WHAM figures and tables

WHAM Tables

	Estimate	Std. Error	95\\% CI lower	95\\% CI upper

stock 1 Mean Recruitment 2.595776e+06 3.711261e+05 1.961409e+06 3.435311e+06 stock 1 NAA
sigma (age 1) 8.328985e-01 1.019848e-01 6.551883e-01 1.058810e+00 Shrimp fully selected q 1.069831e-05 8.672582e-07 9.126675e-06 1.254059e-05 Acoust fully selected q 3.322841e-05 2.010004e-06 2.951345e-05 3.741099e-05 SprAlb85 fully selected q 6.668475e-06 5.045385e-07 5.749425e-06 7.734436e-06 FallAlb85 fully selected q 1.128222e-05 1.311709e-06 8.983202e-06 1.416962e-05 Estimate Std. Error 95\% CI lower 95\% CI upper stock 1 Mean Recruitment 2595775.654 371126.082 1961409.321 3435311.118 stock 1 NAA
sigma (age 1) 0.833 0.102 0.655 1.059 Shrimp fully selected q 1.070
$times 10^{-5}$ 8.673
$times 10^{-7}$ 9.127
$times 10^{-6}$ 1.254
$times 10^{-5}$ Acoust fully selected q 3.323
$times 10^{-5}$ 2.010
$times 10^{-6}$ 2.951
$times 10^{-5}$ 3.741
$times 10^{-5}$ SprAlb85 fully selected q 6.668
$times 10^{-6}$ 5.045
$times 10^{-7}$ 5.749
$times 10^{-6}$ 7.734
$times 10^{-6}$ FallAlb85 fully selected q 1.128
$times 10^{-5}$ 1.312
$times 10^{-6}$ 8.983
$times 10^{-6}$ 1.417
$times 10^{-5}$

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

	Estimate	Std. Error	95% CI lower	95% CI upper
stock 1 Mean Recruitment	2595775.654	371126.082	1961409.321	3435311.118
stock 1 NAA σ (age 1)	0.833	0.102	0.655	1.059
Shrimp fully selected q	1.070×10^{-5}	8.673×10^{-7}	9.127×10^{-6}	1.254×10^{-5}
Acoust fully selected q	3.323×10^{-5}	2.010×10^{-6}	2.951×10^{-5}	3.741×10^{-5}
SprAlb85 fully selected q	6.668×10^{-6}	5.045×10^{-7}	5.749×10^{-6}	7.734×10^{-6}
FallAlb85 fully selected q	1.128×10^{-5}	1.312×10^{-6}	8.983×10^{-6}	1.417×10^{-5}
SprBig fully selected q	3.653×10^{-5}	4.732×10^{-6}	2.834×10^{-5}	4.709×10^{-5}
FallBig fully selected q	4.584×10^{-5}	6.843×10^{-6}	3.421×10^{-5}	6.142×10^{-5}
Mobile Selectivity for age 1 (Block 1)	4.242×10^{-4}	9.786×10^{-5}	2.699×10^{-4}	6.666×10^{-4}
Mobile Selectivity for age 2 (Block 1)	0.091	0.015	0.065	0.126
Mobile Selectivity for age 3 (Block 1)	0.334	0.051	0.242	0.440
Mobile Selectivity for age 4 (Block 1)	0.431	0.062	0.316	0.554
Mobile Selectivity for age 5 (Block 1)	0.531	0.068	0.399	0.659
Mobile Selectivity for age 6 (Block 1)	0.717	0.072	0.560	0.835
Mobile Selectivity for age 7 (Block 1)	1.000	–	–	–
Mobile Selectivity for age 8+ (Block 1)	1.000	–	–	–
Fixed Selectivity for age 1 (Block 2)	0.038	0.007	0.027	0.053
Fixed Selectivity for age 2 (Block 2)	1.000	–	–	–
Fixed Selectivity for age 3 (Block 2)	0.219	0.036	0.156	0.298
Fixed Selectivity for age 4 (Block 2)	0.090	0.021	0.057	0.140
Fixed Selectivity for age 5 (Block 2)	0.061	0.017	0.035	0.103
Fixed Selectivity for age 6 (Block 2)	0.058	0.018	0.031	0.105

