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Rebuilding Analysis for Yelloweye Rockfish for 2005

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Summary

The rebuilding analysis for yelloweye rockfish was first conducted in 2002 based upon the 2001 assessment (Wallace 2001). Methot and Piner (2002) updated the rebuilding analysis based upon the 2002 assessment (Methot *et al*. 2003). This document updates those results based upon the new assessment update (Wallace *et al*. 2005) reviewed in August of 2005.

As in the last rebuilding analysis, future recruitment is based upon the estimated spawner-recruit relationship with a steepness of 0.437 and Sigma R = 0.40. Age specific fishery selectivity, body weight, and maturity data were updated. The estimated mean generation time is 44 years, same as that reported in the previous rebuilding analysis. In the absence of fishing, the stock is estimated to rebuild by 2036. Based on current SPR (SSC runs 1, 3, and 5), the probability of rebuild by T_{TARGET} and T_{MAX} is lower than 1%. The following table summarizes results from SSC runs 2, 4, and 6, where SPR rates were re-estimated, and 10-year OY projects under each scenario.

	SSC run 2	SSC Run 4	SSC Run 6
P_0	0.5	0.8	0.8
Rebuild by T_{TARGET}	2058	--	--
Rebuild by T_{MAX}	--	2071	2080
SPR	0.764	0.744	0.717
F	0.0114	0.0126	0.0143
2007	16.8	18.5	21.0
2008	17.0	18.8	21.3
2009	17.3	19.0	21.5
2010	17.5	19.2	21.7
2011	17.7	19.4	22.0
2012	17.9	19.6	22.2
2013	18.1	19.9	22.4
2014	18.3	20.1	22.6
2015	18.6	20.3	22.9
2016	18.8	20.6	23.1

Introduction

The first and second full assessments for yelloweye rockfish were conducted in 2001 (Wallace 2001) and 2002 (Methot *et al*. 2003). Both assessments were length-based models and used an earlier version of the Stock Synthesis program (Methot 1990). Wallace (2001) conducted two area assessments by using data from California and Oregon. Methot *et al*. (2003) incorporated Washington catch and age data, and treated the stock as one single assemblage off the California, Oregon, and Washington (W-O-C) coast. Their results indicated that the stock was depleted at 24% of B_0 in 2002. A subsequent rebuilding analysis was conducted (Methot and Piner 2002) and the estimated rebuilding parameters were adopted by the PFMC in 2004 (PFMC 2004). The parameters in the 2004 rebuilding plan are as follows:

Year stock declared overfished:	2002
Year rebuilding plan adopted:	2004
B_0:	3,875 mt
B_{MSY}:	1,550 mt
$B_{CURRENT}$ (% OF B0):	24% in 2002
T_{MIN}:	2027
T_{MAX}:	2071
P_{MAX}:	80%
T_{TARGET}:	2058
Harvest control rule:	F = 0.0153

Based on the harvest control rule (F = 0.0153), the optimum yield (OY) for 2004 was determined to be 22 mt.

This rebuilding analysis is based upon the updated yelloweye rockfish stock assessment conducted in 2005 (Wallace *et al*. 2005). Wallace *et al*. (2005) used Stock Synthesis 2 modeling framework to estimate model parameters and management quantities. As in the 2002 assessment, the stock was treated as a single stock off the W-O-C coast. Catch time series for each State used in the 2002 assessment were entirely revised; however, none of the abundance indices were revised. Age and length compositions collected since 2001 were appended to the model and ageing error was revised. Results from 2005 assessment indicated that depletion level of yelloweye rockfish in 2004 was at 21% of B_0, which is further depleted than the 24% in Method *et al*. (2003). The purpose of this document is to use results from the most recent assessment (Wallace *et al*. 2005) to update estimates of the potential rate of rebuilding of yelloweye rockfish.

Methods

We followed the guidelines from the SSC Terms of Reference for Groundfish Rebuilding Analyses dated 20 April 2005 and used the SSC Default Rebuilding Analysis as implemented by Punt (April 2005, version 2.8a). Life history parameters, age structures, and historical estimates of spawning output and recruitments are taken from Wallace *et al*. (2005). The age-specific selectivity pattern is calculated by averaging selectivity functions for seven fisheries (Wallace *et al*. 2005), weighted by total catches of each fishery over the last five years. For estimating B_0, 1953 – 1990 recruitments are selected. Future recruitments are generated by using the Beverton-Holt spawner-recruit relationship with a steepness of 0.437 and Sigma R = 0.40, which is the same as in the previous rebuilding analysis.

