

Table B1. Total landings (mt, live)¹ of white hake by country from the Gulf of Maine to Cape Hatteras (NAFO Subareas 5 and 6), 1964-2000.

	Canada	USA	Other	Total
1964	29	3016	0	3045
1965	0	2615	0	2615
1966	0	1562	0	1562
1967	16	1126	0	1142
1968	85	1209	0	1294
1969	34	1343	6	1383
1970	46	1807	280	2133
1971	100	2583	214	2897
1972	40	2946	159	3145
1973	117	3278	5	3400
1974	232	3773	0	4005
1975	146	3673	0	3819
1976	195	4104	0	4299
1977	170	4976	338	5484
1978	155	4869	29	5053
1979	251	4044	4	4299
1980	305	4746	2	5053
1981	454	5970	0	6424
1982	764	6179	2	6945
1983	810	6408	0	7218
1984	1013	6757	0	7770
1985	953	7353	0	8306
1986	956	6109	0	7065
1987	555	5818	0	6373
1988	534	4783	0	5130
1989	583	4547	0	5130
1990	547	4927	0	5474
1991	552	5607	0	6159
1992	1138	8444	0	9582
1993	1681	7466	0	9147
1994	955	4737	0	5692
1995	481	4333	0	4814
1996	372	3287	0	3659
1997	290	2225	0	2515
1998	228	2367	0	2595
1999	174	2624	0	2728
2000	224	2990	0	3214

¹Canada and Other as reported to ICNAF/NAFO for 1964-1992.

USA Landings derived from NEFSC Weighout files.

⁴Includes Japan, Spain, and USSR.

Table B2. US commercial landings (mt, live) and the annual percentage of total landings of white hake by gear type, 1964-2000.

Year	Landings (mt, live)					Percentage of Annual Landings				
	Line	Bottom Otter	Sink Gill	Other ¹	Total	Line	Bottom Otter	Sink Gill	Other ¹	Total
1964	1228	1681	99	8	3016	40.7	55.7	3.3	0.3	100.0
1965	1513	1034	64	4	2615	57.9	39.5	2.4	0.2	100.0
1966	704	755	99	5	1562	45.1	48.3	6.3	0.3	100.0
1967	326	730	67	4	1126	28.9	64.8	5.9	0.4	100.0
1968	265	825	116	3	1209	21.9	68.2	9.6	0.3	100.0
1969	228	1005	108	2	1343	17.0	74.8	8.0	0.2	100.0
1970	201	1474	129	4	1807	11.1	81.5	7.2	0.2	100.0
1971	532	1925	118	9	2583	20.6	74.5	4.6	0.3	100.0
1972	834	1717	384	11	2946	28.3	58.3	13.0	0.4	100.0
1973	840	1941	491	6	3278	25.6	59.2	15.0	0.2	100.0
1974	638	1852	1274	9	3773	16.9	49.1	33.8	0.2	100.0
1975	993	1356	1320	4	3673	27.1	36.9	35.9	0.1	100.0
1976	546	1606	1943	9	4104	13.3	39.2	47.3	0.2	100.0
1977	391	2316	2257	12	4976	7.9	46.5	45.4	0.2	100.0
1978	321	2183	2341	23	4869	6.6	44.8	48.1	0.5	100.0
1979	206	2058	1752	28	4044	5.1	50.9	43.3	0.7	100.0
1980	90	2656	1967	33	4746	1.9	56.0	41.5	0.7	100.0
1981	108	3473	2376	13	5970	1.8	58.2	39.8	0.2	100.0
1982	97	3860	2202	20	6179	1.6	62.5	35.6	0.3	100.0
1983	79	4868	1395	66	6408	1.2	76.0	21.8	1.0	100.0
1984	22	5158	1486	90	6757	0.3	76.3	22.0	1.4	100.0
1985	315	5508	1418	112	7353	4.3	74.9	19.3	1.5	100.0
1986	231	4671	1163	44	6109	3.8	76.5	19.0	0.7	100.0
1987	86	4798	911	24	5818	1.5	82.5	15.6	0.4	100.0
1988	85	3655	1008	35	4783	1.8	76.4	21.1	0.7	100.0
1989	15	2552	1892	88	4547	0.3	56.1	41.6	2.0	100.0
1990	78	3286	1508	54	4927	1.6	66.7	30.6	1.1	100.0
1991	249	3553	1616	189	5607	4.4	63.4	28.8	3.4	100.0
1992	948	5195	2262	40	8444	11.2	61.5	26.8	0.5	100.0
1993	1203	4656	1590	16	7466	16.1	62.4	21.3	0.2	100.0
1994	1186	2479	1065	7	4737	25.0	52.3	22.5	0.2	100.0
1995	764	2407	1123	39	4333	17.6	55.6	25.9	0.9	100.0
1996	307	2036	926	19	3287	9.3	61.9	28.2	0.6	100.0
1997	394	1284	543	5	2225	17.7	57.7	24.4	0.2	100.0
1998	326	1370	662	9	2367	13.8	57.9	28.0	0.4	100.0
1999	140	1535	925	23	2624	5.4	58.5	35.2	0.9	100.0
2000	95	1831	1042	22	2990	3.2	61.2	34.9	0.7	100.0

¹ Includes handline, Scottish seine, drift gill net, scallop dredge, Danish seine, pound net, floating trap net, longline, midwater trawl, lobster pots, fish pots, purse seine, troll line, common seine, diving gear, set gill net, harpoon, rakes, and trammel net.

Table B3. Landings (mt, live) and the annual percentage of landings of white hake by season, 1964-2000.

Year	Month												Total	
	Unk.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.		Dec.
1964	111	148	126	125	166	110	221	721	406	364	220	199	99	3016
1965	22	82	105	88	38	26	151	763	551	371	163	134	121	2615
1966	26	37	40	67	47	29	94	91	552	224	168	104	83	1562
1967	17	55	29	50	22	22	33	58	241	234	207	97	61	1126
1968	17	38	52	51	22	28	67	103	302	220	165	79	65	1209
1969	8	55	44	19	24	34	69	81	264	254	216	163	112	1343
1970	12	57	54	50	38	115	160	183	243	259	331	171	134	1807
1971	37	82	39	37	43	99	180	181	453	405	443	400	184	2583
1972	22	123	65	54	45	150	186	379	628	423	495	211	165	2946
1973	252	124	54	65	78	145	191	311	578	415	481	323	261	3278
1974	133	175	51	85	148	164	194	354	529	557	640	417	326	3773
1975	187	105	72	64	98	233	296	464	727	500	312	422	193	3673
1976	184	96	147	152	128	133	316	758	563	667	364	378	218	4104
1977	236	117	91	199	146	191	283	684	852	645	648	612	272	4976
1978	185	105	147	114	131	172	271	370	1084	859	761	480	190	4869
1979	262	102	34	78	106	232	322	642	964	433	379	308	182	4044
1980	380	109	108	106	102	131	442	720	860	636	553	405	195	4746
1981	53	196	86	126	116	129	437	903	1375	798	649	766	336	5970
1982	6	174	180	194	134	190	462	1139	1280	809	693	571	348	6179
1983	4	405	237	284	211	334	630	817	1015	745	744	577	406	6408
1984	13	425	228	221	208	341	537	770	1209	961	934	549	362	6757
1985	4	273	231	292	345	358	705	1097	1030	1115	825	633	445	7353
1986	2	309	276	288	386	392	619	999	851	723	623	370	272	6109
1987	4	135	188	221	163	270	724	1000	936	805	694	411	267	5818
1988	7	183	100	132	165	287	646	682	761	844	503	314	159	4783
1989	5	149	130	130	137	204	596	795	807	603	540	291	161	4547
1990	7	157	112	172	135	269	595	812	916	635	617	319	181	4927
1991	7	163	162	90	114	457	554	846	1126	871	624	345	247	5607
1992	5	277	247	294	283	344	832	1487	1756	1203	802	595	321	8444
1993	4	272	213	274	307	532	1000	1319	1232	790	744	514	266	7466
1994		143	275	198	325	348	617	688	717	447	465	293	221	4737
1995		141	180	190	138	261	504	712	597	504	566	366	175	4333
1996		135	149	152	100	243	382	366	553	448	402	236	122	3287
1997		97	116	73	73	62	209	271	344	343	287	206	143	2225
1998		67	92	116	107	101	257	318	308	322	275	213	191	2367
1999		151	141	156	142	181	346	379	330	288	209	175	125	2624
2000		125	160	195	192	294	298	371	358	257	344	225	170	2990

Table B3. Cont.

	Percentage of total													
1964	3.7	4.9	4.2	4.1	5.5	3.6	7.3	23.9	13.5	12.1	7.3	7.0	3.3	100.0
1965	0.8	3.1	4.0	3.4	1.5	1.0	5.8	29.2	21.1	14.2	6.2	5.1	4.6	100.0
1966	1.7	2.4	2.6	4.3	3.0	1.9	6.0	5.8	35.3	14.3	10.7	6.7	5.3	100.0
1967	1.5	4.9	2.6	4.4	2.0	2.0	2.9	5.2	21.4	20.8	18.4	8.6	5.4	100.0
1968	1.4	3.1	4.3	4.2	1.8	2.3	5.5	8.5	25.0	18.2	13.6	6.5	5.4	100.0
1969	0.6	4.1	3.3	1.4	1.8	2.5	5.1	6.0	19.6	18.9	16.1	12.2	8.3	100.0
1970	0.7	3.2	3.0	2.8	2.1	6.4	8.8	10.1	13.4	14.3	18.3	9.5	7.4	100.0
1971	1.4	3.2	1.5	1.5	1.7	3.8	7.0	7.0	17.5	15.7	17.1	15.5	7.1	100.0
1972	0.7	4.2	2.2	1.8	1.5	5.1	6.3	12.9	21.3	14.3	16.8	7.2	5.6	100.0
1973	7.7	3.8	1.6	2.0	2.4	4.4	5.8	9.5	17.6	12.7	14.7	9.9	8.0	100.0
1974	3.5	4.6	1.4	2.3	3.9	4.3	5.1	9.4	14.0	14.8	17.0	11.0	8.6	100.0
1975	5.1	2.9	2.0	1.7	2.7	6.3	8.1	12.7	19.8	13.6	8.5	11.5	5.3	100.0
1976	4.5	2.4	3.6	3.7	3.1	3.2	7.7	18.5	13.7	16.2	8.9	9.2	5.3	100.0
1977	4.7	2.4	1.8	4.0	2.9	3.8	5.7	13.8	17.1	13.0	13.0	12.3	5.5	100.0
1978	3.8	2.2	3.0	2.3	2.7	3.5	5.6	7.6	22.3	17.7	15.6	9.9	3.9	100.0
1979	6.5	2.5	0.8	1.9	2.6	5.7	8.0	15.9	23.8	10.7	9.4	7.6	4.5	100.0
1980	8.0	2.3	2.3	2.2	2.2	2.8	9.3	15.2	18.1	13.4	11.7	8.5	4.1	100.0
1981	0.9	3.3	1.4	2.1	1.9	2.2	7.3	15.1	23.0	13.4	10.9	12.8	5.6	100.0
1982	0.1	2.8	2.9	3.1	2.2	3.1	7.5	18.4	20.7	13.1	11.2	9.2	5.6	100.0
1983	0.1	6.3	3.7	4.4	3.3	5.2	9.8	12.7	15.8	11.6	11.6	9.0	6.3	100.0
1984	0.2	6.3	3.4	3.3	3.1	5.0	7.9	11.4	17.9	14.2	13.8	8.1	5.4	100.0
1985	0.1	3.7	3.1	4.0	4.7	4.9	9.6	14.9	14.0	15.2	11.2	8.6	6.1	100.0
1986	0.0	5.0	4.5	4.7	6.3	6.4	10.1	16.4	13.9	11.8	10.2	6.1	4.5	100.0
1987	0.1	2.3	3.2	3.8	2.8	4.6	12.5	17.2	16.1	13.8	11.9	7.1	4.6	100.0
1988	0.1	3.8	2.1	2.8	3.4	6.0	13.5	14.3	15.9	17.6	10.5	6.6	3.3	100.0
1989	0.1	3.3	2.9	2.9	3.0	4.5	13.1	17.5	17.8	13.3	11.9	6.4	3.5	100.0
1990	0.1	3.2	2.3	3.5	2.7	5.5	12.1	16.5	18.6	12.9	12.5	6.5	3.7	100.0
1991	0.1	2.9	2.9	1.6	2.0	8.2	9.9	15.1	20.1	15.5	11.1	6.1	4.4	100.0
1992	0.1	3.3	2.9	3.5	3.4	4.1	9.8	17.6	20.8	14.2	9.5	7.0	3.8	100.0
1993	0.1	3.6	2.9	3.7	4.1	7.1	13.4	17.7	16.5	10.6	10.0	6.9	3.6	100.0
1994	0.0	3.0	5.8	4.2	6.9	7.3	13.0	14.5	15.1	9.4	9.8	6.2	4.7	100.0
1995	0.0	3.2	4.1	4.4	3.2	6.0	11.6	16.4	13.8	11.6	13.1	8.5	4.0	100.0
1996	0.0	4.1	4.5	4.6	3.0	7.4	11.6	11.1	16.8	13.6	12.2	7.2	3.7	100.0
1997	0.0	4.4	5.2	3.3	3.3	2.8	9.4	12.2	15.5	15.4	12.9	9.3	6.4	100.0
1998	0.0	2.8	3.9	4.9	4.5	4.3	10.9	13.5	13.0	13.6	11.6	9.0	8.1	100.0
1999	0.0	5.8	5.4	6.0	5.4	6.9	13.2	14.5	12.6	11.0	8.0	6.7	4.8	100.0
2000	0.0	4.2	5.4	6.5	6.4	9.8	10.0	12.4	12.0	8.6	11.5	7.5	5.7	100.0

Table B4. Total US Landings (mt, live) and the annual percentage of landings of white hake by state, 1964-2000.