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

	Estimate	Std. Error	95% CI lower	95% CI upper
Fixed Selectivity for age 7 (Block 2)	0.056	0.019	0.028	0.108
Fixed Selectivity for age 8+ (Block 2)	0.040	0.014	0.020	0.080
Shrimp Selectivity for age 1 (Block 3)	0.000	–	–	–
Shrimp Selectivity for age 2 (Block 3)	0.000	–	–	–
Shrimp Selectivity for age 3 (Block 3)	0.106	0.039	0.051	0.209
Shrimp Selectivity for age 4 (Block 3)	1.000	–	–	–
Shrimp Selectivity for age 5 (Block 3)	1.000	–	–	–
Shrimp Selectivity for age 6 (Block 3)	1.000	–	–	–
Shrimp Selectivity for age 7 (Block 3)	1.000	–	–	–
Shrimp Selectivity for age 8+ (Block 3)	1.000	–	–	–
Acoust Selectivity for age 1 (Block 4)	0.000	–	–	–
Acoust Selectivity for age 2 (Block 4)	0.000	–	–	–
Acoust Selectivity for age 3 (Block 4)	1.000	–	–	–
Acoust Selectivity for age 4 (Block 4)	1.000	–	–	–
Acoust Selectivity for age 5 (Block 4)	1.000	–	–	–
Acoust Selectivity for age 6 (Block 4)	1.000	–	–	–
Acoust Selectivity for age 7 (Block 4)	1.000	–	–	–
Acoust Selectivity for age 8+ (Block 4)	1.000	–	–	–
SprAlb85 Selectivity for age 1 (Block 5)	0.000	–	–	–
SprAlb85 Selectivity for age 2 (Block 5)	0.314	0.049	0.227	0.416
SprAlb85 Selectivity for age 3 (Block 5)	1.000	–	–	–
SprAlb85 Selectivity for age 4 (Block 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
SprAlb85 Selectivity for age 5 (Block 5)	1.000	–	–	–
SprAlb85 Selectivity for age 6 (Block 5)	1.000	–	–	–
SprAlb85 Selectivity for age 7 (Block 5)	1.000	–	–	–
SprAlb85 Selectivity for age 8+ (Block 5)	1.000	–	–	–
FallAlb85 a_{50} (Block 6)	2.844	0.154	2.549	3.153
FallAlb85 1/slope (increasing) (Block 6)	0.374	0.045	0.295	0.473
SprBig Selectivity for age 1 (Block 7)	0.000	–	–	–
SprBig Selectivity for age 2 (Block 7)	0.299	0.072	0.179	0.455
SprBig Selectivity for age 3 (Block 7)	0.938	0.167	0.051	1.000
SprBig Selectivity for age 4 (Block 7)	1.000	–	–	–
SprBig Selectivity for age 5 (Block 7)	1.000	–	–	–
SprBig Selectivity for age 6 (Block 7)	1.000	–	–	–
SprBig Selectivity for age 7 (Block 7)	1.000	–	–	–
SprBig Selectivity for age 8+ (Block 7)	1.000	–	–	–
FallBig a_{50} (Block 8)	3.208	0.209	2.809	3.624
FallBig 1/slope (increasing) (Block 8)	0.432	0.059	0.331	0.563
Mobile age comp, logistic-normal: σ	16.794	1.647	13.858	20.353
Mobile age comp, logistic-normal: ρ	0.882	0.025	0.824	0.922
Fixed age comp, logistic-normal: σ	29.608	2.732	24.710	35.476
Fixed age comp, logistic-normal: ρ	0.847	0.031	0.776	0.898
Shrimp age comp, logistic-normal: σ	15.927	3.591	10.237	24.777
Shrimp age comp, logistic-normal: ρ	0.737	0.129	0.432	0.912

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

	Estimate	Std. Error	95% CI lower	95% CI upper
SprAlb85 age comp, logistic-normal: σ	21.782	2.555	17.307	27.413
SprAlb85 age comp, logistic-normal: ρ	0.829	0.044	0.724	0.900
FallAlb85 age comp, logistic-normal: σ	21.592	2.802	16.744	27.844
FallAlb85 age comp, logistic-normal: ρ	0.899	0.028	0.828	0.942
SprBig age comp, logistic-normal: σ	17.913	2.691	13.345	24.045
SprBig age comp, logistic-normal: ρ	0.767	0.079	0.582	0.887
FallBig age comp, logistic-normal: σ	24.014	3.866	17.516	32.923
FallBig age comp, logistic-normal: ρ	0.874	0.045	0.757	0.939
Ecov Haddock Predation on Eggs: RW Ecov_1	14.557	0.218	14.130	14.985
Ecov Haddock Predation on Eggs: RW σ	0.516	0.102	0.350	0.761
Ecov: Haddock Predation on Eggs obs. sd.	0.233	0.114	0.090	0.606

Abundance at age

Table 2. Abundance at age (1000s) for stock 1 in region 1.