A set of six rebuilding runs was requested in the SSC Terms of Reference for species currently managed under rebuilding plans.

Run #	Prob (recovery)	By	Based on
#1 (default)	Estimated	Current T_{TARGET}	Current SPR
#2 (T_{TARGET} with 50% prob)	0.5	Current T_{TARGET}	Estimated SPR
#3 (#1 based on T_{MAX})	Estimated	Current T_{MAX}	Current SPR
#4 (#2 based on T_{MAX})	P_0	Current T_{MAX}	Estimated SPR
#5 (#3 with re-estimated T_{MAX})	Estimated	T_{MAX} (re-estimated)	Current SPR
#6 (#4 with re-estimated T_{MAX})	P_0	T_{MAX} (re-estimated)	Estimated SPR

To compute current SPR rate for three of the six SSC runs, effort was made to re-construct 2002 rebuilding analysis by using current rebuilding computer application (Punt 2005, version 2.8a). We could not get a solution using the materials and methods documented in the Methot and Piner (2002) without substantially increasing steepness of the spawner-recruitment curve. It is to be noted that age specific weight, selectivity, and maturity data used in this rebuilding analysis were re-estimated in 2005 stock assessment; hence they are different from those used in the 2002 rebuilding analysis. Also, Methot and Piner (2002) used ages 3 – 70 and we used ages 0 – 70.

Results

The results from this analysis indicate that the yelloweye rockfish stock is behind in rebuilding schedule and will take longer time to rebuild then as indicated in the 2002 rebuilding analysis (Methot and Piner 2002). New T_{MIN} of 2036 and T_{MAX} of 2080 are 9 years longer than the T_{MIN} of 2027 and T_{MAX} of 2071 reported in the previous analysis (Table 1). Probabilities of recovery by current T_{TARGET} (2058) and T_{MAX} (2071) based on current SPR are low (Table 2). Probability of recovery by re-estimated T_{MAX} (2080) with current SPR is also low. The current harvest

control rule (F = 0.0153) is too high to rebuild the stock by current T_{TARGET} and current T_{MAX} (Tables 3 and 4). Based on SSC run 6 settings (Table 5), where T_{MAX} and SPR are re-estimated and P_o = 80%, OY is projected to be 21.0 mt in 2007 and the stock is estimated to rebuild in year 2076. The longer recovery period predicted in this analysis may be due to the lower depletion level in 2004 and the re-estimated biological parameters in the 2005 assessment.

Literature Cited

Methot, R.D. 1990. Synthesis model: an adaptive framework for analysis of diverse stock assessment data. Int. N. Pac. Fish. Comm. Bull. 50:259-277.

Methot, R.D. and K.R. Piner 2002. Rebuilding Analysis for Yelloweye Rockfish: Update to Incorporate Results of Coastwide Assessment in 2002. Pacific Fishery Management Council.

Methot, R.D., F.R. Wallace, and K.R. Piner 2003. Status of the Yelloweye rockfish (*Sebastes ruberrimus*) off the U.S. west coast in 2002. Pacific Fishery Management Council.

PFMC. 2004. Appendix H to Amendment 16-3 to the Pacific coast groundfish fishery management plan. Yelloweye rockfish (*Sebastes ruberrimus*) draft rebuilding plan. Adopted April 2004. Pacific Fishery Management Council.

Wallace, F.R., T. Tsou, and T.H. Jagielo. Status of the Yelloweye rockfish (*Sebastes ruberrimus*) off the U.S. West Coast in 2005. Pacific Fishery Management Council.

Table 1. Key parameters re-estimated in this rebuilding analysis.

