

## 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)	0.863	0.113	0.668	1.116
NAA $\sigma$ (age 2-10+)	0.507	0.029	0.453	0.568
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	0.107	0.014	0.084	0.137
Block 1: Selectivity for age 2	0.354	0.038	0.283	0.432
Block 1: Selectivity for age 3	0.588	0.057	0.473	0.694
Block 1: Selectivity for age 4	0.687	0.064	0.550	0.797
Block 1: Selectivity for age 5	0.754	0.069	0.595	0.864
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	—	—	—
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	0.450	0.183	0.161	0.778
Block 3: Selectivity for age 5	0.224	0.093	0.092	0.451
Block 3: Selectivity for age 6	0.208	0.070	0.102	0.377
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	0.687	0.161	0.336	0.905
Block 4: Selectivity for age 5	0.522	0.122	0.296	0.740
Block 4: Selectivity for age 6	0.465	0.088	0.302	0.636
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	—	—	—
Fleet 1 age comp, logistic-normal: $\sigma$	17.321	1.050	15.380	19.506
Index 2 age comp, logistic-normal: $\sigma$	33.877	5.175	25.112	45.702
Index 3 age comp, logistic-normal: $\sigma$	29.239	3.123	23.717	36.048

Table 2. Abundance at age (1000s).

	1	2	3	4	5	6	7	8	9	10+
1968	3719607	2757421	1628285	774209	335965	137045	44524	14465	4700	2262
1969	1365625	4283107	1965371	703650	149540	72552	47603	35139	12198	82287
1970	3969340	1003650	3755948	1251927	287436	62339	37427	37704	36704	41954
1971	1854569	2571380	842437	2525803	736524	149057	34308	21579	19331	60710
1972	1129465	1033314	1464941	713577	1368812	316516	74732	16575	15141	37075
1973	1798649	1007316	722486	824990	502768	617541	128383	32521	8889	14262
1974	1819445	969036	503700	300945	425202	263930	253290	63147	12996	8802
1975	1906784	1471264	352496	242337	121104	187645	117986	94885	30492	6558
1976	269489	1134501	679093	159560	96579	49522	68323	49795	29247	21808
1977	100797	200023	430475	215346	54388	31196	15628	21933	16486	10467
1978	42308	44800	98643	209195	105676	32788	15172	7648	14098	30797
1979	157130	53365	19772	54407	137453	74052	22223	9268	5661	21708
1980	83127	140621	28304	15839	39616	104149	35064	12841	5763	17203
1981	372755	47862	103774	16926	16601	35690	59298	20140	9011	9368
1982	710039	184785	17275	54145	7280	14733	22707	40688	12178	19430
1983	1495302	519538	112123	13291	27018	3498	4658	16949	29630	22334
1984	112270	1197826	320907	57028	8858	11118	2489	2804	11917	78913
1985	448480	61926	1176596	202971	24297	4332	12381	1641	1718	51069
1986	200058	275323	59737	954058	143503	13335	2652	11156	930	26745
1987	191907	134695	123853	46019	769361	89452	9606	1865	7859	13899
1988	398101	110730	59336	51771	29730	509296	46857	5829	1676	13646
1989	363294	283665	68453	39528	30669	12789	352133	20469	3104	9632
1990	187552	377836	224661	43247	28476	22573	6565	236579	9944	4771
1991	150227	134767	352532	146629	21276	17413	12768	4408	120091	4649
1992	185426	131967	70767	216563	93081	11559	7631	6952	2995	65396
1993	144497	137880	93813	43933	134194	49920	7113	3914	4977	32595
1994	298155	62344	136347	86348	26866	81587	24311	3564	1789	12057
1995	323487	190632	26461	90872	66903	15151	43802	13034	1724	4100
1996	249995	204880	116363	11511	51656	53356	8753	25027	6772	1898
1997	214599	153353	101679	50333	6379	19777	20349	4467	11349	3449
1998	91654	164467	82368	46827	16494	3447	9231	8629	1698	4334

