

J. Southern New England/Mid-Atlantic Winter Flounder by P. Nitschke

1.0 Background

The Southern New England/Mid-Atlantic stock complex of winter flounder was last assessed by SAW 28 in December 1998, with catches through 1997 (NEFSC 1999). The assessment is for the entire stock complex, which includes several inshore spawning aggregations that individually may not demonstrate the same trend in abundance as the complex. Fully recruited (ages 4-6) fishing mortality in 1997 was estimated at 0.31, corresponding to a biomass weighted $F = 0.24$ (given current age structure). Mean stock biomass in 1997 was estimated to be 17,900 mt. Forecasts made in 1999 (Northern Demersal Working Group 2000) indicate that fully recruited F (age 4-6) in 1998 was 0.33, corresponding to a biomass weighted F (ages 1 and older) of 0.19. In the SAW 28 assessment, B_{MSY} was estimated to be 27,810 mt, MSY was estimated to be 10,200 mt, F_{MSY} was estimated to be biomass weighted $F = 0.37$, and the FMP Amendment 9 ten year rebuilding target biomass weighted fishing mortality was estimated to be $F_{target10} = 0.24$.

2.0 2000 Assessment Update

The Fishery

Commercial and recreational catch was updated through 1999 (Table J1). Commercial discards were assumed to be 7% of the landings, as in SAW 28 projections, and were calculated to be 242 mt for 1999. Recreational landings were taken from the MRFSS, and estimated to be 322 mt in 1999. Recreational discards were taken from the MRFSS, and estimated to be 12 mt in 1999. Total landings were estimated to be 3,779 mt, total discards were estimated to be 254 mt, and total catch was estimated to be 4,033 mt in 1999. Total catch has remained relatively stable and low since 1993 (4,041 mt) in comparison to a high of 15,657 mt in 1981 (Figure J1).

Research Survey Indices

NEFSC spring and autumn survey indices were updated through spring 2000 (Table J2; Figure J1). NEFSC survey indices show an increase in stock biomass since 1993. The NEFSC spring 1999 (1.245 kg/tow) and 2000 (1.123 kg/tow) survey biomass index are among the highest since 1985 (1.983 kg/tow). The NEFSC autumn 1999 survey biomass index (1.549 kg/tow) has decreased since 1997 (2.583 kg/tow) but remain among the highest since 1983 (2.691 kg/tow). The MDMF 1999 spring survey biomass index (4.44 kg/tow) has decreased from 1998 (7.99 kg/tow; Figure J2).

Assessment Results

Projections based on 1998 and 1999 total catch indicate that fully recruited F (age 4-6) declined slightly from 0.33 to 0.29, respectively (Table J3). The assumed 1999 $F=0.33$ used in the 1999 projection (Northern Demersal Working Group 2000) is slightly higher but does fall within the

updated 1999 $F=0.29$ 80% confident interval (0.23 - 0.36). The updated 1999 stock biomass (25,300 mt) is therefore slightly higher than the estimated biomass from the 1999 projection (25,000 mt). Fishing mortality in 1999 likely remained at status quo given that total landings have remained stable and that survey indices have not changed greatly from 1998.

3.0 Harvest Control Rule

The target fishing mortality to be used when stock biomass is greater than B_{MSY} (27,800 mt) was estimated as the 10th percentile of F_{MSY} (Figure J3). $F_{THRESHOLD} = F_{MSY} = 0.37$ on biomass when biomass = B_{MSY} . When total stock biomass is between $\frac{1}{2}B_{MSY}$ (13,900 mt) and B_{MSY} , a 10-year rebuilding strategy applies. When total stock biomass is between $B_{THRESHOLD} = \frac{1}{4}B_{MSY}$ (7,000 mt) and $\frac{1}{2}B_{MSY}$, a 5-year rebuilding strategy applies. When biomass is below $\frac{1}{4}B_{MSY}$, $F_{THRESHOLD} = 0$.

