

Icelandic Saithe (approx. SPALY)**Time series estimates with catch-at-age and linear trend in recruitment****STOCK**

	4	5	6	7	8	9	10	11	BIOM
1985	37178.	20490.	9810.	5479.	3654.	4676.	1372.	290.	262.2
1986	28003.	26776.	13860.	6239.	3185.	2000.	3732.	759.	300.3
1987	58233.	21095.	18211.	8761.	3625.	1674.	1037.	1873.	328.6
1988	55234.	42686.	13494.	10247.	4551.	1776.	779.	490.	363.2
1989	46423.	40579.	28539.	7908.	5549.	2164.	788.	370.	361.4
1990	25895.	33883.	26511.	17015.	4515.	2824.	1034.	377.	348.3
1991	18018.	19238.	22274.	16854.	8362.	2085.	1305.	474.	283.0
1992	22605.	13542.	12334.	11965.	4895.	3703.	905.	528.	226.6
1993	12180.	15670.	7688.	6370.	5948.	9226.	1723.	415.	221.7
1994	16126.	8915.	10154.	4193.	3128.	2789.	4205.	775.	179.1
1995	14040.	10402.	5709.	5940.	2154.	1428.	1194.	1796.	148.1
1996	12552.	9799.	6229.	3067.	2864.	978.	661.	557.	120.5
1997	19339.	7756.	6274.	3638.	1675.	1348.	453.	310.	125.4
1998	11779.	12689.	4405.	3568.	1919.	843.	678.	229.	117.4
1999	5775.	8514.	8386.	5774.	1905.	956.	397.	321.	111.0
2000	17349.	4070.	5521.	4932.	4898.	968.	484.	201.	117.5
2001	20623.	11758.	2548.	3171.	2612.	2432.	483.	242.	127.0

STANDARD DEVIATION OF STOCK ESTIMATES

2000	2119.	549.	574.	504.	398.	120.	77.	37.	9.8
2001	2915.	1948.	436.	445.	378.	323.	87.	51.	13.2

FISHING MORTALITY RATES

	4	5	6	7	8	9	10	11	FGBAR	FBAR
1985	0.127	0.191	0.250	0.343	0.403	0.040	0.397	0.330	0.180	0.226
1986	0.081	0.185	0.259	0.340	0.443	0.457	0.490	0.474	0.254	0.294
1987	0.109	0.238	0.367	0.455	0.513	0.565	0.551	0.527	0.328	0.374
1988	0.106	0.202	0.329	0.411	0.539	0.608	0.542	0.551	0.313	0.366
1989	0.111	0.225	0.313	0.357	0.475	0.538	0.536	0.547	0.299	0.337
1990	0.097	0.219	0.411	0.510	0.572	0.571	0.580	0.596	0.337	0.397
1991	0.085	0.242	0.421	0.829	0.615	0.634	0.703	0.692	0.375	0.471
1992	0.160	0.328	0.448	0.500	0.871	0.561	0.576	0.623	0.423	0.478
1993	0.107	0.231	0.371	0.490	0.552	0.583	0.596	0.596	0.336	0.389
1994	0.213	0.245	0.336	0.446	0.556	0.624	0.630	0.605	0.374	0.404
1995	0.153	0.285	0.411	0.523	0.574	0.563	0.558	0.551	0.381	0.418
1996	0.243	0.246	0.336	0.405	0.548	0.562	0.551	0.540	0.369	0.390
1997	0.221	0.324	0.364	0.439	0.479	0.483	0.475	0.495	0.372	0.385
1998	0.123	0.211	0.380	0.429	0.494	0.548	0.542	0.530	0.324	0.364
1999	0.150	0.233	0.330	0.443	0.477	0.480	0.484	0.479	0.325	0.352
2000	0.189	0.266	0.355	0.435	0.500	0.492	0.490	0.489	0.352	0.373
2001	0.156	0.234	0.316	0.410	0.475	0.480	0.492	0.491	0.320	0.345

STANDARD DEVIATIONS OF LOG(F)

2000	0.29	0.14	0.13	0.13	0.12	0.15	0.16	0.16	0.122
2001	0.34	0.16	0.16	0.17	0.18	0.18	0.19	0.19	0.148

STANDARDIZED CATCH PREDICTION ERRORS

1985	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1986	-1.71	-0.62	-0.82	0.13	0.81	-0.23	1.22	-0.40
1987	0.92	0.37	1.06	1.18	1.70	1.19	1.59	-0.76
1988	1.00	0.73	-0.89	-1.70	0.24	1.97	-1.11	0.98
1989	0.38	1.92	1.18	-2.29	-0.64	-0.35	-0.85	0.65
1990	-1.35	0.34	2.52	1.81	1.49	0.35	-0.27	0.01
1991	-1.58	0.02	1.50	1.39	-0.04	0.31	2.16	0.46
1992	0.42	1.20	0.72	-1.06	-1.81	-1.23	-0.37	-0.55
1993	-1.07	-0.95	-2.37	-1.50	-0.38	-0.29	1.04	0.91
1994	0.73	-0.41	-0.66	-2.22	-1.35	0.12	0.62	0.73
1995	-0.23	-0.73	0.70	1.19	-0.73	-1.27	-0.86	-1.46
1996	0.82	-0.68	-1.94	-1.95	-0.10	-1.03	-0.44	-0.34
1997	1.04	-0.19	0.13	-0.52	0.11	-1.19	-1.51	-0.73
1998	0.02	-1.78	-1.71	0.06	-0.16	1.29	0.54	1.07
1999	-0.11	0.28	1.06	0.18	0.19	-0.68	-0.49	-1.42
2000	1.30	0.23	0.57	0.70	0.55	-0.09	0.03	-0.55
2001	1.53	-0.70	-1.24	-0.31	0.29	-0.43	0.49	0.34

SKEWNESS AND KURTOSIS

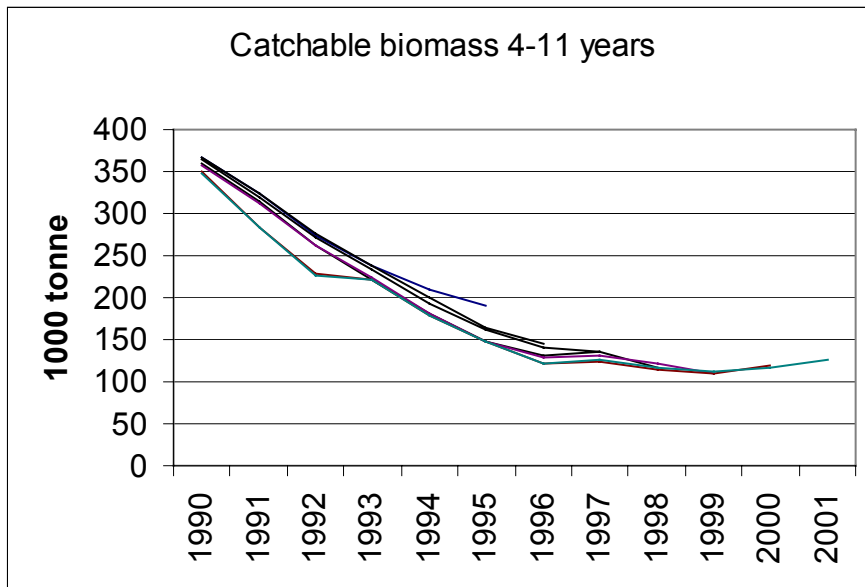
$$\gamma_3 = -0.688 \quad \gamma_4 = -1.292$$

CORRELATION WITHIN COHORTS 0.06

CORRELATION WITHIN AGES AND YEARS 0.45 0.05

Icelandic Saithe

Time series estimates with catch-at-age and linear trend in recruitment
Retrospective analyses



Icelandic saithe

Estimation with catch-at-age data 1985-2001
and survey data, 3-8 years 1985-2002
(ages 3-5 used as survey index for 4 years age)