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

	1	2	3	4	5	6	7	8	9	10+
1999	120605	63200	102060	40589	19639	5520	932	3125	2543	1859
2000	412859	97305	43363	45334	15032	5932	1598	274	689	676
2001	175774	363835	73038	25707	22685	6058	1349	573	155	171
2002	225763	143733	590766	42221	13167	9657	3552	152	128	66
2003	324040	156468	124239	520854	31903	6184	6214	2692	7	78
2004	463418	255995	65292	52633	238502	11842	3019	1978	2647	36
2005	214538	402289	149349	28762	18593	100394	3820	753	220	496
2006	289119	135056	353825	72976	10874	6162	35003	1025	104	56
2007	110757	250212	88455	134933	20493	2239	1606	8382	181	8
2008	225687	73608	195325	28392	32422	4426	470	336	2116	34
2009	230397	164999	37471	76689	8246	9867	843	79	53	629
2010	84944	140745	54609	7983	14310	1524	1682	117	3	76
2011	93434	24862	30319	7818	978	1130	120	107	11	14
2012	84171	88316	8548	7902	1439	157	93	9	4	2
2013	83969	54166	36584	1534	1417	225	19	7	1	1
2014	153747	56841	27137	10820	400	147	13	3	1	0
2015	182728	70199	22533	9612	3311	223	17	6	1	0
2016	231465	107153	24744	7183	3733	1588	62	2	2	0
2017	44128	196895	45346	9855	2543	1404	347	15	0	0
2018	92295	20796	128153	22327	4166	775	391	23	3	0
2019	76666	74029	14221	49566	6510	1558	185	69	5	1
2020	89898	50874	50599	7458	16656	2443	448	35	9	1
2021	102553	58032	22665	15277	1950	3007	567	87	12	2
2022	282706	79148	27591	6661	3298	227	781	227	19	3

Table 3. Total fishing mortality at age.

	1	2	3	4	5	6	7	8	9	10+
1968	0.011	0.035	0.059	0.068	0.075	0.100	0.100	0.100	0.100	0.100
1969	0.016	0.052	0.086	0.100	0.110	0.146	0.146	0.146	0.146	0.146
1970	0.026	0.085	0.141	0.165	0.181	0.240	0.240	0.240	0.240	0.240

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

	1	2	3	4	5	6	7	8	9	10+
1971	0.041	0.134	0.223	0.260	0.285	0.378	0.378	0.378	0.378	0.378
1972	0.046	0.151	0.251	0.293	0.321	0.426	0.426	0.426	0.426	0.426
1973	0.067	0.220	0.367	0.428	0.470	0.623	0.623	0.623	0.623	0.623
1974	0.078	0.255	0.425	0.496	0.545	0.723	0.723	0.723	0.723	0.723
1975	0.091	0.298	0.496	0.579	0.636	0.843	0.843	0.843	0.843	0.843
1976	0.111	0.364	0.606	0.708	0.777	1.030	1.030	1.030	1.030	1.030
1977	0.046	0.153	0.254	0.297	0.326	0.432	0.432	0.432	0.432	0.432
1978	0.018	0.059	0.098	0.114	0.125	0.166	0.166	0.166	0.166	0.166
1979	0.025	0.083	0.138	0.162	0.177	0.235	0.235	0.235	0.235	0.235
1980	0.020	0.065	0.108	0.126	0.139	0.184	0.184	0.184	0.184	0.184
1981	0.026	0.085	0.142	0.166	0.182	0.242	0.242	0.242	0.242	0.242
1982	0.025	0.082	0.136	0.158	0.174	0.231	0.231	0.231	0.231	0.231
1983	0.024	0.078	0.129	0.151	0.165	0.219	0.219	0.219	0.219	0.219
1984	0.018	0.060	0.100	0.117	0.128	0.170	0.170	0.170	0.170	0.170
1985	0.027	0.089	0.147	0.172	0.189	0.250	0.250	0.250	0.250	0.250
1986	0.024	0.079	0.131	0.153	0.167	0.222	0.222	0.222	0.222	0.222
1987	0.029	0.096	0.160	0.187	0.206	0.273	0.273	0.273	0.273	0.273
1988	0.033	0.108	0.180	0.210	0.231	0.306	0.306	0.306	0.306	0.306
1989	0.034	0.112	0.187	0.218	0.239	0.318	0.318	0.318	0.318	0.318
1990	0.047	0.156	0.259	0.303	0.332	0.441	0.441	0.441	0.441	0.441
1991	0.038	0.125	0.207	0.242	0.266	0.353	0.353	0.353	0.353	0.353
1992	0.030	0.098	0.163	0.191	0.210	0.278	0.278	0.278	0.278	0.278
1993	0.033	0.108	0.180	0.210	0.230	0.306	0.306	0.306	0.306	0.306
1994	0.039	0.129	0.214	0.250	0.274	0.364	0.364	0.364	0.364	0.364
1995	0.030	0.099	0.164	0.192	0.211	0.279	0.279	0.279	0.279	0.279
1996	0.047	0.156	0.259	0.303	0.332	0.441	0.441	0.441	0.441	0.441
1997	0.063	0.208	0.346	0.404	0.444	0.589	0.589	0.589	0.589	0.589
1998	0.079	0.260	0.432	0.505	0.554	0.735	0.735	0.735	0.735	0.735
1999	0.096	0.315	0.524	0.612	0.672	0.891	0.891	0.891	0.891	0.891
2000	0.076	0.250	0.416	0.486	0.533	0.708	0.708	0.708	0.708	0.708
2001	0.087	0.286	0.475	0.555	0.609	0.808	0.808	0.808	0.808	0.808