Year	Landings (mt, live)				Percentage of total			
	Maine	Mass.	Others ¹	Total	Maine	Mass.	Others ¹	Total
1964	1603	1362	51	3016	53.1	45.2	1.7	100.0
1965	1743	831	41	2615	66.7	31.8	1.5	100.0
1966	914	598	50	1562	58.5	38.3	3.2	100.0
1967	639	453	34	1126	56.8	40.2	3.0	100.0
1968	569	576	64	1209	47.1	47.6	5.3	100.0
1969	475	818	51	1343	35.3	60.9	3.8	100.0
1970	639	1088	81	1807	35.3	60.2	4.5	100.0
1971	892	1563	128	2583	34.5	60.5	5.0	100.0
1972	1329	1538	79	2946	45.1	52.2	2.7	100.0
1973	1295	1812	171	3278	39.5	55.3	5.2	100.0
1974	1708	1905	160	3773	45.3	50.5	4.2	100.0
1975	2063	1439	170	3673	56.2	39.2	4.6	100.0
1976	2502	1431	171	4104	61.0	34.9	4.1	100.0
1977	2967	1785	223	4976	59.6	35.9	4.5	100.0
1978	3047	1645	178	4869	62.6	33.8	3.6	100.0
1979	2404	1394	246	4044	59.4	34.5	6.1	100.0
1980	2729	1598	419	4746	57.5	33.7	8.8	100.0
1981	3756	2028	186	5970	62.9	34.0	3.1	100.0
1982	4253	1794	133	6179	68.8	29.0	2.2	100.0
1983	4289	1874	245	6408	66.9	29.3	3.8	100.0
1984	3881	2444	431	6757	57.4	36.2	6.4	100.0
1985	3696	3370	287	7353	50.3	45.8	3.9	100.0
1986	2955	2875	280	6109	48.4	47.1	4.5	100.0
1987	3246	2255	317	5818	55.8	38.8	5.4	100.0
1988	2695	1900	188	4783	56.3	39.7	4.0	100.0
1989	3123	1324	100	4547	68.7	29.1	2.2	100.0
1990	2744	2108	74	4927	55.7	42.8	1.5	100.0
1991	3280	2122	205	5607	58.5	37.8	3.7	100.0
1992	5357	2521	566	8444	63.4	29.9	6.7	100.0
1993	5042	2067	357	7466	67.5	27.7	4.8	100.0
1994	2940	1385	412	4737	62.1	29.2	8.7	100.0
1995	2532	1526	275	4333	58.4	35.2	6.3	100.0
1996	1950	1129	208	3287	59.3	34.3	6.3	100.0
1997	1428	623	175	2225	64.1	28.0	7.9	100.0
1998	1357	886	123	2367	57.3	37.4	5.2	100.0
1999	1353	943	328	2624	51.6	35.9	12.5	100.0
2000	1703	910	377	2990	56.9	30.4	12.6	100.0

¹Others include NH,RI,NY,NJ,VA

Table B5. US Landings (mt, live) and the annual percentage of total landings of white hake by tonnage class¹, 1964-2000.

Year	Tonnage Class (TC)					Percentage of total				
	2	3	4	Others ²	Total	2	3	4	Others ²	Total
1964	450	991	230	1345	3016	14.9	32.9	7.6	44.6	100.0
1965	312	510	198	1595	2615	11.9	19.5	7.6	61.0	100.0
1966	280	404	125	753	1562	17.9	25.9	8.0	48.2	100.0
1967	206	333	111	476	1126	18.3	29.6	9.9	42.3	100.0
1968	300	414	162	333	1209	24.8	34.2	13.4	27.5	100.0
1969	286	532	227	298	1343	21.3	39.6	16.9	22.2	100.0
1970	520	728	296	263	1807	28.8	40.3	16.4	14.6	100.0
1971	600	1084	341	558	2583	23.2	42.0	13.2	21.6	100.0
1972	738	972	303	934	2946	25.0	33.0	10.3	31.7	100.0
1973	934	913	287	1144	3278	28.5	27.9	8.8	34.9	100.0
1974	1334	884	338	1217	3773	35.4	23.4	9.0	32.3	100.0
1975	1302	603	254	1514	3673	35.5	16.4	6.9	41.2	100.0
1976	1587	837	279	1401	4104	38.7	20.4	6.8	34.1	100.0
1977	2363	1008	485	1119	4976	47.5	20.3	9.7	22.5	100.0
1978	2161	1083	534	1091	4869	44.4	22.2	11.0	22.4	100.0
1979	1687	1055	469	833	4044	41.7	26.1	11.6	20.6	100.0
1980	1809	1143	730	1065	4746	38.1	24.1	15.4	22.4	100.0
1981	2346	1492	1348	784	5970	39.3	25.0	22.6	13.1	100.0
1982	2626	1828	1309	417	6179	42.5	29.6	21.2	6.7	100.0
1983	1964	2402	1798	244	6408	30.6	37.5	28.1	3.8	100.0
1984	1966	2746	1621	424	6757	29.1	40.6	24.0	6.3	100.0
1985	1883	2987	2180	303	7353	25.6	40.6	29.7	4.1	100.0
1986	1189	2257	2195	468	6109	19.5	36.9	35.9	7.7	100.0
1987	1078	2556	1865	319	5818	18.5	43.9	32.1	5.5	100.0
1988	1114	1753	1682	234	4783	23.3	36.7	35.2	4.9	100.0
1989	1535	1495	1220	297	4547	33.8	32.9	26.8	6.5	100.0
1990	1330	1696	1702	199	4927	27.0	34.4	34.5	4.0	100.0
1991	1749	1895	1688	275	5607	31.2	33.8	30.1	4.9	100.0
1992	2665	2925	2362	491	8444	31.6	34.6	28.0	5.8	100.0
1993	1994	2563	2704	204	7466	26.7	34.3	36.2	2.7	100.0
1994	1294	1733	1695	15	4737	27.3	36.6	35.8	0.3	100.0
1995	1381	1564	1366	22	4333	31.9	36.1	31.5	0.5	100.0
1996	1202	1162	909	15	3287	36.6	35.3	27.7	0.4	100.0
1997	850	951	424	0	2225	38.2	42.7	19.0	0.0	100.0
1998	950	1007	376	34	2367	40.1	42.6	15.9	1.5	100.0
1999	1146	1019	430	29	2624	43.7	38.8	16.4	1.1	100.0
2000	1178	1180	625	7	2990	39.4	39.5	20.9	0.2	100.0

¹TC2 = 5-50 GRT, TC3 = 51-150 GRT, TC4 = 151-500 GRT.

²Undertonnage vessels

Table B6. Estimates of discards in the otter trawl, shrimp trawl, and sink gill net fleets from the DSSP from 1989-2000.

	Jan-Jun			Jul-Dec			Total			Percent	
	trawl	shrimp	SGN	trawl	shrimp	SGN	trawl	shrimp	SGN	Total	of total
1989 tot land (mt)	928	6	378	1620	10	1514	2548	16	1892	4457	
trips	26	5	0	49	4	62					
tot kept (mt)	6.20	0.02		7.56	0.06	6.19					
tot disc (mt)	1.65	0.06		8.41	0.11	0.20					
discard/kept	0.27	3.89		1.11	1.82	0.03					
Exp disc (mt)	247	25	0	1804	18	50	2050	42	50	2143	48.1
1990 tot land (mt)	1073	8	300	2207	8	1208	3280	17	1508	4805	
trips	18	6	16	30	2	37	48	8	53		
tot kept (mt)	1.80	0.03	1.19	4.74	0.01	14.13	7	0	15		
tot disc (mt)	3.54	0.04	0.04	4.69	0.02	0.76	8	0	1		
discard/kept	1.97	1.15	0.04	0.99	3.23	0.05					
Exp disc (mt)	2114	9	11	2182	27	65	4297	37	76	4409	91.8
1991 tot land (mt)	1019	8	291	2529	6	1323	3548	14	1614	5176	
trips	16	16	58	56	6	394	72	22	452		
tot kept (mt)	2.32	0.07	15.70	7.86	0.23	107.06	10	0	123		
tot disc (mt)	0.25	0.18	0.76	3.85	0.38	3.90	4	1	5		
disc/kept	0.11	2.66	0.05	0.49	1.71	0.04					
Exp disc (mt)	111	20	14	1239	11	48	1350	31	62	1443	27.9
1992 tot land (mt)	1274	8	402	3917	0	1859	5191	8	2261	7460	
trips	33	36	93	22	6	358	55	42	451		
tot kept (mt)	11.37	0.44	25.08	11.80	0.01	97.89	23	0	123		
tot disc (mt)	3.13	0.79	1.81	1.10	0.01	4.52	4	1	6		
discard/kept	0.28	1.83	0.07	0.09	1.14	0.05					
Exp disc (mt)	350	14	29	364	0	86	715	15	114	844	11.3
1993 tot land (mt)	1445	0	442	3209	0	1146	4653	0	1588	6242	
trips	21	23	53	16	2	245	37	25	298		
tot kept (mt)	8.68	0.00	16.20	8.81	0.00	61.47	17	0	78		
tot disc (mt)	0.25	0.05	1.48	1.54	0.00	3.36	2	0	5		
discard/kept	0.03	-	0.09	0.18	-	0.06					
Exp disc (mt)	42	-	41	561	-	63	603		104	707	11.3
1994 tot land (mt)	1011	0	322	1468	1	743	2479	1	1065	3545	
trips	24	41	9	11	7	31	35	48	40		
tot kept (mt)	5.38	0.00	0.16	4.29	0.00	4.06	10	0	4		
tot disc (mt)	0.77	0.07	0.01	0.25	0.05	0.10	1	0	0		
discard/kept	0.14	-	0.06	0.06	-	0.03					
Exp disc (mt)	145	-	18	85	-	19	230	-	37	267	7.5

Table B6 (Continued). Estimates of discards in the otter trawl, shrimp trawl, and sink gill net fleets from the DSSP from 1989-2000.