STOCK

	4	5	6	7	8	9	10	11	BIOM
1985	36774.	20305.	9826.	5618.	3759.	4633.	1415.	277.	262.2
1986	26627.	26490.	14021.	6287.	3265.	2069.	3663.	785.	298.3
1987	56396.	20305.	18096.	8889.	3674.	1739.	1092.	1867.	324.7
1988	61657.	41327.	13304.	10213.	4622.	1820.	829.	530.	373.8
1989	45500.	45806.	27537.	7808.	5529.	2221.	826.	406.	368.2
1990	25569.	33236.	30149.	16428.	4459.	2819.	1076.	403.	354.9
1991	16155.	19119.	21778.	19040.	8098.	2074.	1307.	502.	284.3
1992	22751.	11994.	12191.	11671.	6739.	3601.	915.	552.	229.8
1993	11918.	15923.	7434.	6417.	5784.	9005.	1686.	424.	218.8
1994	15416.	8740.	10287.	4099.	3144.	2683.	4030.	749.	175.4
1995	14339.	10032.	5547.	5948.	2086.	1403.	1115.	1649.	145.0
1996	13502.	9721.	6137.	2990.	2851.	931.	631.	502.	120.1
1997	19220.	8791.	6241.	3549.	1605.	1308.	417.	283.	125.8
1998	12010.	12836.	5257.	3554.	1843.	788.	639.	203.	119.8
1999	5976.	8692.	8579.	6173.	1875.	901.	359.	293.	113.0
2000	18816.	4254.	5710.	5074.	4755.	937.	443.	176.	120.7
2001	23979.	13227.	2727.	3311.	2687.	2322.	457.	216.	137.8
2002	15282.	17311.	8807.	1658.	1817.	1366.	1151.	224.	142.6

STANDARD DEVIATION OF STOCK ESTIMATES

	4	5	6	7	8	9	10	11	
2001	4523.	2132.	390.	400.	323.	250.	66.	35.	15.9
2002	8995.	3759.	1622.	293.	303.	243.	195.	45.	24.0

FISHING MORTALITY RATES

	4	5	6	7	8	9	10	11	FGBAR	FBAR
1985	0.125	0.172	0.245	0.343	0.397	0.046	0.392	0.350	0.179	0.221
1986	0.067	0.181	0.256	0.335	0.430	0.439	0.474	0.452	0.241	0.284
1987	0.110	0.224	0.365	0.453	0.503	0.540	0.523	0.498	0.321	0.366

1988	0.096	0.206	0.332	0.412	0.529	0.587	0.515	0.529	0.307	0.360
1989	0.110	0.218	0.314	0.356	0.474	0.525	0.517	0.529	0.296	0.333
1990	0.087	0.221	0.395	0.507	0.566	0.568	0.561	0.567	0.328	0.391
1991	0.089	0.249	0.424	0.763	0.610	0.618	0.661	0.654	0.373	0.459
1992	0.151	0.278	0.440	0.502	0.780	0.556	0.567	0.604	0.399	0.451
1993	0.110	0.236	0.386	0.503	0.566	0.602	0.609	0.614	0.346	0.400
1994	0.180	0.253	0.346	0.466	0.580	0.655	0.670	0.642	0.375	0.413
1995	0.187	0.274	0.415	0.533	0.600	0.591	0.591	0.580	0.399	0.433
1996	0.193	0.242	0.346	0.422	0.574	0.598	0.594	0.585	0.364	0.396
1997	0.197	0.288	0.363	0.454	0.505	0.513	0.514	0.539	0.367	0.387
1998	0.123	0.203	0.357	0.438	0.515	0.583	0.576	0.565	0.325	0.370
1999	0.138	0.220	0.325	0.419	0.494	0.509	0.515	0.500	0.318	0.351
2000	0.151	0.243	0.345	0.435	0.517	0.516	0.520	0.520	0.337	0.368
2001	0.126	0.206	0.296	0.398	0.476	0.501	0.514	0.513	0.300	0.334

STANDARD DEVIATIONS OF LOG(F)

2001	0.26	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.129
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Standardised catch prediction errors

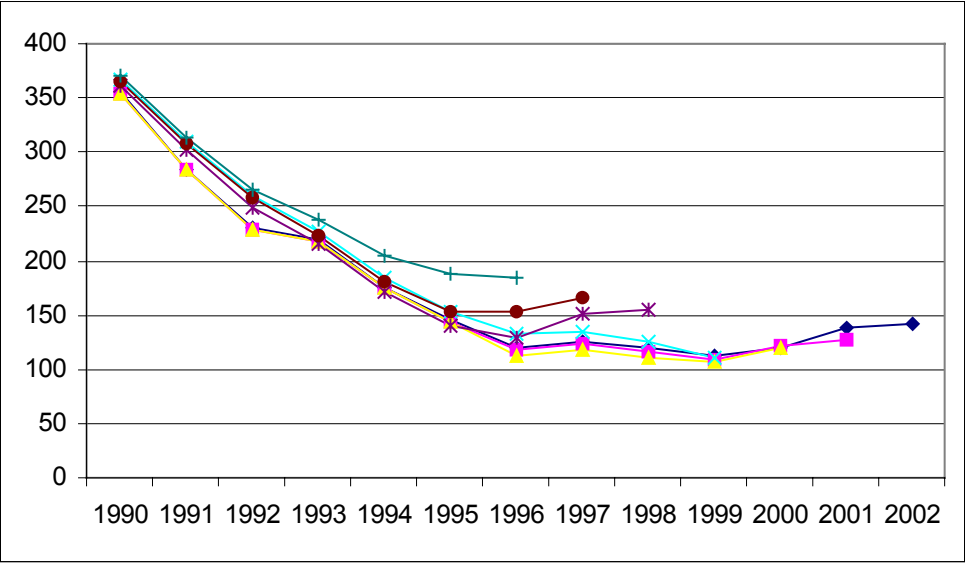
1986	-0.68	-0.83	-1.08	0.04	0.81	-0.32	1.55	-0.60
1987	0.65	2.13	1.21	1.37	2.00	1.31	1.67	-0.86
1988	-0.12	0.53	0.93	-1.70	0.18	2.01	-1.40	1.20
1989	0.96	1.14	1.11	-2.00	-0.65	-0.48	-0.98	0.77
1990	-1.02	0.77	2.08	2.05	1.82	0.19	-0.39	-0.02
1991	-1.35	0.97	2.09	1.81	0.40	0.44	1.49	0.31
1992	-0.90	1.96	1.94	-0.23	-1.47	-0.73	-0.30	-0.83
1993	-0.28	-1.34	-0.14	-0.82	0.32	0.11	1.22	1.10
1994	-0.50	0.72	-0.72	-1.26	-1.09	0.59	0.81	1.09
1995	1.16	-1.38	0.73	0.71	-0.20	-1.51	-0.76	-1.80
1996	-0.09	-0.88	-1.65	-1.79	0.13	-0.63	-0.49	-0.33
1997	0.71	-0.59	-0.57	-0.43	0.06	-1.39	-1.47	-0.90
1998	-0.05	-1.95	-2.07	-0.44	0.10	1.68	0.59	1.58
1999	-0.10	-0.21	0.27	-0.01	-0.46	-0.49	-0.16	-1.63
2000	0.26	-0.06	0.07	0.07	0.45	-0.18	0.27	-0.47
2001	0.63	-0.88	-1.62	-0.74	0.06	-0.32	0.56	0.62

$$\gamma_3 = 0.996 \quad \gamma_4 = -1.586$$

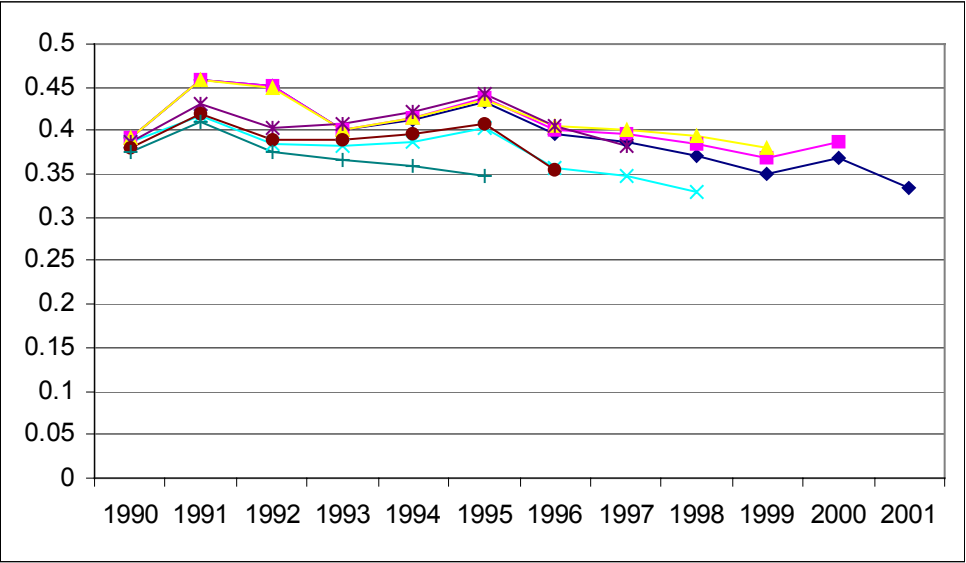
CORRELATION WITHIN COHORTS 0.00

CORRELATION WITHIN AGES AND YEARS 0.39 0.08

Retrospective analyses



Catchable biomass



Average F 4-9 years

Saithe

Catch-at-age 4-11 years

Recruitment index (at 4 years) obtained from trawl survey, 3-5 years

CPUE from trawl fishing in ages 6-8 years obtained by Glim indices. Linear trend in catchability estimated.

