

## 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
NAA $\sigma$ (age 1)	0.807	0.104	0.626	1.039
NAA $\sigma$ (age 2-10+)	0.476	0.030	0.421	0.538
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: Mean Selectivity for age 1	0.096	0.012	0.075	0.122
Block 1: Mean Selectivity for age 2	0.333	0.038	0.264	0.410
Block 1: Mean Selectivity for age 3	0.557	0.054	0.451	0.659
Block 1: Mean Selectivity for age 4	0.635	0.056	0.521	0.736
Block 1: Mean Selectivity for age 5	0.703	0.059	0.576	0.805
Block 1: Mean Selectivity for age 6	0.782	0.063	0.634	0.882
Block 1: Mean Selectivity for age 7	1.000	—	—	—
Block 1: Mean Selectivity for age 8	1.000	—	—	—
Block 1: Mean Selectivity for age 9	1.000	—	—	—
Block 1: Mean 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	—	—	—
Block 2: Selectivity for age 5	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 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	0.454	0.187	0.159	0.786
Block 3: Selectivity for age 5	0.223	0.093	0.091	0.451
Block 3: Selectivity for age 6	0.196	0.066	0.097	0.357
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	0.684	0.164	0.329	0.906
Block 4: Selectivity for age 5	0.515	0.122	0.290	0.734
Block 4: Selectivity for age 6	0.443	0.085	0.288	0.610
Block 4: Selectivity for age 7	0.000	—	—	—

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 4: Selectivity for age 8	0.000	—	—	—
Block 4: Selectivity for age 9	0.000	—	—	—
Block 4: Selectivity for age 10+	0.000	—	—	—
Block 1: Selectivity RE $\sigma$	0.292	0.115	0.135	0.630
Block 1: Selectivity RE AR1 $\rho$ (year)	-0.870	0.109	-0.976	-0.428
Fleet 1 age comp, logistic-normal: $\sigma$	15.727	0.922	14.020	17.642
Index 2 age comp, logistic-normal: $\sigma$	34.543	5.108	25.852	46.158
Index 3 age comp, logistic-normal: $\sigma$	30.326	3.066	24.874	36.972

Table 2. Abundance at age (1000s).

	1	2	3	4	5	6	7	8	9	10+
1968	4444127	3017057	1520673	646293	262599	103077	39017	13619	4754	2549
1969	1641101	5198639	2172903	719737	141836	67863	38663	30584	10980	63824
1970	3701088	996544	3930738	1277593	284258	61548	35431	32971	32749	41061
1971	1906210	2492016	834460	2577198	753914	152976	33863	20657	17721	56678
1972	1195208	1073736	1452242	722335	1403505	328099	75917	15711	14449	32991
1973	1696844	1007671	728900	802707	504234	629739	129724	31717	8202	14307
1974	1923901	982951	519108	302702	409767	265666	266713	61644	13163	7836
1975	1782030	1440091	356350	242636	122569	182820	119970	91660	26632	6731
1976	291522	1159733	678528	160869	97562	49679	74588	51307	31727	19558
1977	91698	196180	435909	216476	54786	31037	15947	19520	13188	10743
1978	48102	48124	103455	219486	108292	34130	14377	7167	12856	23395
1979	138362	53326	20003	54794	136655	73392	22078	8633	5278	22453
1980	91827	143723	30578	16477	40032	102507	32890	11675	5267	13739
1981	328671	46947	99494	17397	16426	35154	56592	18808	7854	9656
1982	786730	187060	18615	55300	7408	14330	21199	36224	11408	15239
1983	1337262	498087	107491	13421	28778	3540	4506	15635	24871	23695
1984	127811	1273942	337385	56324	9003	13582	2383	2625	10825	61676
1985	414711	59562	1151827	206306	23842	4387	13257	1517	1593	51378
1986	213438	280212	60500	947549	146761	13832	2607	11219	862	23641
1987	183131	135022	124675	45936	751573	91287	9694	1774	7592	13498
1988	404523	108774	59892	52266	29704	503815	46728	5676	1607	12620
1989	355289	280289	67321	39441	30878	12746	335021	18875	2848	8717
1990	179370	359172	221329	43220	28648	22553	6388	219467	9139	4425
1991	144781	130248	329870	141155	21779	17200	12446	4106	109847	4108
1992	173707	124044	67287	203068	89084	11639	7358	6392	2744	60340
1993	145498	131954	89185	42134	128001	49064	6889	3618	4501	28108
1994	278844	58816	127051	82192	25757	79343	23322	3272	1595	11135
1995	322062	183791	25014	86157	62730	14836	41929	11994	1549	3564
1996	237515	198198	113584	11025	50390	50241	8545	23711	6188	1771
1997	216148	149852	100137	49031	6054	20306	19918	4246	10833	3107
1998	88805	161222	80398	46711	16707	3282	9597	8295	1545	4129