1995	tot land (mt)	743	0	401	1665	0	721	2407	0	1123	353	
	trips	35	49	10	29	2	31	64	51	41		
	tot kept (mt)	12.02	0.00	0.44	9.76	0.00	4.72	22	0	5		
	tot disc (mt)	0.54	0.10	0.01	0.59	0.01	0.29	1	0	0		
	discard/kept	0.05	-	0.02	0.06	-	0.06					
	Exp disc (mt)	33	-	9	101	-	45	134	0	54	188	5.3
1996	tot land (mt)	716	0	313	1320	0	613	2036	0	926	2961	
	trips	15	17	5	26	2	20	41	19	25		
	tot kept (mt)	6.06	0.00	0.83	0.46	0.00	7.74	7	0	9		
	tot disc (mt)	0.48	0.04	0.05	0.16	0.00	0.37	1	0	0		
	discard/kept	0.08	-	0.06	0.35	-	0.05	0	0	0		
	Exp disc (mt)	57	-	18	460	-	29	517	0	47	564	19.0
1997	tot land (mt)	458	2	120	824	0	423	1281	2	543	1826	
	trips	15	6	8	11	0	17	26	6	25		
	tot kept (mt)	2.10	0.00	0.57	1.73	-	2.38	4	0	3		
	tot disc (mt)	0.41	0.00	0.07	0.28	-	0.09	1	0	0		
	discard/kept	0.19	-	0.13	0.16	-	0.04					
	Exp disc (mt)	89	-	15	133	-	15	222	0	31	253	13.8
1998	tot land (mt)	423	1	210	945	0	453	1368	1	662	2032	
	trips	6	0	12	2	-	23	8	0	35		
	tot kept (mt)	0.68	-	0.91	0.15	-	0.36	1	0	1		
	tot disc (mt)	0.13	-	0.03	0.02	-	0.03	0	0	0		
	discard/kept	0.19	-	0.03	0.17	-	0.08	0	0	0		
	Exp disc (mt)	81	-	6	157	-	35	238	0	41	279	13.7
1999	tot land (mt)	717	0	317	818	0	608	1535	0	925	2460	
	trips	10	-	6	44	-	29	54	0	35		
	tot kept (mt)	0.24	-	1.85	1.79	-	16.59	2	0	18		
	tot disc (mt)	0.01	-	0.09	4.50	-	0.10	5	0	0		
	discard/kept	0.03	-	0.05	2.51	-	0.01	3	0	0		
	Exp disc (mt)	24	-	16	2051	-	4	2076	0	19	2095	85.2
2000	tot land (mt)	900	0	342	931	0	701	1831	0	1042	2873	
	trips	20	0	16	31	0	16	51	0	32		
	tot kept (mt)	7.25	-	3.11	11.41	-	1.58	19	0	5		
	tot disc (mt)	1.50	-	0.06	1.14	-	0.07	3	0	0		
	discard/kept	0.21	-	0.02	0.10	-	0.05	0	0	0		
	Exp disc (mt)	187	-	6	93	-	32	280	0	38	318	11.1

Table B7. Estimates of otter trawl discards from 1964-2000. The estimates for 1989-2000 are directly from sea sampling data while the 1964-1988 estimates are 25% of the landings.

Year	Discards
1964	664
1965	408
1966	298
1967	288
1968	325
1969	370
1970	582
1971	760
1972	678
1973	767
1974	731
1975	536
1976	634
1977	914
1978	862
1979	813
1980	1049
1981	1372
1982	1525
1983	1923
1984	2037
1985	2176
1986	1845
1987	1895
1988	1444
1989	2050
1990	4297
1991	1350
1992	715
1993	603
1994	230
1995	134
1996	517
1997	222
1998	238
1999	2076
2000	280

Table B8. Summary of US commercial white hake landings (mt), number of length samples (n), and number of fish measured (len) by market category and quarter from the Gulf of Maine to the Mid-Atlantic (SA 464,465, 511-515, 521-526, 533-539, 611-626) for all gear types, 1985-2000.

Year		Sampling Intensity																				All Total	mt/ sample
		small					medium					large					unclassified						
		Q1	Q2	Q3	Q4	sum	Q1	Q2	Q3	Q4	sum	Q1	Q2	Q3	Q4	sum	Q1	Q2	Q3	Q4	sum		
1985	mt	129	162	235	167	694	63	78	181	124	446	237	433	1135	623	2428	367	737	1690	988	3782	7349	272
	N	-	2	4	3	9	-	-	-	-	-	-	5	5	3	13	-	1	3	1	5	27	
	#fish	-	233	323	317	873	-	-	-	-	-	-	632	519	271	1422	-	101	293	104	498	2793	
1986	mt	59	134	105	100	398	86	89	55	54	284	274	422	835	417	1948	455	752	1578	694	3478	6107	235
	N	1	3	2	1	7	1	1	-	2	4	1	3	2	1	7	2	2	3	1	8	26	
	#fish	102	263	215	101	681	94	122	-	229	445	122	315	248	96	781	215	206	292	106	819	2726	
1987	mt	98	300	641	576	1616	13	49	122	123	306	171	326	943	372	1813	262	482	1035	301	2080	5814	194
	N	-	2	4	5	11	-	2	1	1	4	-	1	6	3	10	2	1	1	1	5	30	
	#fish	-	240	291	507	1038	-	203	91	109	403	-	111	518	236	865	218	140	112	125	595	2901	
1988	mt	181	549	893	397	2020	26	82	262	120	489	136	330	695	325	1486	73	137	437	134	782	4776	165
	N	5	6	3	5	19	1	1	1	-	3	1	1	2	1	5	-	1	-	1	2	29	
	#fish	558	764	240	478	2040	100	92	105	-	297	112	121	214	85	532	-	100	-	41	141	3010	
1989	mt	149	221	404	358	1132	41	54	124	68	287	188	473	904	470	2035	33	190	774	96	1092	4547	350
	N	1	1	2	2	6	-	-	1	-	1	-	-	2	2	4	1	-	1	-	2	13	
	#fish	91	94	213	195	593	-	-	103	-	103	-	-	206	204	410	100	-	106	-	206	1312	
1990	mt	207	411	885	450	1953	43	108	303	171	625	167	300	596	320	1382	24	182	580	176	962	4922	234
	N	3	4	4	2	13	-	-	2	1	3	2	-	1	1	4	-	-	-	1	1	21	
	#fish	309	408	399	151	1267	-	-	302	99	401	214	-	101	103	418	-	-	-	101	101	2087	
1991	mt	150	366	1215	612	2342	88	160	381	129	758	126	241	533	338	1238	52	358	714	138	1262	5601	156
	N	2	5	6	4	17	1	1	3	1	6	4	1	1	4	10	-	2	1	-	3	36	
	#fish	151	471	485	244	1351	103	100	382	100	685	375	99	96	539	1109	-	207	94	-	301	3446	
1992	mt	424	626	1735	848	3633	102	202	766	358	1428	231	351	699	371	1651	60	280	1246	141	1727	8439	211
	N	4	4	8	3	19	1	4	3	3	11	-	2	3	2	7	1	-	2	-	3	40	
	#fish	329	432	655	240	1656	80	388	266	317	1051	-	194	325	297	816	97	-	237	-	334	3857	
1993	mt	331	502	453	214	1500	161	397	1117	461	2136	173	476	795	416	1860	94	463	975	433	1965	7462	191
	N	2	5	4	1	12	2	3	2	1	8	2	3	7	2	14	-	2	2	1	5	39	
	#fish	150	504	275	50	979	184	309	196	95	784	199	262	676	175	1312	-	214	196	97	507	3582	
1994	mt	63	82	116	56	317	154	374	593	265	1386	206	481	687	407	1782	193	352	457	251	1252	4737	144
	N	-	2	4	1	7	-	2	3	3	8	-	3	4	2	9	-	2	4	3	9	33	
	#fish	-	167	386	100	653	-	230	305	272	807	-	303	363	304	970	-	236	431	372	1039	3469	
1995	mt	39	43	98	56	245	140	238	616	399	1393	197	398	595	374	1564	134	225	504	268	1130	4333	361
	N	-	1	1	1	3	-	2	2	1	5	-	2	-	1	3	-	1	-	-	1	12	
	#fish	-	107	97	105	309	-	191	222	111	524	-	221	-	103	324	-	100	-	-	100	1257	
1996	mt	23	34	80	43	181	96	207	531	269	1103	208	331	416	280	1234	110	152	339	169	769	3287	122
	N	-	-	-	-	-	1	-	4	4	9	-	2	4	5	11	1	1	3	2	7	27	
	#fish	-	-	-	-	-	101	-	435	541	1077	-	202	451	759	1412	127	72	326	220	745	3234	
1997	mt	31	58	124	83	295	76	113	369	193	751	146	146	438	335	1065	34	28	26	26	113	2225	32
	N	4	2	4	2	12	3	7	6	13	29	5	7	7	9	28	-	-	-	1	1	70	
	#fish	458	206	430	261	1355	276	694	564	1200	2734	541	720	678	896	2835	-	-	-	58	58	6982	
1998	mt	31	54	128	105	318	55	77	218	152	502	159	311	571	407	1449	28	23	34	14	100	2370	74
	N	1	2	1	1	5	3	-	3	2	8	7	2	8	1	18	-	-	1	-	1	32	
	#fish	53	220	120	59	452	327	-	402	305	1034	684	213	1311	110	2318	-	-	118	-	118	3922	
1999	mt	50	76	103	87	317	85	110	236	149	580	303	468	633	257	1661	11	14	25	16	66	2624	119
	N	-	-	1	-	1	1	1	3	4	9	1	6	2	3	12	-	-	-	-	-	22	
	#fish	-	-	119	-	119	111	102	315	313	841	166	665	202	327	1360	-	-	-	-	-	2320	
2000	mt	55	70	81	81	286	118	202	289	201	811	293	497	596	446	1833	14	15	20	12	60	2990	120
	N	4	-	-	1	5	5	1	5	4	15	1	1	-	3	5	-	-	-	-	-	25	
	#fish	428	-	-	123	551	527	106	573	450	1656	103	126	-	336	565	-	-	-	-	-	2772	

Table B9. Number of ages used to age the commercial length composition from NEFSC survey and DSSP data.

<u>Year</u>	<u>Spring (Half 1)</u>	<u>Autumn (Half 2)</u>	<u>Total</u>
1985	217	338	555
1986	655	653	1308
1987	171	392	563
1988	273	454	727
1989	192	424	616
1990	436	844	1280
1991	492	762	1254
1992	300	674	974
1993	323	556	879
1994	276	525	801
1995	357	636	993
1996	237	500	737
1997	204	366	570
1998	91	436	527
1999	220	331	551
2000	272	369	641

Table B10. Total US commercial landings-at-age of white hake.

Year	Age									Total
	1	2	3	4	5	6	7	8	9+	
	Total Commercial Landings in Numbers (000s) at age									
1985	0	12	617	1847	679	157	55	20	34	3422
1986	0	18	285	371	289	187	146	84	214	1593
1987	0	46	839	697	351	164	66	74	92	2329
1988	15	1077	966	938	431	86	5	10	27	3556
1989	0	11	540	786	523	243	32	25	11	2172
1990	14	569	1061	1083	298	98	53	11	18	3206
1991	9	237	1458	1276	365	101	20	15	22	3502
1992	0	43	2006	2224	432	214	78	24	11	5032
1993	0	39	1557	2380	632	172	14	5	11	4810
1994	45	28	798	1045	513	225	40	25	7	2726
1995	0	270	1544	789	295	149	42	26	15	3130
1996	0	31	317	477	415	231	46	23	9	1550
1997	0	1	72	216	285	165	93	25	11	867
1998	1	17	58	132	151	183	159	41	1	743
1999	0	0	125	176	200	148	98	82	37	868
2000	0	1	26	214	218	142	90	109	80	879
	Total Commercial Landings in Weight (Tons) at age									
1985	0	8	677	3775	2171	706	344	158	466	8306
1986	0	10	289	626	937	926	858	677	2743	7066
1987	0	25	857	1338	1221	901	372	497	1161	6373
1988	3	491	837	1801	1238	365	34	77	472	5317
1989	0	8	593	1474	1551	999	207	165	134	5131
1990	3	263	1203	2053	916	406	289	91	251	5474
1991	2	90	1656	2551	987	353	111	126	283	6159
1992	0	28	2093	4106	1488	1089	441	178	159	9582
1993	0	14	1639	4466	1939	787	96	43	163	9147
1994	6	10	815	1820	1495	983	254	213	97	5692
1995	0	164	1659	1323	730	461	189	160	127	4814
1996	0	19	357	854	1133	842	198	161	94	3659
1997	0	1	75	402	757	592	436	162	90	2515
1998	0	7	67	250	424	718	808	310	10	2595
1999	0	0	99	302	516	544	486	539	311	2798
2000	0	1	27	398	555	481	417	728	608	3214
	Total Commercial Landings Mean Weight (kg) at age									
1985	0.000	0.682	1.096	2.044	3.195	4.505	6.281	8.104	13.525	2.427
1986	0.000	0.562	1.015	1.686	3.242	4.958	5.898	8.095	12.804	4.435
1987	0.000	0.541	1.022	1.920	3.474	5.492	5.681	6.713	12.677	2.736
1988	0.176	0.455	0.867	1.919	2.874	4.245	7.238	7.604	17.504	1.495
1989	0.000	0.678	1.099	1.875	2.963	4.117	6.399	6.515	11.762	2.362
1990	0.217	0.462	1.134	1.895	3.073	4.118	5.432	8.192	13.902	1.707
1991	0.253	0.379	1.136	1.998	2.708	3.512	5.438	8.712	12.865	1.759
1992	0.000	0.645	1.044	1.847	3.443	5.086	5.668	7.376	13.980	1.904
1993	0.000	0.353	1.053	1.877	3.070	4.571	6.912	9.132	14.312	1.902
1994	0.130	0.362	1.021	1.742	2.914	4.361	6.358	8.483	13.627	2.088
1995	0.000	0.608	1.074	1.677	2.478	3.104	4.500	6.190	8.298	1.538
1996	0.000	0.616	1.125	1.793	2.730	3.643	4.273	6.898	10.129	2.361
1997	0.000	0.693	1.035	1.860	2.658	3.597	4.690	6.565	8.510	2.899
1998	0.202	0.433	1.164	1.889	2.809	3.924	5.083	7.605	9.462	2.382
1999	0.000	0.538	0.797	1.715	2.584	3.668	4.938	6.573	8.288	3.225
2000	0.000	0.612	1.066	1.861	2.550	3.390	4.639	6.682	7.560	3.656
	Total Commercial Landings Mean Length (cm) at age									
1985	0.0	43.8	50.8	61.5	71.0	79.3	87.9	95.4	110.2	63.3
1986	0.0	40.8	49.3	58.0	71.2	81.6	86.3	95.2	107.5	72.6
1987	35.0	40.7	49.7	60.3	72.9	84.0	85.2	89.6	108.5	63.2
1988	28.7	37.7	47.0	60.4	68.7	77.5	92.0	93.6	120.3	52.1
1989	0.0	43.9	50.7	60.1	69.5	77.0	88.6	88.9	106.5	62.8
1990	30.1	38.8	51.1	60.4	70.1	77.1	84.0	95.9	111.6	55.6
1991	31.8	35.6	50.7	60.8	67.1	73.2	84.1	97.1	109.7	56.4
1992	0.0	42.9	49.9	59.1	72.4	82.1	85.2	92.5	113.2	58.1
1993	0.0	35.7	50.0	59.9	70.3	79.7	90.7	98.2	113.3	58.8
1994	26.3	34.8	49.6	58.5	69.0	78.5	88.6	96.4	111.2	59.7
1995	0.0	42.3	50.4	58.1	65.8	70.4	79.3	87.3	94.2	55.0
1996	0.0	42.5	51.1	59.2	67.8	74.2	77.7	90.6	101.9	63.0
1997	0.0	43.5	49.6	59.8	67.1	73.9	80.2	89.1	96.4	67.5
1998	30.2	37.8	51.5	60.2	68.4	75.9	82.3	93.4	100.4	71.1
1999	0.0	40.0	45.8	58.0	66.6	74.3	81.6	89.0	95.8	68.2
2000	0.0	42.2	50.1	60.0	66.4	72.5	79.9	89.5	93.1	72.0