STOCK

	4	5	6	7	8	9	10	11	BIOM
1985	37956.	20719.	9449.	5497.	3722.	4480.	1401.	286.	262.7
1986	26101.	27443.	14090.	5992.	3169.	2041.	3525.	775.	296.9
1987	56611.	19948.	18754.	8925.	3462.	1655.	1062.	1769.	323.8
1988	60425.	41526.	13061.	10604.	4626.	1677.	768.	503.	371.0
1989	45024.	44922.	27713.	7623.	5725.	2193.	739.	363.	364.8
1990	25965.	32731.	29499.	16506.	4327.	2907.	1044.	349.	351.9
1991	17953.	19495.	21412.	18554.	8048.	1970.	1348.	479.	285.0
1992	23151.	13542.	12503.	11415.	6040.	3478.	831.	532.	229.6
1993	12241.	16196.	7783.	6487.	5579.	9177.	1563.	368.	220.4
1994	16402.	9042.	10476.	4286.	3231.	2630.	4168.	700.	180.2
1995	14384.	10877.	5768.	6108.	2207.	1488.	1124.	1765.	151.1
1996	10815.	9812.	6526.	3131.	2978.	1003.	684.	519.	119.6
1997	19638.	6606.	6274.	3820.	1713.	1415.	470.	323.	125.1
1998	12352.	13075.	3540.	3588.	2045.	882.	724.	243.	118.3
1999	6135.	8989.	8669.	5972.	1941.	1047.	424.	348.	116.1
2000	17936.	4368.	5904.	5187.	5238.	1014.	550.	222.	124.4
2001	21650.	12515.	2794.	3481.	2834.	2705.	527.	288.	136.7

STANDARD DEVIATION OF STOCK ESTIMATES

2000	2718.	447.	439.	360.	284.	91.	67.	33.	8.1
2001	4676.	2220.	344.	325.	255.	227.	66.	44.	14.0

Estimated immigration

year	age	number	standard dev.
1986	10	2300	500
1991	7	7600	2400
1993	9	4100	1000
1999	7	2000	1000
2000	8	1900	700

FISHING MORTALITY RATES

	4	5	6	7	8	9	10	11	FGBAR	FBAR
1985	0.123	0.186	0.254	0.351	0.401	0.051	0.396	0.337	0.186	0.228
1986	0.067	0.180	0.257	0.347	0.449	0.453	0.490	0.467	0.245	0.292
1987	0.109	0.224	0.362	0.457	0.523	0.568	0.548	0.524	0.326	0.374
1988	0.096	0.204	0.335	0.413	0.544	0.619	0.549	0.562	0.311	0.368
1989	0.114	0.220	0.317	0.366	0.477	0.540	0.546	0.557	0.301	0.339
1990	0.085	0.220	0.396	0.517	0.584	0.566	0.579	0.600	0.329	0.395
1991	0.079	0.243	0.427	0.854	0.636	0.658	0.729	0.714	0.378	0.483
1992	0.148	0.339	0.456	0.510	0.943	0.579	0.592	0.642	0.431	0.496
1993	0.102	0.235	0.389	0.495	0.552	0.589	0.603	0.611	0.338	0.394
1994	0.174	0.250	0.339	0.463	0.574	0.650	0.659	0.629	0.369	0.408
1995	0.185	0.282	0.408	0.518	0.587	0.578	0.573	0.559	0.394	0.426
1996	0.216	0.247	0.335	0.403	0.540	0.555	0.547	0.537	0.360	0.383
1997	0.204	0.327	0.360	0.422	0.463	0.468	0.459	0.479	0.360	0.374
1998	0.116	0.205	0.381	0.415	0.467	0.526	0.522	0.512	0.312	0.352
1999	0.139	0.220	0.313	0.415	0.450	0.443	0.446	0.431	0.304	0.330
2000	0.158	0.246	0.328	0.403	0.461	0.453	0.444	0.440	0.320	0.341
2001	0.143	0.218	0.287	0.368	0.422	0.424	0.437	0.436	0.289	0.310

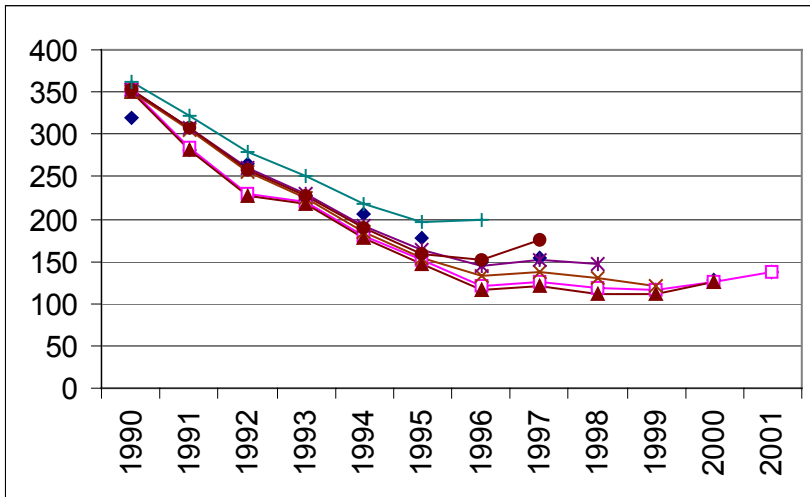
STANDARD DEVIATIONS OF LOG(F)

2000	0.17	0.11	0.10	0.09	0.09	0.11	0.13	0.13	0.073
2001	0.29	0.15	0.12	0.12	0.12	0.12	0.14	0.15	0.104

STANDARDIZED CATCH PREDICTION ERRORS								
	4	5	6	7	8	9	10	11
1986	-0.67	-0.87	-0.74	0.18	0.77	-0.26	1.51	-0.52
1987	0.84	1.84	0.95	0.78	1.85	1.35	1.49	-0.64
1988	0.21	0.46	0.62	-2.00	0.03	2.45	-0.93	1.16
1989	1.37	1.00	0.93	-2.12	-1.15	-0.44	-0.39	0.95
1990	-0.94	0.82	2.06	1.70	1.33	-0.16	-0.43	0.19
1991	-1.28	0.46	1.86	1.68	0.36	0.83	2.03	0.56
1992	-0.54	1.97	1.36	-0.18	-1.08	-0.62	0.17	-0.52
1993	0.06	-1.68	-2.09	-1.02	0.48	-0.61	1.52	1.54
1994	-0.32	0.44	-0.76	-1.68	-0.88	1.15	0.85	1.40
1995	1.43	-1.64	0.68	0.95	-0.18	-0.75	0.05	-1.22
1996	0.34	-0.83	-2.14	-2.04	-0.09	-0.69	-0.23	0.07
1997	0.88	-0.60	-0.29	-0.59	-0.04	-1.55	-1.57	-0.89
1998	0.12	-1.59	-1.62	0.42	-0.73	0.55	-0.20	0.90
1999	-0.09	0.14	1.26	0.50	0.47	-1.01	-0.72	-1.99
2000	0.24	0.06	0.52	0.65	0.43	-0.03	-0.32	-0.92
2001	0.76	-0.72	-1.19	-0.38	0.36	-0.71	0.37	0.09