FMSY proxy	0.032
FMSY SPR / SPR(F=0)	0.5
Virgin SPR	39.20
Generation time	44
Minimum Rebuild Time (from ydecl, 2002)	34
Maximum Rebuild Time (from yinit, 2004)	73
Virgin Spawning Output	7329
Target Spawning Output	2932
Current Spawning Output	1596
Spawning Output (ydecl)	1501
T_{MIN}	2036
T_{MAX}	2080
Prob (<0.4B0) in ydecl	1
Prob (<0.25 B0) in ydecl	1

Table 2. Summary of the six requested rebuilding runs to evaluate progress towards rebuilding. Estimated values are in bold.

Run #	Prob (recovery)	By	Based on	SPR	2007 OY
1	**0.000**	2058	Current SPR	0.591	34.6
2	0.5	2058	estimated SPR	**0.764**	**16.8**
3	**0.001**	2071	Current SPR	0.591	34.6
4	0.8	2071	estimated SPR	**0.744**	**18.5**
5	**0.003**	**2080**	Current SPR	0.591	34.6
6	0.8	**2080**	estimated SPR	**0.717**	**21.0**

Table 3. Summary table for analyses based on current T_{TARGET} (SSC runs 1 and 2).

Rebuild by current T_{TARGET} = 2058	P_{MAX}					F=0	Current SPR
	0.5	0.6	0.7	0.8	0.9		
Fishing rate	0.0114	0.0108	0.0102	0.0092	0.0082	0	User Specified
SPR RATE	0.764	0.773	0.785	0.802	0.821	0.000	0.591
2007 OY	16.8	16	15	13.6	12.1	0	34.6
Prob to rebuild by T_{MAX}	50.1	60.1	69.9	80.1	90.0	100.0	0.1
Median time to rebuild	51	49.1	47.3	44.8	42.5	29.6	-1
Prob overfished after rebuild	0	0	0	0	0	0.0	0.0
Median time to rebuild (yrs)	2058	2056.1	2054.3	2051.8	2049.5	2036.6	
Probability above current spawning outptut in 100 years	100	100	100	100	100	100.0	100.0
Probability above current spawning outptut in 200 years	100	100	100	100	100	100.0	100.0
Probability below 0.01B0 in 100 years	0	0	0	0	0	0.0	0.0
Probability below 0.01B0 in 200 years	0	0	0	0	0	0.0	0.0
Lower 5th percentile, spawning output / target in Tmax	0.901	0.914	0.929	0.951	0.977	1.203	0.685
Median spawning output / target in Tmax	1	1.015	1.031	1.055	1.083	1.330	0.780
Upper 5th percentile, spawning output / target in Tmax	1.115	1.131	1.149	1.176	1.206	1.478	0.9

Table 4. Summary table for analyses based on current T_{MAX} (SSC runs 3 and 4).

Rebuild by current T_{MAX} = 2071	P_{MAX}					F=0	Current SPR
	0.5	0.6	0.7	0.8	0.9		
Fishing rate	0.0149	0.0142	0.0134	0.0126	0.0115	0	User Specified
SPR RATE	0.708	0.718	0.731	0.744	0.761	0.000	0.591
2007 OY	21.9	20.9	19.7	18.5	17	0	34.6
Prob to rebuild by T_{MAX}	50	60.0	69.9	80.0	89.9	100.0	0.1
Median time to rebuild	64	61	57.4	54.5	51.4	29.6	-1
Prob overfished after rebuild	0	0	0	0	0	0.0	0.0
Median time to rebuild (yrs)	2071	2068	2064.4	2061.5	2058.4	2036.6	
Probability above current spawning outptut in 100 years	100	100	100	100	100	100.0	100.0
Probability above current spawning outptut in 200 years	100	100	100	100	100	100.0	100.0
Probability below 0.01B0 in 100 years	0	0	0	0	0	0.0	0.0
Probability below 0.01B0 in 200 years	0	0	0	0	0	0.0	0.0
Lower 5th percentile, spawning output / target in Tmax	0.883	0.901	0.922	0.944	0.972	1.361	0.685
Median spawning output / target in Tmax	1	1.02	1.044	1.068	1.099	1.528	0.780
Upper 5th percentile, spawning output / target in Tmax	1.121	1.142	1.169	1.195	1.229	1.699	0.9

Table 5. Summary table for analysis based on the re-estimated T_{MAX} (SSC runs 5 and 6).