4.0 References

- NEFSC. 1999. 28th Northeast Regional Stock Assessment Workshop (28th SAW). Stock Assessment Review Committee (SARC) Consensus Summary of Assessment. NMFS/NEFSC, Woods Hole Laboratory Ref. Doc. 99-08.
- NDWG (Northern Demersal Working Group, Northeast Regional Stock Assessment Workshop). 2000. Assessment of 11 Northeast groundfish stocks through 1999: a report to the New England Fishery Management Council's Multi-Species Monitoring Committee. *Northeast Fish. Sci. Cent. Ref. Doc.* 00-05, 153 p.

Table J1. Total winter flounder recreational and commercial catch for the Southern New England/Mid-Atlantic stock complex in weight (mt) and numbers (000s).

Year	Commercial Landings		Commercial Discards		Recreational Landings		Recreational Discards		Total Catch		% Discards/Total	
	mt	000s	mt	000s	mt	000s	mt	000s	mt	000s	mt	000s
1981	11,176	20,705	1,343	5,123	3,050	8,089	88	437	15,657	34,354	9.1	16.2
1982	9,438	19,016	1,149	4,271	2,457	8,392	66	341	13,110	32,020	9.3	14.4
1983	8,659	16,312	1,311	5,251	2,524	8,365	125	399	12,619	30,327	11.4	18.6
1984	8,882	17,116	986	3,936	5,772	12,756	148	745	15,788	34,553	7.2	13.5
1985	7,052	14,211	1,534	4,531	5,198	13,297	230	714	14,014	32,753	12.6	16.0
1986	4,929	9,460	1,273	4,902	2,940	6,994	66	356	9,208	21,712	14.5	24.2
1987	5,172	10,524	950	3,545	3,141	6,899	61	347	9,324	21,315	10.8	18.3
1988	4,312	8,377	904	3,728	3,423	7,359	69	416	8,708	19,880	11.2	20.8
1989	3,670	7,888	1,404	5,761	1,802	3,684	49	335	6,925	17,668	21.0	34.5
1990	4,232	7,202	673	2,567	1,063	2,485	31	201	5,999	12,455	11.7	22.2
1991	4,823	9,063	784	2,701	1,214	2,794	51	230	6,872	14,788	12.2	19.8
1992	3,816	6,759	511	1,811	393	802	15	83	4,735	9,455	11.1	20.0
1993	3,010	5,336	457	1,580	543	1,180	31	155	4,041	8,251	12.1	21.0
1994	2,159	1,948	304	344	598	1,210	34	93	3,095	3,595	10.9	12.2
1995	2,634	2,321	121	107	661	1,390	23	69	3,439	3,887	4.2	4.5
1996	2,781	2,372	173	149	689	1,555	64	168	3,707	4,244	6.4	7.5
1997	3,426	5,834	267	1,200	618	1,204	26	85	4,337	8,323	6.8	15.4
1998	3,213		231		564		16		4,024		6.1	
1999	3,457		242		322		12		4,033		6.3	

Table J2. Winter flounder NEFSC and MDMF survey index stratified mean number and mean weight (kg) per tow for the Southern New England- Mid-Atlantic stock complex, strata set (offshore 1-12, 25, 69-76 ; inshore 1-29, 45-56; MDMF 11-21).