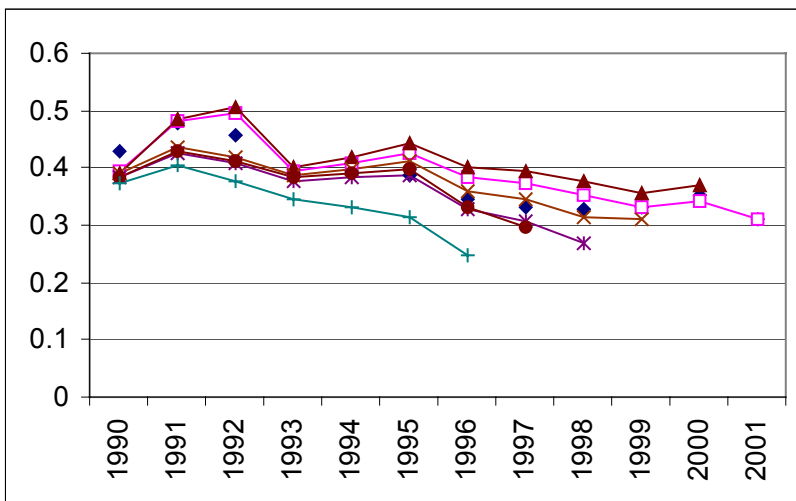
$\gamma_3 = 0.3$ $\gamma_4 = -1.4$
 $r_c = 0.09$ $r_a = 0.36$ $r_t = 0.07$

Retrospective analyses



Total biomass 4-11 years, 1000 tonnes.

Disjoint points are estimates obtained with parameters from the whole data set, based only on observations up to respective point



Average F 4-9 years. Disjoint points as in stocks.

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APL Ver. 2.0.00

ADAPT_W Ver. 2.1

Workspace size = 6000000

c@a	2	3	4	5	6	7	8	9	10	11	12
1985.00	0	376	4014	3366	1958	1536	1172	747	479	74	23
1986.00	0	3108	1400	4170	2665	1550	1116	628	1549	216	51
1987.00	0	956	5135	4428	5409	2915	1348	661	496	498	58
1988.00	0	1318	5067	6619	3678	2859	1775	845	226	270	107
1989.00	0	315	4313	8471	7309	1794	1928	848	270	191	135
1990.00	0	143	1692	5471	10112	6174	1816	1087	380	151	55
1991.00	0	198	874	3613	6844	10772	3223	858	838	228	40
1992.00	0	242	2928	3844	4355	3884	4046	1290	350	196	56
1993.00	0	657	1083	2841	2252	2247	2314	3671	830	223	188

WD nr 28 submitted to the NWWG2002

[illegible]

smb

	2	3	4	5	6	7	8	9	10	11	12
1985.20	0.61	0.59	3.09	5.25	1.77	1.07	0.51	1.38	0.16	0.08	0.08
1986.20	2.33	2.45	2.11	2.14	1.44	0.62	0.28	0.19	0.32	0.09	0.07
1987.20	0.39	11.57	12.99	6.49	4.00	3.10	0.80	0.36	0.27	0.33	0.05
1988.20	0.31	0.49	2.72	2.78	1.68	0.94	0.40	0.07	0.08	0.10	0.05
1989.20	1.43	3.96	5.05	6.57	2.49	1.77	0.91	0.40	0.00	0.02	0.00
1990.20	0.35	1.69	4.86	6.40	12.33	3.30	1.21	0.64	0.12	0.06	0.02
1991.20	0.22	1.40	1.72	2.22	1.13	2.50	0.30	0.02	0.03	0.00	0.01
1992.20	0.14	0.90	5.73	5.52	2.79	2.68	1.91	0.28	0.06	0.06	0.02
1993.20	1.55	11.04	2.00	6.80	2.42	2.26	1.03	4.05	0.66	0.05	0.00
1994.20	0.82	0.72	1.89	1.74	1.97	0.58	1.02	1.35	4.43	0.55	0.25
1995.20	0.49	1.99	1.12	0.51	0.28	0.34	0.10	0.15	0.15	0.34	0.02
1996.20	0.11	0.49	3.72	1.12	1.01	0.61	1.01	0.06	0.10	0.11	0.26
1997.20	0.33	0.91	4.67	3.92	0.95	0.40	0.16	0.10	0.05	0.02	0.02
1998.20	0.11	1.63	2.30	2.53	1.27	0.72	0.30	0.08	0.06	0.03	0.02
1999.20	0.75	3.75	1.01	1.40	1.89	0.64	0.17	0.02	0.01	0.02	0.00
2000.20	0.34	1.75	2.51	0.62	0.88	0.55	0.45	0.08	0.03	0.00	0.00
2001.20	0.90	1.91	2.61	1.60	0.21	0.23	0.39	0.14	0.07	0.04	0.01
2002.00	1.05	2.07	2.47	2.54	1.91	0.40	0.46	0.32	0.22	0.02	0.02

VPA setup

Plus Group : No plus group

Population

	2	3	4	5	6	7	8	9	10	11	12
2002.00	40000	20000	10000	10000	5000	5000	5000	2000	1000	1000	5000
F ratios											
	2	3	4	5	6	7	8	9	10	11	12
1985.00							1.00	1.00	1.00	1.00	(1.00)
1986.00							1.00	1.00	1.00	1.00	(1.00)
1987.00							1.00	1.00	1.00	1.00	(1.00)
1988.00							1.00	1.00	1.00	1.00	(1.00)
1989.00							1.00	1.00	1.00	1.00	(1.00)
1990.00							1.00	1.00	1.00	1.00	(1.00)
1991.00							1.00	1.00	1.00	1.00	(1.00)
1992.00							1.00	1.00	1.00	1.00	(1.00)
1993.00							1.00	1.00	1.00	1.00	(1.00)
1994.00							1.00	1.00	1.00	1.00	(1.00)
1995.00							1.00	1.00	1.00	1.00	(1.00)
1996.00							1.00	1.00	1.00	1.00	(1.00)
1997.00							1.00	1.00	1.00	1.00	(1.00)
1998.00							1.00	1.00	1.00	1.00	(1.00)
1999.00							1.00	1.00	1.00	1.00	(1.00)
2000.00							1.00	1.00	1.00	1.00	(1.00)
2001.00							1.00	1.00	1.00	1.00	(1.00)

Natural Mortality

[illegible]

1997.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1998.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1999.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
2000.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
2001.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)

Virtual Population Analysis using initial values

Population Numbers

	2	3	4	5	6	7	8	9	10	11	12
1985.00	89048	34602	38807	20380	9524	5535	4202	4167	1005	220	70
1986.00	133265	72906	27990	28154	13655	6037	3153	2388	2740	396	114
1987.00	68827	109108	56885	21653	19295	8782	3550	1581	1391	865	132
1988.00	38595	56351	88467	41943	13745	10941	4577	1699	704	695	266
1989.00	26211	31599	44946	67858	28380	7950	6389	2158	638	373	327
1990.00	33660	21460	25587	32910	47924	16669	4896	3501	1008	281	135
1991.00	18381	27558	17440	19422	22019	30143	8118	2382	1891	485	95
1992.00	61029	15049	22384	13490	12650	11888	15028	3762	1182	800	194
1993.00	26095	49966	12102	15688	7594	6454	6250	8670	1924	653	479
1994.00	36634	21364	40316	8932	10288	4196	3270	3045	3816	833	335
1995.00	31555	29993	16858	30342	5721	6084	2201	1564	1363	1335	278
1996.00	29291	25835	23137	12132	22442	3063	2860	992	767	684	626
1997.00	18288	23982	20157	16592	8251	16887	1758	1239	468	388	372
1998.00	20733	14973	19090	13837	11094	5270	12763	902	608	271	233
1999.00	23661	16975	12094	14467	9737	7691	3313	9856	424	261	115
2000.00	16564	19372	13006	9241	10435	6015	4560	2110	7777	222	149
2001.00	24428	13561	15094	8503	6758	7182	3477	2117	1426	6211	131
2002.00	40000	20000	10000	10000	5000	5000	5000	2000	1000	1000	5000