Rebuild by re-estimated T_{MAX} = 2080	P_{MAX}					F=0	Current SPR
	0.5	0.6	0.7	0.8	0.9		
Fishing rate	0.0162	0.0156	0.015	0.0143	0.0134	0	User Specified
SPR RATE	0.687	0.696	0.706	0.717	0.731	0.000	0.591
2007 OY	23.9	23	22	21	19.7	0	34.6
Prob to rebuild by T_{MAX}	49.9	60.0	69.9	80.0	89.9	100.0	0.3
Median time to rebuild	73	68.5	64.6	61.3	57.4	29.6	-1
Prob overfished after rebuild	0	0	0	0	0	0.0	0.0
Median time to rebuild (yrs)	2080	2075.5	2071.6	2068.3	2064.4	2036.6	
Probability above current spawning outptut in 100 years	100	100	100	100	100	100.0	100.0
Probability above current spawning outptut in 200 years	100	100	100	100	100	100.0	100.0
Probability below 0.01B0 in 100 years	0	0	0	0	0	0.0	0.0
Probability below 0.01B0 in 200 years	0	0	0	0	0	0.0	0.0
Lower 5th percentile, spawning output / target in Tmax	0.886	0.904	0.923	0.943	0.97	1.473	0.7
Median spawning output / target in Tmax	1	1.019	1.04	1.063	1.092	1.645	0.8
Upper 5th percentile, spawning output / target in Tmax	1.128	1.149	1.172	1.197	1.23	1.833	0.9

Appendix. Input data for SSC runs 5 and 6

#1 Title
Yelloweye - STAR panel model (2005 base model)
#2 Number of sexes
1
#3 Age range to consider (minimum age; maximum age)
0 70
#4 Number of fleets
1
#5 First year of projection (Yinit, last year of assessment)
2004
#6 Year declared overfished (Ydecl, the first year of zero OY)
2002
#7 Is the maximum age a plus-group (1=Yes;2=No)
1
#8 Generate future recruitments using historical recruitments (1) historical recruits/spawner (2) or a stock-recruitment (3)
3
#9 Constant fishing mortality (1) or constant Catch (2) projections
1
#10 Fishing mortality based on SPR (1) or actual rate (2)
1
#11 Pre-specify the year of recovery (or -1) to ignore
-1
#12 Fecundity-at-age

#0	1	2	3	4	5	6	7	8	9	10	11	12	13
	14	15	16	17	18	19	20	21	22	23	24	25	26
	27	28	29	30	31	32	33	34	35	36	37	38	39
	40	41	42	43	44	45	46	47	48	49	50	51	52
	53	54	55	56	57	58	59	60	61	62	63	64	65
	66	67	68	69	70								

0	0	0	0.00001	0.00001	0.00002	0.00012	0.00059	0.00257
	0.00986	0.03223	0.08614	0.18720	0.33964	0.53421		
	0.75494	0.98649	1.21780	1.44239	1.65719	1.86122		
	2.05459	2.23789	2.41187	2.57722	2.73459	2.88453		
	3.02746	3.16379	3.29381	3.41782	3.53605	3.64873		
	3.75606	3.85825	3.95547	4.04793	4.13579	4.21922		
	4.29842	4.37353	4.44474	4.51221	4.57610	4.63657		
	4.69377	4.74786	4.79898	4.84728	4.89289	4.93595		
	4.97659	5.01493	5.05109	5.08518	5.11732	5.14761		
	5.17615	5.20303	5.22835	5.25219	5.27417	5.29485		
	5.31432	5.33264	5.34988	5.36610	5.38135	5.39570		
	5.40920	5.42189						

#13 Age specific information (Females then males) weight selectivity
weighted average selectivity from 7 fisheries