YEAR	NEFSC Spring		NEFSC Fall		MDMF Spring	
	Number	Weight	Number	Weight	Number	Weight
1963			8.554	3.283		
1964			13.673	4.894		
1965			15.537	4.435		
1966			9.843	3.275		
1967			9.109	2.745		
1968	2.444	0.734	8.106	2.191		
1969	5.640	3.414	6.842	1.939		
1970	2.729	1.326	5.110	2.376		
1971	2.035	0.756	3.862	1.232		
1972	1.866	0.656	7.687	3.054		
1973	7.459	2.013	2.691	0.776		
1974	3.362	1.043	2.032	0.821		
1975	1.136	0.354	2.358	0.742		
1976	3.085	0.805	2.375	1.251		
1977	4.186	1.190	4.722	1.735		
1978	6.696	1.758	3.743	1.430	51.50	18.12
1979	2.965	1.069	10.058	2.606	53.61	18.17
1980	15.250	3.551	9.975	3.216	38.92	15.18
1981	18.234	4.762	9.899	3.109	46.05	15.77
1982	6.986	1.918	4.927	1.683	40.23	14.82
1983	6.262	2.469	8.757	2.691	56.39	19.45
1984	5.524	2.072	2.681	0.887	36.64	14.68
1985	5.360	1.983	2.727	0.991	38.36	11.60
1986	2.266	0.766	1.538	0.487	36.51	10.42
1987	1.763	0.568	1.167	0.419	37.84	9.57
1988	2.126	0.730	1.246	0.530	27.57	6.46
1989	2.485	0.582	1.435	0.341	24.42	7.96
1990	1.992	0.472	1.979	0.546	25.75	5.38
1991	2.473	0.692	1.950	0.708	10.57	2.91
1992	1.579	0.435	2.963	0.829	28.69	7.99
1993	0.961	0.219	1.382	0.392	46.92	8.16
1994	1.510	0.329	4.134	1.482	48.43	12.59
1995	2.097	0.592	2.253	0.626	33.35	7.26
1996	1.517	0.428	3.186	1.063	30.18	9.78
1997	1.436	0.399	7.893	2.583	39.31	10.02
1998	2.774	0.845	6.597	2.232	34.63	7.99
1999	4.171	1.245	3.596	1.549	25.11	4.44
2000	3.172	1.123				

NOTE: NEFSC 1968-1972 spring index does not include inshore strata ; NEFSC 1963-1971 fall index does not include inshore strata. All NEFSC indices calculated with trawl door conversion factors where appropriate.

Table J3. Projection of 1998 VPA (NESFC 1999) with observed 1998 and 1999 catch.

INPUT ASSUMPTIONS

Age	1	2	3	4	5	6	7+
Stock Wt.	0.134	0.388	0.508	0.612	0.754	0.941	1.135
Landed Wt.	0.204	0.427	0.520	0.615	0.755	0.941	1.135
Discard Wt.	0.134	0.277	0.350	0.445	0.617	0.000	0.000
Maturity	0.000	0.000	0.530	0.950	1.000	1.000	1.000
PR	0.020	0.250	0.610	1.000	1.000	1.000	1.000
Discard	1.000	0.350	0.150	0.010	0.010	0.000	0.000

QUOTA BASED CATCHES

YEAR	F	QUOTA (THOUSAND MT)
1998		3.777
1999		3.779

SPAWNING STOCK BIOMASS (THOUSAND MT)

YEAR	AVG SSB (000 MT)	STD
1998	11.849	1.671
1999	13.857	2.312

PERCENTILES OF SPAWNING STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
1998	8.178	9.261	9.958	10.587	11.799	12.797	13.831	14.851	16.100
1999	8.633	10.315	10.999	12.200	13.844	15.355	16.631	17.919	19.829

ANNUAL PROBABILITY THAT SSB EXCEEDS THRESHOLD: 10.000 THOUSAND MT

YEAR	Pr(SSB > Threshold Value)
1998	0.885
1999	0.955

MEAN BIOMASS (THOUSAND MT) FOR AGES:1 TO 7

YEAR	AVG MEAN B (000 MT)	STD
1998	22.553	3.092
1999	25.803	4.580

PERCENTILES OF MEAN STOCK BIOMASS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
1998	16.541	17.693	18.680	20.180	22.318	24.432	26.393	28.524	29.854
1999	16.918	19.028	20.226	22.442	25.346	28.802	31.989	33.904	37.935

ANNUAL PROBABILITY THAT MEAN BIOMASS EXCEEDS THRESHOLD: 27.810 THOUSAND MT

YEAR	Pr(MEAN B > Threshold Value)
1998	0.060
1999	0.314

F WEIGHTED BY MEAN BIOMASS FOR AGES:1 TO 7

YEAR	AVG F_WT_B	STD
1998	0.187	0.025
1999	0.165	0.029

PERCENTILES OF F WEIGHTED BY MEAN BIOMASS FOR AGES:1 TO 7

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
1998	0.137	0.146	0.157	0.169	0.184	0.204	0.220	0.234	0.245
1999	0.109	0.122	0.129	0.143	0.162	0.183	0.202	0.216	0.242

