SUMMER FLOUNDER TABLES

Table 3-1. Input data for summer flounder yield per recruit analyses: mean weights at age. Weights in italics estimated from Gomphertz function and/or Rivard equations. For 2005 SAW 41 catch at age 8, the Nov 1 SSB weight (NEFSC Autumn Survey) was substituted due to low sample numbers from the fisheries. For 2005 SAW 41 Jan 1 Bio at age 0, the Nov 1 SSB weight at age 0 was substituted since no age 0 fish are taken in the Winter survey.

	1990 SAW 11		1999 Assessment			2005 SAW 41		
Age	Catch	Nov 1 SSB	Jan 1 Bio	Catch	Nov 1 SSB	Jan 1 Bio	Catch	Nov 1 SSB
0	0.237	0.237	0.170	0.234	0.234	0.184	0.221	0.184
1	0.432	0.432	0.353	0.471	0.471	0.241	0.499	0.469
2	0.642	0.642	0.556	0.643	0.643	0.577	0.684	0.817
3	1.164	1.164	0.722	0.862	0.862	0.980	1.049	1.402
4	1.811	1.811	1.111	1.277	1.277	1.539	1.489	1.953
5	2.449	2.449	1.860	2.330	2.330	2.136	2.217	2.946
6	3.074	3.074	2.337	2.565	2.565	2.680	2.745	3.073
7	3.434	3.434	3.130	3.537	3.537	3.245	3.515	3.630
8	4.380	4.380	4.120	4.592	4.592	3.576	4.515	4.515
9	*4.841*	*4.841*	*4.671*	*4.841*	*4.841*	3.780	*4.926*	*4.926*
10	*5.336*	*5.336*	*5.162*	*5.336*	*5.336*	4.672	*5.313*	*5.313*
11	*5.767*	*5.767*	*5.590*	*5.767*	*5.767*	5.020	*5.630*	*5.630*
12	*6.135*	*6.135*	*5.957*	*6.135*	*6.135*	5.360	*5.885*	*5.885*
13	*6.445*	*6.445*	*6.266*	*6.445*	*6.445*	*5.553*	*6.089*	*6.089*
14	*6.704*	*6.704*	*6.525*	*6.704*	*6.704*	*5.674*	*6.249*	*6.249*
15	*6.917*	*6.917*	*6.738*	*6.917*	*6.917*	*5.765*	*6.375*	*6.375*

Table 3-2. Input data for summer flounder yield per recruit analyses: percent mature and partial recruitment (percent selection) at age.

	1990 SAW 11		1999 Assessment		2005 SAW 41	
Age	Percent Mature	Partial Recruit.	Percent Mature	Partial Recruit.	Percent Mature	Partial Recruit.
0	38	5	38	1	38	1
1	72	50	72	18	91	19
2	90	100	90	62	98	77
3	97	100	100	100	100	100
4	99	100	100	100	100	100
5	100	100	100	100	100	100
6	100	100	100	100	100	100
7	100	100	100	100	100	100
8	100	100	100	100	100	100
9	100	100	100	100	100	100
10	100	100	100	100	100	100
11	100	100	100	100	100	100
12	100	100	100	100	100	100
13	100	100	100	100	100	100
14	100	100	100	100	100	100
15	100	100	100	100	100	100

Table 3-3. Summary results for summer flounder yield per recruit analyses. Yield per Recruit (Y/R), Spawning Biomass per Recruit (SSB/R) and Total Stock Biomass per Recruit (TSB/R) in kilograms.

	1990 SAW 11	1999 Assessment	2005 SAW 41
Fmax	0.232	0.263	0.276
F40%	0.150	0.167	0.181
Y/R @ Fmax	0.574	0.552	0.576
SSB/R @ Fmax	2.107	2.139	2.466
TSB/R @ Fmax	not calculated	2.813	2.798
Y/R@ F40%	0.540	0.524	0.553
SSB/R @ F40%	3.275	3.111	3.477
TSB/R @ F40%	not calculated	3.853	3.748

Table 3-4. Summary results for summer flounder empirical non-parametric biological reference point calculations. Maximum Sustainable Yield (MSY), Spawning Stock Biomass at MSY (SSB_{MSY}), and Total Stock Biomass at MSY (TSB_{MSY}) in metric tons.

	1990 SAW 11	1999 Assessment	2005 SAW 41
Recruitment Year Range	1982-1987	1982-1998	1982-2004
Median Recruitment (000s)	58,440	37,844	33,111
Y @ Fmax (MSY)	33,545	20,897	19,072
SSB @ Fmax (SSB_{MSY})	123,133	80,948	81,652
TSB @ Fmax (TSB_{MSY})	not calculated	106,444	92,645
Y @ F40% (MSY)	31,558	19,830	18,310
SSB @ F40% (SSB_{MSY})	191,391	117,733	115,127
TSB @ F40% (TSB_{MSY})	not calculated	145,813	124,100

Table 3-5. Input spawning stock biomass (metric tons; ages 0-7+) and recruitment (millions of age 0 fish) data for summer flounder parametric stock-recruitment models.

