000	—	—	—
Block 3: Selectivity for age 8	0.000	—	—	—
Block 3: Selectivity for age 9	0.000	—	—	—
Block 3: Selectivity for age 10+	0.000	—	—	—
Block 4: Selectivity for age 1	0.000	—	—	—
Block 4: Selectivity for age 2	0.000	—	—	—
Block 4: Selectivity for age 3	1.000	—	—	—
Block 4: Selectivity for age 4	0.736	0.123	0.446	0.907
Block 4: Selectivity for age 5	0.601	0.130	0.343	0.813
Block 4: Selectivity for age 6	0.483	0.121	0.266	0.707

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 4: Selectivity for age 7	0.636	0.172	0.289	0.882
Block 4: Selectivity for age 8	0.628	0.188	0.258	0.891
Block 4: Selectivity for age 9	0.960	0.303	0.000	1.000
Block 4: Selectivity for age 10+	0.715	0.229	0.216	0.958
Fleet 1 age comp, logistic-normal: $\sigma$	42.493	3.801	35.660	50.634
Fleet 1 age comp, logistic-normal: $\rho$	0.913	0.017	0.874	0.940
Index 2 age comp, logistic-normal: $\sigma$	37.623	6.154	27.304	51.842
Index 2 age comp, logistic-normal: $\rho$	0.583	0.161	0.275	0.837
Index 3 age comp, logistic-normal: $\sigma$	36.501	3.436	30.352	43.897
Index 3 age comp, logistic-normal: $\rho$	0.684	0.067	0.541	0.800

Table 2. Abundance at age (1000s).

	1	2	3	4	5	6	7	8	9	10+
1968	2313522	1734468	1077064	553266	255875	118337	54729	25311	11706	10072
1969	587399	2699259	1432835	746795	263524	150283	83550	45547	19240	16827
1970	2299085	555333	2564915	1108937	437019	148609	90264	63757	35023	25418
1971	964623	1718650	575296	1959950	739734	255667	83744	56088	42668	39597
1972	744282	751456	1145511	527891	1230602	396746	143647	40490	35391	46096
1973	767255	624138	515302	670632	421210	707474	210272	75409	23200	42960
1974	965584	561539	430600	259638	350217	252774	332490	101648	34539	30317
1975	1212118	786498	306186	230785	114979	170978	125980	141967	44636	27431
1976	182695	843134	452532	139657	90108	45506	69051	52891	53252	28334
1977	64102	136726	360719	159177	44102	28009	14119	22324	16204	26278
1978	46207	44415	94468	199579	84601	26856	15338	7031	13183	24589
1979	132935	44432	24903	67353	141060	58448	19614	10989	5071	28168
1980	35114	107348	29098	18014	46047	98126	36884	12842	8171	21806
1981	152077	26241	81257	17351	14162	32643	68158	26514	8740	21751
1982	396755	104781	17064	63861	9491	10629	21629	44734	18082	20074
1983	1584416	307963	68969	11926	43394	6296	6066	16943	28761	25767
1984	50922	1248712	235169	40191	8030	28911	4622	4004	10743	38921
1985	316087	39650	996754	164999	23999	5338	24269	3308	2768	34001
1986	124533	196010	38925	696672	110577	14648	3362	18568	1941	23241
1987	118798	100384	107860	32132	494037	67004	9770	2152	12900	15484
1988	427561	92916	64100	55298	21226	296640	36430	5204	1386	17434
1989	488407	323519	60010	35875	28747	9327	178757	15869	2704	10292
1990	162544	399479	222765	32239	19845	16268	4519	105913	7649	6654
1991	147845	119353	277785	112192	14266	9271	7292	2269	47263	6380
1992	157390	124616	66668	163160	60125	7541	4434	3667	1305	26393
1993	59713	120368	90486	39104	99251	32702	4713	2183	2316	15207
1994	182018	35822	96629	63627	20382	60175	17612	2773	1121	9003
1995	189098	129435	18855	60716	38333	9970	31090	9241	1377	4603
1996	160655	135640	85548	9469	37237	24307	5436	16163	5291	2985
1997	217136	118144	76787	35804	4093	15942	11163	2140	6682	3501
1998	88062	164209	68034	35661	11887	1699	6682	4454	816	3552