	1	2	3	4	5	6	7	8+
1987	3856670	1828534	904774	961130	167613	66479	13394	6204
1988	4979728	2679014	840621	484614	510688	84983	30309	7611
1989	5557085	3436500	1034995	434048	253966	256820	38481	14646
1990	6528947	3842282	1391965	532620	224256	125172	113034	19707
1991	6329260	4539857	1829996	777421	297263	120653	61791	57491
1992	4389789	4429121	2524990	1001171	408787	147317	53089	43847
1993	4282377	3068306	2398326	1397052	537437	208152	67289	37573
1994	3641785	2988878	1623254	1402103	811604	302289	108849	49126
1995	8455025	2545487	1652360	978326	841061	473983	166153	79229
1996	4115140	5928484	1507704	953595	545764	447174	229044	102582
1997	4258163	2891730	3697121	858838	517212	279446	205090	128673
1998	3234991	2986769	1720268	2095437	467159	266425	129360	131397
1999	8727123	2262416	1647317	968676	1147478	243611	125627	105623
2000	3098657	6112566	1290238	910971	514146	574584	108641	86540
2001	2393368	2178962	3909609	759000	513334	275710	280373	82531
2002	4466602	1677448	1278258	2268740	427408	276274	135480	155315
2003	3808760	3133650	1016574	764915	1322760	239791	143503	134440
2004	2599886	2676972	1980085	598879	432947	713702	118021	119002
2005	1707697	1818902	1498414	1141862	337632	233914	352946	102569
2006	4600354	1196166	1046212	852664	628784	176906	110897	185533
2007	1915218	3219789	668206	572925	448534	311699	77863	109036
2008	3471197	1337135	1681127	358250	296974	219073	134682	67143
2009	9104230	2436087	797979	912745	183781	142202	91856	69175
2010	1826627	6404647	1514214	399791	416666	75950	48796	41659
2011	1941380	1283889	3971229	821488	203280	196934	31260	30179
2012	5788374	1365218	808970	2187615	424986	98087	83326	21294
2013	1201616	4076747	893205	443966	1117383	201443	40476	34969
2014	1401936	845519	2592726	479745	221557	515296	80147	23986
2015	610823	986619	546826	1470171	256687	111329	230186	38899
2016	252995	430068	644661	308338	779054	127373	48882	98094

Table 2. Abundance at age (1000s) for stock 1 in region 1. *(continued)*

	1	2	3	4	5	6	7	8+
2017	1335654	177205	244674	351968	160938	382102	55235	52922
2018	626184	935723	101157	132614	181786	77894	162731	37953
2019	1247843	435593	426983	45317	55466	68461	23747	44380
2020	1063913	864441	187696	232483	24946	29486	33332	29126
2021	912726	745323	507592	114749	140421	14648	16303	31541
2022	1367527	638776	432490	327575	74735	90618	9206	28927
2023	2414668	960237	406621	290386	220823	50100	59830	24624

Fishing mortality at age by region

Table 3. Total fishing mortality at age in region 1.

	1	2	3	4	5	6	7	8+
1987	0.014	0.427	0.274	0.282	0.329	0.435	0.598	0.592
1988	0.021	0.601	0.311	0.296	0.337	0.442	0.603	0.594
1989	0.019	0.554	0.314	0.310	0.358	0.471	0.644	0.636
1990	0.013	0.392	0.232	0.233	0.270	0.356	0.488	0.482
1991	0.007	0.237	0.253	0.293	0.352	0.471	0.652	0.649
1992	0.008	0.263	0.242	0.272	0.325	0.434	0.599	0.596
1993	0.010	0.287	0.187	0.193	0.225	0.298	0.410	0.406
1994	0.008	0.243	0.156	0.161	0.188	0.248	0.341	0.338
1995	0.005	0.174	0.200	0.234	0.282	0.377	0.523	0.521
1996	0.003	0.122	0.213	0.262	0.319	0.429	0.597	0.596
1997	0.005	0.169	0.218	0.259	0.313	0.420	0.583	0.581
1998	0.008	0.245	0.224	0.252	0.301	0.402	0.555	0.552
1999	0.006	0.212	0.242	0.283	0.342	0.458	0.634	0.632
2000	0.002	0.097	0.181	0.224	0.273	0.368	0.511	0.510
2001	0.005	0.183	0.194	0.224	0.270	0.361	0.499	0.497
2002	0.004	0.151	0.163	0.190	0.228	0.305	0.422	0.421
2003	0.003	0.109	0.179	0.219	0.267	0.359	0.499	0.498
2004	0.007	0.230	0.200	0.223	0.266	0.354	0.489	0.486
2005	0.006	0.203	0.214	0.247	0.296	0.396	0.549	0.546