Fishing Mortality

	2	3	4	5	6	7	8	9	10	11	12
1985.00	0.000	0.012	0.121	0.200	0.256	0.363	0.365	0.219	0.733	0.459	0.444
1986.00	0.000	0.048	0.057	0.178	0.241	0.331	0.490	0.340	0.952	0.900	0.671
1987.00	0.000	0.010	0.105	0.254	0.367	0.452	0.537	0.610	0.495	0.980	0.655
1988.00	0.000	0.026	0.065	0.191	0.347	0.338	0.552	0.780	0.434	0.553	0.580
1989.00	0.000	0.011	0.112	0.148	0.332	0.285	0.402	0.561	0.621	0.814	0.599
1990.00	0.000	0.007	0.076	0.202	0.264	0.519	0.520	0.416	0.532	0.879	0.587
1991.00	0.000	0.008	0.057	0.229	0.416	0.496	0.569	0.501	0.661	0.719	0.612
1992.00	0.000	0.018	0.155	0.375	0.473	0.443	0.350	0.471	0.393	0.313	0.382
1993.00	0.000	0.015	0.104	0.222	0.393	0.480	0.519	0.621	0.637	0.468	0.561
1994.00	0.000	0.037	0.084	0.246	0.325	0.445	0.537	0.604	0.851	0.897	0.722
1995.00	0.000	0.060	0.129	0.102	0.425	0.555	0.596	0.513	0.489	0.556	0.539
1996.00	0.000	0.048	0.132	0.186	0.084	0.355	0.636	0.552	0.480	0.410	0.520
1997.00	0.000	0.028	0.176	0.202	0.248	0.080	0.467	0.512	0.347	0.313	0.410
1998.00	0.000	0.014	0.077	0.151	0.166	0.264	0.059	0.554	0.646	0.661	0.480
1999.00	0.000	0.066	0.069	0.127	0.282	0.323	0.251	0.037	0.448	0.360	0.274
2000.00	0.000	0.050	0.225	0.113	0.174	0.348	0.567	0.192	0.025	0.331	0.279
2001.00	0.000	0.105	0.212	0.331	0.101	0.162	0.353	0.550	0.155	0.017	0.269

LAMBDA 1.00000E-2
RSS 1.81194E2
NPHI 1.81194E2

Parameters

1.05966E1	9.90349E0	9.21034E0	9.21034E0	8.51719E0	8.51719E0
8.51719E0	7.60090E0	6.90776E0	6.90776E0	8.51719E0	

... Newton-Raphson-Leavenberg-Marqhardt at work ...

Parameters

1.12227E1	1.06392E1	9.85813E0	9.76149E0	9.06240E0	7.83656E0
7.46205E0	7.55044E0	6.82629E0	4.74914E0	4.01995E0	-1.11739E1
-9.64236E0	-8.90680E0	-8.68738E0	-8.76078E0	-8.72476E0	-8.78273E0
-9.02549E0	-8.81886E0	-8.51825E0	-8.24025E0		

RELATIVE CHANGE IN RESIDUAL SUM OF SQUARES LESS THAN 0.00001

Estimated VPA (biased)

Population Numbers

	2	3	4	5	6	7	8	9	10	11	12
1985.00	88917	34539	38769	20371	9522	5534	4201	4167	1005	220	70
1986.00	132817	72799	27939	28123	13648	6035	3152	2387	2739	396	114
1987.00	68438	108741	56797	21611	19269	8776	3549	1580	1390	865	132
1988.00	38077	56032	88167	41871	13710	10920	4572	1698	703	694	266
1989.00	25803	31175	44685	67612	28321	7922	6372	2154	637	373	327
1990.00	33120	21126	25240	32696	47723	16621	4873	3487	1005	280	135
1991.00	17856	27116	17167	19138	21844	29978	8079	2363	1880	482	95
1992.00	24371	14619	22022	13267	12418	11745	14893	3731	1166	791	192
1993.00	20683	19954	11751	15392	7411	6264	6133	8560	1898	641	471
1994.00	36241	16934	15743	8644	10045	4047	3116	2950	3727	812	325
1995.00	31153	29672	13230	10231	5485	5886	2079	1439	1286	1262	261
1996.00	18440	25506	22874	9163	5986	2871	2699	893	664	621	568
1997.00	11572	15097	19888	16377	5822	3420	1601	1108	387	305	320
1998.00	28815	9475	11816	13617	10918	3284	1744	774	501	205	164
1999.00	37065	23591	7592	8513	9556	7547	1690	839	320	174	61
2000.00	30160	30346	18422	5556	5562	5868	4442	785	397	137	78
2001.00	50981	24693	24078	12936	3742	3197	3357	2021	343	170	61
2002.00	74806	41740	19113	17352	8625	2531	1741	1902	922	115	56

Fishing Mortality

	2	3	4	5	6	7	8	9	10	11	12
1985.00	0.000	0.012	0.121	0.201	0.256	0.363	0.365	0.219	0.733	0.459	0.444
1986.00	0.000	0.048	0.057	0.178	0.242	0.331	0.490	0.341	0.953	0.900	0.671
1987.00	0.000	0.010	0.105	0.255	0.368	0.452	0.537	0.610	0.495	0.981	0.656
1988.00	0.000	0.026	0.065	0.191	0.349	0.339	0.552	0.781	0.434	0.554	0.580
1989.00	0.000	0.011	0.112	0.148	0.333	0.286	0.403	0.563	0.622	0.816	0.601
1990.00	0.000	0.007	0.077	0.203	0.265	0.521	0.524	0.418	0.534	0.883	0.589
1991.00	0.000	0.008	0.058	0.233	0.421	0.500	0.573	0.506	0.666	0.724	0.617
1992.00	0.000	0.018	0.158	0.382	0.484	0.450	0.354	0.476	0.399	0.318	0.386
1993.00	0.000	0.037	0.107	0.227	0.405	0.498	0.532	0.632	0.649	0.479	0.573
1994.00	0.000	0.047	0.231	0.255	0.335	0.466	0.573	0.630	0.883	0.935	0.755
1995.00	0.000	0.060	0.167	0.336	0.448	0.580	0.645	0.573	0.528	0.599	0.586
1996.00	0.000	0.049	0.134	0.254	0.360	0.384	0.690	0.636	0.579	0.462	0.592
1997.00	0.000	0.045	0.179	0.205	0.372	0.473	0.526	0.593	0.436	0.418	0.493
1998.00	0.000	0.022	0.128	0.154	0.169	0.464	0.532	0.683	0.856	1.009	0.770
1999.00	0.000	0.047	0.112	0.226	0.288	0.330	0.567	0.549	0.648	0.600	0.591
2000.00	0.000	0.031	0.154	0.195	0.354	0.359	0.588	0.627	0.646	0.605	0.617
2001.00	0.000	0.056	0.128	0.205	0.191	0.408	0.368	0.585	0.889	0.917	0.690

APPROXIMATE STATISTICS ASSUMING LINEARITY NEAR SOLUTION

ORTHOGONALITY OFFSET..... 0.000182

MEAN SQUARE RESIDUALS 0.610057

Estimates for parameters

PAR. EST.	STD. ERR.	REL. ERR.	BIAS	REL. BIAS
1.12E1	8.06E-1	0.072	7.57E-3	0.001
1.06E1	5.71E-1	0.054	7.32E-3	0.001
9.86E0	4.82E-1	0.049	3.50E-3	0.000
9.76E0	4.46E-1	0.046	-1.60E-3	0.000
9.06E0	4.56E-1	0.050	-1.06E-2	-0.001
7.84E0	4.42E-1	0.056	-1.26E-2	-0.002
7.46E0	5.36E-1	0.072	-2.79E-2	-0.004
7.55E0	5.31E-1	0.070	-2.57E-2	-0.003
6.83E0	6.12E-1	0.090	-2.79E-2	-0.004
4.75E0	6.81E-1	0.143	-2.08E-2	-0.004
4.02E0	6.95E-1	0.173	-2.56E-2	-0.006
-1.12E1	1.99E-1	-0.018	-7.57E-3	0.001
-9.64E0	1.93E-1	-0.020	-7.07E-3	0.001
-8.91E0	1.90E-1	-0.021	-6.16E-3	0.001
-8.69E0	1.89E-1	-0.022	-5.11E-3	0.001
-8.76E0	1.89E-1	-0.022	-4.19E-3	0.000
-8.72E0	1.88E-1	-0.022	-3.68E-3	0.000
-8.78E0	1.89E-1	-0.022	-2.69E-3	0.000
-9.03E0	1.89E-1	-0.021	-3.09E-3	0.000
-8.82E0	1.96E-1	-0.022	-2.51E-3	0.000
-8.52E0	2.03E-1	-0.024	-1.72E-3	0.000
-8.24E0	2.18E-1	-0.027	4.29E-3	-0.001