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

	1	2	3	4	5	6	7	8	9	10+
2002	0.062	0.205	0.341	0.399	0.437	0.580	0.580	0.580	0.580	0.580
2003	0.056	0.184	0.306	0.358	0.392	0.521	0.521	0.521	0.521	0.521
2004	0.127	0.418	0.695	0.811	0.890	1.181	1.181	1.181	1.181	1.181
2005	0.132	0.434	0.722	0.843	0.926	1.228	1.228	1.228	1.228	1.228
2006	0.164	0.539	0.896	1.047	1.149	1.525	1.525	1.525	1.525	1.525
2007	0.136	0.448	0.745	0.870	0.955	1.267	1.267	1.267	1.267	1.267
2008	0.131	0.431	0.717	0.838	0.920	1.220	1.220	1.220	1.220	1.220
2009	0.216	0.709	1.180	1.378	1.513	2.007	2.007	2.007	2.007	2.007
2010	0.254	0.836	1.390	1.624	1.782	2.364	2.364	2.364	2.364	2.364
2011	0.232	0.764	1.271	1.485	1.629	2.162	2.162	2.162	2.162	2.162
2012	0.215	0.708	1.177	1.375	1.509	2.002	2.002	2.002	2.002	2.002
2013	0.201	0.663	1.102	1.288	1.413	1.875	1.875	1.875	1.875	1.875
2014	0.130	0.428	0.713	0.832	0.913	1.212	1.212	1.212	1.212	1.212
2015	0.115	0.379	0.630	0.736	0.808	1.072	1.072	1.072	1.072	1.072
2016	0.118	0.387	0.644	0.752	0.826	1.095	1.095	1.095	1.095	1.095
2017	0.129	0.426	0.708	0.828	0.908	1.205	1.205	1.205	1.205	1.205
2018	0.117	0.386	0.642	0.750	0.823	1.092	1.092	1.092	1.092	1.092
2019	0.113	0.372	0.619	0.723	0.794	1.053	1.053	1.053	1.053	1.053
2020	0.137	0.451	0.750	0.876	0.961	1.275	1.275	1.275	1.275	1.275
2021	0.130	0.428	0.712	0.832	0.913	1.211	1.211	1.211	1.211	1.211
2022	0.023	0.076	0.127	0.148	0.162	0.215	0.215	0.215	0.215	0.215