Table 3. Total fishing mortality at age in region 1. *(continued)*

	1	2	3	4	5	6	7	8+
2006	0.007	0.232	0.252	0.292	0.352	0.471	0.652	0.649
2007	0.009	0.300	0.273	0.307	0.367	0.489	0.676	0.672
2008	0.004	0.166	0.261	0.317	0.386	0.519	0.721	0.720
2009	0.002	0.125	0.341	0.434	0.534	0.720	1.002	1.002
2010	0.003	0.128	0.262	0.326	0.399	0.538	0.748	0.747
2011	0.002	0.112	0.246	0.309	0.379	0.510	0.710	0.709
2012	0.001	0.074	0.250	0.322	0.397	0.535	0.746	0.746
2013	0.001	0.103	0.272	0.345	0.424	0.572	0.796	0.796
2014	0.001	0.086	0.217	0.275	0.338	0.456	0.635	0.634
2015	0.001	0.076	0.223	0.285	0.351	0.473	0.659	0.659
2016	0.006	0.214	0.255	0.300	0.362	0.486	0.673	0.671
2017	0.006	0.211	0.262	0.311	0.376	0.504	0.698	0.696
2018	0.013	0.435	0.453	0.522	0.627	0.838	1.160	1.155
2019	0.017	0.492	0.258	0.247	0.282	0.370	0.504	0.497
2020	0.006	0.182	0.142	0.154	0.182	0.243	0.334	0.332
2021	0.007	0.194	0.088	0.079	0.088	0.114	0.155	0.152
2022	0.004	0.102	0.048	0.044	0.050	0.065	0.089	0.087
2023	0.001	0.037	0.066	0.081	0.099	0.133	0.186	0.185

Fishing mortality at age by fleet

Table 4. Total fishing mortality at age in Mobile.

	1	2	3	4	5	6	7	8+
1987	0	0.053	0.192	0.249	0.306	0.414	0.577	0.577
1988	0	0.052	0.191	0.247	0.304	0.410	0.572	0.572
1989	0	0.056	0.205	0.265	0.327	0.442	0.616	0.616
1990	0	0.043	0.156	0.202	0.249	0.336	0.468	0.468
1991	0	0.059	0.214	0.277	0.341	0.461	0.642	0.642
1992	0	0.054	0.196	0.253	0.312	0.421	0.588	0.588
1993	0	0.036	0.132	0.170	0.210	0.284	0.396	0.396
1994	0	0.030	0.110	0.142	0.175	0.236	0.329	0.329

Table 4. Total fishing mortality at age in Mobile. *(continued)*

	1	2	3	4	5	6	7	8+
1995	0	0.047	0.172	0.222	0.274	0.370	0.516	0.516
1996	0	0.054	0.198	0.256	0.315	0.426	0.593	0.593
1997	0	0.053	0.192	0.248	0.306	0.413	0.576	0.576
1998	0	0.050	0.182	0.235	0.289	0.390	0.544	0.544
1999	0	0.057	0.209	0.269	0.332	0.449	0.625	0.625
2000	0	0.046	0.170	0.219	0.270	0.365	0.508	0.508
2001	0	0.045	0.164	0.212	0.261	0.352	0.491	0.491
2002	0	0.038	0.139	0.179	0.221	0.298	0.416	0.416
2003	0	0.045	0.165	0.213	0.263	0.355	0.495	0.495
2004	0	0.044	0.160	0.206	0.254	0.343	0.479	0.479
2005	0	0.049	0.180	0.233	0.287	0.387	0.540	0.540
2006	0	0.059	0.214	0.277	0.341	0.461	0.642	0.642
2007	0	0.060	0.221	0.285	0.352	0.475	0.663	0.663
2008	0	0.065	0.239	0.308	0.380	0.513	0.716	0.716
2009	0	0.091	0.334	0.431	0.532	0.718	1.000	1.000
2010	0	0.068	0.248	0.321	0.396	0.534	0.745	0.745
2011	0	0.065	0.236	0.305	0.376	0.507	0.707	0.707
2012	0	0.068	0.249	0.321	0.396	0.535	0.746	0.746
2013	0	0.072	0.265	0.342	0.422	0.570	0.794	0.794
2014	0	0.058	0.211	0.273	0.336	0.454	0.633	0.633
2015	0	0.060	0.220	0.284	0.350	0.472	0.658	0.658
2016	0	0.061	0.222	0.286	0.353	0.477	0.664	0.664
2017	0	0.063	0.230	0.297	0.367	0.495	0.690	0.690
2018	0	0.104	0.381	0.492	0.607	0.819	1.141	1.141
2019	0	0.044	0.160	0.206	0.255	0.344	0.479	0.479
2020	0	0.030	0.109	0.140	0.173	0.234	0.326	0.326
2021	0	0.013	0.048	0.062	0.077	0.104	0.145	0.145
2022	0	0.008	0.028	0.036	0.044	0.060	0.083	0.083
2023	0	0.017	0.062	0.079	0.098	0.132	0.184	0.184