0.0021	0.0118	0.0331	0.1309	0.1383	0.1880	0.2668	0.3610	0.4679	0.5859	0.7134	0.8491	0.9915
	1.1390	1.2905	1.4446	1.6003	1.7564	1.9122	2.0668	2.2196	2.3698	2.5171	2.6610	2.8012
	2.9374	3.0693	3.1968	3.3199	3.4384	3.5523	3.6615	3.7663	3.8665	3.9622	4.0536	4.1408
	4.2238	4.3028	4.3779	4.4492	4.5169	4.5811	4.6420	4.6996	4.7542	4.8059	4.8547	4.9009
	4.9445	4.9857	5.0246	5.0613	5.0959	5.1285	5.1593	5.1884	5.2157	5.2415	5.2657	5.2886
	5.3096	5.3293	5.3479	5.3654	5.3819	5.3973	5.4119	5.4256	5.4385	5.4507		
0.0000	0.0000	0.0000	0.0033	0.0045	0.0152	0.0431	0.0975	0.1746	0.2583	0.3374	0.4097	0.4772
	0.5419	0.6039	0.6619	0.7139	0.7586	0.7953	0.8242	0.8458	0.8609	0.8705	0.8753	0.8762
	0.8739	0.8691	0.8623	0.8539	0.8445	0.8343	0.8237	0.8128	0.8019	0.7911	0.7805	0.7701

0.7601 0.7505 0.7413 0.7325 0.7241 0.7162 0.7086 0.7015 0.6948 0.6885 0.6825 0.6769
0.6717 0.6667 0.6621 0.6577 0.6536 0.6497 0.6461 0.6427 0.6395 0.6366 0.6338 0.6311
0.6287 0.6265 0.6244 0.6224 0.6206 0.6188 0.6172 0.6156 0.6142 0.6128
#14 M and initial age-structure
for both female and male
0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045
0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045
0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045
0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045
0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045 0.045
0.045 0.045 0.045 0.045 0.045
99.1905 91.8831 83.9813 76.7590 71.5077 70.7876 64.6572
59.9013 50.4972 37.8697 31.0196 29.2413 27.0497
31.9434 42.4556 45.8211 39.1614 35.8022 45.0433
63.8793 67.0023 38.1170 27.2053 24.9897 25.8319
27.3087 13.2838 8.3970 7.9898 11.0186 12.2653 8.2142 6.6661
6.5892 8.9204 7.3214 4.1168 2.8078 2.1887 1.8787 1.7494 1.7485 1.8423 1.9926 2.1214
2.1031 1.9362 1.7787 1.7398 1.8629 2.3107 2.2559 2.2013 2.1467 2.0917 2.0366 1.9816
1.9272 1.8738 1.8214 1.7700 1.7194 1.6695 1.6201 1.5713 1.5231 1.4753 1.4282 1.3817
1.3359 31.3499
#15 Initial age-structure for Tmin
91.8993 83.9960 78.2496 77.4634 70.7692 65.6012 55.3610
41.5805 34.1181 32.2154 29.8439 35.2864 46.9488
50.7188 43.3844 39.6934 49.9720 70.9085 74.4082
42.3446 30.2301 27.7726 28.7110 30.3531 14.7642
9.3322 8.8787 12.2427 13.6259 9.1238 7.4029 7.3161 9.9027 8.1261 4.5685
3.1152 2.4279 2.0837 1.9400 1.9386 2.0424 2.2087 2.3511 2.3305 2.1453 1.9706 1.9273
2.0634 2.5591 2.4982 2.4376 2.3769 2.3159 2.2547 2.1936 2.1332 2.0740 2.0160 1.9590
1.9028 1.8475 1.7928 1.7388 1.6853 1.6324 1.5802 1.5287 1.4780 1.4280 1.3790 31.8758
#16 Year for Tmin Age-structure (Yinit or Ydecl)
2002
#17 Number of simulations
1000
recruitment and biomass
#18 Number of historical assessment years
52
Historical data
#19 year recruitment spawner in B0 in R project in R/S project
1953 194.30 7616.60 1 1 0
1954 196.46 7363.68 1 1 0
1955 154.67 7363.68 1 1 0
1956 141.06 7326.69 1 1 1
1957 140.76 7289.63 1 1 1
1958 149.44 7252.56 1 1 1
1959 158.08 7215.57 1 1 1
1960 154.98 7178.72 1 1 1
1961 141.07 7142.12 1 1 1
1962 125.93 7105.83 1 1 1
1963 114.87 7069.88 1 1 1
1964 109.85 7034.18 1 1 1
1965 112.03 6998.34 1 1 1
1966 123.02 6961.55 1 1 1
1967 147.50 6922.62 1 1 1
1968 200.21 6880.39 1 1 1
1969 326.23 6834.18 1 1 1
1970 360.41 6783.93 1 1 1