ANNUAL PROBABILITY THAT F WEIGHTED BY MEAN BIOMASS EXCEEDS THRESHOLD: 0.240

YEAR	Pr(F_WT_B > Threshold Value)
1998	0.030
1999	0.011

RECRUITMENT UNITS ARE:1000. FISH

BIRTH	AVG	STD
YEAR	RECRUITMENT	
1998	27447.426	15121.907
1999	27612.614	15283.267

PERCENTILES OF RECRUITMENT UNITS ARE:1000. FISH

BIRTH	1%	5%	10%	25%	50%	75%	90%	95%	99%
YEAR									
1998	8834.000	8834.000	12020.000	16837.000	23487.000	34619.000	56505.000	62859.000	62859.000
1999	8834.000	8834.000	12020.000	16837.000	23288.000	34619.000	56505.000	62859.000	62859.000

TABLE J3. Continued.

LANDINGS FOR F-BASED PROJECTIONS

YEAR	AVG LANDINGS (000 MT)	STD
1998	3.777	0.000
1999	3.779	0.000

PERCENTILES OF LANDINGS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
1998	3.777	3.777	3.777	3.777	3.777	3.777	3.777	3.777	3.777
1999	3.779	3.779	3.779	3.779	3.779	3.779	3.779	3.779	3.779

DISCARDS FOR F-BASED PROJECTIONS

YEAR	AVG DISCARDS (000 MT)	STD
1998	0.243	0.034
1999	0.226	0.041

PERCENTILES OF DISCARDS (000 MT)

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
1998	0.162	0.187	0.201	0.220	0.246	0.267	0.286	0.295	0.314
1999	0.144	0.165	0.176	0.196	0.223	0.252	0.281	0.298	0.343

REALIZED F SERIES FOR QUOTA-BASED PROJECTIONS

YEAR	AVG F	STD
1998	0.334	0.048
1999	0.294	0.051

PERCENTILES OF REALIZED F SERIES

YEAR	1%	5%	10%	25%	50%	75%	90%	95%	99%
1998	0.234	0.257	0.275	0.303	0.328	0.365	0.396	0.423	0.440
1999	0.194	0.220	0.234	0.260	0.289	0.326	0.364	0.391	0.440