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

	1	2	3	4	5	6	7	8	9	10+
1999	126805	63961	100378	40583	19985	5751	978	3235	2577	1699
2000	388304	94994	42301	44955	14958	5939	1641	246	607	651
2001	185123	356043	71839	25847	23624	6398	1544	607	158	158
2002	217956	140625	557135	40491	12734	9896	3484	139	103	58
2003	312287	151847	119074	501126	31129	6633	6556	2549	6	61
2004	482204	255471	64668	51769	240563	12140	3329	2053	2578	28
2005	222234	412030	151006	29164	19031	101773	4375	789	214	482
2006	288269	134980	346040	71773	10908	6191	37669	1009	97	53
2007	113570	251085	88256	135234	20876	2359	1864	8716	185	8
2008	227810	74548	188531	29083	33937	4521	540	342	2050	34
2009	243235	170083	37689	75959	8794	10606	1003	92	54	648
2010	79422	136580	54011	7828	13526	1489	2043	101	3	72
2011	107823	25010	30783	7746	1026	1178	190	187	12	15
2012	75601	88370	8547	7653	1275	157	80	6	4	1
2013	88073	53821	37537	1608	1599	219	42	7	1	1
2014	139082	54632	27324	10578	382	151	11	3	0	0
2015	207209	71711	22146	10341	3525	245	27	6	1	0
2016	212846	107336	24617	6889	3688	1374	62	2	1	0
2017	50540	204065	47432	10727	2847	1651	352	21	1	0
2018	83560	20555	126396	21731	4097	746	413	21	2	0
2019	83902	73510	14672	48777	6665	1603	220	87	5	1
2020	85280	51568	50627	7413	16123	2290	428	27	9	1
2021	113475	60274	23678	15989	2121	3297	684	91	11	2
2022	286359	84906	29323	7322	3528	268	972	259	16	2

Table 3. Total fishing mortality at age.

	1	2	3	4	5	6	7	8	9	10+
1968	0.017	0.044	0.060	0.064	0.067	0.071	0.078	0.078	0.078	0.078
1969	0.010	0.040	0.079	0.096	0.113	0.135	0.219	0.219	0.219	0.219
1970	0.030	0.093	0.141	0.155	0.167	0.180	0.213	0.213	0.213	0.213