1971	239.10	6721.78	1	1	1
1972	215.49	6643.59	1	1	1
1973	234.98	6545.60	1	1	1
1974	308.68	6429.03	1	1	1
1975	242.44	6292.86	1	1	1
1976	152.44	6136.51	1	1	1
1977	137.49	5961.41	1	1	1
1978	184.57	5769.40	1	1	1
1979	318.52	5570.13	1	1	1
1980	250.69	5332.85	1	1	1
1981	200.59	5091.07	1	1	1
1982	180.00	4576.07	1	1	1
1983	208.12	4243.87	1	1	1
1984	303.84	3940.69	1	1	1
1985	243.25	3774.49	1	1	1
1986	146.13	3574.64	1	1	1
1987	100.69	3456.59	1	1	1
1988	97.26	3281.88	1	1	1
1989	102.34	3088.85	1	1	1
1990	86.72	2831.84	0	0	0
1991	60.54	2664.92	0	0	0
1992	48.05	2411.94	0	0	0
1993	49.01	2159.36	0	0	0
1994	49.27	1962.46	0	0	0
1995	57.19	1859.49	0	0	0
1996	72.68	1738.52	0	0	0
1997	82.26	1642.82	0	0	0
1998	84.79	1520.40	0	0	0
1999	88.71	1505.68	0	0	0
2000	85.64	1449.61	0	0	0
2001	87.87	1483.79	0	0	0
2002	91.90	1501.40	0	0	0
2003	96.12	1550.05	0	0	0
2004	99.19	1595.52	0	0	0

#20 Number of years with pre-specified catches
3
#21 catches for years with pre-specified catches
2004 22
2005 26
2006 27
#22 Number of future recruitments to override
0
#23 Process for overiding (-1 for average otherwise index in data list)
#24 Which probability to product detailed results for (1=0.5; 2=0.6; 3=0.7; 4=0.8; 5=0.9; 6=Ttarget of Tmin+0.75(Tmax-Tmin); 7="F=0"; 8="40-10" rule; 9=ABC rule)
4
#25 Steepness sigma-R Auto-correlation (0.437 and 0.4 form yeye base model, same as in 2002 rebuilding)
0.437 0.40 0.00
#26 Target SPR rate (FMSY Proxy)
0.5
#27 Target SPR information: Use (1=Yes) and power
0 20
#28 Discount rate (for cumulative catch)
0.1
#29 Truncate the series when 0.4B0 is reached (1=Yes)
0

#30 Set F to FMSY once 0.4B0 is reached (1=Yes)
0
#31 Percentage of FMSY which defines Ftarget (see equation 7c and instrucion for #33)
0.9
#32 Maximum possible F for projection (-1 to set to FMSY, it is recommended the -1 be used, see instruciont #32)
-1
#33 Conduct MacCall transition policy (1=Yes)
0
#34 Defintion of recovery (1=now only;2=now or before, 2 is less conservative and should be for "rebuilt" case)
1
#35 Results for rec probs by Tmax (1) or 0.5 prob for various Ttargets (2)
1
#36 Definition of the "40-10" rule (should not be changed unless the "40-10" rule is changed)
10 40
#37 Produce the risk-reward plots (1=Yes,, don't do this untill the final calculation)
0
#38 Calculate coefficients of variation (1=Yes)
0
#39 Number of replicates to use (at least 10, this number is ignored unless #38 is 1)
20
#40 Random number seed (a number between -1 and -99999)
-34530
#41 Conduct projections for multiple starting values (0=No based on the "best estimates" ;else yes)
0
#42 File with multiple parameter vectors
MCMC.PRJ
#43 Number of parameter vectors (only matters if #41 is not zero)
100
#44 User-specific projection (1=Yes); Output replaced (1->9); type (0, 1, 2, 3); value (only used when type is not 0)
1 6 0 0.5
#45 Catches and Fs (Year; 1 or 2 (F/SPR or C); value); Final row is -1
2007 3 0.591
-1 -1 -1
#46 Split of Fs (first year MUST be Yinit)
2004 1
2005 1
2006 1
-1 1
Time varying weight-at-age (1=Yes;0=No)
0
File with time series of weight-at-age data
HakWght.Csv