SNE/MA Winter Flounder

Total Catch and NEFSC Spring/Fall Survey Index

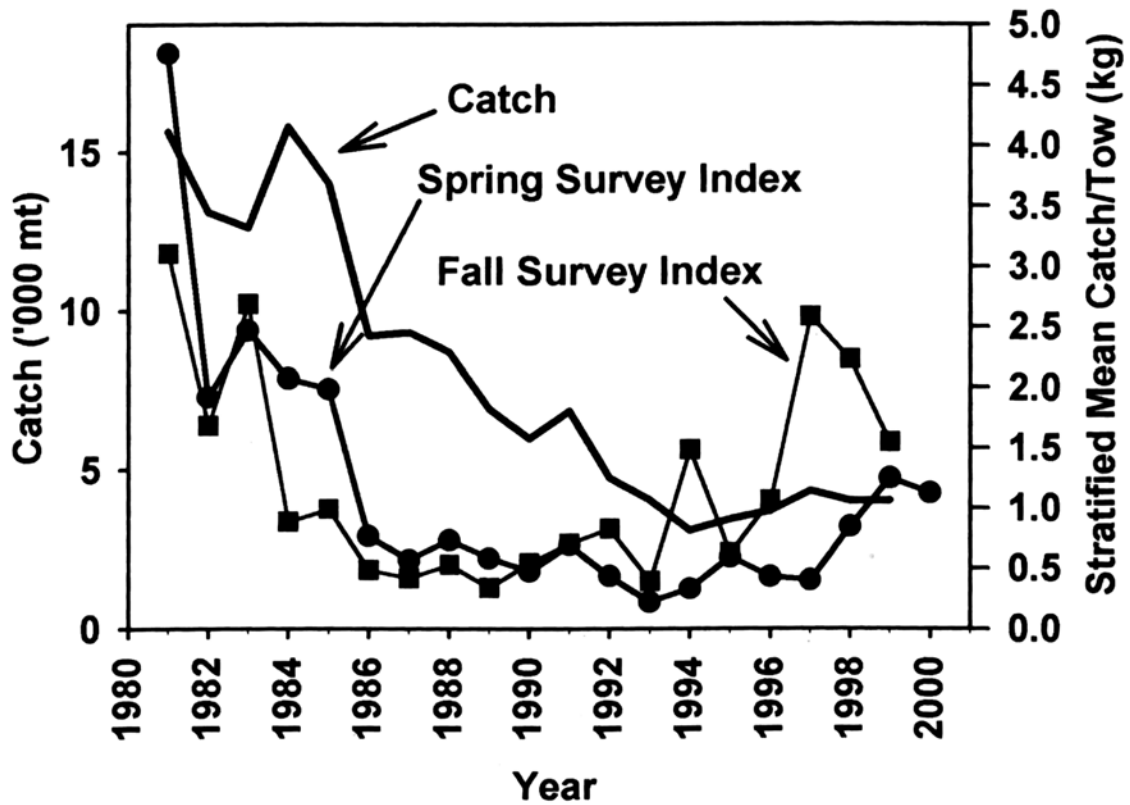


Figure J1. Total catch (landings and discards, thousands of metric tons) and the standardized spring and fall survey index for SNE/MA winter flounder.

SNE/MA Winter Flounder MDMF Spring Survey Index

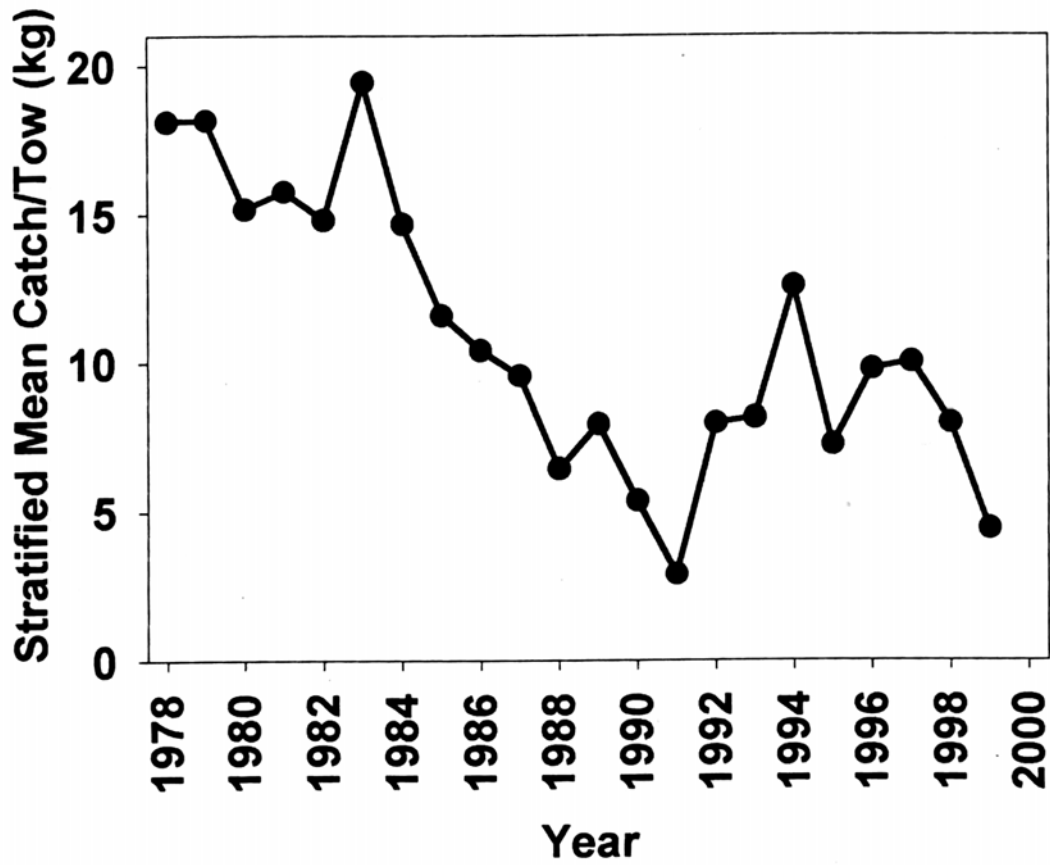


Figure J2. The MDMF spring biomass survey index for SNE/MA winter flounder.