Parameters in linear scale

PAR. EST.	STD. ERR.	REL. ERR.	BIAS	REL. BIAS
-----	-----	-----	-----	-----
7.48E4	6.03E4	0.806	2.49E4	0.332
4.17E4	2.38E4	0.571	7.11E3	0.170
1.91E4	9.22E3	0.482	2.29E3	0.120
1.74E4	7.75E3	0.446	1.70E3	0.098
8.62E3	3.93E3	0.456	8.05E2	0.093
2.53E3	1.12E3	0.442	2.15E2	0.085
1.74E3	9.33E2	0.536	2.02E2	0.116
1.90E3	1.01E3	0.531	2.19E2	0.115
9.22E2	5.64E2	0.612	1.47E2	0.159
1.15E2	7.86E1	0.681	2.43E1	0.211
5.57E1	3.87E1	0.695	1.20E1	0.216
1.40E-5	2.80E-6	0.199	1.72E-7	0.012
6.49E-5	1.25E-5	0.193	7.52E-7	0.012
1.35E-4	2.58E-5	0.191	1.62E-6	0.012
1.69E-4	3.19E-5	0.189	2.16E-6	0.013
1.57E-4	2.96E-5	0.189	2.14E-6	0.014
1.63E-4	3.06E-5	0.188	2.29E-6	0.014
1.53E-4	2.90E-5	0.189	2.32E-6	0.015
1.20E-4	2.27E-5	0.189	1.77E-6	0.015
1.48E-4	2.90E-5	0.196	2.47E-6	0.017
2.00E-4	4.06E-5	0.203	3.78E-6	0.019
2.64E-4	5.76E-5	0.218	7.42E-6	0.028

WEDNESDAY, MAY 1, 2002 9:42:05.910 AM

APL Ver. 2.0.00

ADAPT_W Ver. 2.1

Workspace size = 6000000

TUESDAY, APRIL 30, 2002 10:33:33.600 AM

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APL Ver. 2.0.00

ADAPT_W Ver. 2.1

Workspace size = 6000000

c@a

	2	3	4	5	6	7	8	9	10	11	12
1985.00	0	376	4014	3366	1958	1536	1172	747	479	74	23
1986.00	0	3108	1400	4170	2665	1550	1116	628	1549	216	51
1987.00	0	956	5135	4428	5409	2915	1348	661	496	498	58
1988.00	0	1318	5067	6619	3678	2859	1775	845	226	270	107
1989.00	0	315	4313	8471	7309	1794	1928	848	270	191	135
1990.00	0	143	1692	5471	10112	6174	1816	1087	380	151	55
1991.00	0	198	874	3613	6844	10772	3223	858	838	228	40
1992.00	0	242	2928	3844	4355	3884	4046	1290	350	196	56
1993.00	0	657	1083	2841	2252	2247	2314	3671	830	223	188
1994.00	0	702	2955	1770	2603	1377	1243	1263	2009	454	158
1995.00	0	1573	1853	2661	1807	2370	905	574	482	521	106
1996.00	0	1102	2608	1868	1649	835	1233	385	267	210	232
1997.00	0	603	2960	2766	1651	1178	599	454	125	95	114
1998.00	0	183	1289	1767	1545	1114	658	351	265	120	81
1999.00	0	989	732	1564	2176	1934	669	324	140	72	25
2000.00	0	850	2383	896	1511	1612	1806	335	173	57	33
2001.00	0	1223	2619	2184	591	977	943	819	186	94	28
2002.00											

smb

	2	3	4	5	6	7	8	9
1985.20	0.61	0.59	3.09	5.25	1.77	1.07	0.51	1.38
1986.20	2.33	2.45	2.11	2.14	1.44	0.62	0.28	0.19
1987.20	0.39	11.57	12.99	6.49	4.00	3.10	0.80	0.36

1988.20	0.31	0.49	2.72	2.78	1.68	0.94	0.40	0.07
1989.20	1.43	3.96	5.05	6.57	2.49	1.77	0.91	0.40
1990.20	0.35	1.69	4.86	6.40	12.33	3.30	1.21	0.64
1991.20	0.22	1.40	1.72	2.22	1.13	2.50	0.30	0.02
1992.20	0.14	0.90	5.73	5.52	2.79	2.68	1.91	0.28
1993.20	1.55	11.04	2.00	6.80	2.42	2.26	1.03	4.05
1994.20	0.82	0.72	1.89	1.74	1.97	0.58	1.02	1.35
1995.20	0.49	1.99	1.12	0.51	0.28	0.34	0.10	0.15
1996.20	0.11	0.49	3.72	1.12	1.01	0.61	1.01	0.06
1997.20	0.33	0.91	4.67	3.92	0.95	0.40	0.16	0.10
1998.20	0.11	1.63	2.30	2.53	1.27	0.72	0.30	0.08
1999.20	0.75	3.75	1.01	1.40	1.89	0.64	0.17	0.02
2000.20	0.34	1.75	2.51	0.62	0.88	0.55	0.45	0.08
2001.20	0.90	1.91	2.61	1.60	0.21	0.23	0.39	0.14
2002.00	1.05	2.07	2.47	2.54	1.91	0.40	0.46	0.32

Models selected

smb 2 Power
smb 3 Power
smb 4 Power
smb 5 Power
smb 6 Power
smb 7 Power
smb 8 Power
smb 9 Power

VPA setup

Plus Group : No plus group

Population

	2	3	4	5	6	7	8	9	10	11	12
2002.00	40000	40000	20000	20000	10000	10000	5000	5000	2000	(100)	(50)
F ratios	2	3	4	5	6	7	8	9	10	11	12
1985.00							1.00	1.00	1.00	1.00	(1.00)
1986.00							1.00	1.00	1.00	1.00	(1.00)
1987.00							1.00	1.00	1.00	1.00	(1.00)
1988.00							1.00	1.00	1.00	1.00	(1.00)
1989.00							1.00	1.00	1.00	1.00	(1.00)
1990.00							1.00	1.00	1.00	1.00	(1.00)
1991.00							1.00	1.00	1.00	1.00	(1.00)
1992.00							1.00	1.00	1.00	1.00	(1.00)
1993.00							1.00	1.00	1.00	1.00	(1.00)
1994.00							1.00	1.00	1.00	1.00	(1.00)
1995.00							1.00	1.00	1.00	1.00	(1.00)
1996.00							1.00	1.00	1.00	1.00	(1.00)
1997.00							1.00	1.00	1.00	1.00	(1.00)
1998.00							1.00	1.00	1.00	1.00	(1.00)
1999.00							1.00	1.00	1.00	1.00	(1.00)
2000.00							1.00	1.00	1.00	1.00	(1.00)
2001.00							1.00	1.00	1.00	1.00	(1.00)

Natural Mortality

	2	3	4	5	6	7	8	9	10	11	12
1985.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1986.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1987.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1988.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1989.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1990.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1991.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1992.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1993.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1994.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1995.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1996.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1997.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1998.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
1999.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
2000.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
2001.00	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)