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

	1	2	3	4	5	6	7	8	9	10+
1971	0.039	0.134	0.226	0.259	0.287	0.320	0.411	0.411	0.411	0.411
1972	0.037	0.137	0.246	0.288	0.325	0.372	0.514	0.514	0.514	0.514
1973	0.086	0.267	0.405	0.448	0.482	0.521	0.615	0.615	0.615	0.615
1974	0.059	0.221	0.403	0.474	0.539	0.621	0.878	0.878	0.878	0.878
1975	0.124	0.364	0.532	0.581	0.621	0.664	0.766	0.766	0.766	0.766
1976	0.075	0.292	0.550	0.657	0.757	0.887	1.320	1.320	1.320	1.320
1977	0.069	0.195	0.277	0.300	0.318	0.338	0.383	0.383	0.383	0.383
1978	0.011	0.043	0.084	0.103	0.121	0.145	0.237	0.237	0.237	0.237
1979	0.041	0.116	0.164	0.177	0.188	0.199	0.225	0.225	0.225	0.225
1980	0.013	0.053	0.101	0.122	0.141	0.167	0.256	0.256	0.256	0.256
1981	0.042	0.119	0.168	0.182	0.193	0.205	0.232	0.232	0.232	0.232
1982	0.016	0.062	0.121	0.145	0.169	0.200	0.310	0.310	0.310	0.310
1983	0.035	0.094	0.131	0.141	0.148	0.157	0.175	0.175	0.175	0.175
1984	0.012	0.048	0.095	0.115	0.135	0.162	0.265	0.265	0.265	0.265
1985	0.035	0.105	0.154	0.168	0.180	0.193	0.223	0.223	0.223	0.223
1986	0.019	0.072	0.130	0.152	0.172	0.197	0.273	0.273	0.273	0.273
1987	0.034	0.109	0.174	0.195	0.212	0.232	0.283	0.283	0.283	0.283
1988	0.034	0.119	0.204	0.234	0.261	0.292	0.382	0.382	0.382	0.382
1989	0.032	0.111	0.188	0.215	0.238	0.266	0.344	0.344	0.344	0.344
1990	0.049	0.167	0.275	0.312	0.344	0.381	0.480	0.480	0.480	0.480
1991	0.036	0.127	0.218	0.250	0.279	0.313	0.409	0.409	0.409	0.409
1992	0.033	0.111	0.180	0.203	0.222	0.244	0.303	0.303	0.303	0.303
1993	0.030	0.108	0.190	0.221	0.249	0.282	0.382	0.382	0.382	0.382
1994	0.047	0.153	0.245	0.275	0.301	0.329	0.404	0.404	0.404	0.404
1995	0.028	0.100	0.173	0.199	0.223	0.251	0.331	0.331	0.331	0.331
1996	0.053	0.177	0.286	0.322	0.352	0.387	0.478	0.478	0.478	0.478
1997	0.058	0.207	0.357	0.412	0.460	0.517	0.681	0.681	0.681	0.681
1998	0.083	0.276	0.445	0.501	0.548	0.603	0.745	0.745	0.745	0.745
1999	0.078	0.292	0.532	0.626	0.712	0.820	1.157	1.157	1.157	1.157
2000	0.088	0.274	0.421	0.467	0.504	0.546	0.649	0.649	0.649	0.649
2001	0.075	0.285	0.524	0.618	0.705	0.815	1.162	1.162	1.162	1.162

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

	1	2	3	4	5	6	7	8	9	10+
2002	0.063	0.218	0.365	0.416	0.460	0.512	0.654	0.654	0.654	0.654
2003	0.060	0.201	0.326	0.368	0.404	0.445	0.553	0.553	0.553	0.553
2004	0.115	0.406	0.694	0.797	0.887	0.994	1.297	1.297	1.297	1.297
2005	0.120	0.431	0.747	0.863	0.965	1.088	1.443	1.443	1.443	1.443
2006	0.161	0.548	0.905	1.027	1.132	1.254	1.581	1.581	1.581	1.581
2007	0.119	0.427	0.739	0.853	0.954	1.075	1.421	1.421	1.421	1.421
2008	0.136	0.452	0.728	0.820	0.898	0.987	1.220	1.220	1.220	1.220
2009	0.180	0.661	1.177	1.372	1.548	1.764	2.412	2.412	2.412	2.412
2010	0.355	1.019	1.469	1.598	1.699	1.810	2.068	2.068	2.068	2.068
2011	0.158	0.630	1.232	1.492	1.744	2.080	3.306	3.306	3.306	3.306
2012	0.262	0.770	1.126	1.230	1.313	1.404	1.619	1.619	1.619	1.619
2013	0.153	0.599	1.145	1.374	1.592	1.877	2.860	2.860	2.860	2.860
2014	0.173	0.474	0.664	0.717	0.758	0.802	0.902	0.902	0.902	0.902
2015	0.087	0.348	0.688	0.837	0.983	1.180	1.916	1.916	1.916	1.916
2016	0.149	0.412	0.578	0.624	0.660	0.699	0.787	0.787	0.787	0.787
2017	0.093	0.371	0.732	0.890	1.044	1.251	2.023	2.023	2.023	2.023
2018	0.148	0.441	0.651	0.713	0.763	0.817	0.948	0.948	0.948	0.948
2019	0.090	0.349	0.662	0.791	0.914	1.072	1.611	1.611	1.611	1.611
2020	0.163	0.496	0.746	0.821	0.882	0.949	1.113	1.113	1.113	1.113
2021	0.101	0.376	0.678	0.794	0.900	1.032	1.436	1.436	1.436	1.436
2022	0.023	0.074	0.113	0.125	0.135	0.147	0.175	0.175	0.175	0.175