Year Class	Spawning Stock Biomass	Recruitment
1983	17,501	80,323
1984	18,837	48,380
1985	16,087	48,579
1986	14,972	53,444
1987	13,934	43,921
1988	14,424	13,033
1989	8,130	27,270
1990	5,217	30,352
1991	7,453	28,686
1992	6,007	32,315
1993	7,303	33,158
1994	9,249	35,251
1995	11,960	38,679
1996	15,611	28,244
1997	15,886	29,089
1998	15,669	31,046
1999	17,794	29,417
2000	16,497	35,871
2001	19,381	33,831
2002	25,544	38,133
2003	29,415	27,478
2004	36,696	33,111

Table 3-6. Stock-recruitment model comparisons for summer flounder. MSY and S_{MSY} in 000s metric tons.

Model	**BH**	**ABH**	**RBH**	**SBH**	**ARBH**	**ASBH**	**RSBH**	**ARSB**	**RK**	**ARK**	**SRK**	**ASRK**
Number of data points	22	22	22	22	22	22	22	22	22	22	22	22
Number of parameters	3	4	3	3	4	4	3	4	3	4	3	4
Negative log likelihood	84.520	83.379	87.742	84.751	86.636	83.849	87.997	87.072	85.015	84.483	122.85	90.690
Bias corrected AIC	***176.37***	177.11	176.37	176.51	177.13	177.42	176.44	177.39	177.36	179.31	246.66	190.49
Parameter estimates												
F_{MSY}	***0.254***	0.262	0.254	0.252	0.260	0.256	0.252	0.256	1.360	1.414	0.272	0.252
S_{MSY}	***106.4***	95.5	106.1	112.7	98.1	106.2	110.4	105.6	20.7	20.3	101,45	10.7
MSY	***23.2***	21.4	23.1	24.4	21.9	23.3	23.9	23.2	17.8	17.9	23,488	2.3
Alpha	***40.6***	36.9	40.5	43.0	37.9	40.8	42.0	40.5	1.876	1.906	0.098	4.54e-
Beta	***1.506***	5.09e-	1.467	2.375	0.238	1.445	2.094	1.376	-0.059	-0.060	-9.99e-	-0.092
steepness	***0.984***	1.000	0.984	0.976	0.997	0.984	0.978	0.985	n/a	n/a	n/a	n/a
R_{max}	***39.4***	36.9	39.3	41.1	37.7	39.6	40.4	39.4	17.3	16.8	55.1	0.5
Prior mean steepness;	n/a	n/a	n/a	0.8	n/a	0.8	0.8	0.8	n/a	n/a	0.8	0.8
Prior se steepness; slope	n/a	n/a	n/a	0.1	n/a	0.1	0.1	0.1	n/a	n/a	0.1	0.1
Prior mean recruitment	n/a	n/a	40	n/a	40	n/a	40	40	n/a	n/a	n/a	n/a
Prior se recruitment	n/a	n/a	10	n/a	10	n/a	10	10	n/a	n/a	n/a	n/a
Sigma	n/a	0.340	0.328	0.329	0.339	0.332	0.328	0.332	0.336	0.338	0.890	3.153
Phi	n/a	0.408	n/a	n/a	0.397	0.336	n/a	0.339	n/a	0.247	n/a	0.993
Sigmaw	n/a	0.311	n/a	n/a	0.311	0.313	n/a	0.313	n/a	0.327	n/a	0.384
last log-residual R	n/a	-0.109	n/a	n/a	-4.563	-0.169	n/a	-0.165	n/a	5.497	n/a	3.239
expected lognormal error	1.055	1.060	1.055	1.056	1.059	1.057	1.055	1.057	1.058	1.059	1.486	144.58

Table 3-7. Posterior probability and odds ratio tests for the most likely stock-recruitment models for summer flounder.

S-R Model	**BH**	RBH	SBH	RSBH
Number of data points	**22**	22	22	22
Number of parameters	**3**	3	3	3
Bias-corrected AIC	**175.373**	176.374	176.512	176.446
Prior Probability	**0.250**	0.250	0.250	0.250
Model AIC Ratio	**1.072**	1.071	1.000	1.034
Normalized (Unity) Likelihood	**0.257**	0.257	0.239	0.247
Posterior Probability	**0.257**	0.257	0.239	0.247
Odds Ratio for Most Likely Model	**1.000**	1.001	1.072	1.037
	Most Likely Model			