Table B11. Summary of Domestic Sea Sampling number of number of trips (trips) and number of age samples taken (age) by gear type, half year, and catch disposition, 1989-2000.

		Sink Gill Net						Otter Trawl						Grand	
		Half 1		Half 2		Total		Half 1		Half 2		Total		Total	
		Kept	Disc	Kept	Disc	Kept	Disc	Kept	Disc	Kept	Disc	Kept	Disc	Kept	Disc
1989	trips			14	1	14	1	4	10	3	19	7	29	21	30
	len			512	2	512	2	123	916	154	1734	277	2650	789	2652
	age			8		8	0		7	16	113	16	120	24	120
1990	trips	6		8	1	14	1	3	4	1	5	4	9	18	10
	len	206		1197	32	1403	32	69	53	138	312	207	365	1610	397
	age	30		76		106	0	19	7			19	7	125	7
1991	trips	20	1	89	7	109	8	2	1	3	2	5	3	114	11
	len	2526	135	9973	30	12499	165	53	180	413	45	466	225	12965	390
	age	155	49	334	11	489	60				2	0	2	489	62
1992	trips	34	1	182	4	216	5	7	6	2	4	9	10	225	15
	len	1620	1	8473	4	10093	5	265	17	59	144	324	161	10417	166
	age	61		278	3	339	3	47			13	47	13	386	16
1993	trips	26	1	129	10	155	11	8	20	5	2	13	22	168	33
	len	1276	1	4001	13	5277	14	681	333	658	44	1339	377	6616	391
	age	30	1	169	4	199	5	17	16	3		20	16	219	21
1994	trips	10		81	3	91	3	12	37	8	7	20	44	111	47
	len	44		1835	12	1879	12	247	570	489	294	736	864	2615	876
	age	9		64	1	73	1	22	22	54	2	76	24	149	25
1995	trips	9	1	117	7	126	8	12	49	9	10	21	59	147	67
	len	167	1	2638	30	2805	31	1111	1375	697	372	1808	1747	4613	1778
	age	7	1	57	2	64	3	70	57	137	41	207	98	271	101
1996	trips	11	2	78	2	89	4	8	16	6	13	14	29	103	33
	len	70	13	826	3	896	16	284	526	331	381	615	907	1511	923
	age	22		284		306	0	99	31	15	28	114	59	420	59
1997	trips	8		24	2	32	2	5	9	6	6	11	15	43	17
	len	85		427	4	512	4	117	93	110	64	227	157	739	161
	age	34		118	2	152	2	65	64	93	65	158	129	310	131
1998	trips	8		31	1	39	1	3	2	1	1	4	3	43	4
	len	36		411	1	447	1	39	17	12	2	51	19	498	20
	age	31		113	1	144	1	29	14	12	2	41	16	185	17
1999	trips	6		17	3	23	3	1		7	17	8	17	31	20
	len	79		218	20	297	20	23		113	287	136	287	433	307
	age	38		76	12	114	12	24		104	113	128	113	242	125
2000	trips	7	2	5		12	2	7	5	15	10	22	15	34	17
	len	47	9	143		190	9	421	119	475	76	896	195	1086	204
	age	4	4	15		19	4	160	34	114	6	274	40	293	44

Table B12. Discards at age in the otter trawl fishery, 1989-2000

Year	Age								Total	
	0	1	2	3	4	5	6	7		
	Otter Trawl Discards in Numbers (000s) at age									
1989	0	646	2476	1864	95	1	0	0	0	5082
1990	32	939	10362	2204	267	0	0	0	0	13804
1991	2152	7342	92	514	109	0	0	0	0	10209
1992	268	1754	2372	573	0	0	0	0	0	4967
1993	0	237	1161	443	2	0	0	0	0	1843
1994	37	833	608	41	23	14	1	0	0	1557
1995	0	139	237	77	4	1	<1	0	0	458
1996	0	1317	1013	112	6	0	0	0	0	2448
1997	0	76	214	76	27	13	4	3	<1	414
1998	0	88	237	80	29	12	2	3	0	451
1999	0	1232	2110	615	223	88	5	3	9	4286
2000	0	23	878	192	7	4	1	0	0	1106
	Otter Trawl Discards in Weight (tons) at age									
1989	0	90	874	1383	104	3	0	0	0	2454
1990	2	169	2812	1027	286	0	0	0	0	4296
1991	113	537	24	530	146	0	0	0	0	1350
1992	9	111	326	268	0	0	0	0	0	714
1993	0	36	262	304	1	0	0	0	0	603
1994	2	63	68	22	36	36	3	0	0	230
1995	0	11	64	53	5	1	<1	0	0	134
1996	0	169	285	57	6	0	0	0	0	517
1997	0	10	63	46	44	29	13	16	2	222
1998	0	13	70	54	49	30	7	15	0	238
1999	0	224	682	459	421	203	14	20	53	2075
2000	0	4	177	75	11	11	2	0	0	280
	Otter Trawl Discards Mean Weight (kg) at age									
1989	0.058	0.140	0.353	0.742	1.090	2.562				0.483
1990		0.180	0.271	0.466	1.071					0.311
1991	0.053	0.073	0.258	1.032	1.337					0.132
1992	0.034	0.063	0.137	0.467						0.144
1993		0.150	0.225	0.688	0.628					0.327
1994	0.040	0.076	0.112	0.543	1.589	2.519	3.746			0.148
1995		0.077	0.269	0.691	1.194	2.411	2.605			0.293
1996		0.128	0.281	0.511	0.997					0.211
1997		0.133	0.292	0.605	1.635	2.234	3.292	4.715	4.519	0.537
1998		0.150	0.293	0.674	1.720	2.539	4.292	4.567		0.528
1999		0.182	0.323	0.746	1.888	2.315	2.804	5.650	5.819	0.484
2000		0.156	0.201	0.392	1.546	2.624	2.677			0.253
	Otter Trawl Discards Mean Length (cm) at age									
1989	20.5	26.8	35.4	45.0	50.9	66.2				38.1
1990		28.8	32.7	38.7	49.5					33.7
1991	19.8	22.0	31.4	49.0	53.7					23.3
1992	17.4	20.9	25.9	37.0						24.9
1993		27.0	30.8	44.1	42.7					33.5
1994	18.1	21.5	24.3	40.6	56.9	66.1	75.0			24.0
1995		21.4	30.9	43.7	52.1	65.3	67.0			30.4
1996		25.9	33.0	39.9	49.6					29.5
1997		26.1	33.4	41.8	57.7	63.7	71.9	80.4	79.5	36.9
1998		27.0	33.4	43.2	58.5	66.3	77.8	79.6		36.9
1999		29.0	34.7	44.7	60.4	64.5	68.4	85.2	86.0	36.6
2000		27.6	29.5	36.4	55.6	67.1	67.5			31.0

Table B13. Total catch at age for white hake 1989-2000.

Year	1	2	3	4	5	6	7	8	9+	Total
Total Catch in Numbers (000s) at age										
1989	646	2488	2403	881	525	243	32	25	11	7255
1990	953	10932	3264	1351	298	98	53	11	18	17010
1991	7350	329	1972	1385	365	101	20	15	22	13710
1992	1754	2415	2579	2224	432	214	78	24	11	9999
1993	237	1201	2000	2382	632	172	14	5	11	6653
1994	878	636	839	1068	527	226	40	25	7	4283
1995	139	508	1620	793	295	149	42	26	15	3587
1996	1317	1045	429	482	415	231	46	23	9	3998
1997	76	216	148	243	298	169	96	25	11	1281
1998	89	255	138	161	163	184	162	41	1	1194
1999	1232	2111	740	399	297	153	102	91	37	5154
2000	23	879	218	221	222	142	90	109	80	1985
Total Catch in Weight (tons) at age										
1989	90	881	1976	1578	1554	999	207	165	134	7585
1990	172	3074	2230	2339	916	406	289	91	251	9770
1991	539	114	2186	2697	987	353	111	126	283	7509
1992	111	353	2361	4106	1488	1089	441	178	159	10296
1993	36	276	1944	4468	1939	787	96	43	163	9750
1994	69	78	837	1857	1530	986	254	213	97	5922
1995	11	228	1712	1328	731	461	189	160	127	4948
1996	169	304	414	860	1133	842	198	161	94	4176
1997	10	64	121	446	786	605	452	164	90	2737
1998	13	77	121	299	454	725	823	310	10	2833
1999	224	682	558	724	719	558	506	592	311	4873
2000	4	177	103	409	567	482	417	728	608	3494
Total Catch Mean Weight (kg) at age										
1989	0.140	0.354	0.822	1.790	2.962	4.117	6.399	6.515	11.762	1.046
1990	0.181	0.281	0.683	1.732	3.073	4.118	5.432	8.192	13.902	0.574
1991	0.073	0.345	1.109	1.946	2.708	3.512	5.438	8.712	12.865	0.548
1992	0.063	0.146	0.915	1.847	3.443	5.086	5.668	7.376	13.980	1.030
1993	0.150	0.230	0.972	1.876	3.070	4.571	6.912	9.132	14.312	1.465
1994	0.079	0.123	0.998	1.739	2.903	4.359	6.358	8.483	13.627	1.383
1995	0.078	0.450	1.056	1.674	2.478	3.104	4.500	6.190	8.298	1.379
1996	0.128	0.291	0.965	1.783	2.730	3.643	4.273	6.898	10.129	1.044
1997	0.133	0.295	0.814	1.835	2.640	3.590	4.691	6.535	8.510	2.137
1998	0.150	0.302	0.879	1.859	2.790	3.928	5.072	7.605	9.462	2.373
1999	0.182	0.323	0.754	1.812	2.418	3.640	4.962	6.498	8.288	0.946
2000	0.155	0.202	0.471	1.851	2.552	3.386	4.639	6.682	7.560	1.760
Total Catch in Mean Length (cm) at age										
1989	26.79	35.45	46.25	59.11	69.45	77.05	88.56	88.87	106.54	45.52
1990	28.86	33.02	42.76	58.22	70.13	77.07	83.99	95.85	111.62	37.82
1991	21.99	34.37	50.30	60.23	67.11	73.20	84.05	97.14	109.73	31.76
1992	20.85	26.20	47.04	59.06	72.43	82.13	85.16	92.45	113.18	41.62
1993	27.01	30.92	48.69	59.92	70.28	79.66	90.67	98.24	113.32	51.81
1994	21.73	24.78	49.19	58.43	68.96	78.48	88.56	96.41	111.17	46.70
1995	21.40	36.95	50.11	58.05	65.76	70.44	79.28	87.30	94.18	51.82
1996	25.85	33.28	48.13	59.11	67.77	74.16	77.69	90.64	101.94	42.49
1997	26.11	33.45	45.62	59.53	67.00	73.86	80.20	88.98	96.43	57.61
1998	27.04	33.73	46.69	59.88	68.23	75.90	82.22	93.44	100.37	58.16
1999	29.04	34.67	44.90	59.35	65.90	74.08	81.68	88.75	95.82	41.95
2000	27.55	29.52	38.05	59.85	66.41	72.48	79.89	89.51	93.06	49.16

Table B14. Stratified mean catch per tow in numbers and weight (kg) for white hake from NEFSC offshore spring research vessel bottom trawl surveys (strata 21-30,33-40), 1968-2000.