NEFMC Amendment 9 Control Rule for SNE/MA Winter Flounder

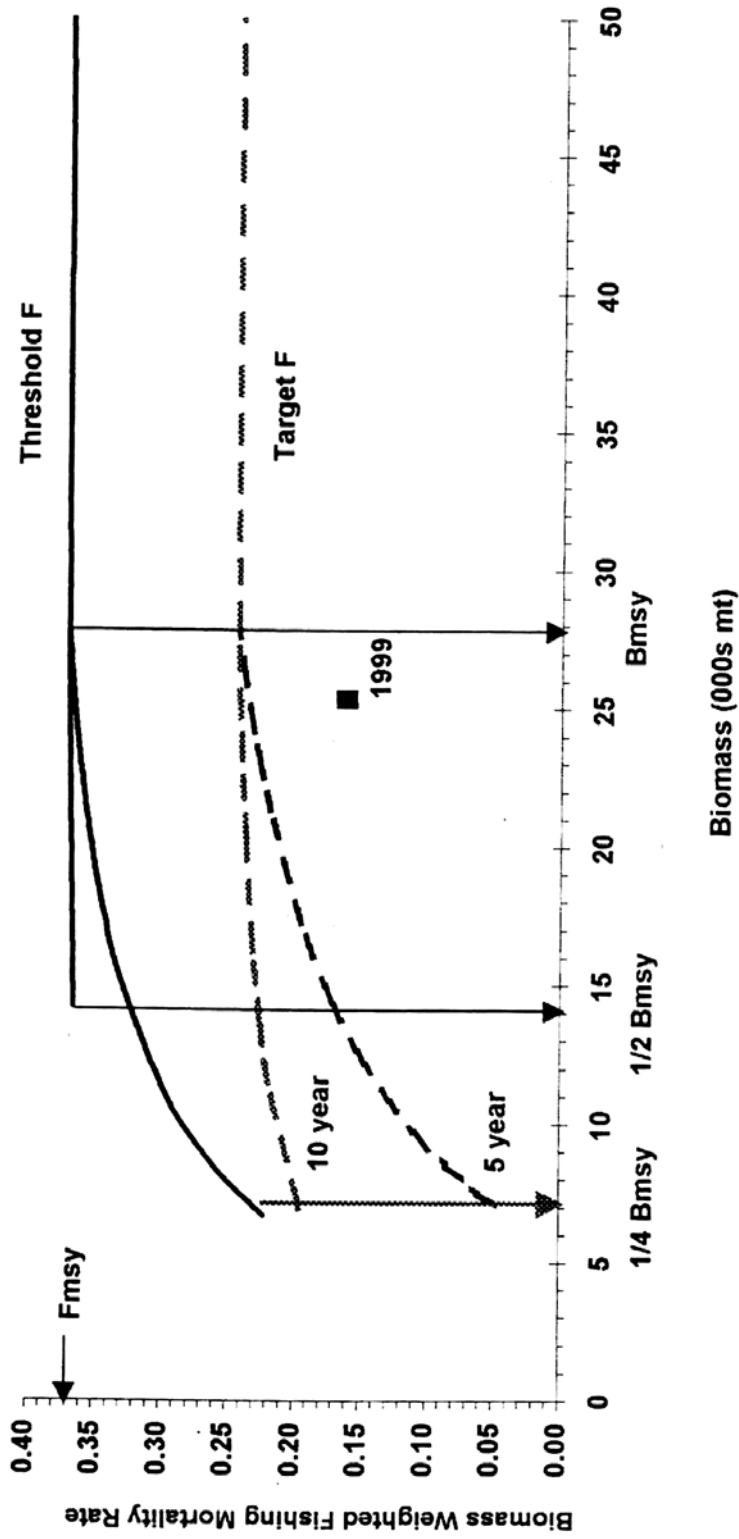


Figure J3. NEFMC FMP Amendment 9 control rule for SNE/MA winter flounder for rebuilding to BMSY, with current 1998-1999 projection estimates of biomass weighted F and mean stock biomass using the total catch in 1998 and 1999.