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

	1	2	3	4	5	6	7	8	9	10+
1999	126098	67596	90973	30636	13743	4209	626	2719	1628	1562
2000	715810	95612	38690	37462	10976	4800	1389	236	988	982
2001	184889	575973	64489	20729	18491	5121	2132	592	136	872
2002	202708	138815	518596	34801	10830	9075	2801	944	274	486
2003	366893	144110	92141	322551	19389	5258	4234	1389	407	378
2004	727589	298830	72012	44496	159764	8528	2376	1500	641	343
2005	226167	545797	145600	23391	12093	49846	2347	701	311	269
2006	515855	156959	315084	49009	6225	3407	14809	638	167	148
2007	109829	347832	74464	95088	10412	1264	742	3404	130	62
2008	233454	74920	182164	23716	27834	2601	320	189	951	50
2009	206995	159752	35822	68864	6726	9339	720	89	49	323
2010	51598	123430	53509	6725	10430	942	1475	117	9	56
2011	149952	24026	27578	4565	376	571	50	78	6	4
2012	82890	100353	7854	6702	723	68	91	8	12	2
2013	59751	55875	40901	1734	1411	116	13	16	2	3
2014	92388	36900	26611	11657	464	303	21	3	4	1
2015	133251	56701	16247	9173	2755	162	58	5	1	1
2016	318606	89177	23300	5105	2555	777	44	15	1	1
2017	32515	232231	43728	8868	1607	875	232	14	5	1
2018	127565	21707	126972	17998	3430	510	312	73	5	2
2019	74406	81415	13701	49163	6062	1399	175	105	25	2
2020	95496	49978	45014	6379	17397	2314	621	56	39	10
2021	98710	64537	24025	14398	1852	4600	650	172	16	14
2022	285861	72746	33062	9776	4976	503	1877	228	60	10

Table 3. Total fishing mortality at age.

	1	2	3	4	5	6	7	8	9	10+
1968	0.017	0.052	0.087	0.107	0.107	0.107	0.107	0.107	0.107	0.107
1969	0.020	0.064	0.108	0.132	0.132	0.132	0.132	0.132	0.132	0.132
1970	0.032	0.101	0.171	0.209	0.209	0.209	0.209	0.209	0.209	0.209