Year	Abundance						Biomass						Individual Mean Wt	Length			Number	
	Raw Index			Smoothed			Raw Index			Smoothed				Min	Mean	Max	of Tows	Nonzero Tows
	Mean	L95%CI	U95%CI	Mean	L95%CI	U95%CI	Mean	L95%CI	U95%CI	Mean	L95%CI	U95%CI						
1968	1.60	0.99	2.21	2.80			1.74	0.85	2.63	3.63			1.09	10	44.1	118	84	32
1969	3.76	2.14	5.38	3.59			5.09	3.15	7.03	5.02			1.36	11	46.3	127	83	40
1970	5.84	3.48	8.19	4.50			11.86	2.60	21.12	6.92			2.03	21	52.9	114	90	47
1971	3.31	2.16	4.47	5.03	3.25	7.88	5.14	3.03	7.25	7.50	4.43	12.69	1.55	17	51.3	121	94	45
1972	10.18	6.71	13.65	6.78	4.38	10.61	12.66	6.03	19.30	9.60	5.67	16.26	1.24	18	47.3	112	94	59
1973	9.24	4.96	13.52	7.62	4.92	11.93	12.22	7.30	17.15	10.89	6.43	18.43	1.32	18	49.9	120	85	55
1974	8.08	5.61	10.54	7.86	5.08	12.32	13.99	9.06	18.93	11.72	6.92	19.85	1.73	10	55.0	126	81	56
1975	9.32	5.94	12.70	8.02	5.18	12.56	11.22	7.60	14.85	11.67	6.89	19.77	1.21	9	44.7	115	81	48
1976	9.98	6.90	13.06	7.66	4.94	11.99	17.01	9.27	24.74	11.83	6.98	20.03	1.70	10	52.7	122	97	70
1977	6.13	3.82	8.43	6.50	4.19	10.17	11.01	6.79	15.23	10.20	6.02	17.28	1.79	22	55.5	128	105	52
1978	3.22	2.10	4.34	5.66	3.65	8.86	6.14	3.76	8.52	8.51	5.02	14.40	1.91	20	51.8	131	112	49
1979	5.26	3.40	7.11	6.32	4.08	9.90	4.97	2.56	7.38	8.19	4.84	13.88	1.02	16	43.0	113	131	65
1980	10.38	7.26	13.49	7.66	4.95	12.00	13.96	9.51	18.41	9.85	5.82	16.69	1.35	10	49.7	123	83	54
1981	17.09	12.45	21.73	8.12	5.25	12.72	19.92	8.91	30.93	10.15	5.99	17.19	1.17	11	45.9	131	84	66
1982	6.06	3.33	8.78	6.20	4.00	9.70	8.91	4.86	12.95	7.76	4.58	13.14	1.47	16	51.0	122	90	52
1983	3.23	2.26	4.19	4.77	3.08	7.47	3.12	2.13	4.11	5.58	3.29	9.45	0.97	15	43.7	102	87	54
1984	2.75	1.85	3.65	4.37	2.82	6.84	4.17	2.10	6.24	5.19	3.06	8.79	1.52	15	51.4	118	83	38
1985	4.33	2.97	5.68	4.90	3.17	7.68	5.38	3.12	7.64	5.32	3.14	9.00	1.24	20	48.5	117	78	39
1986	8.24	6.39	10.10	5.82	3.76	9.11	5.61	3.97	7.25	5.42	3.20	9.17	0.68	11	40.0	96	87	60
1987	7.15	5.29	9.00	5.92	3.82	9.27	6.44	4.56	8.31	5.44	3.21	9.21	0.90	12	45.3	128	81	49
1988	4.52	3.58	5.45	5.54	3.58	8.67	3.69	2.82	4.57	5.06	2.99	8.57	0.82	13	41.9	95	87	50
1989	3.65	2.06	5.24	5.67	3.66	8.88	3.22	1.22	5.22	5.42	3.20	9.18	0.88	16	43.0	92	79	42
1990	11.11	0.84	21.38	7.05	4.55	11.04	18.37	-8.27	45.00	7.31	4.32	12.38	1.65	22	53.3	119	87	50
1991	8.42	6.30	10.55	7.17	4.63	11.23	6.14	4.05	8.23	6.56	3.87	11.10	0.73	9	41.6	131	83	55
1992	7.59	4.95	10.24	6.79	4.39	10.63	7.11	3.54	10.69	6.06	3.57	10.25	0.94	22	45.1	105	77	48
1993	7.93	5.50	10.35	6.13	3.96	9.58	6.84	4.49	9.19	5.21	3.07	8.82	0.86	17	45.1	85	84	48
1994	4.59	3.29	5.89	4.93	3.18	7.71	3.17	1.69	4.66	3.97	2.34	6.72	0.69	18	40.1	96	85	55
1995	4.38	3.20	5.55	4.09	2.64	6.41	4.02	2.58	5.46	3.34	1.97	5.65	0.92	14	44.1	100	86	48
1996	2.87	2.17	3.58	3.30	2.13	5.25	3.07	2.22	3.92	2.58	1.52	4.38	1.07	12	45.9	104	78	47
1997	1.88	1.27	2.48	2.82	1.82	4.78	0.89	0.58	1.20	1.85	1.09	3.15	0.47	18	38.4	67	87	36
1998	2.25	1.57	2.92	2.90	1.85	4.52	1.09	0.70	1.48	1.84	1.08	3.15	0.49	17	37.7	74	113	53
1999	3.32	1.75	4.90	3.32	2.08	5.30	2.97	0.88	5.05	2.31	1.31	4.05	0.89	10	44.6	89	81	44
2000	5.19	3.85	6.52	3.81	2.22	6.53	3.33	2.32	4.35	2.58	1.35	4.94	0.64	14	40.4	77	86	54

Table B15. Stratified mean catch per tow in numbers and weight (kg) for white hake from NEFSC offshore autumn research vessel bottom trawl surveys (strata 21-30,33-40), 1963-2000.

Year	Abundance						Biomass						Individual Mean Wt	Length			Number of Tows	Number of Nonzero Tows
	Raw Index			Smoothed			Raw Index			Smoothed				Min	Mean	Max		
	Mean	L95%CI	U95%CI	Mean	L95%CI	U95%CI	Mean	L95%CI	U95%CI	Mean	L95%CI	U95%CI						
1963	5.00	3.85	6.15	3.87			6.31	4.66	7.97	5.75			1.26	9	46.2	121	90	54
1964	1.77	1.22	2.31	3.46			4.14	2.51	5.78	5.52			2.38	24	56.3	123	86	36
1965	4.39	2.75	6.02	4.16			6.86	4.61	9.11	6.02			1.56	15	50.4	125	87	60
1966	6.79	5.06	8.53	4.88	3.34	7.13	7.67	5.75	9.59	6.20	4.30	8.93	1.13	18	45.1	121	85	66
1967	3.92	2.85	5.00	4.94	3.39	7.22	3.64	2.33	4.95	5.80	4.03	8.36	0.93	9	42.6	117	83	53
1968	4.24	2.57	5.91	5.55	3.80	8.11	4.54	2.46	6.62	6.68	4.63	9.62	1.07	11	44.9	120	84	54
1969	9.24	7.08	11.41	7.03	4.82	10.27	13.09	9.00	17.19	9.12	6.33	13.14	1.42	14	46.8	112	85	62
1970	8.05	6.17	9.92	7.89	5.40	11.52	12.82	8.95	16.70	10.60	7.36	15.28	1.59	5	51.3	127	90	68
1971	10.38	6.33	14.43	8.77	6.01	12.81	12.10	9.49	14.71	11.34	7.87	16.34	1.17	5	43.6	130	92	76
1972	12.52	5.80	19.24	9.05	6.20	13.22	13.10	8.54	17.65	11.78	8.17	16.97	1.05	9	45.2	122	92	74
1973	9.05	6.39	11.72	8.09	5.54	11.81	13.46	9.15	17.76	11.67	8.10	16.82	1.49	8	51.7	119	89	72
1974	5.35	4.12	6.59	6.88	4.71	10.04	11.00	7.96	14.04	10.85	7.53	15.64	2.06	7	54.5	130	95	73
1975	5.28	4.03	6.53	6.53	4.47	9.54	7.23	5.43	9.03	10.04	6.97	14.46	1.37	15	48.5	116	105	74
1976	6.04	4.09	7.99	6.82	4.67	9.97	10.56	7.39	13.72	10.73	7.45	15.47	1.75	8	54.7	134	91	68
1977	9.78	7.77	11.78	7.52	5.15	10.99	13.74	10.51	16.96	11.56	8.02	16.66	1.41	10	47.8	123	122	94
1978	7.87	6.25	9.49	7.38	5.05	10.78	12.54	9.73	15.35	11.54	8.01	16.63	1.59	12	50.2	131	191	146
1979	5.62	4.38	6.85	7.04	4.82	10.28	10.31	7.27	13.36	11.10	7.70	15.99	1.84	22	53.1	127	203	146
1980	10.86	7.38	14.33	7.42	5.08	10.84	16.66	8.79	24.54	11.03	7.65	15.89	1.54	4	48.8	118	94	76
1981	8.70	6.87	10.53	6.61	4.53	9.65	12.16	9.69	14.63	9.13	6.33	13.15	1.40	20	49.9	132	88	65
1982	1.96	1.37	2.55	5.21	3.57	7.61	2.11	1.35	2.88	6.65	4.62	9.58	1.08	12	46.7	93	92	49
1983	8.22	6.11	10.32	6.33	4.34	9.25	10.79	8.16	13.42	8.06	5.59	11.62	1.31	22	48.8	117	80	59
1984	5.32	4.38	6.26	6.86	4.70	10.02	8.23	6.60	9.86	8.58	5.96	12.37	1.55	22	51.9	123	86	69
1985	9.37	6.79	11.94	8.31	5.69	12.14	9.74	6.48	12.99	9.32	6.46	13.43	1.04	9	42.9	128	85	68
1986	14.42	11.34	17.50	9.55	6.54	13.95	11.56	9.54	13.58	9.91	6.88	14.28	0.80	10	41.9	108	89	79
1987	7.59	6.16	9.02	9.14	6.26	13.35	9.62	6.79	12.44	9.85	6.84	14.20	1.27	17	49.2	113	85	61
1988	8.12	6.35	9.89	9.51	6.51	13.88	9.88	6.87	12.90	9.89	6.87	14.26	1.22	19	46.1	136	86	69
1989	11.76	7.94	15.58	10.60	7.26	15.47	9.23	7.39	11.07	9.94	6.90	14.33	0.79	9	40.5	91	85	68
1990	13.09	9.76	16.41	11.28	7.72	16.47	10.58	6.87	14.28	10.33	7.17	14.89	0.81	5	41.5	83	87	72
1991	13.22	9.77	16.68	11.24	7.70	16.41	12.20	8.05	16.36	10.62	7.37	15.30	0.92	16	44.6	94	87	76
1992	10.16	8.57	11.76	10.42	7.14	15.22	11.24	9.09	13.39	10.26	7.12	14.79	1.11	16	47.7	115	84	68
1993	11.35	8.64	14.05	9.78	6.69	14.28	11.66	8.89	14.42	9.52	6.61	13.72	1.03	11	45.2	86	84	75
1994	8.44	6.67	10.20	8.58	5.88	12.54	7.02	5.02	9.02	8.08	5.61	11.64	0.83	3	42.3	88	86	73
1995	9.54	7.81	11.28	7.59	5.20	11.09	8.20	6.43	9.96	7.30	5.06	10.52	0.86	3	40.8	126	91	72
1996	4.52	3.66	5.37	6.07	4.15	8.87	6.35	4.74	7.96	6.26	4.34	9.02	1.41	10	51.2	97	83	56
1997	4.69	3.58	5.80	5.53	3.78	8.09	4.55	3.29	5.80	5.33	3.69	7.70	0.97	18	41.5	118	88	65
1998	4.41	3.59	5.23	5.42	3.68	7.97	4.27	3.30	5.25	4.87	3.36	7.07	0.97	12	44.5	97	101	72
1999	5.68	3.55	7.80	5.81	3.88	8.71	3.44	2.48	4.39	4.72	3.19	6.97	0.61	11	36.3	92	104	72
2000	7.57	5.95	9.19	6.30	3.95	10.06	6.72	5.25	8.19	5.26	3.35	8.25	0.89	5	43.8	110	85	62