Table 5. Total fishing mortality at age in Fixed.

	1	2	3	4	5	6	7	8+
1987	0.014	0.375	0.082	0.034	0.023	0.022	0.021	0.015
1988	0.021	0.549	0.120	0.050	0.033	0.032	0.031	0.022
1989	0.019	0.498	0.109	0.045	0.030	0.029	0.028	0.020
1990	0.013	0.349	0.076	0.032	0.021	0.020	0.020	0.014
1991	0.007	0.178	0.039	0.016	0.011	0.010	0.010	0.007
1992	0.008	0.210	0.046	0.019	0.013	0.012	0.012	0.008
1993	0.009	0.251	0.055	0.023	0.015	0.015	0.014	0.010
1994	0.008	0.213	0.047	0.019	0.013	0.012	0.012	0.009
1995	0.005	0.127	0.028	0.011	0.008	0.007	0.007	0.005
1996	0.003	0.068	0.015	0.006	0.004	0.004	0.004	0.003
1997	0.004	0.117	0.026	0.011	0.007	0.007	0.007	0.005
1998	0.007	0.195	0.043	0.018	0.012	0.011	0.011	0.008
1999	0.006	0.155	0.034	0.014	0.009	0.009	0.009	0.006
2000	0.002	0.051	0.011	0.005	0.003	0.003	0.003	0.002
2001	0.005	0.139	0.030	0.013	0.008	0.008	0.008	0.006
2002	0.004	0.113	0.025	0.010	0.007	0.007	0.006	0.005
2003	0.002	0.064	0.014	0.006	0.004	0.004	0.004	0.003
2004	0.007	0.187	0.041	0.017	0.011	0.011	0.010	0.008
2005	0.006	0.154	0.034	0.014	0.009	0.009	0.009	0.006
2006	0.007	0.174	0.038	0.016	0.011	0.010	0.010	0.007
2007	0.009	0.239	0.052	0.022	0.015	0.014	0.013	0.010
2008	0.004	0.101	0.022	0.009	0.006	0.006	0.006	0.004
2009	0.001	0.034	0.008	0.003	0.002	0.002	0.002	0.001
2010	0.002	0.060	0.013	0.005	0.004	0.003	0.003	0.002
2011	0.002	0.047	0.010	0.004	0.003	0.003	0.003	0.002
2012	0.000	0.006	0.001	0.001	0.000	0.000	0.000	0.000
2013	0.001	0.030	0.007	0.003	0.002	0.002	0.002	0.001
2014	0.001	0.028	0.006	0.003	0.002	0.002	0.002	0.001
2015	0.001	0.016	0.003	0.001	0.001	0.001	0.001	0.001
2016	0.006	0.153	0.034	0.014	0.009	0.009	0.009	0.006
2017	0.006	0.148	0.032	0.013	0.009	0.009	0.008	0.006

Table 5. Total fishing mortality at age in Fixed. *(continued)*

	1	2	3	4	5	6	7	8+
2018	0.012	0.330	0.072	0.030	0.020	0.019	0.019	0.013
2019	0.017	0.448	0.098	0.040	0.027	0.026	0.025	0.018
2020	0.006	0.153	0.033	0.014	0.009	0.009	0.009	0.006
2021	0.007	0.181	0.040	0.016	0.011	0.010	0.010	0.007
2022	0.004	0.094	0.021	0.008	0.006	0.005	0.005	0.004
2023	0.001	0.021	0.005	0.002	0.001	0.001	0.001	0.001