Virtual Population Analysis using initial values

Population Numbers

	2	3	4	5	6	7	8	9	10	11	12
1985.00	88917	34605	38711	20387	9538	5587	4356	4167	1024	232	89
1986.00	132694	72799	27992	28075	13661	6048	3195	2514	2740	410	124
1987.00	68499	108641	56798	21655	19230	8787	3559	1616	1494	865	144
1988.00	38319	56082	88084	41871	13746	10888	4580	1707	732	778	266
1989.00	25832	31373	44726	67545	28321	7951	6346	2161	644	396	395
1990.00	33308	21149	25401	32730	47668	16621	4897	3466	1010	286	154
1991.00	18480	27270	17187	19270	21871	29933	8079	2383	1863	487	99
1992.00	24327	15130	22148	13282	12526	11767	14857	3731	1182	776	195
1993.00	20586	19918	12169	15495	7424	6352	6152	8530	1898	654	459
1994.00	41633	16854	15714	8986	10130	4058	3188	2965	3702	812	335
1995.00	43762	34086	13165	10207	5765	5955	2088	1497	1298	1243	261
1996.00	29291	35829	26487	9110	5966	3099	2755	900	712	631	552
1997.00	31883	23982	28340	19335	5778	3404	1787	1154	393	344	328
1998.00	31878	26104	19090	20534	13338	3249	1731	926	538	210	196
1999.00	41890	26100	21206	14467	15218	9528	1661	828	444	204	65
2000.00	31483	34297	20476	16702	10435	10500	6061	762	388	238	103
2001.00	48856	25776	27312	14617	12866	7182	7145	3342	324	163	144
2002.00	40000	40000	20000	20000	10000	10000	5000	5000	2000	100	50

Fishing Mortality

	2	3	4	5	6	7	8	9	10	11	12
1985.00	0.000	0.012	0.121	0.200	0.256	0.359	0.350	0.219	0.714	0.430	0.334
1986.00	0.000	0.048	0.057	0.178	0.241	0.330	0.482	0.320	0.952	0.850	0.599
1987.00	0.000	0.010	0.105	0.254	0.369	0.451	0.535	0.592	0.452	0.981	0.582
1988.00	0.000	0.026	0.065	0.191	0.347	0.340	0.551	0.775	0.413	0.478	0.580
1989.00	0.000	0.011	0.112	0.149	0.333	0.285	0.405	0.560	0.613	0.745	0.468
1990.00	0.000	0.007	0.076	0.203	0.265	0.521	0.520	0.421	0.530	0.856	0.496
1991.00	0.000	0.008	0.058	0.231	0.420	0.501	0.573	0.501	0.675	0.714	0.580
1992.00	0.000	0.018	0.157	0.382	0.479	0.449	0.355	0.476	0.392	0.324	0.378
1993.00	0.000	0.037	0.103	0.225	0.404	0.490	0.530	0.635	0.649	0.467	0.593
1994.00	0.000	0.047	0.232	0.244	0.331	0.464	0.556	0.626	0.892	0.935	0.721
1995.00	0.000	0.052	0.168	0.337	0.421	0.571	0.641	0.543	0.521	0.612	0.586
1996.00	0.000	0.035	0.115	0.255	0.361	0.350	0.670	0.629	0.528	0.453	0.615
1997.00	0.000	0.028	0.122	0.171	0.376	0.476	0.457	0.562	0.428	0.361	0.478
1998.00	0.000	0.008	0.077	0.100	0.136	0.471	0.537	0.535	0.768	0.972	0.600
1999.00	0.000	0.043	0.039	0.127	0.171	0.252	0.580	0.558	0.424	0.487	0.546
2000.00	0.000	0.028	0.137	0.061	0.174	0.185	0.395	0.654	0.667	0.305	0.433
2001.00	0.000	0.054	0.112	0.180	0.052	0.162	0.157	0.313	0.976	0.983	0.241

LAMBDA 1.00000E-2
 RSS 8.28277E1
 NPHI 8.28277E1

Parameters

1.05966E1 1.05966E1 9.90349E0 9.90349E0 9.21034E0 9.21034E0
 8.51719E0 8.51719E0 7.60090E0

... Newton-Raphson-Leavenberg-Marquardt at work ...

LAMBDA 1.00000E-5
 RSS 6.24762E1
 NPHI 6.24762E1

Parameters

1.16771E1 1.11352E1 9.68237E0 9.78471E0 8.94371E0 7.28548E0
 7.25682E0 7.61768E0 6.41013E0 -7.48310E0 6.45014E-1 -3.10919E0
 3.59347E-1 -5.06486E0 6.16247E-1 -6.86422E0 8.13310E-1 -9.25603E0
 1.05856E0 -7.89788E0 9.08532E-1 -7.37830E0 8.26958E-1 -1.38982E1
 1.65826E0

RELATIVE CHANGE IN RESIDUAL SUM OF SQUARES LESS THAN 0.00001

Estimated VPA (biased)

Population Numbers

	2	3	4	5	6	7	8	9	10	11	12
1985.00	88894	34589	38700	20385	9537	5587	4356	4167	1024	232	89
1986.00	132599	72780	27979	28067	13659	6047	3195	2513	2739	410	124

1987.00	68343	108563	56782	21644	19223	8786	3559	1616	1494	865	144
1988.00	38238	55954	88020	41859	13737	10882	4579	1707	731	778	266
1989.00	25811	31307	44622	67493	28311	7944	6342	2160	644	396	395
1990.00	33081	21132	25347	32644	47625	16613	4891	3462	1010	286	154
1991.00	17956	27085	17172	19226	21801	29898	8072	2378	1859	487	99
1992.00	24327	14701	21996	13271	12490	11710	14828	3725	1178	774	195
1993.00	20586	19918	11818	15371	7415	6323	6105	8507	1894	651	457
1994.00	34659	16854	15714	8699	10028	4050	3164	2927	3683	809	333
1995.00	31693	28376	13165	10207	5530	5872	2081	1478	1267	1227	258
1996.00	17360	25948	21813	9110	5966	2907	2687	895	696	606	539
1997.00	8651	14213	20250	15509	5778	3404	1631	1099	389	331	308
1998.00	26664	7083	11093	13913	10208	3249	1731	799	494	206	186
1999.00	37808	21830	5633	7920	9799	6966	1661	828	340	168	62
2000.00	25564	30954	16981	3953	5077	6066	3967	762	388	153	73
2001.00	83715	20930	24576	11756	2431	2801	3519	1635	324	163	74
2002.00	117843	68540	16032	17760	7660	1459	1418	2034	608	100	50

Fishing Mortality

	2	3	4	5	6	7	8	9	10	11	12
1985.00	0.000	0.012	0.121	0.200	0.256	0.359	0.350	0.219	0.714	0.430	0.334
1986.00	0.000	0.048	0.057	0.178	0.241	0.330	0.482	0.320	0.953	0.850	0.599
1987.00	0.000	0.010	0.105	0.255	0.369	0.452	0.535	0.592	0.452	0.981	0.582
1988.00	0.000	0.026	0.066	0.191	0.348	0.340	0.551	0.775	0.413	0.478	0.580
1989.00	0.000	0.011	0.113	0.149	0.333	0.285	0.405	0.561	0.613	0.746	0.469
1990.00	0.000	0.007	0.076	0.204	0.266	0.522	0.521	0.422	0.530	0.857	0.496
1991.00	0.000	0.008	0.058	0.231	0.422	0.501	0.573	0.502	0.677	0.715	0.581
1992.00	0.000	0.018	0.158	0.382	0.481	0.451	0.356	0.477	0.394	0.326	0.379
1993.00	0.000	0.037	0.106	0.227	0.405	0.493	0.535	0.637	0.651	0.470	0.596
1994.00	0.000	0.047	0.232	0.253	0.335	0.466	0.561	0.637	0.899	0.942	0.729
1995.00	0.000	0.063	0.168	0.337	0.443	0.582	0.644	0.553	0.538	0.623	0.595
1996.00	0.000	0.048	0.141	0.255	0.361	0.378	0.694	0.634	0.544	0.477	0.635
1997.00	0.000	0.048	0.175	0.218	0.376	0.476	0.514	0.600	0.434	0.378	0.519
1998.00	0.000	0.029	0.137	0.151	0.182	0.471	0.537	0.654	0.877	0.999	0.647
1999.00	0.000	0.051	0.154	0.245	0.280	0.363	0.580	0.558	0.597	0.630	0.579
2000.00	0.000	0.031	0.168	0.286	0.395	0.345	0.687	0.654	0.667	0.522	0.676
2001.00	0.000	0.067	0.125	0.228	0.310	0.481	0.348	0.789	0.976	0.983	0.530