Table B16. Summary of results from alternative ADAPT calibrations.

run#	1	2	3	4	5	6	7
CAA data	Survey only	With SS	With disc	With SS	With SS	With SS (8+)	With SS
Tuning	2-7	2-7	2-7	2-7	2-6	2-5, 6+	2-7
Estimation	2-7	2-7	2-7	2-6	2-6	2-6	2-7
Ages for est. of Z on oldest age	4-8	4-8	4-8	4-8	4-8	4-7	5-8
Years	85-00	85-00	85-00	85-00	85-00	85-00	
Age PR set to one	4	4	4	4	4	4	5
results							
MSR	0.549	0.542	0.604	0.556	0.447	0.505	0.514
N2	2095	2106	3159	2080	2114	2074	2115
N3	4899	4924	6315	4864	4942	4848	4943
N4	1433	1450	1527	1433	1457	1427	1455
N5	901	986	897	926	944	1015	1061
N6	206	195	204	60	91	32	257
N7	21	32	31	-	-	-	34
CV(N2)	0.77	0.76	0.81	0.77	0.69	0.74	0.74
CV(N3)	0.44	0.44	0.50	0.45	0.40	0.43	0.43
CV(N4)	0.35	0.35	0.47	0.35	0.32	0.34	0.34
CV(N5)	0.37	0.35	0.44	0.36	0.32	0.34	0.34
CV(N6)	0.50	0.51	0.58	0.52	0.50	0.86	0.45
CV(N7)	0.70	0.69	0.74	-	-	-	0.67
F00	0.91	0.83	0.84	0.82	0.67	1.08	1.07
SSB00	6016	6412	5627	6255	6972	5748	6220

Table B16. Continued. (Summary of results from alternative ADAPT calibrations.)

Run #	8	9	10	11	12	13	14	15
CAA	9+	9+ with Disc.	7+	9+	9+ with 4X	9+ with 4X	9+ with disc.	9+ with disc.
Tuning	NEFSC2-7 Shrimp1-5	NEFSC2-7 Shrimp 1-5	NEFSC2-6 Shrimp 1-5	NEFSC2-5 Shrimp 1-5	NEFSC2-5 Shrimp 1-5	NEFSC2-7 Shrimp 1-5	NEFSC2-5 Shrimp1-5	NEFSC2-5 Shrimp1-5
Estimation	2-7	2-7	2-6	2-5	2-5	2-7	2-5	2-5
Ages for Est. of Z on oldest age	5-8	5-8	4-6	4-6	4-6	5-8	4-6	4-6
Years	85-00	89-00	85-00	85-00	85-00	85-00	89-00	85-00
Age PR set to one	5	5	4	4	4	4	4	
MSR	0.502	0.587	0.506	0.398	0.400	0.517	0.464	0.448
CV2	0.53	0.58	0.53	0.47	0.48	0.54	0.51	0.50
CV3	0.34	0.39	0.34	0.30	0.30	0.34	0.35	0.34
CV4	0.27	0.40	0.27	0.24	0.24	0.27	0.36	0.35
CV5	0.28	0.35	0.28	0.21	0.21	0.28	0.28	0.28
CV6	0.34	0.41	0.42	-	-	0.33	-	-
CV7	0.63	0.69	-	-	-	0.64	-	-
N2	6316	11135	6510	6659	10474	9882	11624	10554
N3	6601	9773	6842	6995	11071	10413	10388	9258
N4	969	1164	1014	1034	1642	1537	1260	1119
N5	952	1009	921	470	769	1459	530	412
N6	342	353	127	-	-	574	-	-
N7	36	46	-	-	-	45	-	-
F00	0.99	0.89	0.56	0.35	0.31	0.74	0.32	0.40
SSB00	6315	6378	8003	10306	16416	10416	10697	8884

Table B17. Commercial catch of white hake by size group.

Year	> 60 cm			<= 60 cm		
	Landings	Discards	Total	Landings	Discards	Total
1964	2284	0	2284	761	664	1425
1965	1963	0	1963	654	408	1062
1966	1173	0	1173	391	298	689
1967	857	0	857	286	288	574
1968	971	0	971	324	325	649
1969	1037	0	1037	346	370	716
1970	1600	0	1600	533	582	1115
1971	2173	0	2173	724	760	1484
1972	2359	0	2359	786	678	1464
1973	2551	0	2551	850	767	1617
1974	3004	0	3004	1001	731	1732
1975	2864	0	2864	954	536	1490
1976	3224	0	3224	1075	634	1709
1977	4113	0	4113	1371	914	2285
1978	3790	0	3790	1263	862	2125
1979	3224	0	3224	1075	813	1888
1980	3790	0	3790	1263	1049	2312
1981	4817	0	4817	1606	1372	2978
1982	5209	0	5209	1736	1525	3261
1983	5414	0	5414	1805	1923	3728
1984	5828	0	5828	1943	2037	3980
1985	6306	0	6306	1987	2176	4163
1986	6405	0	6405	654	1845	2499
1987	5025	0	5025	1353	1895	3248
1988	3295	0	3295	2041	1444	3485
1989	3944	0	3944	1186	2050	3236
1990	3156	0	3156	2330	4297	6627
1991	3824	0	3824	2347	1350	3697
1992	6147	0	6147	3434	715	4149
1993	5576	0	5576	3583	603	4186
1994	3985	55	4040	1706	177	1883
1995	2185	2	2187	2625	133	2758
1996	2850	0	2850	806	517	1323
1997	2248	75	2323	270	147	417
1998	2421	78	2499	173	160	333
1999	2530	565	3095	269	1509	1778
2000	2999	17	3016	215	263	478

Table B18. NEFSC autumn and spring survey indices by size group.

Year	Autumn		Spring	
	> 60	<= 60	> 60	<= 60
1964	3.25	0.89		
1965	4.60	2.26		
1966	4.00	3.67		
1967	1.77	1.85		
1968	2.20	2.34	0.98	0.76
1969	8.38	4.71	3.58	1.52
1970	7.76	5.07	9.12	2.74
1971	8.00	4.10	3.62	1.52
1972	7.04	6.05	8.95	3.71
1973	8.22	5.23	7.01	5.21
1974	8.19	2.80	10.34	3.65
1975	4.46	2.77	7.48	3.74
1976	6.83	3.73	12.90	4.10
1977	9.07	4.67	7.97	3.04
1978	8.46	4.08	4.97	1.17
1979	6.97	3.34	2.83	2.14
1980	11.60	5.06	8.73	5.23
1981	8.44	3.72	13.47	6.45
1982			6.15	2.76
1983	6.06	4.73	1.54	1.58
1984	5.05	3.18	2.68	1.49
1985	5.49	4.24	3.06	2.32
1986	4.38	7.18	2.29	3.32
1987	4.56	5.06	2.56	3.88
1988	5.41	4.48	1.90	1.80
1989	3.84	5.39	1.80	1.42
1990	3.79	6.79	12.14	6.22
1991	4.83	7.37	2.76	3.38
1992	4.14	7.10	2.30	4.81
1993	4.90	6.76	2.68	4.16
1994	2.46	4.56	1.23	1.94
1995	2.96	5.23	1.96	2.06
1996	3.34	3.01	1.77	1.30
1997	2.60	1.95	0.14	0.75
1998	1.64	2.64	0.26	0.84
1999	1.26	2.17	1.43	1.53
2000	2.91	3.81	1.08	2.26

Table B19. Exploitation ratios (catch/autumn survey).

<u>Year</u>	<u>< 60</u>	<u><= 60</u>	<u>Total</u>
1964	0.70	1.60	0.90
1965	0.43	0.47	0.44
1966	0.29	0.19	0.24
1967	0.48	0.31	0.39
1968	0.44	0.28	0.36
1969	0.12	0.15	0.13
1970	0.21	0.22	0.21
1971	0.27	0.36	0.30
1972	0.33	0.24	0.29
1973	0.31	0.31	0.31
1974	0.37	0.62	0.43
1975	0.64	0.54	0.60
1976	0.47	0.46	0.47
1977	0.45	0.49	0.47
1978	0.45	0.52	0.47
1979	0.46	0.57	0.50
1980	0.33	0.46	0.37
1981	0.57	0.80	0.64
1982			
1983	0.89	0.79	0.85
1984	1.15	1.25	1.19
1985	1.15	0.98	1.08
1986	1.46	0.35	0.77
1987	1.10	0.64	0.86
1988	0.61	0.78	0.68
1989	1.03	0.60	0.78
1990	0.83	0.98	0.92
1991	0.79	0.50	0.62
1992	1.48	0.58	0.92
1993	1.14	0.62	0.84
1994	1.64	0.41	0.84
1995	0.74	0.53	0.60
1996	0.85	0.44	0.66
1997	0.89	0.21	0.60
1998	1.53	0.13	0.66
1999	2.45	0.82	1.42
2000	1.04	0.13	0.52

Table B20. White Hake -- ASPIC 3.6x -- 60+ Biomass

09 Jul 2001 at 14:51.12

ASPIC -- A Surplus-Production Model Including Covariates (Ver. 3.77)

BOT Mode

CONTROL PARAMETERS USED (FROM INPUT FILE)

Number of years analyzed:	37	Number of bootstrap trials:	500
Number of data series:	2	Lower bound on MSY:	1.000E+00
Objective function computed:	in effort	Upper bound on MSY:	5.000E+02
Relative conv. criterion (simplex):	1.000E-08	Lower bound on r:	1.000E-01
Relative conv. criterion (restart):	3.000E-08	Upper bound on r:	1.000E+01
Relative conv. criterion (effort):	1.000E-04	Random number seed:	1964285
Maximum F allowed in fitting:	5.000	Monte Carlo search trials:	50000

PROGRAM STATUS INFORMATION (NON-BOOTSTRAPPED ANALYSIS)

code 0

Normal convergence.

CORRELATION AMONG INPUT SERIES EXPRESSED AS CPUE (NUMBER OF PAIRWISE OBSERVATIONS BELOW)

1	Fall Survey	1.000	
		36	
2		0.606	1.000
		32	33
		1	2

GOODNESS-OF-FIT AND WEIGHTING FOR NON-BOOTSTRAPPED ANALYSIS

Loss component number and title	Weighted SSE	N	Weighted MSE	Current weight	Suggested weight	R-squared in CPUE
Loss(-1) SSE in yield	0.000E+00					
Loss(0) Penalty for B1R > 2	0.000E+00	1	N/A	1.000E+00	N/A	
Loss(1) Fall Survey	4.387E+00	36	1.290E-01	1.000E+00	1.575E+00	0.620
Loss(2)	1.689E+01	33	5.450E-01	1.000E+00	3.729E-01	0.294
TOTAL OBJECTIVE FUNCTION:	2.12811511E+01					

Number of restarts required for convergence: 7
 Est. B-ratio coverage index (0 worst, 2 best): 1.2499
 Est. B-ratio nearness index (0 worst, 1 best): 1.0000

< These two measures are defined in Prager et al. (1996), Trans. A. F. S. 125: 729

MODEL PARAMETER ESTIMATES (NON-BOOTSTRAPPED)

Parameter	Estimate	Starting guess	Estimated	User guess
B1R Starting biomass ratio, year 1964	3.465E-01	5.000E-01	1	1
MSY Maximum sustainable yield	4.234E+00	7.700E+00	1	1
r Intrinsic rate of increase	5.761E-01	7.000E-01	1	1
..... Catchability coefficients by fishery:				
q(1) Fall Survey	4.090E-01	6.000E-01	1	1
q(2)	2.414E-01	4.000E-01	1	1

MANAGEMENT PARAMETER ESTIMATES (NON-BOOTSTRAPPED)