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

	1	2	3	4	5	6	7	8	9	10+
1971	0.050	0.156	0.264	0.323	0.323	0.323	0.323	0.323	0.323	0.323
1972	0.053	0.167	0.282	0.346	0.346	0.346	0.346	0.346	0.346	0.346
1973	0.078	0.245	0.413	0.506	0.506	0.506	0.506	0.506	0.506	0.506
1974	0.092	0.289	0.487	0.597	0.597	0.597	0.597	0.597	0.597	0.597
1975	0.114	0.359	0.606	0.742	0.742	0.742	0.742	0.742	0.742	0.742
1976	0.149	0.468	0.789	0.967	0.967	0.967	0.967	0.967	0.967	0.967
1977	0.061	0.192	0.324	0.397	0.397	0.397	0.397	0.397	0.397	0.397
1978	0.022	0.070	0.118	0.145	0.145	0.145	0.145	0.145	0.145	0.145
1979	0.030	0.093	0.157	0.192	0.192	0.192	0.192	0.192	0.192	0.192
1980	0.025	0.078	0.132	0.162	0.162	0.162	0.162	0.162	0.162	0.162
1981	0.033	0.102	0.172	0.211	0.211	0.211	0.211	0.211	0.211	0.211
1982	0.031	0.099	0.166	0.204	0.204	0.204	0.204	0.204	0.204	0.204
1983	0.031	0.096	0.162	0.199	0.199	0.199	0.199	0.199	0.199	0.199
1984	0.024	0.075	0.126	0.155	0.155	0.155	0.155	0.155	0.155	0.155
1985	0.034	0.107	0.180	0.221	0.221	0.221	0.221	0.221	0.221	0.221
1986	0.033	0.105	0.176	0.216	0.216	0.216	0.216	0.216	0.216	0.216
1987	0.049	0.155	0.261	0.320	0.320	0.320	0.320	0.320	0.320	0.320
1988	0.069	0.216	0.365	0.447	0.447	0.447	0.447	0.447	0.447	0.447
1989	0.065	0.205	0.346	0.424	0.424	0.424	0.424	0.424	0.424	0.424
1990	0.087	0.273	0.461	0.564	0.564	0.564	0.564	0.564	0.564	0.564
1991	0.068	0.215	0.362	0.444	0.444	0.444	0.444	0.444	0.444	0.444
1992	0.051	0.161	0.272	0.333	0.333	0.333	0.333	0.333	0.333	0.333
1993	0.054	0.170	0.287	0.351	0.351	0.351	0.351	0.351	0.351	0.351
1994	0.068	0.213	0.359	0.440	0.440	0.440	0.440	0.440	0.440	0.440
1995	0.055	0.172	0.291	0.356	0.356	0.356	0.356	0.356	0.356	0.356
1996	0.096	0.301	0.507	0.621	0.621	0.621	0.621	0.621	0.621	0.621
1997	0.109	0.343	0.578	0.708	0.708	0.708	0.708	0.708	0.708	0.708
1998	0.114	0.356	0.601	0.736	0.736	0.736	0.736	0.736	0.736	0.736
1999	0.124	0.388	0.654	0.801	0.801	0.801	0.801	0.801	0.801	0.801
2000	0.075	0.237	0.400	0.490	0.490	0.490	0.490	0.490	0.490	0.490
2001	0.071	0.222	0.374	0.458	0.458	0.458	0.458	0.458	0.458	0.458

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

	1	2	3	4	5	6	7	8	9	10+
2002	0.074	0.231	0.390	0.477	0.477	0.477	0.477	0.477	0.477	0.477
2003	0.094	0.294	0.496	0.607	0.607	0.607	0.607	0.607	0.607	0.607
2004	0.167	0.526	0.887	1.086	1.086	1.086	1.086	1.086	1.086	1.086
2005	0.167	0.523	0.882	1.081	1.081	1.081	1.081	1.081	1.081	1.081
2006	0.203	0.638	1.076	1.318	1.318	1.318	1.318	1.318	1.318	1.318
2007	0.170	0.533	0.898	1.100	1.100	1.100	1.100	1.100	1.100	1.100
2008	0.154	0.483	0.814	0.997	0.997	0.997	0.997	0.997	0.997	0.997
2009	0.268	0.841	1.418	1.737	1.737	1.737	1.737	1.737	1.737	1.737
2010	0.418	1.311	2.210	2.708	2.708	2.708	2.708	2.708	2.708	2.708
2011	0.242	0.760	1.281	1.570	1.570	1.570	1.570	1.570	1.570	1.570
2012	0.225	0.707	1.192	1.460	1.460	1.460	1.460	1.460	1.460	1.460
2013	0.195	0.613	1.033	1.265	1.265	1.265	1.265	1.265	1.265	1.265
2014	0.178	0.560	0.944	1.156	1.156	1.156	1.156	1.156	1.156	1.156
2015	0.167	0.523	0.881	1.080	1.080	1.080	1.080	1.080	1.080	1.080
2016	0.139	0.438	0.738	0.904	0.904	0.904	0.904	0.904	0.904	0.904
2017	0.128	0.403	0.679	0.832	0.832	0.832	0.832	0.832	0.832	0.832
2018	0.124	0.391	0.659	0.807	0.807	0.807	0.807	0.807	0.807	0.807
2019	0.114	0.358	0.604	0.740	0.740	0.740	0.740	0.740	0.740	0.740
2020	0.162	0.508	0.856	1.049	1.049	1.049	1.049	1.049	1.049	1.049
2021	0.129	0.404	0.681	0.835	0.835	0.835	0.835	0.835	0.835	0.835
2022	0.021	0.067	0.113	0.138	0.138	0.138	0.138	0.138	0.138	0.138