Population abundance was copied to clipboard

Fishing mortality was copied to clipboard

WEDNESDAY, MAY 1, 2002 10:01:00.120 AM

APL Ver. 2.0.00

ADAPT_W Ver. 2.1

Workspace size = 6000000

APPROXIMATE STATISTICS ASSUMING LINEARITY NEAR SOLUTION

ORTHOGONALITY OFFSET..... 0.003605
MEAN SQUARE RESIDUALS 0.525010

Estimates for parameters

PAR. EST.	STD. ERR.	REL. ERR.	BIAS	REL. BIAS
-----	-----	-----	-----	-----
1.17E1	1.30E0	0.111	2.54E-1	0.022
1.11E1	1.08E0	0.097	1.47E-1	0.013
9.68E0	8.11E-1	0.084	-2.49E-2	-0.003
9.78E0	6.39E-1	0.065	-3.00E-4	0.000
8.94E0	5.34E-1	0.060	-1.92E-2	-0.002
7.29E0	6.29E-1	0.086	-7.99E-2	-0.011
7.26E0	6.54E-1	0.090	-8.43E-2	-0.012
7.62E0	3.89E-1	0.051	-5.87E-3	-0.001
6.41E0	7.55E-1	0.118	-1.21E-1	-0.019
-7.48E0	2.94E0	-0.393	-6.41E-2	0.009
6.45E-1	2.83E-1	0.439	5.65E-3	0.009
-3.11E0	2.74E0	-0.883	-3.59E-2	0.012
3.59E-1	2.69E-1	0.749	3.25E-3	0.009
-5.06E0	2.74E0	-0.542	-5.78E-2	0.011
6.16E-1	2.76E-1	0.447	5.41E-3	0.009
-6.86E0	2.60E0	-0.378	-7.04E-2	0.010

8.13E-1	2.69E-1	0.331	6.91E-3	0.008
-9.26E0	2.50E0	-0.270	-4.65E-2	0.005
1.06E0	2.71E-1	0.256	4.65E-3	0.004
-7.90E0	2.37E0	-0.300	8.41E-3	-0.001
9.09E-1	2.73E-1	0.301	-1.19E-3	-0.001
-7.38E0	2.37E0	-0.321	2.43E-2	-0.003
8.27E-1	2.93E-1	0.355	-3.04E-3	-0.004
-1.39E1	1.97E0	-0.142	-1.14E-2	0.001
1.66E0	2.65E-1	0.160	1.58E-3	0.001

Parameters in linear scale

PAR. EST.	STD. ERR.	REL. ERR.	BIAS	REL. BIAS
-----	-----	-----	-----	-----
1.18E5	1.53E5	1.298	1.29E5	1.096
6.85E4	7.41E4	1.081	5.01E4	0.731
1.60E4	1.30E4	0.811	4.87E3	0.304
1.78E4	1.14E4	0.639	3.62E3	0.204
7.66E3	4.09E3	0.534	9.46E2	0.124
1.46E3	9.17E2	0.629	1.72E2	0.118
1.42E3	9.28E2	0.654	1.84E2	0.130
2.03E3	7.92E2	0.389	1.42E2	0.070
6.08E2	4.59E2	0.755	9.99E1	0.164
5.63E-4	1.65E-3	2.938	2.39E-3	4.252
1.91E0	5.40E-1	0.283	8.73E-2	0.046
4.46E-2	1.22E-1	2.744	1.66E-1	3.729
1.43E0	3.85E-1	0.269	5.65E-2	0.039
6.31E-3	1.73E-2	2.744	2.34E-2	3.706
1.85E0	5.10E-1	0.276	8.04E-2	0.043
1.04E-3	2.71E-3	2.598	3.45E-3	3.304
2.26E0	6.07E-1	0.269	9.74E-2	0.043
9.55E-5	2.39E-4	2.498	2.94E-4	3.072
2.88E0	7.81E-1	0.271	1.19E-1	0.041
3.72E-4	8.80E-4	2.369	1.05E-3	2.814
2.48E0	6.77E-1	0.273	8.95E-2	0.036
6.25E-4	1.48E-3	2.372	1.77E-3	2.837
2.29E0	6.71E-1	0.293	9.14E-2	0.040
9.21E-7	1.82E-6	1.972	1.78E-6	1.933
5.25E0	1.39E0	0.265	1.92E-1	0.037

VPA using analytical bias adjusted parameters (linear scale)

Population Numbers

	2	3	4	5	6	7	8	9	10	11	12
1985.00	88892	34587	38700	20385	9537	5587	4356	4167	1024	232	89
1986.00	132592	72779	27978	28066	13659	6047	3195	2513	2739	410	124
1987.00	68333	108557	56781	21643	19223	8785	3559	1616	1494	865	144
1988.00	38233	55946	88015	41858	13737	10882	4579	1707	731	778	266
1989.00	25809	31302	44615	67489	28310	7943	6341	2160	644	396	395
1990.00	33064	21131	25344	32639	47622	16612	4891	3462	1010	285	154
1991.00	17924	27071	17171	19223	21797	29895	8072	2378	1859	486	99
1992.00	24327	14675	21985	13270	12487	11706	14826	3725	1178	774	195
1993.00	20586	19918	11796	15362	7414	6321	6102	8505	1893	650	457
1994.00	34152	16854	15714	8682	10020	4049	3162	2924	3682	808	333
1995.00	31112	27961	13165	10207	5516	5866	2081	1476	1265	1226	258
1996.00	16744	25473	21473	9110	5966	2895	2682	895	695	604	538
1997.00	8182	13709	19860	15231	5778	3404	1621	1095	388	330	306
1998.00	24554	6699	10680	13594	9980	3249	1731	791	490	206	185
1999.00	31202	20103	5320	7582	9538	6780	1661	828	334	165	62
2000.00	18291	25546	15567	3696	4801	5853	3815	762	388	148	71
2001.00	22551	14975	20148	10599	2221	2575	3344	1511	324	163	70
2002.00	-11356	18463	11158	14136	6713	1287	1234	1892	508	100	50

Fishing Mortality

	2	3	4	5	6	7	8	9	10	11	12
1985.00	0.000	0.012	0.121	0.200	0.256	0.359	0.350	0.219	0.714	0.430	0.334
1986.00	0.000	0.048	0.057	0.178	0.241	0.330	0.482	0.320	0.953	0.850	0.599
1987.00	0.000	0.010	0.105	0.255	0.369	0.452	0.535	0.592	0.452	0.981	0.582
1988.00	0.000	0.026	0.066	0.191	0.348	0.340	0.551	0.775	0.413	0.478	0.580
1989.00	0.000	0.011	0.113	0.149	0.333	0.285	0.405	0.561	0.613	0.746	0.469
1990.00	0.000	0.007	0.076	0.204	0.266	0.522	0.521	0.422	0.530	0.857	0.496
1991.00	0.000	0.008	0.058	0.231	0.422	0.501	0.573	0.502	0.677	0.716	0.581
1992.00	0.000	0.018	0.158	0.382	0.481	0.452	0.356	0.477	0.394	0.326	0.379
1993.00	0.000	0.037	0.107	0.227	0.405	0.493	0.536	0.637	0.651	0.471	0.596

WD nr 28 submitted to the NWWG2002											
1994.00	0.000	0.047	0.232	0.254	0.336	0.466	0.562	0.638	0.900	0.942	0.729
1995.00	0.000	0.064	0.168	0.337	0.444	0.583	0.644	0.554	0.539	0.624	0.596
1996.00	0.000	0.049	0.144	0.255	0.361	0.380	0.696	0.634	0.545	0.479	0.636
1997.00	0.000	0.050	0.179	0.223	0.376	0.476	0.518	0.603	0.435	0.379	0.522
1998.00	0.000	0.031	0.143	0.154	0.187	0.471	0.537	0.662	0.886	1.001	0.651
1999.00	0.000	0.056	0.164	0.257	0.288	0.375	0.580	0.558	0.613	0.645	0.581
2000.00	0.000	0.037	0.184	0.309	0.423	0.360	0.726	0.654	0.667	0.546	0.706
2001.00	0.000	0.094	0.154	0.257	0.345	0.536	0.370	0.890	0.976	0.983	0.572

An assessment of saithe around Iceland

Sigurður Þór Jónsson

MRI 

Mouseboys and girls
(as PC as ever)
Com'on everybody!
Sigurjónas