Parameter	Estimate	Formula	Related quantity
MSY Maximum sustainable yield	4.234E+00	Kr/4	
K Maximum stock biomass	2.940E+01		
Bmsy Stock biomass at MSY	1.470E+01	K/2	
Fmsy Fishing mortality at MSY	2.880E-01	r/2	
F(0.1) Management benchmark	2.592E-01	0.9*Fmsy	
Y(0.1) Equilibrium yield at F(0.1)	4.192E+00	0.99*MSY	
B-ratio Ratio of B(2001) to Bmsy	2.053E-01		
F-ratio Ratio of F(2000) to Fmsy	2.924E+00		
F01-mult Ratio of F(0.1) to F(2000)	3.078E-01		
Y-ratio Proportion of MSY avail in 2001	3.685E-01	2*Br-Br^2	Ye(2001) = 1.560E+00
..... Fishing effort at MSY in units of each fishery:			
fmsy(1) Fall Survey	7.043E-01	r/2q(1)	f(0.1) = 6.339E-01

Table B20. Continued (White Hake -- ASPIC 3.6x -- 60+ Biomass)

ESTIMATED POPULATION TRAJECTORY (NON-BOOTSTRAPPED)									
Obs	Year or ID	Estimated total F mort	Estimated starting biomass	Estimated average biomass	Observed total yield	Model total yield	Estimated surplus production	Ratio of F mort to Fmsy	Ratio of biomass to Bmsy
1	1964	0.441	5.094E+00	5.183E+00	2.284E+00	2.284E+00	2.459E+00	1.530E+00	3.465E-01
2	1965	0.351	5.269E+00	5.592E+00	1.963E+00	1.963E+00	2.608E+00	1.219E+00	3.585E-01
3	1966	0.172	5.915E+00	6.812E+00	1.172E+00	1.172E+00	3.010E+00	5.974E-01	4.024E-01
4	1967	0.094	7.752E+00	9.099E+00	8.565E-01	8.565E-01	3.607E+00	3.268E-01	5.273E-01
5	1968	0.081	1.050E+01	1.205E+01	9.712E-01	9.712E-01	4.081E+00	2.798E-01	7.145E-01
6	1969	0.068	1.361E+01	1.522E+01	1.037E+00	1.037E+00	4.212E+00	2.366E-01	9.260E-01
7	1970	0.089	1.679E+01	1.803E+01	1.600E+00	1.600E+00	4.007E+00	3.080E-01	1.142E+00
8	1971	0.109	1.919E+01	1.999E+01	2.173E+00	2.173E+00	3.682E+00	3.774E-01	1.306E+00
9	1972	0.111	2.070E+01	2.125E+01	2.359E+00	2.359E+00	3.391E+00	3.854E-01	1.408E+00
10	1973	0.116	2.174E+01	2.207E+01	2.551E+00	2.551E+00	3.170E+00	4.013E-01	1.479E+00
11	1974	0.134	2.235E+01	2.239E+01	3.004E+00	3.004E+00	3.074E+00	4.657E-01	1.521E+00
12	1975	0.127	2.243E+01	2.252E+01	2.864E+00	2.864E+00	3.036E+00	4.415E-01	1.526E+00
13	1976	0.143	2.260E+01	2.250E+01	3.224E+00	3.224E+00	3.042E+00	4.975E-01	1.537E+00
14	1977	0.188	2.242E+01	2.193E+01	4.113E+00	4.113E+00	3.209E+00	6.512E-01	1.525E+00
15	1978	0.178	2.151E+01	2.129E+01	3.790E+00	3.790E+00	3.382E+00	6.179E-01	1.463E+00
16	1979	0.152	2.110E+01	2.120E+01	3.224E+00	3.224E+00	3.406E+00	5.280E-01	1.436E+00
17	1980	0.180	2.128E+01	2.109E+01	3.790E+00	3.790E+00	3.433E+00	6.238E-01	1.448E+00
18	1981	0.237	2.093E+01	2.028E+01	4.817E+00	4.817E+00	3.621E+00	8.245E-01	1.424E+00
19	1982	0.274	1.973E+01	1.901E+01	5.209E+00	5.209E+00	3.867E+00	9.513E-01	1.342E+00
20	1983	0.306	1.839E+01	1.766E+01	5.413E+00	5.413E+00	4.059E+00	1.064E+00	1.251E+00
21	1984	0.361	1.703E+01	1.616E+01	5.827E+00	5.827E+00	4.188E+00	1.252E+00	1.159E+00
22	1985	0.442	1.539E+01	1.428E+01	6.306E+00	6.306E+00	4.224E+00	1.533E+00	1.047E+00
23	1986	0.531	1.331E+01	1.207E+01	6.405E+00	6.405E+00	4.090E+00	1.842E+00	9.056E-01
24	1987	0.484	1.100E+01	1.039E+01	5.025E+00	5.025E+00	3.868E+00	1.679E+00	7.482E-01
25	1988	0.326	9.841E+00	1.011E+01	3.295E+00	3.295E+00	3.821E+00	1.131E+00	6.695E-01
26	1989	0.382	1.037E+01	1.032E+01	3.944E+00	3.944E+00	3.859E+00	1.326E+00	7.053E-01
27	1990	0.296	1.028E+01	1.067E+01	3.156E+00	3.156E+00	3.915E+00	1.027E+00	6.995E-01
28	1991	0.344	1.104E+01	1.112E+01	3.824E+00	3.824E+00	3.984E+00	1.193E+00	7.512E-01
29	1992	0.619	1.120E+01	9.933E+00	6.147E+00	6.147E+00	3.780E+00	2.149E+00	7.620E-01
30	1993	0.736	8.834E+00	7.572E+00	5.576E+00	5.576E+00	3.230E+00	2.556E+00	6.010E-01
31	1994	0.701	6.489E+00	5.761E+00	4.041E+00	4.041E+00	2.665E+00	2.435E+00	4.414E-01
32	1995	0.416	5.113E+00	5.266E+00	2.188E+00	2.188E+00	2.490E+00	1.443E+00	3.479E-01
33	1996	0.546	5.416E+00	5.222E+00	2.850E+00	2.850E+00	2.474E+00	1.895E+00	3.684E-01
34	1997	0.456	5.039E+00	5.091E+00	2.322E+00	2.322E+00	2.425E+00	1.584E+00	3.428E-01
35	1998	0.489	5.141E+00	5.107E+00	2.498E+00	2.498E+00	2.431E+00	1.699E+00	3.497E-01
36	1999	0.669	5.074E+00	4.630E+00	3.095E+00	3.095E+00	2.246E+00	2.321E+00	3.452E-01
37	2000	0.842	4.224E+00	3.581E+00	3.015E+00	3.015E+00	1.809E+00	2.924E+00	2.874E-01
38	2001		3.018E+00						2.053E-01

RESULTS FOR DATA SERIES # 1 (NON-BOOTSTRAPPED)

Fall Survey

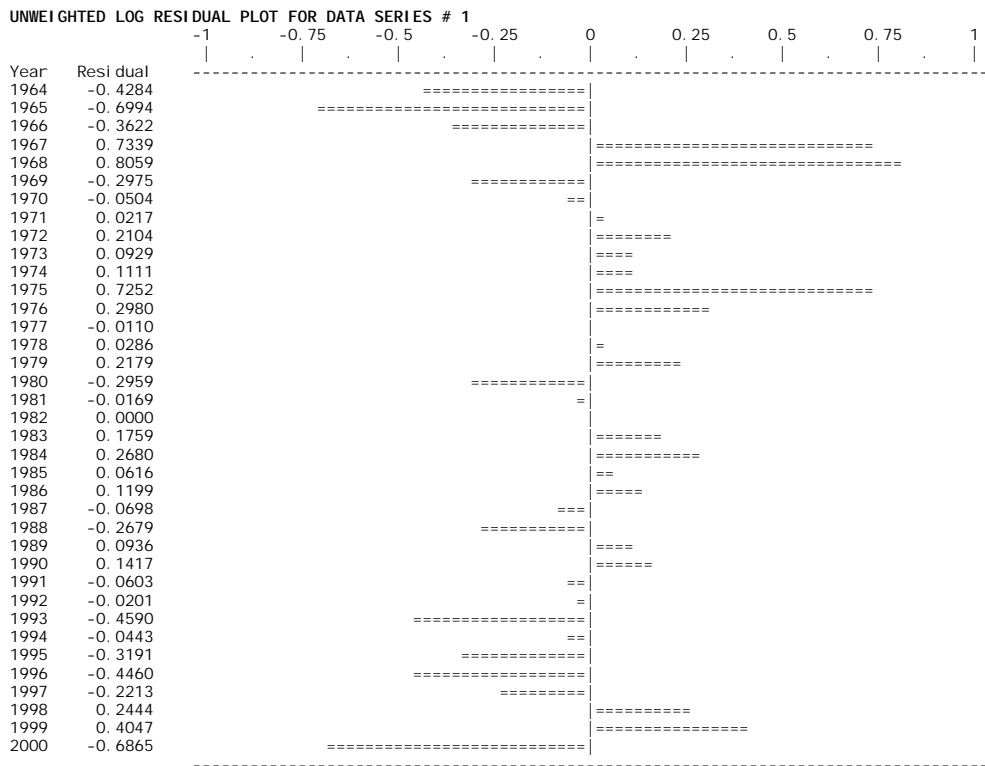
Data type CC: CPUE-catch series

Series weight: 1.000

Obs	Year	Observed CPUE	Estimated CPUE	Estim F	Observed yield	Model yield	Resid in log scale	Resid in yield
1	1964	3.253E+00	2.119E+00	0.4407	2.284E+00	2.284E+00	-0.42842	0.000E+00
2	1965	4.602E+00	2.287E+00	0.3510	1.963E+00	1.963E+00	-0.69936	0.000E+00
3	1966	4.002E+00	2.786E+00	0.1721	1.172E+00	1.172E+00	-0.36217	0.000E+00
4	1967	1.786E+00	3.721E+00	0.0941	8.565E-01	8.565E-01	0.73388	0.000E+00
5	1968	2.201E+00	4.928E+00	0.0806	9.712E-01	9.712E-01	0.80588	0.000E+00
6	1969	8.382E+00	6.225E+00	0.0681	1.037E+00	1.037E+00	-0.29745	0.000E+00
7	1970	7.757E+00	7.375E+00	0.0887	1.600E+00	1.600E+00	-0.05044	0.000E+00
8	1971	7.999E+00	8.174E+00	0.1087	2.173E+00	2.173E+00	0.02173	0.000E+00
9	1972	7.042E+00	8.691E+00	0.1110	2.359E+00	2.359E+00	0.21036	0.000E+00
10	1973	8.223E+00	9.024E+00	0.1156	2.551E+00	2.551E+00	0.09294	0.000E+00
11	1974	8.195E+00	9.158E+00	0.1341	3.004E+00	3.004E+00	0.11106	0.000E+00
12	1975	4.459E+00	9.209E+00	0.1272	2.864E+00	2.864E+00	0.72524	0.000E+00
13	1976	6.830E+00	9.201E+00	0.1433	3.224E+00	3.224E+00	0.29801	0.000E+00
14	1977	9.066E+00	8.967E+00	0.1876	4.113E+00	4.113E+00	-0.01098	0.000E+00
15	1978	8.462E+00	8.708E+00	0.1780	3.790E+00	3.790E+00	0.02857	0.000E+00
16	1979	6.972E+00	8.670E+00	0.1521	3.224E+00	3.224E+00	0.21789	0.000E+00
17	1980	1.160E+01	8.626E+00	0.1797	3.790E+00	3.790E+00	-0.29590	0.000E+00
18	1981	8.437E+00	8.295E+00	0.2375	4.817E+00	4.817E+00	-0.01694	0.000E+00
19	1982	*	7.774E+00	0.2740	5.209E+00	5.209E+00	0.00000	0.000E+00
20	1983	6.059E+00	7.224E+00	0.3065	5.413E+00	5.413E+00	0.17589	0.000E+00
21	1984	5.054E+00	6.608E+00	0.3607	5.827E+00	5.827E+00	0.26803	0.000E+00
22	1985	5.491E+00	5.840E+00	0.4416	6.306E+00	6.306E+00	0.06160	0.000E+00
23	1986	4.380E+00	4.937E+00	0.5305	6.405E+00	6.405E+00	0.11985	0.000E+00
24	1987	4.556E+00	4.249E+00	0.4837	5.025E+00	5.025E+00	-0.06976	0.000E+00
25	1988	5.405E+00	4.135E+00	0.3259	3.295E+00	3.295E+00	-0.26795	0.000E+00
26	1989	3.845E+00	4.222E+00	0.3820	3.944E+00	3.944E+00	0.09357	0.000E+00
27	1990	3.787E+00	4.364E+00	0.2957	3.156E+00	3.156E+00	0.14168	0.000E+00
28	1991	4.832E+00	4.549E+00	0.3437	3.824E+00	3.824E+00	-0.06033	0.000E+00
29	1992	4.145E+00	4.062E+00	0.6189	6.147E+00	6.147E+00	-0.02011	0.000E+00
30	1993	4.900E+00	3.097E+00	0.7363	5.576E+00	5.576E+00	-0.45897	0.000E+00
31	1994	2.462E+00	2.356E+00	0.7014	4.041E+00	4.041E+00	-0.04427	0.000E+00
32	1995	2.963E+00	2.153E+00	0.4155	2.188E+00	2.188E+00	-0.31907	0.000E+00
33	1996	3.335E+00	2.135E+00	0.5459	2.850E+00	2.850E+00	-0.44596	0.000E+00
34	1997	2.597E+00	2.082E+00	0.4562	2.322E+00	2.322E+00	-0.22126	0.000E+00
35	1998	1.636E+00	2.088E+00	0.4892	2.498E+00	2.498E+00	0.24436	0.000E+00
36	1999	1.263E+00	1.893E+00	0.6686	3.095E+00	3.095E+00	0.40475	0.000E+00
37	2000	2.909E+00	1.464E+00	0.8422	3.015E+00	3.015E+00	-0.68652	0.000E+00

* Asterisk indicates missing value(s).

Table B20. Continued (White Hake -- ASPIC 3.6x -- 60+ Biomass)



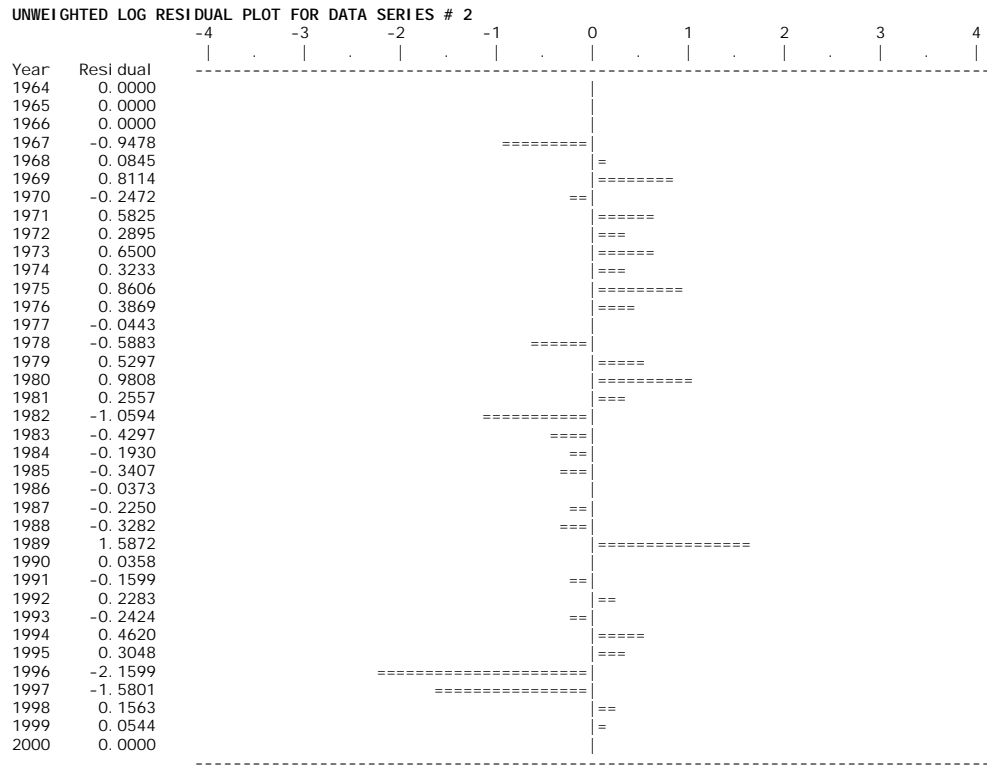
RESULTS FOR DATA SERIES # 2 (NON-BOOTSTRAPPED)

Data type 12: End-of-year biomass index Series weight: 1.000

Obs	Year	Observed effort	Estimated effort	Estim F	Observed index	Model index	Resid in log index	Resid in index
1	1964	0.000E+00	0.000E+00	0.0	*	1.272E+00	0.00000	0.0
2	1965	0.000E+00	0.000E+00	0.0	*	1.428E+00	0.00000	0.0
3	1966	0.000E+00	0.000E+00	0.0	*	1.872E+00	0.00000	0.0
4	1967	1.000E+00	1.000E+00	0.0	9.829E-01	2.536E+00	-0.94778	-1.553E+00
5	1968	1.000E+00	1.000E+00	0.0	3.577E+00	3.287E+00	0.08455	2.900E-01
6	1969	1.000E+00	1.000E+00	0.0	9.124E+00	4.053E+00	0.81138	5.071E+00
7	1970	1.000E+00	1.000E+00	0.0	3.619E+00	4.634E+00	-0.24718	-1.015E+00
8	1971	1.000E+00	1.000E+00	0.0	8.951E+00	4.999E+00	0.58253	3.952E+00
9	1972	1.000E+00	1.000E+00	0.0	7.010E+00	5.248E+00	0.28951	1.762E+00
10	1973	1.000E+00	1.000E+00	0.0	1.034E+01	5.398E+00	0.64998	4.942E+00
11	1974	1.000E+00	1.000E+00	0.0	7.481E+00	5.415E+00	0.32328	2.066E+00
12	1975	1.000E+00	1.000E+00	0.0	1.290E+01	5.456E+00	0.86065	7.446E+00
13	1976	1.000E+00	1.000E+00	0.0	7.969E+00	5.412E+00	0.38692	2.557E+00
14	1977	1.000E+00	1.000E+00	0.0	4.969E+00	5.194E+00	-0.04430	-2.250E-01
15	1978	1.000E+00	1.000E+00	0.0	2.829E+00	5.095E+00	-0.58833	-2.266E+00
16	1979	1.000E+00	1.000E+00	0.0	8.728E+00	5.139E+00	0.52966	3.589E+00
17	1980	1.000E+00	1.000E+00	0.0	1.347E+01	5.053E+00	0.98079	8.421E+00
18	1981	1.000E+00	1.000E+00	0.0	6.152E+00	4.764E+00	0.25565	1.388E+00
19	1982	1.000E+00	1.000E+00	0.0	1.539E+00	4.440E+00	-1.05936	-2.901E+00
20	1983	1.000E+00	1.000E+00	0.0	2.676E+00	4.113E+00	-0.42969	-1.437E+00
21	1984	1.000E+00	1.000E+00	0.0	3.065E+00	3.717E+00	-0.19301	-6.524E-01
22	1985	1.000E+00	1.000E+00	0.0	2.286E+00	3.214E+00	-0.34075	-9.282E-01
23	1986	1.000E+00	1.000E+00	0.0	2.558E+00	2.656E+00	-0.03735	-9.734E-02
24	1987	1.000E+00	1.000E+00	0.0	1.897E+00	2.376E+00	-0.22502	-4.788E-01
25	1988	1.000E+00	1.000E+00	0.0	1.803E+00	2.503E+00	-0.32817	-7.003E-01
26	1989	1.000E+00	1.000E+00	0.0	1.214E+01	2.483E+00	1.58719	9.658E+00
27	1990	1.000E+00	1.000E+00	0.0	2.763E+00	2.666E+00	0.03585	9.731E-02
28	1991	1.000E+00	1.000E+00	0.0	2.305E+00	2.705E+00	-0.15995	-3.998E-01
29	1992	1.000E+00	1.000E+00	0.0	2.680E+00	2.133E+00	0.22827	5.470E-01
30	1993	1.000E+00	1.000E+00	0.0	1.229E+00	1.567E+00	-0.24244	-3.373E-01
31	1994	1.000E+00	1.000E+00	0.0	1.960E+00	1.235E+00	0.46196	7.249E-01
32	1995	1.000E+00	1.000E+00	0.0	1.773E+00	1.308E+00	0.30478	4.659E-01
33	1996	1.000E+00	1.000E+00	0.0	1.403E-01	1.217E+00	-2.15991	-1.076E+00
34	1997	1.000E+00	1.000E+00	0.0	2.556E-01	1.241E+00	-1.58014	-9.857E-01
35	1998	1.000E+00	1.000E+00	0.0	1.432E+00	1.225E+00	0.15628	2.072E-01
36	1999	1.000E+00	1.000E+00	0.0	1.077E+00	1.020E+00	0.05439	5.701E-02
37	2000	0.000E+00	0.000E+00	0.0	*	7.287E-01	0.00000	0.0

* Asterisk indicates missing value(s).

Table B20. Continued (White Hake -- ASPIC 3.6x -- 60+ Biomass)



RESULTS OF BOOTSTRAPPED ANALYSIS

Param name	Bias-corrected estimate	Ordinary estimate	Relative bias	Approx 80% Lower CL	Approx 80% upper CL	Approx 50% Lower CL	Approx 50% upper CL	Inter-quartile range	Relative IQ range
B1ratio	3.576E-01	3.465E-01	-3.10%	2.835E-01	5.272E-01	3.155E-01	4.329E-01	1.174E-01	0.328
K	2.957E+01	2.940E+01	-0.58%	2.107E+01	4.112E+01	2.441E+01	3.511E+01	1.070E+01	0.362
r	5.725E-01	5.761E-01	0.63%	3.785E-01	8.708E-01	4.633E-01	7.261E-01	2.627E-01	0.459
q(1)	3.964E-01	4.090E-01	3.17%	2.830E-01	5.768E-01	3.324E-01	4.850E-01	1.526E-01	0.385
q(2)	2.374E-01	2.414E-01	1.68%	1.694E-01	3.351E-01	1.995E-01	2.868E-01	8.726E-02	0.367
MSY	4.214E+00	4.234E+00	0.47%	3.952E+00	4.580E+00	4.067E+00	4.419E+00	3.521E-01	0.084
Ye(2001)	1.630E+00	1.560E+00	-4.28%	6.310E-01	3.099E+00	1.108E+00	2.286E+00	1.178E+00	0.723
Bmsy	1.479E+01	1.470E+01	-0.58%	1.054E+01	2.056E+01	1.221E+01	1.756E+01	5.350E+00	0.362
Fmsy	2.862E-01	2.880E-01	0.63%	1.893E-01	4.354E-01	2.317E-01	3.630E-01	1.314E-01	0.459
fmsy(1)	7.116E-01	7.043E-01	-1.02%	5.873E-01	8.466E-01	6.457E-01	7.719E-01	1.262E-01	0.177
fmsy(2)	1.196E+00	1.193E+00	-0.28%	9.763E-01	1.435E+00	1.077E+00	1.310E+00	2.327E-01	0.195
F(0.1)	2.576E-01	2.592E-01	0.56%	1.703E-01	3.919E-01	2.085E-01	3.267E-01	1.182E-01	0.459
Y(0.1)	4.172E+00	4.192E+00	0.46%	3.912E+00	4.534E+00	4.026E+00	4.375E+00	3.486E-01	0.084
B-ratio	2.188E-01	2.053E-01	-6.16%	7.623E-02	4.420E-01	1.375E-01	3.122E-01	1.747E-01	0.798
F-ratio	2.835E+00	2.924E+00	3.15%	1.493E+00	5.046E+00	2.031E+00	3.683E+00	1.652E+00	0.583
Y-ratio	3.901E-01	3.685E-01	-5.53%	1.466E-01	6.886E-01	2.562E-01	5.269E-01	2.708E-01	0.694
f0.1(1)	6.404E-01	6.339E-01	-0.92%	* * * * *	0.177				
f0.1(2)	1.077E+00	1.074E+00	-0.26%	* * * * *	0.195				
q2/q1	5.952E-01	5.904E-01	-0.81%	4.975E-01	7.189E-01	5.435E-01	6.586E-01	1.150E-01	0.193

NOTES ON BOOTSTRAPPED ESTIMATES:

- The bootstrapped results shown were computed from 500 trials.
- These results are conditional on the constraints placed upon MSY and r in the input file (ASPIC.INP).
- All bootstrapped intervals are approximate. The statistical literature recommends using at least 1000 trials for accurate 95% intervals. The 80% intervals used by ASPIC should require fewer trials for equivalent accuracy. Using at least 500 trials is recommended.
- The bias corrections used here are based on medians. This is an accepted statistical procedure, but may estimate nonzero bias for unbiased, skewed estimators.

Trials replaced for lack of convergence: 5
 Trials replaced for MSY out-of-bounds: 0
 Trials replaced for r out-of-bounds: 1
 Residual -adjustment factor: 1.0383